

TRASNET FREIGHT RAIL

an Operating Division of **TRANSNET SOC LTD**

[hereinafter referred to as **Transnet**]

[Registration No. 1990/000900/30]

REQUEST FOR INFORMATION [RFI]

Information is required to enable Transnet to evaluate strategy, capacity, and proposal for advanced technology in Railhead transverse profile corrective and preventative maintenance through Railhead surface material removal.

TRANSNET MAY, AT ITS SOLE DISCRETION DECIDE TO EMBARK ON A SEPARATE "REQUEST FOR PROPOSAL" [RFP] PROCESS WHICH WILL BE OPEN TO THE MARKET

to appoint national Service provider to undertake the provision of strategy, capacity, and proposal for advanced technology in Railhead transverse profile corrective and preventative maintenance through Railhead surface material removal.

RFI NUMBER:	HOAC HO 48869
ISSUE DATE:	27 February 2025
CLOSING DATE:	02 April 2025
CLOSING TIME:	10:00 AM

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RFI FOR STRATEGY, CAPACITY, AND PROPOSAL FOR ADVANCED TECHNOLOGY IN RAILHEAD TRANSVERSE PROFILE CORRECTIVE AND PREVENTATIVE MAINTENANCE THROUGH RAILHEAD SURFACE MATERIAL REMOVAL.

SECTION 1: SBD1 FORM

PART A

INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF TRANSNET FREIGHT RAIL, A DIVISION TRANSNET SOC LTD								
BID NUMBER:	HOAC 48869	HO	ISSUE DATE:	27 February 2025	CLOSING DATE:	02 April 2025	CLOSING TIME:	10:00AM
DESCRIPTION	STRATEGY, CAPACITY, AND PROPOSAL FOR ADVANCED TECHNOLOGY IN RAILHEAD TRANSVERSE PROFILE CORRECTIVE AND PREVENTATIVE MAINTENANCE THROUGH RAILHEAD SURFACE MATERIAL REMOVAL.							
BID RESPONSE DOCUMENTS SUBMISSION								
RESPONDENTS ARE TO UPLOAD THEIR BID RESPONSE PROPOSALS ONTO THE TRANSNET SYSTEM AGAINST EACH BID/RFI SELECTED <i>(please refer to section 2, paragraph 4 for a detailed process on how to upload submissions):</i> https://transnetetenders.azurewebsites.net								
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO				TECHNICAL ENQUIRIES MAY BE DIRECTED TO:				
CONTACT PERSON	Delisiwe Mngomezulu			CONTACT PERSON	Delisiwe Mngomezulu			
TELEPHONE NUMBER	N/A			TELEPHONE NUMBER	N/A			
FACSIMILE NUMBER	N/A			FACSIMILE NUMBER	N/A			
E-MAIL ADDRESS	Delisiwe Mngomezulu@transnet.net			E-MAIL ADDRESS	Delisiwe Mngomezulu@transnet.net			
SUPPLIER INFORMATION								
NAME OF BIDDER								
POSTAL ADDRESS								
STREET ADDRESS								
TELEPHONE NUMBER	CODE			NUMBER				
CELLPHONE NUMBER								
FACSIMILE NUMBER	CODE			NUMBER				
E-MAIL ADDRESS								
VAT REGISTRATION NUMBER								
SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:			OR	CENTRAL SUPPLIER DATABASE	UNIQUE REGISTRATION REFERENCE NUMBER: MAAA		
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE	TICK APPLICABLE BOX] ☐ Yes ☐ No			B-BBEE STATUS LEVEL SWORN AFFIDAVIT		[TICK APPLICABLE BOX] ☐ Yes ☐ No		

Respondent's Signature

Date and Company Stamp

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT MUST BE SUBMITTED FOR PURPOSES OF COMPLIANCE WITH THE B-BBEE ACT]

1 ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES ENCLOSE PROOF]	2 ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES, ANSWER QUESTIONNAIRE BELOW]
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QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	☐ YES ☐ NO
DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO
IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 1.3 BELOW.

PART B

TERMS AND CONDITIONS FOR BIDDING

1. TAX COMPLIANCE REQUIREMENTS

- 1.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
- 1.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.
- 1.3 APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA.
- 1.4 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
- 1.5 IN BIDS WHERE UNINCORPORATED CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
- 1.6 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.

NB: FAILURE TO PROVIDE / OR COMPLY WITH ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.

SIGNATURE OF BIDDER:

CAPACITY UNDER WHICH THIS BID IS SIGNED:

(Proof of authority must be submitted e.g. company resolution)

DATE: _____

Respondent's Signature

Date and Company Stamp

SECTION 2 : NOTICE TO RESPONDENTS

1 INFORMATION REQUEST

Information is requested from interested persons, companies, close corporations or enterprises [hereinafter referred to as the **Respondent(s)**] to supply the aforementioned information to Transnet.

Respondents are to note that the subsequent Request for Proposal [**RFP**] when is issued by Transnet will be to the open market where anyone can respond

DESCRIPTION	STRATEGY, CAPACITY, AND PROPOSAL FOR ADVANCED TECHNOLOGY IN RAILHEAD TRANSVERSE PROFILE CORRECTIVE AND PREVENTATIVE MAINTENANCE THROUGH RAILHEAD SURFACE MATERIAL REMOVAL.
TENDER ADVERT	All Transnet tenders are advertised on the National Treasury's e-Tender Publication Portal and the Transnet website. Should one of these media (i.e. National Treasury's e-Tender Publication Portal or Transnet website) not be available, bidders are advised to check on the other media for advertised tenders.
RFI DOWNLOADING	This RFI may be downloaded directly from National Treasury's e-Tender Publication Portal at www.etenders.gov.za free of charge. To download RFI and Annexures: - Click on "Tender Opportunities"; - Select "Advertised Tenders"; - In the "Department" box, select Transnet SOC Ltd; Once the tender has been located in the list, click on the "Tender documents" tab and process to download all uploaded documents. The RFI may also be downloaded from the Transnet Portal at https://transnetetenders.azurewebsites.net (please use Google Chrome to access Transnet link) free of charge (refer to section 2, paragraph 4 below for detailed steps)
COMMUNICATION	Any addenda to the RFI or clarifications will be published on the e-tender portal and Transnet website. Bidders are required to check the e-tender portal and Transnet website prior to finalising their bid submissions for any changes or clarifications to the RFI. Transnet will not be held liable if Bidders do not receive the latest information regarding this RFI.
BRIEFING SESSION	Not Applicable
CLOSING DATE	10:00 am on Tuesday 02 April 2025 Bidders must ensure that bids are uploaded timeously onto the system. As a general rule, if a bid is late, it will not be accepted for consideration. <i>Bidders are required to ensure that electronic bid submissions are done at least a day before the closing date to prevent issues which they may encounter due to their internet speed, bandwidth or the size of the number of uploads they are submitting. Transnet will not be held liable for any challenges experienced by bidders as a result of the technical challenges. Please do not wait for the last hour to submit. A Bidder can upload 30mb per upload and multiple uploads are permitted.</i>
VALIDITY PERIOD	180 Business Days from Closing Date. Bidders are to note that they may be requested to extend the validity period of their bid, on the same terms and conditions, if the internal evaluation process has not been finalised within the validity period. However, once the adjudication body has approved the process, the validity of the bidder(s)' bid will be deemed to remain valid until the RFI process has been concluded.

Any additional information or clarification will be published on the e-Tender portal and Transnet website, if necessary.

2 FORMAL BRIEFING

There will be no briefing session. Bidders are welcome to email clarifications questions in writing to the tender administrator as well as the Secretariat should the need arise.

3 RESPONSE SUBMISSION

Transnet has implemented a new electronic tender submission system, the e-Tender Submission Portal, in line with the overall Transnet digitalization strategy where suppliers can view advertised tenders, register their information, log their intent to respond to bids and upload their bid proposals/responses on to the system.

a) The Transnet e-Tender Submission Portal can be accessed as follows:

- Log on to the Transnet eTenders management platform website/ Portal (transnetetenders.azurewebsites.net) Please use **Google Chrome** to access Transnet link/site)
- Click on "ADVERTISED TENDERS" to view advertised tenders;
- Click on "SIGN IN/REGISTER – for bidder to register their information (must fill in all mandatory information);
- Click on "SIGN IN/REGISTER" - to sign in if already registered;
- Toggle (click to switch) the "Log an Intent" button to submit a bid;
- Submit bid documents by uploading them into the system against each tender selected;
- No late submissions will be accepted. The bidder guide can be found on the Transnet Portal transnetetenders.azurewebsites.net

4 RFI INSTRUCTIONS

4.1 All returnable documents listed in the expression of interest [section 5] in this RFI must be returned with your submission.

4.2 The person or persons signing the submission must be legally authorised by the respondent to do so.

5 B-BBEE JOINT VENTURES OR CONSORTIUMS

Bidders may choose during the subsequent RFP process to enter into a Joint Venture with B-BBEE companies. RFP Bidders will also be required to submit a signed JV agreement between the parties clearly stating the percentage [%] split of business and the associated responsibilities of each party. If at the time of the bid submission such a JV or consortium agreement has not been concluded, the partners must submit confirmation in writing of their intention to enter into a JV or consortium agreement should they be awarded business by Transnet through the RFP process. This written confirmation must clearly indicate the percentage [%] split of business and the responsibilities of each party. In such cases, award of business will only take place once a signed copy of a JV or consortium agreement is submitted to Transnet.

Please indicate below whether your entity has an existing JV, and if so, provide details, including details of the percentage split of business, or whether your entity intends to create a JV relationship for RFP purposes:

6 COMMUNICATION

- 6.1 For specific queries relating to this RFI a Clarification Request Form should be submitted onto the system and to [Delisiwe.Mngomezulu@transnet.net] before **12:00 pm on 14 March 2025** substantially in the form set out in Section 8. In the interest of fairness and transparency Transnet's response to such a query will be published on the e-tender portal and Transnet website.
- 6.2 After the closing date of the RFI/EOI a Respondent may only communicate with the name of delegated individual (Prudence Nkabinde or Sinovuyo Ngqele), email Prudence.Nkabinde@transnet.net or Sinovuyo.Ngqele@transnet.net on any matter relating to its RFI Proposal.
- 6.3 Respondents are to note that changes to its submission will not be considered after the closing date.
- 6.4 It is prohibited for Respondents to attempt, either directly or indirectly, to canvass any officer or employee of Transnet in respect of this RFI.
- 6.5 Respondents found to be in collusion with one another will be automatically disqualified and restricted from doing business with organs of state for a specified period.

7 CONFIDENTIALITY

All information related to this RFI is to be treated with strict confidence. In this regard Respondents are required to certify that they have acquainted themselves with the Non-Disclosure Agreement. All information related to a subsequent contract, both during and after completion thereof, will be treated with strict confidence. Should the need however arise to divulge any information related to this RFI or the subsequent RFP process, written approval to divulge such information must be obtained from Transnet.

8 STATUS OF THIS RFI AND SUBSEQUENT PROCESS

- 8.1 This RFI is not an offer to purchase and Transnet is under no obligation to accept any proposals in this process and/or the subsequent RFP which may be issued hereafter.
- 8.2 As this is a Request for Information only, no business will be awarded through this process.

9 DISCLAIMERS

- 9.1 Respondents are hereby advised that Transnet is not committed to any course of action as a result of its issuance of this RFI and/or its receipt of submissions in response to it. In particular, please note that Transnet reserves the right and at its sole and full discretion to:
 - (a) utilise any information provided to it in response to this RFI to draft the scope of requirements for inclusion in an RFP;
 - (b) take no further action whatsoever, if it so decides;
 - (c) withdraw from this process and the provisions of this project at any time;
 - (d) select the RFI and RFP participants based on Transnet's criteria;
 - (e) change the dates of adjudication and submission;
 - (f) not invite RFI respondents for further participation in the RFP process;
 - (g) not bind itself to accept any or all of the RFIs;
 - (h) increase or decrease the quantities/scope as indicated in the RFI;

- (i) validate any information submitted by Respondents in response to this bid. This would include, but is not limited to, requesting the Respondents to provide supporting evidence. By submitting a bid, Respondents hereby irrevocably grant the necessary consent to Transnet to do so;
- (j) request audited financial statements or other documentation for the purposes of a due diligence exercise;
- (k) not accept any changes or purported changes by the Respondent to the bid rates after the closing date;

9.2 Note that Transnet will not reimburse any Respondent for any preparatory costs or other work performed in connection with this submission.

10 SECURITY CLEARANCE

Acceptance of this bid could be subject to the condition that the Successful Respondent, its personnel providing the goods and its subcontractor(s) must obtain security clearance from the appropriate authorities to the level of **CONFIDENTIAL/ SECRET/TOP SECRET**. Obtaining the required clearance is the responsibility of the Successful Respondent. Acceptance of the bid is also subject to the condition that the Successful Respondent will implement all such security measures as the safe performance of the contract may require.

11 NATIONAL TREASURY'S CENTRAL SUPPLIER DATABASE

Respondents are required to self-register on National Treasury's Central Supplier Database (CSD) which has been established to centrally administer supplier information for all organs of state and facilitate the verification of certain key supplier information. Respondents must register on the CSD prior to submitting their bids. Business may not be awarded to a Respondent who has failed to register on the CSD. Only foreign suppliers with no local registered entity need not register on the CSD.

For this purpose, the attached SBD 1 Form must be completed and submitted as a returnable document by the closing date and time of the bid.

12 TAX COMPLIANCE

Respondents must be compliant when submitting a proposal to Transnet and remain compliant for the entire contract term with all applicable tax legislation, including but not limited to the Income Tax Act, 1962 (Act No. 58 of 1962) and Value Added Tax Act, 1991 (Act No. 89 of 1991).

It is a condition of this bid that the tax matters of the successful Respondents be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the bidder's tax obligations. The Tax Compliance status requirements are also applicable to foreign Respondents / individuals who wish to submit bids.

Where Consortia / Joint Ventures / Sub-contractors are involved, each party must be registered on the Central Supplier Database and their tax compliance status will be verified through the Central Supplier Database.

**Transnet urges its clients, suppliers and the general public to report any fraud or corruption to
TIP-OFFS ANONYMOUS:**



Ethics Helpdesk (Pty) LTD.
Ethics Management System™

You can choose to be Anonymous or Non-Anonymous on ANY of the platforms
PLEASE RETAIN YOUR REFERENCE NUMBER



AI Voice Bot "Jack"
Speak to our AI Voice Chat Bot "JACK", you converse with him like chatting to a human, with the option to record a message and speak to an agent at anytime.



What's App
Speak to an Agent via What's App.



Speak to an Agent
Speak to an Agent via the platform with no call or data charge



Telegram
Speak to an Agent via Telegram



0800 003 056



086 551 4153



reportit@ethicshelpdesk.com



***120*0785980808#**

SECTION 3 : RFI SCOPE OF REQUIREMENTS

1 INTRODUCTION

This document aims to aid in determining the available technologies and materials that will reduce theft on Transnet assets while maintaining acceptable levels of electrical and mechanical performance when compared to copper. The components under investigation are busbars of the locomotive roofs, high voltage cubicles and substations.

2 BACKGROUND

Transnet Freight Rail (TFR) is a custodian of a railway infrastructure used in the haulage of bulk goods nationally. It has twenty-two (22) Rail Network depots that are responsible for the maintenance of track infrastructure along some 20 953 route kilometres. Specific focused maintenance interventions are required on a continuous basis to ensure the availability, reliability and the safety of the network. Transnet's increase in train traffic and million gross tons (MGT) accelerates rail degradation through wear and plastic flow, compromising the wheel/rail interface. Maintaining optimal wheel/rail interaction is crucial to minimize contact stresses and extending the lifespan of both the rail and the overall track system.

Excessive contact stresses reduce rail fatigue life and increase wear, leading to surface defects like head checks, rolling contact fatigue (RCF), corrugations etc. The surface cracks (RCF), if not promptly addressed can penetrate the rail head at a shallow angle and can lead to rail breaks. Preventive and corrective maintenance are essential for restoring the rail profile, removing the abovementioned defects and minimising the surface cracks.

Rail grinding has been the conventional preventative maintenance method for addressing the abovementioned requirements of restoring the rail profile of the various corridors and controlling the defects. Your submission should include in detail your proposed methodology, and preliminary program of expected activities. From the RFI and response and/or submissions thereto, Transnet will compile an RFP document which will include an indicative schedule of activities and timelines.

3 KEY OBJECTIVES OF THIS RFI PROCESS

The following list of deliverables captures the minimum intent and objectives of the RFI process. Transnet requests all Respondents to assist with the achievement of these objectives by submitting the requested information as indicated below. This will be finalised in the RFP documents following the RFI process:

Bidders are required to provide detailed responses to the requirements and to complete the Questionnaire in the Annexures.:

3.1 Deliverables:

All respondents to assist with the achievement of these objectives by submitting the requested information as indicated below:

Bidders are required to complete the questionnaire in the Annexures with written and/or documented evidence in the form of letters/brochures/technical reports/studies etc. . The following information is requested from bidders:

3.1.1 Rail Grinding

- Information on latest technology and capability to offer prescriptive maintenance
- Assessment of the adequacy and technology sufficiency of Transnet Freight Rail's current grinding resources to enable transition from corrective to preventative grinding and provide proposals for recommended solutions or more advanced technologies.
- Assessment of Transnet Freight Rail's current rail grinding funding model or approach including its suitability to enable the transition from corrective to preventative grinding as a maintenance strategy.

3.1.2 Introduction of New or Alternative Rail Profiling Technologies in the Market

- Submission of detailed Proposals for new and advanced rail profiling technologies such as rail milling etc and others available
- Provide detailed feasibility studies of implementing these technologies, pros and cons and what Transnet requires in introducing these technologies on its network.

3.2 Key Information requested

- Workshop session with the bidders
- Delivery times
- Contractor capacity
- Cost
- Machine availability
- Rail reprofiling capacity

4 GENERAL RESPONDENT OBLIGATIONS

- 4.1 The Respondent(s) shall be fully responsible to Transnet for the acts and omissions of persons directly or indirectly employed by them.
- 4.2 The Respondent (s) must comply with the requirements stated in this RFI.

5 CONFIDENTIALITY AND COMPLIANCE

This RFI and information contained herein or provided for purposes thereof, remain the property of Transnet and may not be reproduced, sold or otherwise disposed of. All recipients of this document (whether a RFI is submitted or not) shall treat the details of this document as strictly private and confidential.

Information disclosed in this RFI is given in good faith and only for the purposes of providing sufficient information to the Respondent to enable submission of a well-informed and realistic RFI.

6 UNDERTAKINGS BY RESPONDENT

It will be accepted that the Respondent, on submitting the RFI response, has read, understood and accepted all the terms and conditions of the document. The submission of an RFI by any Respondent shall presume complete acceptance of the terms and conditions of the document. All qualifications and or exceptions should be noted in the RFI Response document.

7 COSTS TO RESPOND TO THE RFI

- 7.1 All Respondents wishing to submit a RFI response must be in possession of this document, the RFI. Transnet will not be responsible for or pay any expense or losses which may be incurred by any Respondent in the preparation and submission of the RFI and the costs of the RFI at all stages of the RFI process. Costs, if any, will be for each Respondent's own account.
- 7.2 Transnet reserves the right to invite certain Respondents to present or otherwise demonstrate their proposed solution as per their RFI, at the Respondent's own cost.

8 AUTHORITY OF SIGNATORY

- 8.1 If the RFI Respondent is a company, a certified copy of the resolution of the Board of Directors (i.e. personally signed by the Chairman or Secretary of the Board) authorising the person who signs this RFI to do so and any other documents and correspondence in connection with this RFI and/or agreement on behalf of the company, must be submitted with their RFI.
- 8.2 If the RFI Respondent is a partnership, a certified copy of the resolution of the partners (personally signed by all the partners) authorising the person who signs this RFI to do so and any other documents and correspondence in connection with this RFI and/or agreement on behalf of the partnership, must be submitted with this RFI.
- 8.3 If the RFI Respondent constitutes a "one-man business", certified proof must be submitted that the person signing this RFI and any other documents and correspondence in connection with this RFI and/or agreement is the sole owner of the one-man business.

Failure to comply with this clause may result in rejection of the RFI response.

9 OFFERING OF COMMISSION OR GRATUITY

If a Respondent, or any person employed by him, is found to have either directly or indirectly offered, promised or given to any person in the employ of Transnet, any commission, gratuity, gift or other consideration, Transnet shall have the right and without prejudice to any other legal remedy which it may have in regard to any loss or additional cost or expenses, to disqualify the RFI Respondent from further participation in this process and any other subsequent processes in this regard. The RFI Respondent will be responsible for all and any loss that Transnet may suffer as a result thereof. In addition, Transnet reserves the right to exclude such a Respondent from future business with Transnet.

10 UNDERTAKING BY TRANSNET

In responding to this RFI, Transnet encourages all RFI Respondents to put their best effort into the construction and development of the proposal.

The RFI process will include due governance and the results of the adjudication process will be available to Respondents.

SECTION 4 : TRANSNET'S RFI

Quality Criteria	Type of Document/Evidence to be submitted
GENERAL INFORMATION	
How does your railhead reprofiling technology comply with BS EN 13231, ISO9001, ISO4288 standards for railhead profiling or railway industry equivalent?	
Provide documentation or certifications that demonstrate compliance with relevant standards.	
What are the technical specifications of your railhead reprofiling technology used for railhead reprofiling? Include details on weight, structural gauge, operating speed, dimensions, power requirements, propulsion method, tool temperature, workpiece temperature and operational capabilities i.e. material removal capability relative to railhead angle marks, the railhead angle mark relative to the pursued railhead profile. The supplier to provide all relevant technical information critical to TFR operation.	
What is the capability of your railhead reprofiling technology to perform corrective and/or preventative maintenance on different rail profiles, track types and defect including alternating side wear?	
Does your technology have an anti-hunting detection capability during reprofiling operation? include a brief description of how the anti-hunting capability works if any?	
Does your railhead reprofiling technology have a stabilizing system to circumvent unwanted oscillatory excitation?	
What preparatory work does Transnet have to do prior railhead reprofiling? elaborate on any condition assessment work, removal of any signalling systems, electrical assets, and railway track components etc.	
What is the capability of your technology to perform railhead reprofiling on two custom profile types at the same time i.e., high leg custom profile vs. left leg custom profile respectively?	
What is the ease of switching between different profiles and patterns while machine is in operation or in service? Elaborate on the turnaround time to get the railhead reprofiling technology back online.	
What is the capability of your technology to perform railhead reprofiling on broad, standard versus narrow gauge	
What is the capability of your technology to perform railhead reprofiling on curves < R500m, turnout sizes 1:9 and 1:20, check rails, guard rails, near platforms, crossings, bridges and tunnels.	
What is the capability of your technology to perform railhead reprofiling on High Carbon 48kg/m rails, 57kg/m, and 60kg/m	
Give a detailed description of the control systems employed withing your technology. Include feedback mechanisms, frequency of data logging, etc, if any.	
COMMISSIONING, IMPLEMENTATION AND TRAINING	
What commissioning services does the company offer to ensure your railhead reprofiling technology is deployed and operational?	
Describe the typical process for implementing your railhead reprofiling technology in a railway maintenance environment such as in South Africa.	
What support services do you provide to prepare, during and post the implementation phase?	
Detail the training programs available to operate and maintain your technology.	

Respondent's Signature

Date and Company Stamp

OPERATION AND MAINTENANCE	
How is the operational performance of your technology monitored and evaluated?	
Provide examples of performance metrics used to track efficiency and effectiveness.	
What are the typical time frames for completing corrective and/or preventative railhead reprofiling projects of varying scales?	
What are the maintenance requirements for your railhead reprofiling technology? Include information on the frequency of maintenance, typical maintenance tasks, and any special tools or skills required to reduce the impact on railway operations?	
What strategies are employed to minimize track downtime during railhead reprofiling operations?	
MEASUREMENT AND VERIFICATION	
What measurement techniques are used to verify the transverse profile pre, during, and post railhead reprofiling?	
What is your railhead reprofiling technology's capability to continuously measure the longitudinal, lateral, and traverse railhead profiles? Give detailed description of the measuring frequency, speeds and wavelength.	
Provide documentation to demonstrate the capability of the technology to provide Pre and post railhead reprofiling, with an approximate to the persuade profile	
Provide details regarding the precision and accuracy metrics of your technology's railhead reprofiling process.	
How do you ensure the accuracy and reliability of these measurements?	
Describe how data is collected, managed, and reported pre, during and post the reprofiling process.	
What systems are in place to ensure data integrity and accessibility?	
LIFECYCLE MANAGEMENT	
What is the expected operational life on average? Include mean and standard deviation.	
What lifecycle support services do you provide, from initial implementation to end-of-life management?	
How do you assist with technology upgrades and replacements?	
What is your strategy for managing the end-of-life phase of the rail reprofiling technology?	
How do you manage the decommissioning and disposal of the railhead reprofiling technology? Include disposal of cut of material and tool tips.	
Do you have local support for the railhead reprofiling technology in South Africa? Include list of spare parts and lead times.	
INNOVATION AND UPGRADES	
To what extent have you incorporated automation and digital tools in the reprofiling process?	
How often do you review and upgrade your railhead reprofiling technology?	
Provide examples of recent upgrades or innovations that have improved the performance or efficiency of your railhead reprofiling technology.	
Describe your company's commitment to research and development in the field of rail reprofiling technology.	
How do you incorporate the latest advancements and innovations into your product offerings? Include description of if any future technology developments?	

Respondent's Signature

Date and Company Stamp

SAFETY, RISK AND ENVIRONMENTAL CONSIDERATIONS	
What are the primary risks associated with the use of your railhead reprofiling technology, and how are they mitigated? Include circumventing metallurgical changes, overheating and firefighting if any.	
Provide examples of risk mitigation strategies implemented in previous projects.	
Does the railhead reprofiling technology have an emergency backup system in an event of failure.	
What safety features does your railhead reprofiling technology have to prevent risk of personnel injury, damage to infrastructure and/or accidents.	
How would you rate the eco-friendliness of your railhead reprofiling technology? Provide supporting documentation if any.	
REGULATORY AND QUALITY COMPLIANCE	
How does the railhead reprofiling technology ensure quality and compliance of the railhead traverse and longitudinal profiles during and after reprofiling process?	
How do you stay informed about updates or changes to relevant standards and regulations?	
How do you ensure that the railhead reprofiling technology remains compliant with regulatory requirements?	
CASE STUDIES AND REFERENCES	
Provide case studies or examples of successful implementations of your railhead reprofiling technology. Include details on the challenges faced, solutions provided, and outcomes achieved.	
Provide references from clients who have used your railhead reprofiling technology for transverse railhead reprofiling. Include contact information for references, if available.	
COMMERCIAL AND CONTRACTUAL INFORMATION	
What is your pricing model for the railhead reprofiling technology and associated services? Include a comprehensive Life Cycle Costing (LCC) breakdown structure.	
Provide detailed pricing information, including any options for leasing or financing.	
Outline the standard contract terms and conditions for purchasing or leasing your railhead reprofiling technology.	
Include information on lead times for sourcing, warranties, service agreements, and after sales support packages.	

TEST FOR ADMINISTRATIVE RESPONSIVENESS

The test for administrative responsiveness will include the following:

Administrative responsiveness check
Whether the Bid has been lodged on time
Whether all Returnable Documents and/or schedules [where applicable] were completed and returned by the closing date and time
Verify the validity of all returnable documents
Verify if the Bid document has been duly signed by the authorised respondent

Respondent's Signature

Date and Company Stamp

SECTION 5 : EXPRESSION OF INTEREST

I/We _____

[name of company, close corporation or partnership]

of [full address] _____

carrying on business under style or title of [trading as]

represented by _____

in my capacity as _____

being duly authorised, hereby lodge an **Expression of Interest** for the strategy, capacity, and proposal for advanced technology in Railhead transverse profile corrective and preventative maintenance through Railhead surface material removal.:

ADDRESS FOR NOTICESRespondent to indicate its *domicilium citandi et executandi* hereunder:

Name of entity: _____

Facsimile: _____

Address: _____

NAME(s) AND ADDRESS / ADDRESSES OF DIRECTOR(s) OR MEMBER(s)

The Respondent must disclose hereunder the full name(s) and address(s) of the director(s) or members of the company or close corporation [C.C.] on whose behalf the RFI is submitted.

(i) Registration number of company / C.C.

(ii) Registered name of company / C.C.

(iii) Full name(s) of director/member(s): Address/Addresses: ID Number/s:

.....

.....

.....

.....

.....

.....

Respondent's Signature_____
Date and Company Stamp

RETURNABLE DOCUMENTS

*Respondents must submit with their responses to this RFI, **as a minimum requirement**, all the returnable documents indicated below with a [✓]. All Sections must be signed and dated by the Respondent.*

Minimum Requirements - Returnable Documents	Submitted [✓]
SECTION 1: SBD1 FORM	
SECTION 2 : Notice to Respondents	
SECTION 3 : RFI Scope of Requirements	
SECTION 4 : Transnet's RFI/EOI Information	
SECTION 5 : Expression of Interest	
QUALITY CRITERIA	
General Information	
Technical Requirements	
Commissioning, Implementation and Training	
Operation and Maintenance	
Measurement and verification	
Lifecycle management	
Innovation and upgrades	
Safety, Risk, and Environmental Considerations	
Regulatory and Quality compliance	
Case Studies and References	
Commercial and Contractual Information	
Valid proof of Respondent's compliance to B-BBEE requirements (Valid B-BBEE certificate or Sworn Affidavit) stipulated in Section 7 of this RFI	
In the case of Joint Ventures, a copy of the Joint Venture Agreement or written confirmation of the intention to enter into a Joint Venture Agreement	
Latest Financial Statements signed by your Accounting Officer or latest Audited Financial Statements plus 2 previous years	
SECTION 6 : Certificate Of Acquaintance with RFI Terms & Conditions & Applicable Documents	
SECTION 7 : B-BBEE Preference Claim Form	
SECTION 9: SBD 4 - Bidder's Disclosure	
SECTION 10 : Certificate of attendance of compulsory / non-compulsory Site Meeting / RFI Briefing	
SECTION 11: Protection of Personal Information	

 Respondent's Signature

 Date and Company Stamp

CONTINUED VALIDITY OF RETURNABLE DOCUMENTS

The Respondent will be required to ensure the validity of all returnable documents, including but not limited to its valid proof of B-BBEE status, for the duration of this RFI process.

SIGNED at _____ on this ____ day of _____ 20____

SIGNATURE OF WITNESSES

ADDRESS OF WITNESSES

1 _____

Name _____

2 _____

Name _____

SIGNATURE OF RESPONDENT'S AUTHORISED REPRESENTATIVE: _____

NAME: _____

DESIGNATION: _____

Respondent's Signature

Date and Company Stamp

SECTION 6 : CERTIFICATE OF ACQUAINTANCE WITH RFI, TERMS & CONDITIONS & APPLICABLE DOCUMENTS

By signing these RFI documents, the Respondent is deemed to acknowledge that he/she has made himself/herself thoroughly familiar with all the conditions governing this RFI, including those contained in any printed form stated to form part hereof including but not limited to the documents stated below. Transnet SOC Ltd will recognise no claim for relief based on an allegation that the Respondent overlooked any such term or condition.

1	Transnet's General Bid Conditions
2	Transnet's Supplier Integrity Pact
3	Non-disclosure Agreement
4	Specifications and drawings attached to this RFI/EOI

Should the Bidder find any terms or conditions stipulated in any of the relevant documents quoted in this RFI/EOI unacceptable, it should indicate which conditions are unacceptable and offer alternatives by written submission on its company letterhead, attached to its submitted Bid. Any such submission shall be subject to review by Transnet's Legal Counsel who shall determine whether the proposed alternative(s) are acceptable or otherwise, as the case may be. A material deviation from any term or condition may result in disqualification.

Bidders accept that an obligation rests on them to clarify any uncertainties regarding any bid to which they intend to respond on, before submitting the bid. The Bidder agrees that he/she will have no claim or cause of action based on an allegation that any aspect of this RFI/EOI was unclear but in respect of which he/she failed to obtain clarity.

The bidder understands that his/her Bid will be disqualified if the Certificate of Acquaintance with RFI documents included in the RFI/EOI as a returnable document, is found not to be true and complete in every respect.

SIGNED at _____ on this ____ day of _____ 20__

SIGNATURE OF WITNESSES

ADDRESS OF WITNESSES

1 _____

Name _____

2 _____

Name _____

SIGNATURE OF RESPONDENT'S AUTHORISED REPRESENTATIVE: _____

NAME: _____

DESIGNATION: _____

Respondent's Signature

Date and Company Stamp

SECTION 7 : SPECIFIC GOAL CLAIM FORM**Note:**

- *This is for data collection and not for scoring purposes*
- *We have attached a Sworn Affidavit **(Annexure D)** template for ease of reference for entities that do not have updated sworn affidavits*
- *Only complete one that is applicable to your entity either EME or QSE not both*

Indicate your B-BBEE LEVEL	
Confirm if your entity has at least 30% Black Women Ownership	
Confirm if your entity has at least 51% Black Ownership	
Confirm if your entity has at least 51% Black Youth Ownership	
Confirm if your entity has Black Disabled ownership	
Indicate in which region/province your entity is based	
Indicate if your entity is non-Compliant	

Confirmation of B-BBEE Credentials	
B-BBEE	B-BBEE Certificate / Sworn- Affidavit / B-BBEE CIPC Certificate (in case of JV, a consolidated scorecard will be accepted) as per DTIC guideline
30% Black Women Owned Entities	B-BBEE Certificate / Sworn- Affidavit / B-BBEE CIPC Certificate (in case of JV, a consolidated scorecard will be accepted) as per DTIC guideline
>50% Black Youth Owned Entities	Certified copy of ID Documents of the Owners and B-BBEE Certificate / Sworn- Affidavit / B-BBEE CIPC Certificate (in case of JV, a consolidated scorecard will be accepted) as per DTIC guideline
Entities Owned by People with Disability (PWD)	Certified copy of ID Documents of the Owners / Doctor's note and /or EEA1 form confirming the disability
Entities/Black People living in rural areas	Entity 's Municipal/ESKOM bill or letter from Induna/chief confirming residential address not older than 3 months.
South African Enterprises	CIPC Certificate
Entities that are 51 % Black Owned	CI B-BBEE Certificate / Sworn- Affidavit / B-BBEE CIPC Certificate (in case of JV, a consolidated scorecard will be accepted) as per DTIC guideline

Respondent's Signature

Date and Company Stamp

SECTION 8: RFI CLARIFICATION REQUEST FORM

RFI No: HOAC HO 48869

Deadline for RFI clarification submissions: Before **12:00 am on 14 March 2025**

TO: Transnet SOC Ltd

ATTENTION: The Tender Administrator

EMAIL [Delisiwe. Mngomezulu@transnet.net]

DATE:

FROM:

RFI Clarification No *[to be inserted by Transnet]*

REQUEST FOR RFI CLARIFICATION:

.....

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SECTION 9: SBD 4 - BIDDER'S DISCLOSURE**1 PURPOSE OF THE FORM**

- 1.1 Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.
- 1.2 Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2 Bidder's declaration

- 2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest¹ in the enterprise, employed by the state? **YES/NO**

- 2.1.1. If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

- 2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution?

YES/NO

- 2.2.1. If so, furnish particulars:

.....

¹ the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

.....

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract?

YES/NO

2.3.1. If so, furnish particulars:

.....

.....

3 DECLARATION

I, the undersigned, (name)..... in submitting the accompanying bid, do hereby make the following statements that I certify to be true and complete in every respect:

- 3.1 I have read and I understand the contents of this disclosure;
- 3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;
- 3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium² will not be construed as collusive bidding.
- 3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.
- 3.5 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
- 3.6 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.
- 3.7 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59

² Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

Respondent's Signature

Date and Company Stamp

SECTION 10: PROTECTION OF PERSONAL INFORMATION

1. The following terms shall bear the same meaning as contemplated in Section 1 of the Protection of Person information act, No.4 of 2013.("POPIA"):

consent; data subject; electronic communication; information officer; operator; person; personal information; processing; record; Regulator; responsible party; special information; as well as any terms derived from these terms.
2. Transnet will process all information by the Respondent in terms of the requirements contemplated in Section 4(1) of the POPIA:

Accountability; Processing limitation; Purpose specification; Further processing limitation; Information quality; Openness; Security safeguards and Data subject participation.
3. The Parties acknowledge and agree that, in relation to personal information that will be processed pursuant to this RFI, the Responsible party is "Transnet" and the Data subject is the "Respondent". Transnet will process personal information only with the knowledge and authorisation of the Respondent and will treat personal information which comes to its knowledge as confidential and will not disclose it, unless so required by law or subject to the exceptions contained in the POPIA.
4. Transnet reserves all the rights afforded to it by the POPIA in the processing of any of its information as contained in this RFI and the Respondent is required to comply with all prescripts as detailed in the POPIA relating to all information concerning Transnet.
5. In responding to this bid, Transnet acknowledges that it will obtain and have access to personal information of the Respondent. Transnet agrees that it shall only process the information disclosed by Respondent in their response to this bid for the purpose of evaluating and subsequent award of business and in accordance with any applicable law.
6. Transnet further agrees that in submitting any information or documentation requested in this RFI, the Respondent is consenting to the further processing of their personal information for the purpose of, but not limited to, risk assessment, assurances, contract award, contract management, auditing, legal opinions/litigations, investigations (if applicable), document storage for the legislatively required period, destruction, de-identification and publishing of personal information by Transnet and/or its authorised appointed third parties.
7. Furthermore, Transnet will not otherwise modify, amend or alter any personal data submitted by the Respondent or disclose or permit the disclosure of any personal data to any third party without the prior written consent from the Respondent. Similarly, Transnet requires the Respondent to process any personal information disclosed by Transnet in the bidding process in the same manner.
8. Transnet shall, at all times, ensure compliance with any applicable laws put in place and maintain sufficient measures, policies and systems to manage and secure against all forms of risks to any information that may be shared or accessed pursuant to this RFI (physically, through a computer or any other form of electronic communication).

9. Transnet shall notify the Respondent in writing of any unauthorised access to information, cybercrimes or suspected cybercrimes, in its knowledge and report such crimes or suspected crimes to the relevant authorities in accordance with applicable laws, after becoming aware of such crimes or suspected crime. The Respondent must take all necessary remedial steps to mitigate the extent of the loss or compromise of personal information and to restore the integrity of the affected personal information as quickly as is possible.
10. The Respondent may, in writing, request Transnet to confirm and/or make available any personal information in its possession in relation to the Respondent and if such personal information has been accessed by third parties and the identity thereof in terms of the POPIA. The Respondent may further request that Transnet correct (excluding critical/mandatory or evaluation information), delete, destroy, withdraw consent or object to the processing of any personal information relating to the Respondent in Transnet's possession in terms of the provision of the POPIA and utilizing Form 2 of the POPIA Regulations.
11. In submitting any information or documentation requested in this RFI, the Respondent is hereby consenting to the processing of their personal information for the purpose of this RFI and further confirming that they are aware of their rights in terms of Section 5 of POPIA

Respondents are required to provide consent below:

YES		NO	
------------	--	-----------	--

12. Further, the Respondent declares that they have obtained all consents pertaining to other data subject's personal information included in its submission and thereby indemnifying Transnet against any civil or criminal action, administrative fines or other penalty or loss that may arise as a result of the processing of any personal information that the Respondent submitted.
13. The Respondent declares that the personal information submitted for the purpose of this RFI is complete, accurate, not misleading, is up to date and may be updated where applicable.

Signature of Respondent's authorised representative: _____

Should a Respondent have any complaints or objections to processing of its personal information, by Transnet, the Respondent can submit a complaint to the Information Regulator on <https://www.justice.gov.za/inforeg/>, click on contact us, click on complaints.IR@justice.gov.za

NON DISCLOSURE AGREEMENT

[April 2020]

THIS AGREEMENT is made between

Transnet SOC Ltd [Transnet] [Registration No. 1990/000900/30]

whose registered office is at 138 Eloff Street, Braamfontein, JOHANNESBURG, 2000,

and

the Company as indicated in the RFP bid response hereto

WHEREAS

Transnet and the Company wish to exchange Information [as defined below] and it is envisaged that each party may from time to time receive Information relating to the other in respect thereof. In consideration of each party making available to the other such Information, the parties jointly agree that any dealings between them shall be subject to the terms and conditions of this Agreement which themselves will be subject to the parameters of the Bid Document.

IT IS HEREBY AGREED

1. INTERPRETATION

In this Agreement:

- 1.1 **Agents** mean directors, officers, employees, agents, professional advisers, contractors or sub-contractors, or any Group member;
- 1.2 **Bid or Bid Document** means Transnet's Request for Information [**RFI**] Request for Proposal [**RFP**] or Request for Quotation [**RFQ**], as the case may be;
- 1.3 **Confidential Information** means any information or other data relating to one party [the **Disclosing Party**] and/or the business carried on or proposed or intended to be carried on by that party and which is made available for the purposes of the Bid to the other party [the **Receiving Party**] or its Agents by the Disclosing Party or its Agents or recorded in agreed minutes following oral disclosure and any other information otherwise made available by the Disclosing Party or its Agents to the Receiving Party or its Agents, whether before, on or after the date of this Agreement, and whether in writing or otherwise, including any information, analysis or specifications derived from, containing or reflecting such information but excluding information which:
 - 1.3.1 is publicly available at the time of its disclosure or becomes publicly available [other than as a result of disclosure by the Receiving Party or any of its Agents contrary to the terms of this Agreement]; or
 - 1.3.2 was lawfully in the possession of the Receiving Party or its Agents [as can be demonstrated by its written records or other reasonable evidence] free of any restriction as to its use or disclosure prior to its being so disclosed; or

- 1.3.3 following such disclosure, becomes available to the Receiving Party or its Agents [as can be demonstrated by its written records or other reasonable evidence] from a source other than the Disclosing Party or its Agents, which source is not bound by any duty of confidentiality owed, directly or indirectly, to the Disclosing Party in relation to such information;
- 1.4 **Group** means any subsidiary, any holding company and any subsidiary of any holding company of either party; and
- 1.5 **Information** means all information in whatever form including, without limitation, any information relating to systems, operations, plans, intentions, market opportunities, know-how, trade secrets and business affairs whether in writing, conveyed orally or by machine-readable medium.

2. CONFIDENTIAL INFORMATION

- 2.1 All Confidential Information given by one party to this Agreement [the **Disclosing Party**] to the other party [the **Receiving Party**] will be treated by the Receiving Party as secret and confidential and will not, without the Disclosing Party's written consent, directly or indirectly communicate or disclose [whether in writing or orally or in any other manner] Confidential Information to any other person other than in accordance with the terms of this Agreement.
- 2.2 The Receiving Party will only use the Confidential Information for the sole purpose of technical and commercial discussions between the parties in relation to the Bid or for the subsequent performance of any contract between the parties in relation to the Bid.
- 2.3 Notwithstanding clause 2.1 above, the Receiving Party may disclose Confidential Information:
- 2.3.1 to those of its Agents who strictly need to know the Confidential Information for the sole purpose set out in clause 2.2 above, provided that the Receiving Party shall ensure that such Agents are made aware prior to the disclosure of any part of the Confidential Information that the same is confidential and that they owe a duty of confidence to the Disclosing Party. The Receiving Party shall at all times remain liable for any actions of such Agents that would constitute a breach of this Agreement; or
- 2.3.2 to the extent required by law or the rules of any applicable regulatory authority, subject to clause 2.4 below.
- 2.4 In the event that the Receiving Party is required to disclose any Confidential Information in accordance with clause 2.3.2 above, it shall promptly notify the Disclosing Party and cooperate with the Disclosing Party regarding the form, nature, content and purpose of such disclosure or any action which the Disclosing Party may reasonably take to challenge the validity of such requirement.
- 2.5 In the event that any Confidential Information shall be copied, disclosed or used otherwise than as permitted under this Agreement then, upon becoming aware of the same, without prejudice to any rights or remedies of the Disclosing Party, the Receiving Party shall as soon as practicable notify the Disclosing Party of such event and if requested take such steps [including the institution of legal proceedings] as shall be necessary to remedy [if capable of remedy] the default and/or to prevent further unauthorised copying, disclosure or use.
- 2.6 All Confidential Information shall remain the property of the Disclosing Party and its disclosure shall not confer on the Receiving Party any rights, including intellectual property rights over the Confidential Information whatsoever, beyond those contained in this Agreement.

3. RECORDS AND RETURN OF INFORMATION

- 3.1 The Receiving Party agrees to ensure proper and secure storage of all Information and any copies thereof.
- 3.2 The Receiving Party shall keep a written record, to be supplied to the Disclosing Party upon request, of the Confidential Information provided and any copies made thereof and, so far as is reasonably practicable, of the location of such Confidential Information and any copies thereof.
- 3.3 The Company shall, within 7 [seven] days of receipt of a written demand from Transnet:
 - 3.3.1 return all written Confidential Information [including all copies]; and
 - 3.3.2 expunge or destroy any Confidential Information from any computer, word processor or other device whatsoever into which it was copied, read or programmed by the Company or on its behalf.
- 3.4 The Company shall on request supply a certificate signed by a director as to its full compliance with the requirements of clause 3.3.2 above.

4. ANNOUNCEMENTS

- 4.1 Neither party will make or permit to be made any announcement or disclosure of its prospective interest in the Bid without the prior written consent of the other party.
- 4.2 Neither party shall make use of the other party's name or any information acquired through its dealings with the other party for publicity or marketing purposes without the prior written consent of the other party.

5. DURATION

The obligations of each party and its Agents under this Agreement shall survive the termination of any discussions or negotiations between the parties regarding the Bid and continue thereafter for a period of 5 [five] years.

6. PRINCIPAL

Each party confirms that it is acting as principal and not as nominee, agent or broker for any other person and that it will be responsible for any costs incurred by it or its advisers in considering or pursuing the Bid and in complying with the terms of this Agreement.

7. ADEQUACY OF DAMAGES

Nothing contained in this Agreement shall be construed as prohibiting the Disclosing Party from pursuing any other remedies available to it, either at law or in equity, for any such threatened or actual breach of this Agreement, including specific performance, recovery of damages or otherwise.

8. PRIVACY AND DATA PROTECTION

- 8.1 The Receiving Party undertakes to comply with South Africa's general privacy protection in terms Section 14 of the Bill of Rights in connection with this Bid and shall procure that its personnel shall observe the provisions of such Act [as applicable] or any amendments and re-enactments thereof and any regulations made pursuant thereto.
- 8.2 The Receiving Party warrants that it and its Agents have the appropriate technical and organisational measures in place against unauthorised or unlawful processing of data relating to the Bid and against accidental loss or destruction of, or damage to such data held or processed by them.

9. GENERAL

- 9.1 Neither party may assign the benefit of this Agreement, or any interest hereunder, except with the prior written consent of the other, save that Transnet may assign this Agreement at any time to any member of the Transnet Group.
- 9.2 No failure or delay in exercising any right, power or privilege under this Agreement will operate as a waiver of it, nor will any single or partial exercise of it preclude any further exercise or the exercise of any right, power or privilege under this Agreement or otherwise.
- 9.3 The provisions of this Agreement shall be severable in the event that any of its provisions are held by a court of competent jurisdiction or other applicable authority to be invalid, void or otherwise unenforceable, and the remaining provisions shall remain enforceable to the fullest extent permitted by law.
- 9.4 This Agreement may only be modified by a written agreement duly signed by persons authorised on behalf of each party.
- 9.5 Nothing in this Agreement shall constitute the creation of a partnership, joint venture or agency between the parties.
- 9.6 This Agreement will be governed by and construed in accordance with South African law and the parties irrevocably submit to the exclusive jurisdiction of the South African courts.

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GENERAL BID CONDITIONS

[June 2022]

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1 DEFINITIONS

Where the following words or phrases are used in this Agreement, such words or phrases shall have the meaning assigned thereto in this clause, except where the context clearly requires otherwise:

- 1.1 **Bid** shall mean a Respondent's tendered response / proposal to a Transnet RFP or RFQ;
- 1.2 **Bid Document(s)** shall mean a reference to a Request for Proposal or Request for Quotation;
- 1.3 **Business Day** shall mean any day other than a Saturday, Sunday or public holiday;
- 1.4 **Goods** shall mean the goods required by Transnet as specified in its Bid Document;
- 1.5 **Parties** shall mean Transnet and the Respondents to a Bid Document;
- 1.6 **Respondent(s)** shall mean a respondent/bidder to a Bid Document;
- 1.7 **RFP** shall mean Request for Proposal;
- 1.8 **RFQ** shall mean Request for Quotation;
- 1.9 **RFX** shall mean RFP or RFQ, as the case may be;
- 1.10 **Services** shall mean the services required by Transnet as specified in its Bid Document;
- 1.11 **Service Provider or Supplier** shall mean the successful Respondent;
- 1.12 **Tax Invoice** shall mean the document as required by Section 20 of the Value-Added Tax Act, 89 of 1991, as may be amended from time to time;
- 1.13 **Transnet** shall mean Transnet SOC Ltd, a State Owned Company; and
- 1.14 **VAT** shall mean Value-Added Tax in terms of the Value-Added Tax Act, 89 of 1991, as may be amended from time to time.

2 GENERAL

All Bid Documents and subsequent contracts and orders shall be subject to the following general conditions as laid down by Transnet and are to be strictly adhered to by any Respondent to this RFX.

3 SUBMITTING OF BID DOCUMENTS

- 3.1 A Bid, which shall hereinafter include reference to an RFP or RFQ, shall be submitted to Transnet no later than the closing date and time specified in accordance with the directions issued in the Bid Documents. Late Bids will not be considered.
- 3.2 The Bid Documents must be completed in their entirety and Respondents are required to complete and submit their Bid submissions by uploading them into the system against each tender selected. The bidder guide can be found on the Transnet Portal transnetetenders.azurewebsites.net.

4 USE OF BID FORMS

- 4.1 Where special forms and/or formats are issued by Transnet for the submission of Bids, Respondents are required to submit their Bids by completion of the appropriate sections on such official forms and/or formats and not in other forms and/or formats or documents bearing their own terms and conditions of contract. Non-compliance with this condition may result in the rejection of a Bid.
- 4.2 Respondents must note that the original Bid forms and/or formats must be completed for submission.
- 4.3 Only if insufficient space has been allocated to a particular response may a Respondent submit additional information under separate cover using the Company's letterhead. This must be duly cross-referenced in the RFX.

5 BID FEES

A bid fee is not applicable. The Bid Documents may be downloaded directly from National Treasury's e-Tender Publication Portal at www.etenders.gov.za and may also be downloaded from the Transnet website at www.transnet.net free of charge.

6 VALIDITY PERIOD

- 6.1 The Respondents must hold their Bid valid for acceptance by Transnet at any time within the requested validity period after the closing date of the bid.
- 6.2 Respondents may be requested to extend their validity period for a specified additional period. In such instances, Respondents will not be allowed to change any aspect of their Bid, unless they are able to demonstrate that the proposed change/s is as a direct and unavoidable consequence of Transnet's extension of the validity period.

7 SITE VISITS / BRIEFING SESSIONS

Respondents may be requested to attend a site visit or briefing session where it is necessary to view the site in order to prepare their Bids, or where Transnet deems it necessary to provide Respondents with further information to allow them to complete their Bids properly. Where such visits or sessions are indicated as compulsory in the RFX Document, Respondents are obliged to attend these meetings as failure to do so will result in their disqualification.

8 CLARIFICATION BEFORE THE CLOSING DATE

Should clarification be required on any aspect of the Bid before the closing date, the Respondent must upload questions onto the Transnet e-Tender Submission Portal or direct such queries to the contact person listed in the RFX Document in the stipulated manner.

9 COMMUNICATION AFTER THE CLOSING DATE

After the closing date of a Bid (i.e. during the evaluation period) the Respondent may only communicate with the contact person listed in the RFX Document.

10 UNAUTHORISED COMMUNICATION ABOUT BIDS

Respondents may at any time communicate with the contact person listed in the RFX Document on any matter relating to its Bid but, in the absence of written authority from the delegated individual (BEC chairperson), no communication on a question affecting the subject of a Bid shall take place between Respondents or other potential service providers or any member of the Bid Adjudication Committee or official of Transnet during the period between the closing date for the receipt of the Bid and the date of the notification of the successful Respondent(s). A Bid, in respect of which any such unauthorised communication has occurred, may be disqualified.

11 RETURNABLE DOCUMENTS

All returnable documents listed in the RFX Documents must be submitted with Respondent's Bid. Failure to submit mandatory returnable schedules / documents will result in disqualification. Failure to submit other schedules / documents may result in disqualification.

12 DEFAULTS BY RESPONDENTS

If the Respondent, after it has been notified of the acceptance of its Bid fails to:

- 12.1 enter into a formal contract when called upon to do so within such period as Transnet may specify; or
- 12.2 accept an order in terms of the Bid;
- 12.3 furnish satisfactory security when called upon to do so for the fulfilment of the contract; or
- 12.4 comply with any condition imposed by Transnet,

Transnet may, in any such case, without prejudice to any other legal remedy which it may have, proceed to accept any other Bid or, if it is necessary to do so, call for Bids afresh, and may recover from the defaulting Respondent any additional expense incurred by Transnet in calling for new offers or in accepting a less favourable offer.

13 CURRENCY

All monetary amounts referred to in a Bid response must be in Rand, the currency of the Republic of South Africa [**ZAR**], save to the extent specifically permitted in the RFP.

14 PRICES SUBJECT TO CONFIRMATION

Prices which are quoted subject to confirmation will not be considered.

15 ALTERATIONS MADE BY THE RESPONDENT TO BID PRICES

All alterations made by the Respondent to its Bid price(s) prior to the submission of its Bid Documents must be done by deleting the incorrect figures and words where required and by inserting the correct figures and words against the items concerned. All such alterations must be initialled by the person who signs the Bid Documents. Failure to observe this requirement may result in the particular item(s) concerned being excluded in the matter of the award of the business.

16 EXCHANGE AND REMITTANCE

- 16.1 The Respondent should note that where the whole or a portion of the contract or order value is to be remitted overseas, Transnet shall, if requested to do so by the Supplier/Service Provider, effect payment overseas directly to the foreign principal or manufacturer of such percentage of the contract or order value as may be stipulated by the Respondent in its Bid Documents.
- 16.2 It is Transnet's preference to enter into Rand-based agreements. Transnet would request, therefore, that the Respondent give favourable consideration to obtaining forward exchange cover on the foreign currency portion of the Agreement at a cost that is acceptable to Transnet to protect itself against any currency rate fluctuation risks for the duration of any resulting contract or order.
- 16.3 The Respondent who desires to avail itself of the aforementioned facility must at the time of bidding furnish the information called for in the Exchange and Remittance section of the Bid Documents and also furnish full details of the principals or manufacturer to whom payment is to be made.
- 16.4 The South African Reserve Bank's approval is required before any foreign currency payments can be made to or on behalf of Respondents.
- 16.5 Transnet will not recognise any claim for adjustment of the order and/or contract price if the increase in price arises after the date on which the Goods/Services were to be delivered, as set out in the order and/or contract, or any subsequent agreement between the parties.
- 16.6 Transnet reserves the right to request a pro-forma invoice/tax invoice in order to ensure compliance with the contract and Value-Added Tax Act no. 89 of 1991 [VAT Act].

17 ACCEPTANCE OF BID

- 17.1 Upon the acceptance of a Bid by Transnet, the parties shall be bound by these General Bid Conditions and any contractual terms and/or any schedule of "Special Conditions" or otherwise which form part of the Bid Documents.
- 17.2 Where the Respondent has been informed by Transnet of the acceptance of its Bid, an email communication that has been successfully sent to the Respondent shall be regarded as proof of delivery to the Respondent 1 day after the date of submission.

18 NOTICE TO UNSUCCESSFUL RESPONDENTS

- 18.1 Unsuccessful Respondents shall be advised in writing that their Bids have not been accepted as soon as possible after the closing date of the Bid. On award of business to the successful Respondent all unsuccessful Respondents must be informed of the name of the successful Respondent and of the reason as to why their Bids had been unsuccessful.

19 TERMS AND CONDITIONS OF CONTRACT

- 19.1 The Supplier/Service Provider shall adhere to the Terms and Conditions of Contract issued with the Bid Documents, together with any schedule of "Special Conditions" or otherwise which form part of the Bid Documents.
- 19.2 Should the Respondent find any conditions unacceptable, it should indicate which conditions are unacceptable and offer amendments/ alternatives by written submission on a company letterhead. Any such submission shall be subject to review by Transnet's Legal Counsel who shall determine whether the proposed amendments /alternative(s) are acceptable or otherwise, as the case may be. Respondents will be afforded an opportunity to withdraw an unacceptable deviation, failing which the respondent will be disqualified.

20 CONTRACT DOCUMENTS

- 20.1 The contract documents will comprise these General Bid Conditions, the Terms and Conditions of Contract and any schedule of "Special Conditions" which form part of the Bid Documents.
- 20.2 The abovementioned documents together with the Respondent's Bid response will constitute the contract between the parties upon receipt by the Respondent of Transnet's letter of acceptance, subject to all additional amendments and/or special conditions thereto as agreed to by the parties.
- 20.3 Should Transnet inform the Respondent that a formal contract will be signed, the abovementioned documents together with the Respondent's Bid response [and, if any, its covering letter and any subsequent exchange of correspondence] as well as Transnet's Letter of Acceptance, shall constitute a binding contract until the final contract is signed.

21 LAW GOVERNING CONTRACT

The law of the Republic of South Africa shall govern the contract created by the acceptance of a Bid. The *domicilium citandi et executandi* shall be a place in the Republic of South Africa to be specified by the Respondent in its Bid at which all legal documents may be served on the Respondent who shall agree to submit to the jurisdiction of the courts of the Republic of South Africa. A foreign Respondent shall, therefore, state in its Bid the name of its authorised representative in the Republic of South Africa who is empowered to sign any contract which may be entered into in the event of its Bid being accepted and to act on its behalf in all matters relating to the contract.

22 IDENTIFICATION

If the Respondent is a company, the full names of the directors shall be stated in the Bid. If the Respondent is a close corporation, the full names of the members shall be stated in the Bid. If the Respondent is a partnership or an individual trading under a trade name, the full names of the partners or of such individual, as the case may be, shall be furnished.

23 RESPONDENT'S SAMPLES

- 23.1 If samples are required from Respondents, such samples shall be suitably marked with the Respondent's name and address, the Bid number and the Bid item number and must be despatched in time to reach the addressee as stipulated in the Bid Documents on or before the closing date of the Bid. Failure to submit samples by the due date may result in the rejection of a Bid.
- 23.2 Transnet reserves the right to retain samples furnished by Respondents in compliance with Bid conditions.
- 23.3 Payment will not be made for a successful Respondent's samples that may be retained by Transnet for the purpose of checking the quality and workmanship of Goods/Services delivered in execution of a contract.
- 23.4 If Transnet does not wish to retain unsuccessful Respondents' samples and the Respondents require their return, such samples may be collected by the Respondents at their own risk and cost.

24 SECURITIES

- 24.1 The successful Respondent, when called upon to do so, shall provide security to the satisfaction of Transnet for the due fulfilment of a contract or order. Such security shall be in the form of a Deed of Suretyship [Deed of Suretyship] furnished by an approved bank, building society, insurance or guarantee corporation carrying on business in South Africa.
- 24.2 The security may be applied in whole or part at the discretion of Transnet to make good any loss or damage which Transnet may incur in consequence of a breach of the contract or any part thereof.
- 24.3 Such security, if required, shall be an amount which will be stipulated in the Bid Documents.
- 24.4 For the purpose of clause 24.124.1 above, Transnet will supply a Deed of Suretyship form to the successful Respondent for completion and no guarantee in any other form will be accepted. A copy of such form will be supplied to Respondents on request. For this purpose a Deed of Suretyship form will be provided which shall be completed and returned to Transnet or a designated official by the successful Respondent within 30 [thirty] calendar days from the date of the letter of acceptance. No payment will be made until the form, duly completed, is delivered to Transnet. Failure to return the Deed of Suretyship within the prescribed time shall, save where prior extension has been granted, entitle Transnet without notice to the Supplier/Service Provider to cancel the contract with immediate effect.
- 24.5 Additional costs incurred by Transnet necessitated by reason of default on the part of the Supplier/Service Provider in relation to the conditions of this clause 244 will be for the account of the Supplier/Service Provider.

25 PRICE AND DELIVERY BASIS FOR GOODS

- 25.1 Unless otherwise specified in the Bid Documents, the prices quoted for Goods must be on a Delivered Duty Paid [latest ICC Incoterms] price basis in accordance with the terms and at the delivery point or

points specified in Transnet's Bid Documents. Bids for supply on any other basis of delivery are liable to disqualification. The lead time for delivery stated by the Respondent must be inclusive of all non-working days or holidays, and of periods occupied in stocktaking or in effecting repairs to or overhauling plant, which would ordinarily occur within the delivery period given by the Respondent.

25.2 Respondents must furnish their Bid prices in the Price Schedule of the Bid Documents on the following basis:

- a) Local Supplies - Prices for Goods to be manufactured, produced or assembled in the Republic of South Africa, or imported supplies held in South Africa, to be quoted on a Delivered RSA named destination basis.
- b) Imported Supplies - Prices for Goods to be imported from all sources to be quoted on a Delivered Duty Paid [latest ICC Incoterms] basis, to end destination in South Africa, unless otherwise specified in the Bid Price Schedule.

26 EXPORT LICENCE

The award of a Bid for Goods to be imported may be subject to the issue of an export licence in the country of origin or supply. If required, the Supplier/Service Provider's manufacturer or forwarding agent shall be required to apply for such licence.

27 QUALITY OF MATERIAL

Unless otherwise stipulated, the Goods offered shall be NEW i.e. in unused condition, neither second-hand nor reconditioned.

28 DELETION OF ITEMS EXCLUDED FROM BID

The Respondent must delete items for which it has not tendered or for which the price has been included elsewhere in its Bid.

29 VALUE-ADDED TAX

29.1 In respect of local supplies, i.e. Goods to be manufactured, produced or assembled in the Republic of South Africa, or imported supplies held or already in transit to South Africa, the prices quoted by the Respondent are to be inclusive of VAT which must be shown separately at the standard rate on the Tax Invoice.

29.2 In respect of foreign Services rendered:

- a) the invoicing by a South African Service Provider on behalf of its foreign principal rendering such Service represents a Service rendered by the principal; and
- b) the Service Provider's Tax Invoice(s) for the local portion only [i.e. the "commission" for the Services rendered locally] must show the VAT separately.

30 IMPORTANT NOTICE TO RESPONDENTS REGARDING PAYMENT

30.1 Method of Payment

- a) The attention of the Respondent is directed to the Terms and Conditions of Contract which set out the conditions of payment on which Bid price(s) shall be based.
- b) However, in addition to the foregoing the Respondent is invited to submit offers based on alternative methods of payment and/or financing proposals.

- c) The Respondent is required to give full particulars of the terms that will be applicable to its alternative offer(s) and the financial merits thereof will be evaluated and taken into consideration when the Bid is adjudicated.
- d) The Respondent must, therefore, in the first instance, tender strictly in accordance with clause 30.1 (a) above. Failure to comply with clause 30.1 (a) above may preclude a Bid from further consideration.

NOTE: The successful Respondent [the **Supplier/Service Provider**] shall, where applicable, be required to furnish a guarantee covering any advance payments.

30.2 Conditional Discount

Respondents offering prices which are subject to a conditional discount applicable for payment within a specific period are to note that the conditional period will be calculated as from the date of receipt by Transnet of the Supplier/Service Provider's month-end statement reflecting the relevant Tax Invoice(s) for payment purposes, provided the conditions of the order or contract have been fulfilled and the Tax Invoice is correct in all respects as referred to in the contract or order. Incomplete and/or incorrect Tax Invoices shall be returned and the conditional period will be recalculated from the date of receipt of the correct documentation.

31 CONTRACT QUANTITIES AND DELIVERY REQUIREMENTS

31.1 Contract Quantities

- a) It must be clearly understood that although Transnet does not bind itself to purchase a definitive quantity under any contract which may be entered into pursuant to this Bid, the successful Respondent nevertheless undertakes to supply against the contract such quantities as may be ordered against the contract, which orders are posted or delivered by hand or transmitted electronically on or before the expiry date of such contract.
- b) It is furthermore a condition that Transnet will not accept liability for any material/stocks specially ordered or carried by the Respondent with a view to meeting the requirements under any such contract.
- c) The estimated planned quantities likely to be ordered by Transnet per annum are furnished in relevant section of the Bid Documents. For avoidance of doubt the estimated quantities are estimates and Transnet reserves the right to order only those quantities sufficient for its operational requirements.

31.2 Delivery Period

a) Period Contracts and Fixed Quantity Requirements

It will be a condition of any resulting contract/order that the delivery period embodied therein will be governed by the provisions of the Terms and Conditions of Contract.

b) Progress Reports

The Supplier/Service Provider may be required to submit periodical progress reports with regard to the delivery of the Goods/Services.

c) Emergency Demands as and when required

If, due to unforeseen circumstances, supplies of the Goods/Services covered by the Bid are required at short notice for immediate delivery, the Supplier/Service Provider will be given first right of refusal for such business. If it is unable to meet the desired critical delivery period,

Transnet reserves the right to purchase such supplies as may be required to meet the emergency outside the contract if immediate delivery can be offered from any other source. The *Total or Partial Failure to Perform the Scope of Supply* section in the Terms and Conditions of Contract will not be applicable in these circumstances.

32 PLANS, DRAWINGS, DIAGRAMS, SPECIFICATIONS AND DOCUMENTS

32.1 Copyright

Copyright in plans, drawings, diagrams, specifications and documents compiled by the Supplier/Service Provider for the purpose of contract work shall be governed by the Intellectual Property Rights section in the Terms and Conditions of Contract.

32.2 Drawings and specifications

In addition to what may be stated in any Bid Document, the Respondent should note that, unless notified to the contrary by Transnet or a designated official by means of an official amendment to the Bid Documents, it is required to tender for Goods/Services strictly in accordance with the drawings and/or specifications supplied by Transnet, notwithstanding that it may be aware that alterations or amendments to such drawings or specifications are contemplated by Transnet.

32.3 Respondent's drawings

Drawings required to be submitted by the Respondent must be furnished before the closing time and date of the Bid. The non-receipt of such drawings by the appointed time may disqualify the Bid.

32.4 Foreign specifications

The Respondent quoting for Goods/Services in accordance with foreign specifications, other than British and American standards, is to submit translated copies of such specifications with the Bid. In the event of any departures or variations between the foreign specification(s) quoted in the Bid Documents, full details regarding such departures or variations must be furnished by the Respondent in a covering letter attached to the Bid. Non-compliance with this condition may result in disqualification.

33 BIDS BY OR ON BEHALF OF FOREIGN RESPONDENTS

33.1 Bids submitted by foreign principals may be forwarded directly by the principals or by its South African representative or agent to the designated official of Transnet according to whichever officer is specified in the Bid Documents.

33.2 In the case of a representative or agent, written proof must be submitted to the effect that such representative or agent has been duly authorised to act in that capacity by the principal. Failure to submit such authorisation by the representative or agent shall disqualify the Bid.

33.3 When legally authorised to prepare and submit Bids on behalf of their principals not domiciled in the Republic of South Africa, representatives or agents must compile the Bids in the names of such principals and sign them on behalf of the latter.

33.4 South African representatives or agents of a successful foreign Respondent must when so required enter into a formal contract in the name of their principals and must sign such contract on behalf of the latter. In every such case a legal Power of Attorney from their principals must be furnished to Transnet by the South African representative or agents authorising them to enter into and sign such contract.

- a) Such Power of Attorney must comply with Rule 63 (Authentication of documents executed outside the Republic for use within the Republic) of the Uniform Rules of Court: Rules regulating the conduct of the proceedings of the several provincial and local divisions of the Supreme Court of South Africa.
 - b) The Power of Attorney must be signed by the principal under the same title as used in the Bid Documents.
 - c) If a Power of Attorney held by the South African representative or agent includes matters of a general nature besides provision for the entering into and signing of a contract with Transnet, a certified copy thereof should be furnished.
 - d) The Power of Attorney must authorise the South African representative or agent to choose the *domicilium citandi et executandi*.
- 33.5 If payment is to be made in South Africa, the foreign Supplier/Service Provider [i.e. the principal, or its South African agent or representative], must notify Transnet in writing whether, for payment by electronic funds transfer [EFT]:
- a) funds are to be transferred to the credit of the foreign Supplier/Service Provider's account at a bank in South Africa, in which case the name and branch of such bank shall be furnished; or
 - b) funds are to be transferred to the credit of its South African agent or representative, in which case the name and branch of such bank shall be furnished.
- 33.6 The attention of the Respondent is directed to clause 24 above [Securities] regarding the provision of security for the fulfilment of contracts and orders and the manner and form in which such security is to be furnished.

34 DATABASE OF RESTRICTED SUPPLIERS

The process of restriction is used to exclude a company/person from conducting future business with Transnet and other organs of state for a specified period. No Bid shall be awarded to a Bidder whose name (or any of its members, directors, partners or trustees) appear on the Register of Tender Defaulters kept by National Treasury, or who have been placed on National Treasury's List of Restricted Suppliers. Transnet reserves the right to withdraw an award, or cancel a contract concluded with a Bidder should it be established, at any time, that a bidder has been restricted with National Treasury by another government institution.

35 CONFLICT WITH ISSUED RFX DOCUMENT

- 35.1 Should a conflict arise between these General Bid Conditions and the issued RFX document, the conditions stated in the RFX document shall prevail.

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Important Note: All potential bidders must read this document and certify in the RFX Declaration Form that they have acquainted themselves with, and agree with the content. The contract with the successful bidder will automatically incorporate this Integrity Pact as part of the final concluded contract.

INTEGRITY PACT

Between

TRANSNET SOC LTD

Registration Number: 1990/000900/30

("Transnet")

And The Bidder / Supplier/ Service Provider / Contractor (hereinafter referred to as the "Bidder / Supplier")

PREAMBLE

Transnet values full compliance with all relevant laws and regulations, ethical standards and the principles of economical use of resources, fairness and transparency in its relations with its Bidders / Suppliers.

In order to achieve these goals, Transnet and the Bidder / Supplier hereby enter into this agreement hereinafter referred to as the "Integrity Pact" which will form part of the Bidder's / Supplier's application for registration with Transnet as a vendor.

The general purpose of this Integrity Pact is to agree on avoiding all forms of dishonesty, fraud and corruption by following a system that is fair, transparent and free from any undue influence prior to, during and subsequent to the currency of any procurement and / or reverse logistics event and any further contract to be entered into between the Parties, relating to such event.

All Bidders / Suppliers will be required to sign and comply with undertakings contained in this Integrity Pact, should they want to be registered as a Transnet vendor.

1 OBJECTIVES

- 1.1 Transnet and the Bidder / Supplier agree to enter into this Integrity Pact, to avoid all forms of dishonesty, fraud and corruption including practices that are anti-competitive in nature, negotiations made in bad faith and under-pricing by following a system that is fair, transparent and free from any influence / unprejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:
 - a) Enable Transnet to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works, goods and services; and
 - b) Enable Bidders / Suppliers to abstain from bribing or participating in any corrupt practice in order to secure the contract.

2 COMMITMENTS OF TRANSNET

Transnet commits to take all measures necessary to prevent dishonesty, fraud and corruption and to observe the following principles:

- 2.1 Transnet hereby undertakes that no employee of Transnet connected directly or indirectly with the sourcing event and ensuing contract, will demand, take a promise for or accept directly or through intermediaries any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organisation or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to any contract.
- 2.2 Transnet will, during the registration and bidding process treat all Bidders / Suppliers with equity, transparency and fairness. Transnet will in particular, before and during the registration process, provide to all Bidders / Suppliers the same information and will not provide to any Bidders / Suppliers confidential / additional information through which the Bidders / Suppliers could obtain an advantage in relation to any bidding process.
- 2.3 Transnet further confirms that its employees will not favour any prospective bidder in any form that could afford an undue advantage to a particular bidder during the tendering stage, and will further treat all Bidders / Supplier participating in the bidding process in a fair manner.
- 2.4 Transnet will exclude from the bidding process such employees who have any personal interest in the Bidders / Suppliers participating in the bidding process.

3 OBLIGATIONS OF THE BIDDER / SUPPLIER

- 3.1 Transnet has a '**Zero Gifts**' Policy. No employee is allowed to accept gifts, favours or benefits.
- a) Transnet officials and employees **shall not** solicit, give or accept, or from agreeing to solicit, give, accept or receive directly or indirectly, any gift, gratuity, favour, entertainment, loan, or anything of monetary value, from any person or juridical entities in the course of official duties or in connection with any operation being managed by, or any transaction which may be affected by the functions of their office.
 - b) Transnet officials and employees **shall not** solicit or accept gifts of any kind, from vendors, suppliers, customers, potential employees, potential vendors, and suppliers, or any other individual or organisation irrespective of the value.
 - c) Under **no circumstances** should gifts, business courtesies or hospitality packages be accepted from or given to prospective suppliers participating in a tender process at the respective employee's Operating Division, regardless of retail value.
 - d) Gratuities, bribes or kickbacks of any kind must never be solicited, accepted or offered, either directly or indirectly. This includes money, loans, equity, special privileges, personal favours, benefit or services. Such favours will be considered to constitute corruption.
- 3.2 The Bidder / Supplier commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any ensuing contract stage in order to secure the contract or in furtherance to secure it and in particular the Bidder / Supplier commits to the following:
- a) The Bidder / Supplier will not, directly or through any other person or firm, offer, promise or give to Transnet or to any of Transnet's employees involved in the bidding process or to any third person any material or other benefit or payment, in order to obtain in exchange an advantage during the bidding process; and
 - b) The Bidder / Supplier will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any employee of Transnet, connected directly or indirectly with the bidding process, or to any person, organisation or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.
- 3.3 The Bidder / Supplier will not collude with other parties interested in the contract to preclude a competitive bid price, impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract. The Bidder / Supplier further commits itself to delivering against all agreed upon conditions as stipulated within the contract.
- 3.4 The Bidder / Supplier will not enter into any illegal or dishonest agreement or understanding, whether formal or informal with other Bidders / Suppliers. This applies in particular to certifications, submissions or non-submission of documents or actions that are restrictive or to introduce cartels into the bidding process.
- 3.5 The Bidder / Supplier will not commit any criminal offence under the relevant anti-corruption laws of South Africa or any other country. Furthermore, the Bidder /Supplier will not use for illegitimate purposes or for restrictive purposes or personal gain, or pass on to others, any information provided by Transnet as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 3.6 A Bidder / Supplier of foreign origin shall disclose the name and address of its agents or representatives in South Africa, if any, involved directly or indirectly in the registration or bidding process. Similarly, the Bidder / Supplier of South African nationality shall furnish the name and address of the foreign principals, if any, involved directly or indirectly in the registration or bidding process.
- 3.7 The Bidder / Supplier will not misrepresent facts or furnish false or forged documents or information in order to influence the bidding process to the advantage of the Bidder / Supplier or detriment of Transnet or other competitors.

- 3.8 Transnet may require the Bidder / Supplier to furnish Transnet with a copy of its code of conduct. Such code of conduct must address the compliance programme for the implementation of the code of conduct and reject the use of bribes and other dishonest and unethical conduct.
- 3.9 The Bidder / Supplier will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 3.10 The Bidder/Supplier confirms that they will uphold the ten principles of the United Nations Global Compact (UNGC) in the fields of Human Rights, Labour, Anti-Corruption and the Environment when undertaking business with Transnet as follows:
- a) Human Rights
 - Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
 - Principle 2: make sure that they are not complicit in human rights abuses.
 - b) Labour
 - Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
 - Principle 4: the elimination of all forms of forced and compulsory labour;
 - Principle 5: the effective abolition of child labour; and
 - Principle 6: the elimination of discrimination in respect of employment and occupation.
 - c) Environment
 - Principle 7: Businesses should support a precautionary approach to environmental challenges;
 - Principle 8: undertake initiatives to promote greater environmental responsibility; and
 - Principle 9: encourage the development and diffusion of environmentally friendly technologies.
 - d) Anti-Corruption
 - Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

4 INDEPENDENT BIDDING

- 4.1 For the purposes of this undertaking in relation to any submitted Bid, the Bidder declares to fully understand that the word "competitor" shall include any individual or organisation, other than the Bidder, whether or not affiliated with the Bidder, who:
- a) has been requested to submit a Bid in response to this Bid invitation;
 - b) could potentially submit a Bid in response to this Bid invitation, based on their qualifications, abilities or experience; and
 - c) provides the same Goods and Services as the Bidder and/or is in the same line of business as the Bidder.
- 4.2 The Bidder has arrived at his submitted Bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium will not be construed as collusive bidding.
- 4.3 In particular, without limiting the generality of paragraph 4.2 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
- a) prices;
 - b) geographical area where Goods or Services will be rendered [market allocation];
 - c) methods, factors or formulas used to calculate prices;
 - d) the intention or decision to submit or not to submit, a Bid;

- e) the submission of a Bid which does not meet the specifications and conditions of the RFP; or
 - f) bidding with the intention of not winning the Bid.
- 4.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the Goods or Services to which his/her Bid relates.
- 4.5 The terms of the Bid as submitted have not been, and will not be, disclosed by the Bidder, directly or indirectly, to any competitor, prior to the date and time of the official Bid opening or of the awarding of the contract.
- 4.6 Bidders are aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, Bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and/or may be reported to the National Prosecuting Authority **[NPA]** for criminal investigation and/or may be restricted from conducting business with the public sector for a period not exceeding 10 [ten] years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

5 DISQUALIFICATION FROM BIDDING PROCESS

- 5.1 If the Bidder / Supplier has committed a transgression through a violation of paragraph 3 of this Integrity Pact or in any other form such as to put its reliability or credibility as a Bidder / Supplier into question, Transnet may reject the Bidder's / Supplier's application from the registration or bidding process and remove the Bidder / Supplier from its database, if already registered.
- 5.2 If the Bidder / Supplier has committed a transgression through a violation of paragraph 3, or any material violation, such as to put its reliability or credibility into question, Transnet may after following due procedures and at its own discretion also exclude the Bidder / Supplier from future bidding processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, which will include amongst others the number of transgressions, the position of the transgressors within the company hierarchy of the Bidder / Supplier and the amount of the damage. The exclusion will be imposed for up to a maximum of 10 (ten) years. However, Transnet reserves the right to impose a longer period of exclusion, depending on the gravity of the misconduct.
- 5.3 If the Bidder / Supplier can prove that it has restored the damage caused by it and has installed a suitable corruption prevention system, or taken other remedial measures as the circumstances of the case may require, Transnet may at its own discretion revoke the exclusion or suspend the imposed penalty.

6 DATABASE OF RESTRICTED SUPPLIERS

- 6.1 The process of restriction is used to exclude a company/person from conducting future business with Transnet and other organs of state for a specified period. No Bid shall be awarded to a Bidder whose name (or any of its members, directors, partners or trustees) appear on the Register of Tender Defaulters kept by National Treasury, or who have been placed on National Treasury's List of Restricted Suppliers. Transnet reserves the right to withdraw an award, or cancel a contract concluded with a Bidder should it be established, at any time, that a bidder has been restricted with National Treasury by another government institution.
- 6.2 All the stipulations on Transnet's restriction process as laid down in Transnet's Supply Chain Policy and Procurement Procedures Manual are included herein by way of reference. Below follows a condensed summary of this restriction procedure.
- 6.3 On completion of the restriction procedure, Transnet will submit the restricted entity's details (including the identity number of the individuals and registration number of the entity) to National Treasury for placement on National Treasury's Database of Restricted Suppliers for the specified period of exclusion. National

Treasury will make the final decision on whether to restrict an entity from doing business with any organ of state for a period not exceeding 10 years and place the entity concerned on the Database of Restricted Suppliers published on its official website.

- 6.4 The decision to restrict is based on one of the grounds for restriction. The standard of proof to commence the restriction process is whether a "*prima facie*" (i.e. on the face of it) case has been established.
- 6.5 Depending on the seriousness of the misconduct and the strategic importance of the Goods/Services, in addition to restricting a company/person from future business, Transnet may decide to terminate some or all existing contracts with the company/person as well.
- 6.6 A supplier or contractor to Transnet may not subcontract any portion of the contract to a restricted company.
- 6.7 Grounds for restriction include: If any person/Enterprise which has submitted a Bid, concluded a contract, or, in the capacity of agent or subcontractor, has been associated with such Bid or contract:
 - a) Has, in bad faith, withdrawn such Bid after the advertised closing date and time for the receipt of Bids;
 - b) has, after being notified of the acceptance of his Bid, failed or refused to sign a contract when called upon to do so in terms of any condition forming part of the bid documents;
 - c) has carried out any contract resulting from such bid in an unsatisfactory manner or has breached any condition of the contract;
 - d) has offered, promised or given a bribe in relation to the obtaining or execution of the contract;
 - e) has acted in a fraudulent or improper manner or in bad faith towards Transnet or any Government Department or towards any public body, Enterprise or person;
 - f) has made any incorrect statement in a certificate or other communication with regard to the Local Content of his Goods or his B-BBEE status and is unable to prove to the satisfaction of Transnet that:
 - (i) he made the statement in good faith honestly believing it to be correct; and
 - (ii) before making such statement he took all reasonable steps to satisfy himself of its correctness;
 - g) has submitted false information regarding any other matter required in terms of the Preferential Procurement Regulations, 2017 issued in terms of the Preferential Procurement Policy Framework Act which will affect the evaluation of a Bid or where a Bidder has failed to declare any subcontracting arrangements;
 - h) caused Transnet damage, or to incur costs in order to meet the contractor's requirements and which could not be recovered from the contractor;
 - i) has litigated against Transnet in bad faith.

7 PREVIOUS TRANSGRESSIONS

- 7.1 The Bidder / Supplier hereby declares that no previous transgressions resulting in a serious breach of any law, including but not limited to, corruption, fraud, theft, extortion and contraventions of the Competition Act 89 of 1998, which occurred in the last 5 (five) years with any other public sector undertaking, government department or private sector company that could justify its exclusion from its registration on the Bidder's / Supplier's database or any bidding process.
- 7.2 If it is found to be that the Bidder / Supplier made an incorrect statement on this subject, the Bidder / Supplier can be rejected from the registration process or removed from the Bidder / Supplier database, if already registered, for such reason (refer to the Breach of Law Form contained in the applicable RFX document.)

8 SANCTIONS FOR VIOLATIONS

8.1 Transnet shall also take all or any one of the following actions, wherever required to:

- a) Immediately exclude the Bidder / Supplier from the bidding process or call off the pre-contract negotiations without giving any compensation to the Bidder / Supplier. However, the proceedings with the other Bidders / Suppliers may continue;
- b) Immediately cancel the contract, if already awarded or signed, without giving any compensation to the Bidder / Supplier;
- c) Recover all sums already paid by Transnet;
- d) Encash the advance bank guarantee and performance bond or warranty bond, if furnished by the Bidder / Supplier, in order to recover the payments, already made by Transnet, along with interest;
- e) Cancel all or any other contracts with the Bidder / Supplier;
- f) Exclude the Bidder / Supplier from entering into any bid with Transnet and other organs of state in future for a specified period; and
- g) If the Supplier subcontracted a portion of the bid to another person without declaring it to Transnet, Transnet must penalise the Supplier up to 10% of the value of the contract.

9 CONFLICTS OF INTEREST

9.1 A conflict of interest includes, inter alia, a situation in which:

- a) A Transnet employee has a personal financial interest in a bidding / supplying entity; and
- b) A Transnet employee has private interests or personal considerations or has an affiliation or a relationship which affects, or may affect, or may be perceived to affect his / her judgment in action in the best interest of Transnet, or could affect the employee's motivations for acting in a particular manner, or which could result in, or be perceived as favouritism or nepotism.

9.2 A Transnet employee uses his / her position, or privileges or information obtained while acting in the capacity as an employee for:

- a) Private gain or advancement; or
- b) The expectation of private gain, or advancement, or any other advantage accruing to the employee must be declared in a prescribed form.

Thus, conflicts of interest of any bid committee member or any person involved in the sourcing process must be declared in a prescribed form.

9.3 If a Bidder / Supplier has or becomes aware of a conflict of interest i.e. a family, business and / or social relationship between its owner(s) / member(s) / director(s) / partner(s) / shareholder(s) and a Transnet employee / member of Transnet's Board of Directors in respect of a bid which will be considered for the bid process, the Bidder / Supplier:

- a) must disclose the interest and its general nature, in the Request for Proposal ("RFX") declaration form; or
- b) must notify Transnet immediately in writing once the circumstances has arisen.

9.4 The Bidder / Supplier shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any committee member or any person involved in the sourcing process, where this is done, Transnet shall be entitled forthwith to rescind the contract and all other contracts with the Bidder / Supplier.

10 DISPUTE RESOLUTION

10.1 Transnet recognises that trust and good faith are pivotal to its relationship with its Bidders / Suppliers. When a dispute arises between Transnet and its Bidder / Supplier, the parties should use their best endeavours to resolve the dispute in an amicable manner, whenever possible. Litigation in bad faith negates the principles of trust and good faith on which commercial relationships are based. Accordingly, following a restriction process as mentioned in paragraph 6 above, Transnet will not do business with a company that litigates against it in bad faith or is involved in any action that reflects bad faith on its part. Litigation in bad faith includes, but is not limited to the following instances:

- a) **Vexatious proceedings:** these are frivolous proceedings which have been instituted without proper grounds;
- b) **Perjury:** where a supplier make a false statement either in giving evidence or on an affidavit;
- c) **Scurrilous allegations:** where a supplier makes allegations regarding a senior Transnet employee which are without proper foundation, scandalous, abusive or defamatory; and
- d) **Abuse of court process:** when a supplier abuses the court process in order to gain a competitive advantage during a bid process.

11 GENERAL

- 11.1 This Integrity Pact is governed by and interpreted in accordance with the laws of the Republic of South Africa.
- 11.2 The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the law relating to any civil or criminal proceedings.
- 11.3 The validity of this Integrity Pact shall cover all the bidding processes and will be valid for an indefinite period unless cancelled by either Party.
- 11.4 Should one or several provisions of this Integrity Pact turn out to be invalid the remainder of this Integrity Pact remains valid.
- 11.5 Should a Bidder / Supplier be confronted with dishonest, fraudulent or corruptive behaviour of one or more Transnet employees, Transnet expects its Bidders / Suppliers to report this behaviour directly to a senior Transnet official / employee or alternatively by using Transnet's "Tip-Off Anonymous" hotline number 0800 003 056, whereby your confidentiality is guaranteed.

The Parties hereby declare that each of them has read and understood the clauses of this Integrity Pact and shall abide by it. To the best of the Parties' knowledge and belief, the information provided in this Integrity Pact is true and correct.

ooo000ooo

SWORN AFFIDAVIT – B-BBEE EXEMPTED MICRO ENTERPRISE - GENERAL

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.
2. I am a Member / Director / Owner of the following enterprise and am duly authorised to act on its behalf:

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Business:	
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – (a) who are citizens of the Republic of South Africa by birth or descent; or (b) who became citizens of the Republic of South Africa by naturalisation- i. before 27 April 1994; or ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"
Definition of "Black Designated Groups"	"Black Designated Groups means: (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;"

3. I hereby declare under Oath that:

- The Enterprise is _____% Black Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Female Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____% Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- Black Designated Group Owned % Breakdown as per the definition stated above:
 - Black Youth % = _____%
 - Black Disabled % = _____%
 - Black Unemployed % = _____%
 - Black People living in Rural areas % = _____%
 - Black Military Veterans % = _____%

- Based on the Financial Statements/Management Accounts and other information available on the latest financial year-end of _____, the annual Total Revenue was R10,000,000.00 (Ten Million Rands) or less
- Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box.**

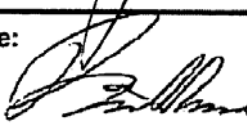
100% Black Owned	Level One (135% B-BBEE procurement recognition level)	
At least 51% Black Owned	Level Two (125% B-BBEE procurement recognition level)	
Less than 51% Black Owned	Level Four (100% B-BBEE procurement recognition level)	

- 4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the Owners of the Enterprise which I represent in this matter.
- 5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature: _____

Date: _____

Commissioner of Oaths
Signature & stamp

TRANSNET FREIGHT RAIL		
	RAIL AND TURNOUT GRINDING SPECIFICATION	Document no: BBD5154
		Revision: 00
Compiled by:	Georg Hettasch Signature:  Senior Engineer, Wheel/Rail Interaction	Date: 2010/09/21
	Pieter Swart Signature:  Chief Engineering Technician, Track Technology	Page 1 of 18
Authorised by:	J.S. Maree Signature:  Principal Engineer, Track Technology	
	Dr. Robert Fröhling Signature:  Principal Engineer, Mechanical Technology	
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TRANSNET FREIGHT RAIL

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SCHEDULE OF AMENDMENTS

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1 INTRODUCTION

This document provides an overview of the rail grinding target profiles that shall be used by Transnet Freight Rail.

A history of previously used rail grinding target profiles is provided in Report BBD5153, entitled "History of South African Rail Grinding Target Profiles".

2 PRINCIPLE

The shape of the rail head profile is designed to allow vehicles to steer, generate minimum stresses in the wheel/rail interface and to minimise wear (caused by creep). These requirements must all be met in a balanced way between the wheel and the rail profile to provide optimum system performance.

Rail grinding is done for three main reasons:

1. To remove fatigued material from the rail.
2. To restore the rail profile to its design (target) shape.
3. To remove rail corrugations.

3 COAL EXPORT LINE RAIL GRINDING TARGET PROFILES

Figure 1 shows the principal dimensions of the Coal Line high leg and tangent target rail profile. Figure 2 shows the principal dimensions of the Coal Line low leg target rail profile. Both these profiles were implemented from November 2004. The latest Coal Line Grinding Gauge and template drawings are:

- Coal Line Grinding Gauge drawing A027_001_100_D. See Appendix A Figure A1.
- No.23 High Leg/Tangent Grinding Template drawing RS A134_001_100_A. See Appendix A Figure A2.
- No.23 Low Leg Grinding Template drawing RS A135_001_100_A. See Appendix A Figure A 3.

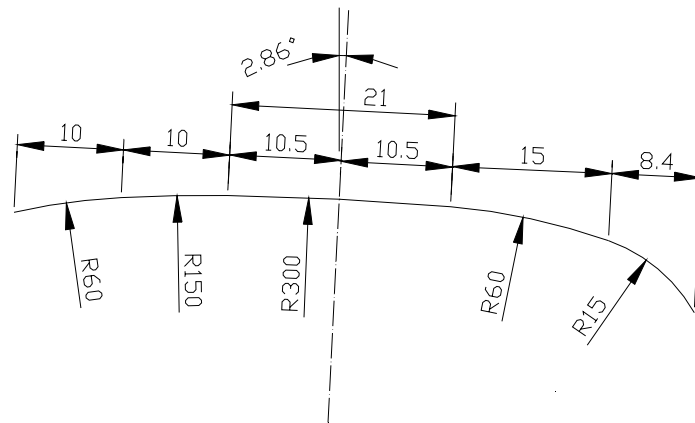


Figure 1

Figure 1: Principal dimensions of the Coal Line high leg and tangent target rail profile

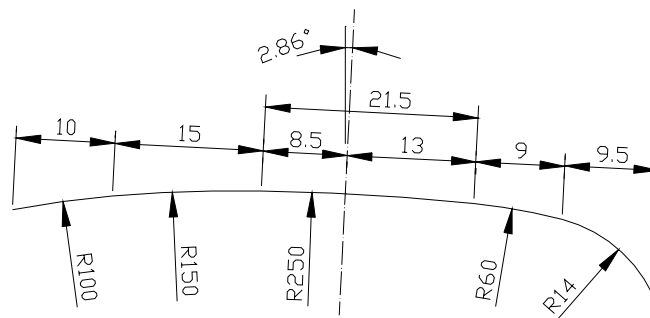


Figure 2

Figure 2: Principal dimensions of the Coal Line low leg target rail profile

The coal export line profiles are applicable to the following track sections:

Blackhill to Ogies, Ogies to Broodsnyersplaas, Wonderfontein to Geluksplaas, Broodsnyersplaas to Ermelo, Ermelo to Vryheid and Vryheid to Richards Bay.

4 IRON ORE EXPORT LINE RAIL GRINDING TARGET PROFILES

Figure 3 shows the principal dimensions of the Iron Ore Line target rail profile as implemented in 1999. The latest Rail Grinding Profile Gauge drawing (RS A067_001_100/C) is shown in Appendix A Figure A4.

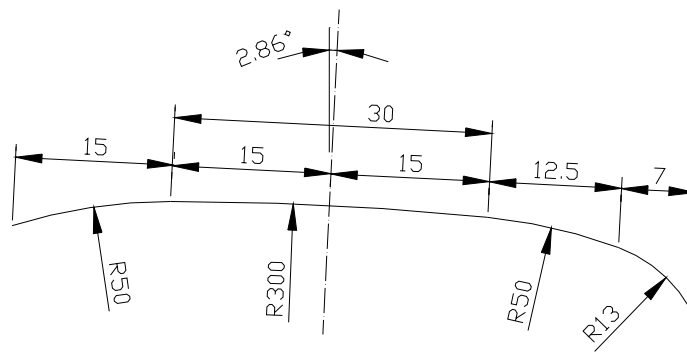


Figure 3

Figure 3: Principal dimensions of the Iron Ore Line target rail profile

The Iron Ore Export line profiles are applicable to the following track sections:

Sishen to Saldanha.

5 GENERAL FREIGHT BUSINESS RAIL GRINDING PROFILES

Figure 4 shows the principal dimensions of the General Freight Business target rail profile.

The GFB Rail Grinding Gauge and template drawings are:

- GFB Rail Grinding Gauge drawing RS A101_001_100_A. See Appendix A, Figure A5.
- R300 Template drawing RS A106_001_100. See Appendix A, Figure A6.

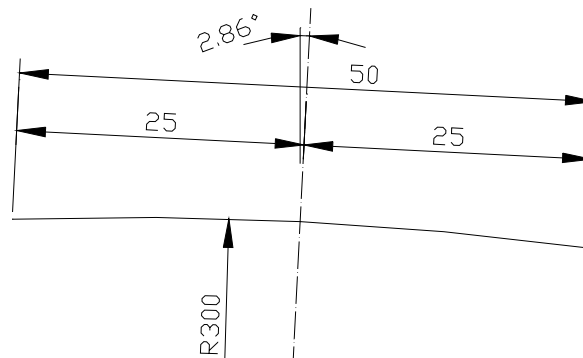


Figure 4

Figure 4: Principal dimensions of the GFB target rail profile

The gauge corner radius is not specified. A smooth transition between the running surface profile and the gauge corner shall be maintained.

In curves less than 500 m radius, the high leg profile shall be offset by -5 mm.

When checking grinding work with a hand gauge (stencil), the profile may be proud in the centre to an extent that the gauge (stencil) is 0.3 mm above the rail at points 15 mm from the centre as shown in Figure 5.

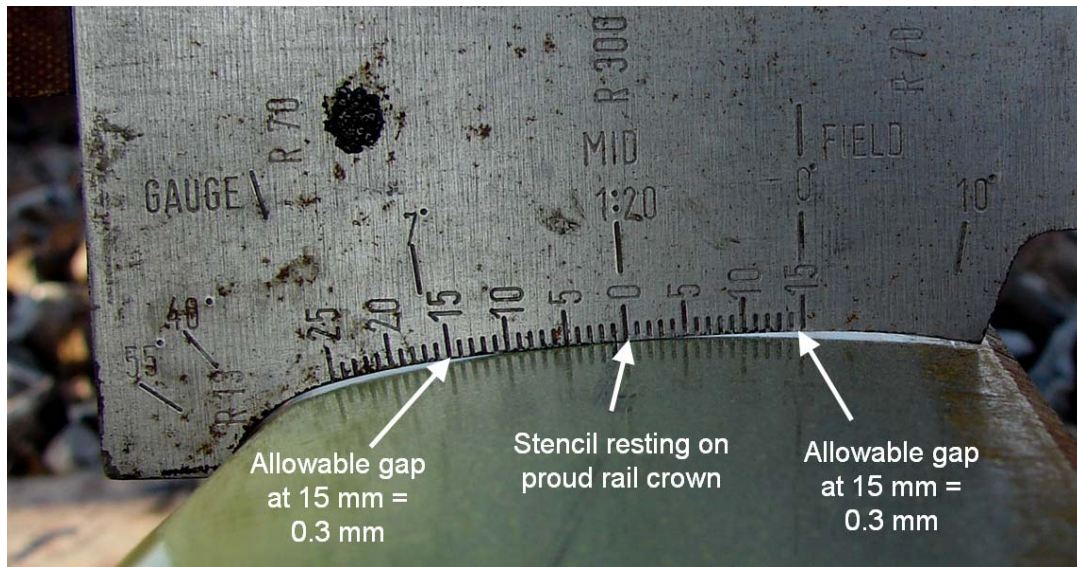


Figure 5: Allowable gaps around a proud rail crown

6 RAIL GRINDING IN TURNOUTS

All Transnet Freight Rail turnouts shall be ground to the same target profile as the General Freight Business lines. Refer to section 5. (The Iron Ore Export line turnout target profile is still under discussion.)

The grinding of all turnouts shall be in accordance with the following strategy:

Rail grinding on all turnouts shall be according to:

- GFB Rail Grinding Gauge drawing RS A101_001_100_A. See Appendix A, Figure A5.
- R300 Template drawing RS A106_001_100. See Appendix A, Figure A6.

In addition to the rail crown R300 mm profile, the gauge corner of all the turnout set rails shall have a radius of 13 mm or more. No radii of less than 13 mm are permitted. This radius shall join the R300 mm profile tangentially without forming a discontinuity (bump).

In the outer (high) leg of the curved part (curved lead rail and points blade) the R300 Template (RS A106_001_100) shall be used with an offset of -5mm. Refer to Figure 6.

Metal removal in the straight sections and in the outer leg of the curved part section of a turnout shall be based on the assessment of the representative rail profile at:

- VAE design turnouts at Sleeper 18 for 1:9 turnouts
- VAE design turnouts at Sleeper 28 for 1:12 turnouts
- VAE design turnouts at Sleeper 38 for 1:20 turnouts
- For all other design turnouts, the second sleeper behind the heel area / block.

Note: Sleeper 1 is the sleeper directly in front of the points of the points blades. From there sleepers are counted towards (and beyond) the frog. The heel is the end (hinging area) of the points blades.

Where required, due to for example metal flow in the gauge corner or on the field side, the special grinding units shall be used on the grinding machine, to remove excess material and to retain the 13mm gauge radii within the complete turnout.

The turnout grinding frequency shall be in line with the open track grinding frequency of the adjacent track.

When new turnouts are installed, grinding shall only be done to remove metal flow and sharp edges (burrs). No profile grinding shall be done during the warranty period of the turnout. After the expiry of the turnout warranty period, new turnouts shall systematically be profiled to an incline of 1:20.

Where new (replacement) components are installed into an existing set, the transverse profile of these components shall be ground to match the adjacent transverse rail head profiles on installation.

Hand grinding in turnouts is only permitted in the following exceptional circumstances:

- a. Where this grinding forms part of a welding intervention. This grinding must be done as per the relevant grinding gauges and the specific design parameters and shall be confined to the area in which the welding was done. The profile shall match the adjacent rail profile.
- b. In places that cannot be reached by the grinding machine and that are ground with the specific intention to remove stress raisers such as excess material, sharp edges and

metal flow. Such grinding shall take place immediately after machine grinding. No part of the turnout that was ground by machine shall be ground by hand. Referring to Figure 6, examples of such places where hand grinding may be required are:

- i. Between the points blade and stock rail on the stock rail to obtain the 13mm gauge radii and to remove excess material.
- ii. On the gauge or field side of the points blades where the grinding machine cannot reach to remove excess material and sharp edges.
- iii. In the moveable “V” area in the 1:20 turnout between the point rail and the wings to remove excess material and sharp edges.

No grinding is permitted on the running surface of railbound frogs.

After grinding the turnout, an inspection shall be done to make sure that all sharp edges have been ground to a radius more than 3 mm radius. No edge or part of the turnout rail profile shall have a radius less than 3 mm.

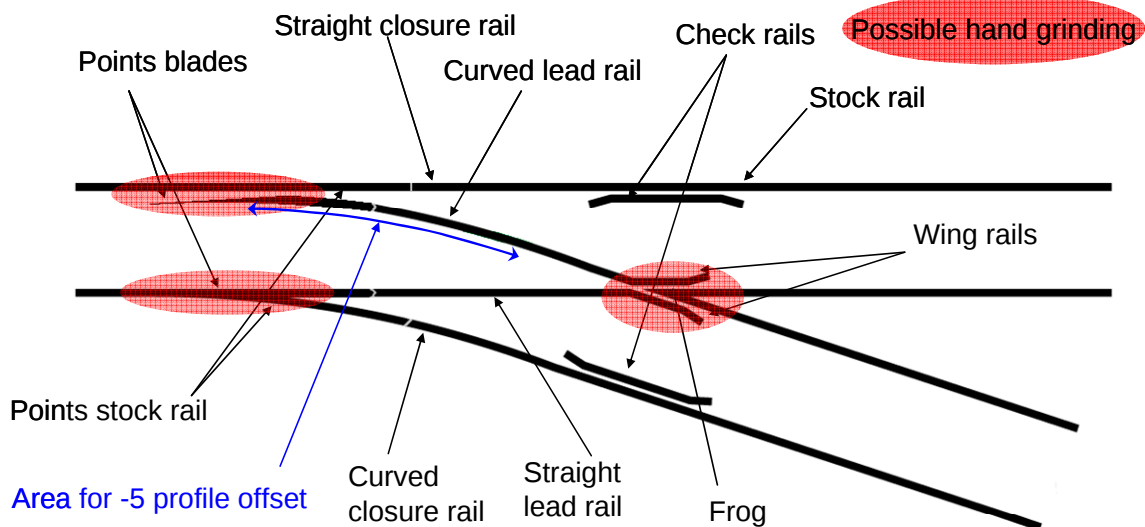


Figure 4

Figure 6: Turnout nomenclature showing areas for special attention

7 SKEW BOGIE DETECTOR RAIL TARGET PROFILE

Figure 7 shows the principal dimensions of the Skew Bogie Detector target rail profile. The template for the Skew Bogie Detector Rail Target Profile (RS A140_001_100) is shown in Appendix A, Figure A7.

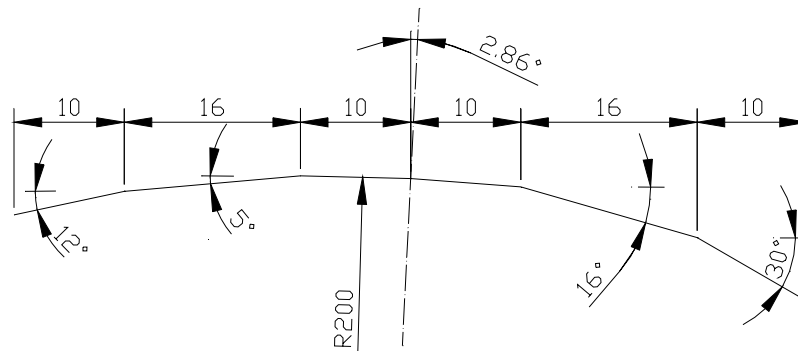


Figure 4

Figure 7: Principal dimensions of the Skew Bogie Detector target rail profile

8 ACCEPTANCE CRITERIA FOR THE TRANSVERSE RAIL PROFILE (GRINDING CAMPAIGN QUALITY)

These quality requirements are based on: "Railway applications – Track – Acceptance of works – Part 3 Acceptance of rail grinding, milling and planning work in track" (BS EN 13231-3:2006)

8.1 Principle

All rail grinding should be done towards a target profile. Although the target profile may not be achieved (within tolerances) on new or severely un-profiled rail in one grinding campaign, the grinding intervention should move the profile measurably closer to the target profile.

8.2 Measurement method

For each ground section of rail that is to be verified, a number of transverse rail profiles shall be measured to provide a statistically meaningful sample. Measurements shall be done using a measurement method / instrument that is approved for this purpose by Technology Management.

The ground transverse rail profile shall be compared with the target profile by matching the two profiles at -2.86° (1:20) and at -45° as shown in Figure 8. Neither profile may be rotated.

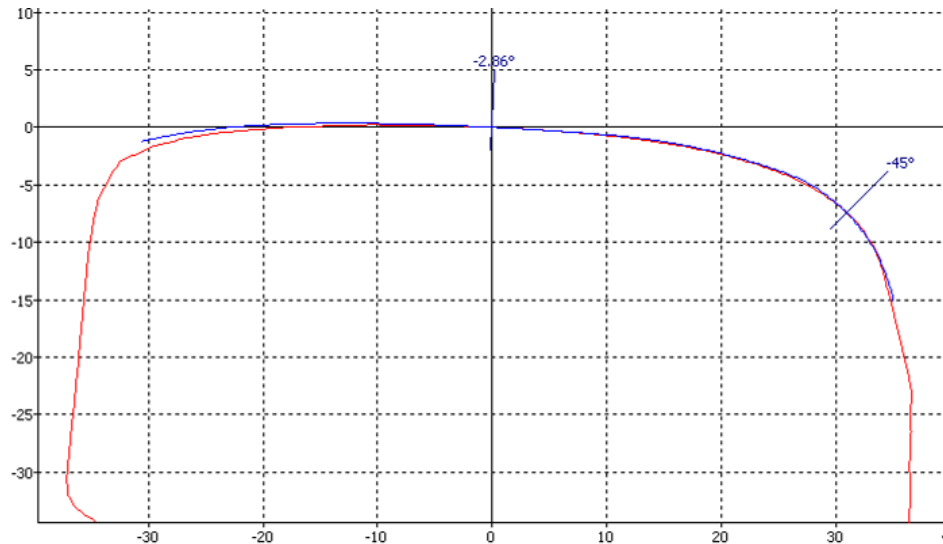


Figure 8: Achieved profile (red) matched to target (blue) at -2.86° and -45°

The conformance between the re-profiled rail and the target profile shall be determined by measuring the difference between them at positions at -30° and at $+8^\circ$ as shown in Figure 9.

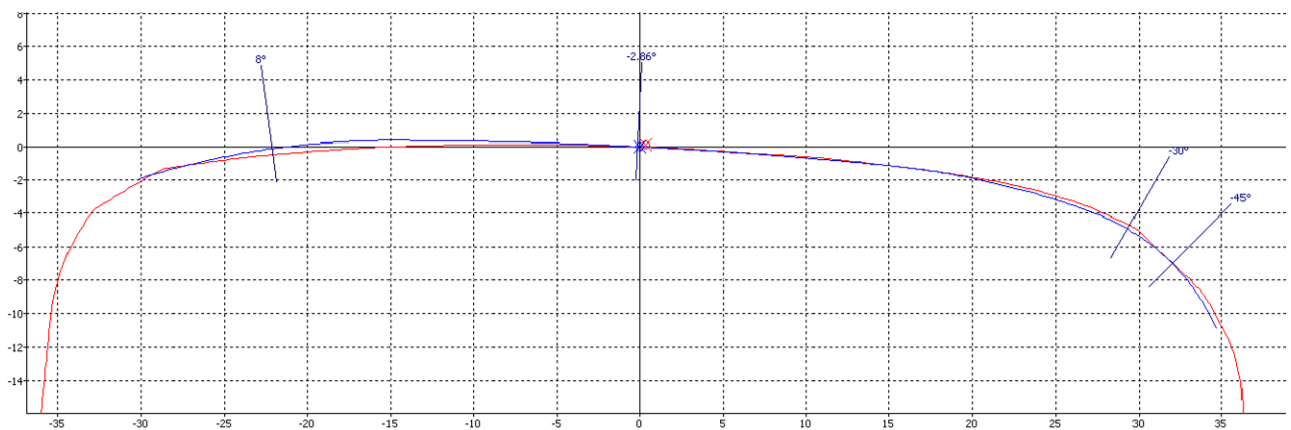


Figure 9: Profile comparison showing conformance measuring positions

For each grinding section the percentage of the profile deviation measurements at -30° and at $+8^\circ$ shall be within the permissible maximum deviations as listed in Table 1.

Table 1: Minimum proportion of measurements within the specified range

Permissible maximum deviations (mm)	+ 0.3/ - 0.3	+ 0.5/ - 0.5	+ 0.8/ - 0.9
Class Q (Heavy Haul)	90 %	95 %	98 %
Class R (General Freight)	75 %	85 %	98 %
Class S (Branch Lines)	No requirement	No requirement	75 %

8.3 Visual appearance

There shall not be continuous blueing on the reprofiled zone.

Grinding facets shall have the following maximum widths:

Location	Transverse radius	Maximum facet width
Gauge corner	< 50 mm	4 mm
Shoulder	< 150 mm	7 mm
Rail crown	>=150 mm	10 mm

The reprofiled rail shall blend smoothly into the parent rail.

9 RELATED DOCUMENTS

1. Report BBD5153, "History of South African Rail Grinding Target Profiles"
2. British Standard. "Railway applications – Track – Acceptance of works – Part 3 Acceptance of rail grinding, milling and planning work in track" (BS EN 13231-3:2006)

10 ACKNOWLEDGEMENTS

The contribution make to this document by the Infrastructure Managers, Welding gangs, Track Technology Engineers and Technicians, Grinding Contractors and others caring for Transnet Freight Rail rails is gratefully acknowledged.

Figure A1: Coal Line Grinding Gauge drawing A027_001_100_D

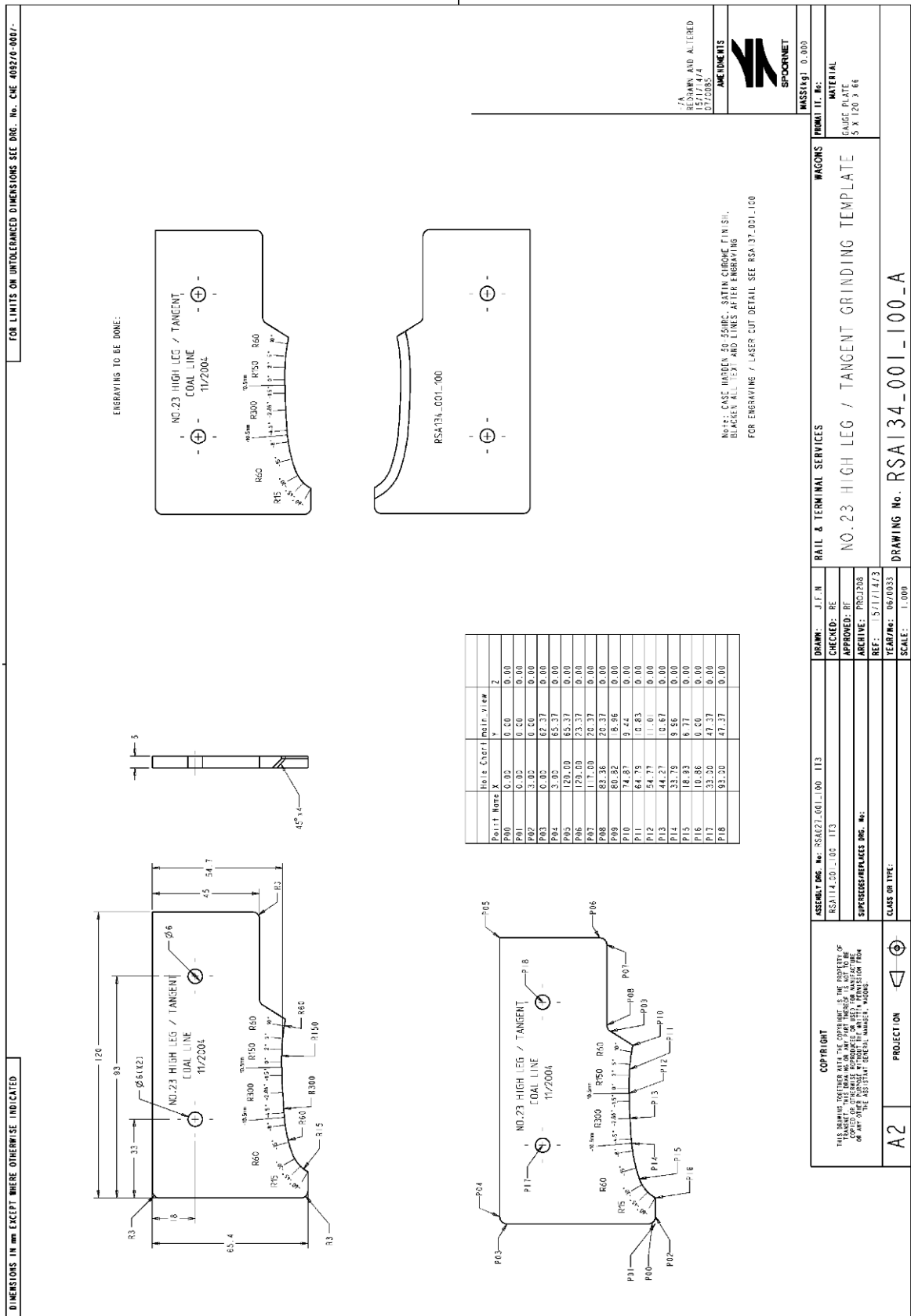


Figure A2: No.23 High Leg/Tangent Grinding Template drawing RS A134_001_100_A

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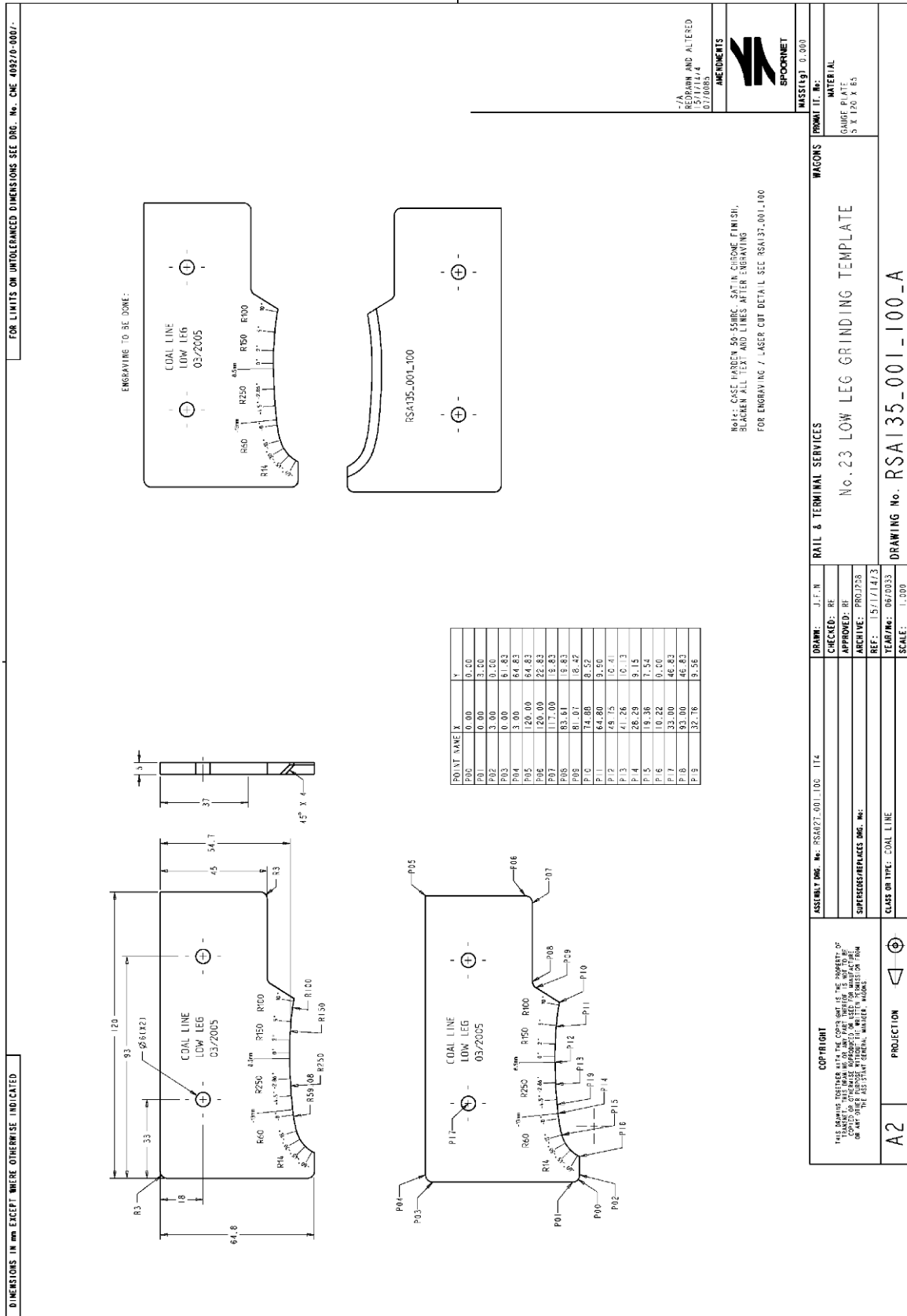
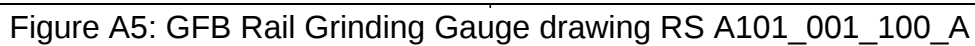


Figure A3: No.23 Low Leg Grinding Template drawing RS A135_001_100_A





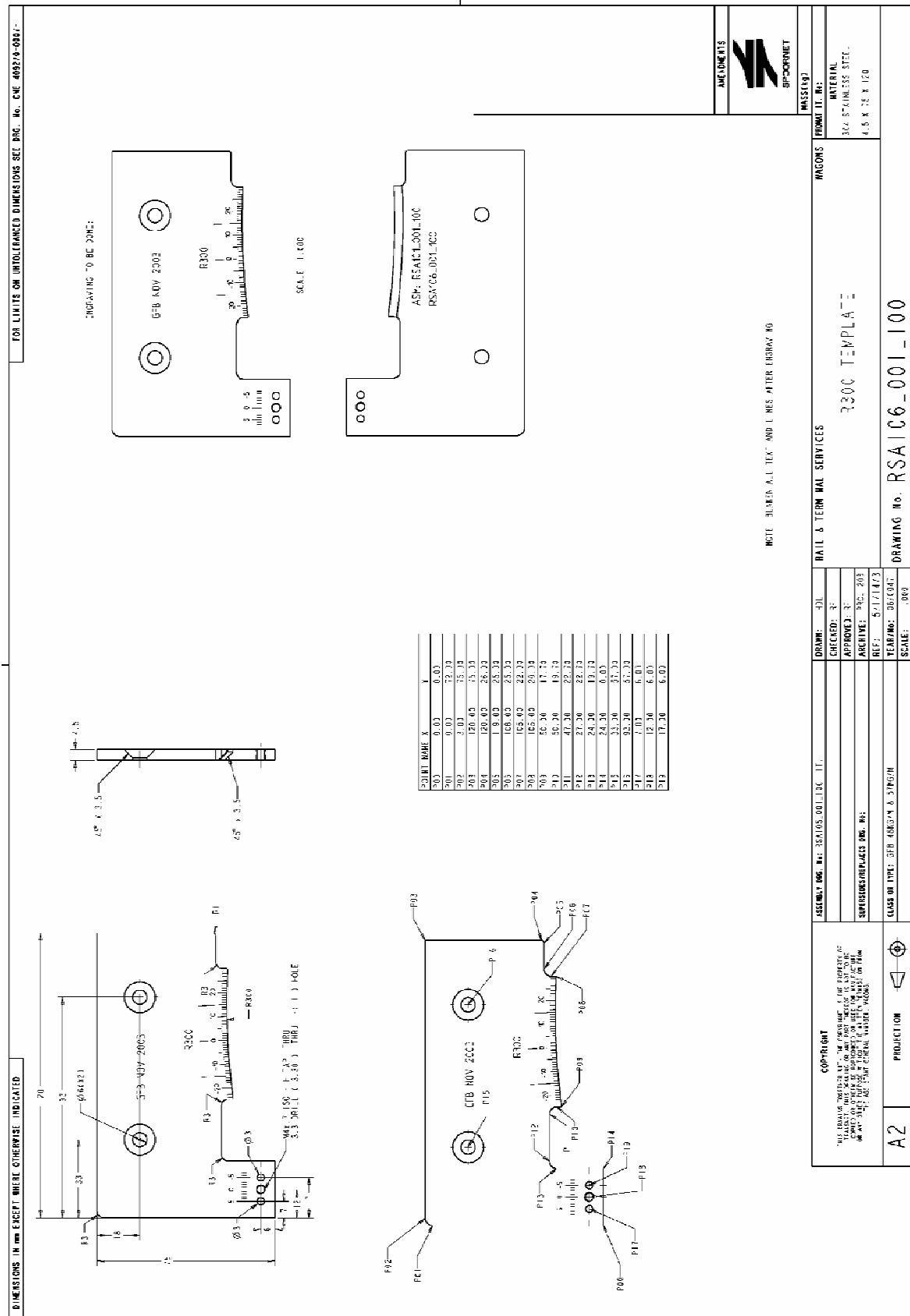


Figure A6: R300 Template drawing RS A106_001_100

(10 January 1992 - to date)

ENVIRONMENT CONSERVATION ACT 73 OF 1989

(Gazette No. 11927, Notice No. 1188. Commencement date: 9 June 1989)

NOISE CONTROL REGULATIONS IN TERMS OF SECTION 25 OF THE ENVIRONMENT CONSERVATION ACT, 1989 (ACT NO. 73 OF 1989)

*Published by Government Notice R154 in Government Gazette 13717. Commencement date: 10 January
1992*

IMPORTANT NOTE BY EDITOR:

These regulations have been repealed in the following provinces:

- Gauteng by GN 5479/PG 75/19990820;
- Free State by GN 24/PG 35/19980424; and
- Western Cape by RN 627/PG 5309/19981120.

Proposed Noise Control Regulations have been published for the Eastern Cape Province under GN 181/PG 824/20011210. Please also note that various provinces and municipalities have their own By-Laws regarding noise control.

The Minister of Environment Affairs has under section 25 of the Environment Conservation Act (Act 73 of 1989), made the regulations in the Schedule.

SCHEDULE

- 1 Definitions
- 2 Powers of a local authority
- 3 General prohibition
- 4 Prohibition of disturbing noise
- 5 Prohibition of noise nuisance
- 6 Use of measuring instruments
- 7 Exemptions
- 8 Attachment
- 9 Penalties
- 10 Commencement

1. Definitions

In these Regulations any word or expression to which a meaning has been assigned in the Act, shall have the meaning so assigned to it and, unless the context otherwise indicates-

'ambient sound level' means the reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes, after such meter had been put into operation;

'animal' also includes birds and poultry;

'controlled area' means a piece of land designated by a local authority where, in the case of-

- (a) road transport noise in the vicinity of a road-
 - (i) the reading on an integrating impulse sound level meter, taken outdoors at the end of a period extending from 06:00 to 24:00 while such meter is in operation, exceeds 65 dBA; or
 - (ii) the equivalent continuous W-weighted sound pressure level at a height of at least 1,2 metres, but not more than 1,4 metres, above the ground for a period extending from 06:00 to 24:00 as calculated in accordance with SABS 0210-1986, titled: 'Code of Practice for calculating and predicting road traffic noise', published under Government Notice No. 358 of 20 February 1987, and projected for a period of 15 years following the date on which the local authority has made such designation, exceeds 65 dBA;
- (b) aircraft noise in the vicinity of an airfield, the calculated noisiness index, projected for a period of 15 years following the date on which the local authority has made such designation, exceeds 65 dBA; or
- (c) industrial noise in the vicinity of an industry-
 - (i) the reading on an integrating impulse sound level meter, taken outdoors at the end of a period of 24 hours while such meter is in operation, exceeds 61 dBA; or
 - (ii) the calculated outdoor equivalent continuous W-weighted sound pressure level at a height of at least 1,2 metres, but not more than 1,4 metres, above the ground for a period of 24 hours, exceeds 61 dBA;

'dBA' means the value of the sound pressure level in decibels, determined using a frequency weighting network A, and derived from the following equation:

$$L_{p_A} = 10 \log_{10} \left[\frac{p_A}{p_0} \right]^2, \text{ where—}$$

p_A = the "A"-weighted sound pressure; and

p_0 = the reference sound pressure
($p_0 = 20 \mu \text{ Pa}$);

‘disturbing noise’ means a noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more;

‘erect’ also means alter, convert, extend or re-erect;

‘integrating impulse sound level meter’ means a device which integrates a function of the root mean square value of sound pressure over a period of time while it is set on ‘I’-time weighting and indicates the result in dBA;

‘measuring point’, relating to-

- (a) a piece of land from which an alleged disturbing noise emanates, means a point outside the property projection plane where an alleged disturbing noise, in the opinion of a local authority, shall be measured in accordance with the provisions of regulation 6;
- (b) a building with more than one occupant, means a point in or outside the building where an alleged disturbing noise, in the opinion of a local authority, shall be measured in accordance with the provisions of regulation 6; and
- (c) a stationary vehicle, means a point as described in SABS 0181-1981, titled: ‘Code of Practice for the measurement of noise emitted by road vehicles when stationary’, published under General Notice 463 of 9 July 1982, where a measuring microphone shall be placed;

‘noise level’ means the reading on an integrating impulse sound level meter taken at a measuring point in the presence of any alleged disturbing noise at the end of a total period of at least 10 minutes, after such meter had been put into operation, and, if the alleged disturbing noise has a discernible pitch, to which 5 dBA has been added;

‘noise nuisance’ means any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person;

‘noisiness index’ means a number expressed in dBA as defined in SABS 0117-1974, titled: ‘Code of Practice for the determination and limitation of disturbance around an aerodrome due to noise from aeroplanes’, published under Government Notice No. 151 of 1 February 1985;

‘plant’ means a refrigeration machine, air-conditioners, fan system, compressor, power generator or pump;

‘property projection plane’ means a vertical plane on, and including the boundary line of a piece of land defining the boundaries of such piece of land in space;

‘recreational vehicle’ also means-

- (a) an off-road vehicle, scrambler, dune buggy or ultra-light aircraft;
- (b) a model aircraft, vessel or vehicle;
- (c) any aircraft or helicopter used for sport or recreational purposes; or
- (d) any other conveyance or model which in the opinion of a local authority is a recreational vehicle;

‘sound level’ means the reading on a sound level meter taken at a measuring point;

‘sound level meter’ means a device measuring sound pressure while it is set on W-time weighting and indicates the result in dBA;

‘the Act’, means the Environment Conservation Act, 1989 (Act No. 73 of 1989);

‘zone sound level’ means a derived dBA value determined indirectly by means of a series of measurements, calculations or table readings and designated by a local authority for an area.

2. Powers of a local authority

A local authority may-

- (a) for the purposes of applying these Regulations, at any reasonable time enter a premises without prior notice-
 - (i) to conduct any appropriate examination, enquiry or inspection as it may deem expedient thereon; and
 - (ii) to take any steps it may deem necessary;

- (b) in order to determine whether a vehicle using any road in the area of jurisdiction of that local authority, including a private, provincial or national road crossing its area of jurisdiction, complies with the provisions of these Regulations, instruct the owner or person in control of the vehicle-
 - (i) to have any appropriate inspection or test as such authority may deem necessary conducted on the vehicle on a date and at a time and place determined by the local authority in writing;
 - (ii) to stop the vehicle or cause it to be stopped;
 - (iii) to have any appropriate inspection or test as such authority may deem necessary conducted on the vehicle;
- (c) if a noise emanating from a building, premises, vehicle, recreational vehicle or street is a disturbing noise or noise nuisance, or may in the opinion of the local authority concerned be a disturbing noise or noise nuisance, instruct in writing the person causing such noise or who is responsible therefor, or the owner or occupant of such building or premises from which or from where such noise emanates or may emanate, or all such persons, to discontinue or cause to be discontinued such noise, or to take steps to lower the level of the noise to a level conforming to the requirements of these Regulations within the period stipulated in the instruction: Provided that the provisions of this paragraph shall not apply in respect of a disturbing noise or noise nuisance caused by rail vehicles or aircraft which are not used as recreational vehicles;
- (d) before changes are made to existing facilities or existing uses of land or buildings, or before new buildings are erected, in writing require that noise impact assessments or tests are conducted to the satisfaction of that local authority by the owner, developer, tenant or occupant of the facilities, land or buildings or that, for the purposes of regulation 3(b) or (c), reports or certificates in relation to the noise impact to the satisfaction of that local authority are submitted by the owner, developer, tenant or occupant to the local authority on written demand;
- (e) if excavation work, earthmoving work, pumping work, drilling work, construction work or demolition work or any similar activity, power generation or music causes a noise nuisance or a disturbing noise, instruct in writing that such work, activity, generation or music be forthwith discontinued until such conditions as the local authority may deem necessary have been complied with;
- (f) designate a controlled area in its area of jurisdiction or amend or cancel an existing controlled area by notice in the Official Gazette concerned;

- (g) if the owner or person in charge of an animal fails to comply with an instruction referred to in paragraph (c), subject to the appropriate provisions of any other law, impound or cause to be impounded such animal;
- (h) subject to the provisions of regulation 8 and the appropriate provisions of any other law, attach a vehicle if the sound level of such vehicle exceeds the sound level referred to in regulation 3(j) by more than 5 dBA;
- (i) in writing request the owner or person in control of a plant referred to in regulation 3(k) to furnish forthwith proof to its satisfaction that the plan shall not cause a disturbing noise;
- (j) impose such conditions as it may deem fit when granting any permission or exemption in terms of these Regulations;
- (k) incorporate conditions in relation to noise control with the establishment of a new township, in order to implement the objectives of the Act;
- (l) subject to the appropriate provisions of any other law, place or cause to be placed measuring instruments or similar devices, road traffic signs or notices at any place within its area of jurisdiction for the enforcement of the provisions of these Regulations: Provided that road traffic signs and notices be placed on private property only with the permission of the owner;
- (m) designate zone sound levels for specific areas and for specific times by notice in the Official Gazette concerned.

3. General prohibition

No person shall-

- (a) establish a new township unless the layout plan concerned, if required by a local authority, indicates in accordance with the specifications of the local authority, the existing and future sources of noise, with concomitant dBA values which are foreseen in the township for a period of 15 years following the date on which the erection of the buildings in and around the township commences;
- (b) erect educational, residential, flat, hospital, church or office buildings in an existing township within a controlled area, unless acoustic screening measures have been provided in the building to limit the reading on an integrating impulse sound level meter, measured inside the building after completion, to 40 dBA: Provided that any air-

conditioning or ventilating system shall be switched off during the course of such noise measurements;

- (c) make changes to existing facilities or existing uses of land or buildings or erect new buildings, if it shall in the opinion of a local authority house or cause activities which shall, after such change or erection, cause a disturbing noise, unless precautionary measures to prevent the disturbing noise have been taken to the satisfaction of the local authority;
- (d) build a road or change an existing road, or alter the speed limit on a road, if it shall in the opinion of the local authority concerned cause an increase in noise in or near residential areas, or office, church, hospital or educational buildings, unless noise control measures have been taken in consultation with the local authority concerned to ensure that the land in the vicinity of such road shall not be designated as a controlled area;
- (e) situate educational, residential, hospital or church erven within a controlled area in a new township or an area which has been rezoned: Provided that such situation may be allowed by the local authority concerned in accordance with the acoustic screening measures mentioned by that local authority in the approved building plans; fail to comply with a directive, instruction or notice issued by a local authority in terms of these Regulations;
- (g) notwithstanding the provisions of paragraph (h), stage an organised open-air music festival or similar gathering without the prior consent in writing of a local authority;
- (h) subject to the provisions of regulations 4 and 5(a), operate or play a radio, television set, gramophone, recording device, drum, musical instrument, sound amplifier or similar device producing, reproducing or amplifying sound, or allow it to be operated or played, in a public place, if the noise level, measured at any point which may be occupied by a member of the public, exceeds 95 dBA, unless the following warning is displayed in both official languages and in legible form in a conspicuous place at each entrance to such place:

WARNING:

SOUND LEVELS INSIDE MAY CAUSE PERMANENT HEARING DAMAGE

WAARSKUWING:

KLANKPEILE BINNE KAN PERMANENTE GEHOORSKADE VEROORSAAK;

- (i) use any power tool or power equipment for construction, earth drilling or demolition works, or allow it to be used, in a residential area during the following periods of time:
 - (i) Before 06:00 and after 18:00 from Monday to Saturday; and

- (ii) at any time on any Sunday, Good Friday, Ascension Day, Day of the Covenant and Christmas Day, or any other day as may be determined by a local authority;
- (j) drive a vehicle, or allow it to be driven, on a public road, if the sound level at the measuring point measured-in accordance with the procedure prescribed in SABS 0181-1981, titled: 'Code of Practice for the measurement of noise emitted by road vehicles when stationary' published under General Notice No. 463 of 9 July 1982, exceeds the sound level indicated in the second or third column, as the case may be, of the following table opposite to the type of vehicle indicated in the first column of that table:

Type of vehicle	Sound level dBA up to and including 1992-01-01	Sound level dBA after 1992-01-01
Two and three-wheeled vehicles	95	95
Vehicles with spark ignition and with four or more wheels used for the conveyance of passengers or goods	99	96
Vehicles with diesel engines and not equipped with an engine brake	109	105
Vehicles with diesel engines and equipped with an engine brake:		
(i) engine brake switched off	109	105
(ii) engine brake switched on	109	109

- (k) if required by a local authority, install, replace or modify a plant with a total input power exceeding 10 kilowatts on any premises, unless the local authority has been notified by the owner of the plant in writing at least 14 days before such installation, replacement or modification of-
- (i) the particulars of the plant;
- (ii) the number, street address and title deed description of the premises concerned; and
- (iii) the nature of and the date on which the installation, replacement or modification shall commence:

Provided that if an existing plant had to be replaced by necessity without preceding notification to the local authority, the local authority shall be notified thereof by the owner of the plant in writing within 14 days after the replacement of the plant;

- (l) tamper with, remove, put out of action, damage or impair the functioning of a noise monitoring system, noise limiter, noise measuring instrument, acoustic device, road traffic sign or notice, placed in a position by or on behalf of a local authority;

- (m) for the purposes of these Regulations in respect of a duly authorised employee of a local authority-
 - (i) fail or refuse to grant admission to such employee to enter and to inspect a premises;
 - (ii) fail to refuse to give information which may lawfully be required of him to such employee;
 - (iii) hinder or obstruct such employee in the execution of his duties; or
 - (iv) give false or misleading information to such employee knowing that it is false or misleading.

4. Prohibition of disturbing noise

No person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof.

5. Prohibition of noise nuisance

No person shall-

- (a) cause a noise nuisance, or allow it to be caused, by operating or playing any radio, television set, drum, musical instrument, sound amplifier, loudspeaker system or similar device producing, reproducing or amplifying sound;
- (b) offer any article for sale by shouting or ringing a bell, or by allowing shouting or the ringing of a bell, in a manner which may cause a noise nuisance;
- (c) allow an animal owned or controlled by him to cause a noise nuisance;
- (d) build, repair, rebuild, modify, operate or test a vehicle, vessel or aircraft on residential premises, or allow it to be built, repaired, rebuilt, modified, operated or tested, if it may cause a noise nuisance;
- (e) use or discharge any explosive, firearm or similar device which emits impulsive sound, or allow it to be used or discharged, if it may cause a noise nuisance, except with the prior consent in writing of the local authority concerned and subject to such conditions as the local authority may deem necessary;

- (f) on a piece of land designated by a local authority by means of a notice on that piece of land and in the press in both official languages, or in the air-space above that piece of land-
 - (i) move about on or in recreational vehicle;
 - (ii) exercise control over a recreational vehicle; or
 - (iii) as owner or person in control of the piece of land concerned, allow that on that piece of land, or in the airspace above that piece of land -
 - (aa) is being moved about on or in a recreational vehicle; or
 - (bb) control is being exercised over a recreational vehicle, if it may cause a noise nuisance;
- (g) except in an emergency, emit a sound, or allow a sound to be emitted, by means of a bell, carillon, siren, hooter, static alarm, whistle, loudspeaker or similar device, if it may cause a noise nuisance;
- (h) operate any machinery, saw, sander, drill, grinder, lawnmower, power garden implement or similar device in a residential area, or allow it to be operated, if it may cause a noise nuisance;
- (i) load, unload, open, shut or in any other way handle a crate, box, container, building material, rubbish container or similar article, or allow it to be loaded, unloaded, opened, shut or handled, if it may cause a noise nuisance;
- (j) drive a vehicle on a public road in such a manner that it may cause a noise nuisance.

6. Use of measuring instruments

- (1) The measurement of dBA values in respect of controlled areas, ambient sound levels or noise levels in terms of these Regulations shall be done as follows:
 - (a) Outdoor measurements on a piece of land: By placing the microphone of an integrating impulse sound level meter at least 1,2 metres, but not more than 1,4 metres, above the ground and at least 3,5 metres away from walls, buildings or other sound reflecting surfaces; and
 - (b) indoor measurements in a room or enclosed space, which is not ventilated mechanically: By placing the microphone of an integrating impulse sound level meter at least 1,2

metres, but not more than 1,4 metres, above the floor and at least 1,2 metres away from the wall, with all the windows and outer doors of the room or enclosed space entirely open: Provided that the windows and doors are closed for indoor measurements in rooms or enclosed spaces which are mechanically ventilated.

- (2) Any person taking readings, shall ensure that-
 - (a) the microphone of an integrating impulse sound level meter is at all times provided with a windshield;
 - (b) the measuring instruments are operated strictly in accordance with the manufacturer's instructions; and
 - (c) sound measuring instruments are checked annually by the South African Bureau of Standards or a calibration laboratory approved by the Minister in order to comply with the appropriate specifications for accuracy.

7. Exemptions

- (1) The provisions of these Regulations shall not apply, if-
 - (a) the emission of sound is for the purposes of warning people of a dangerous situation; or
 - (b) the emission of sound takes place during an emergency.
- (2) Any person may by means of a written application, in which the reasons are given in full, apply to the local authority concerned for exemption from any provision of these Regulations.
- (3) An exemption shall, if approved, be granted by a local authority in writing, and the conditions under which and the period for which such exemption is granted, shall be stipulated in such exemption.
- (4) An exemption shall not take effect before the applicant has undertaken in writing to comply with all conditions imposed by a local authority under subregulation (3): Provided that if activities are commenced before such undertaking has been submitted to the local authority concerned, the exemption shall lapse.
- (5) If any condition of exemption is not complied with, the exemption shall lapse forthwith.

8. Attachment

- (1) A vehicle attached under regulation 2(h) shall be kept in safe custody by a local authority.

- (2) A local authority may lift the attachment contemplated in regulation 2(h) if the owner or person in control of the vehicle concerned has been instructed in writing by such authority-
- (a) to repair or to modify the vehicle concerned or cause it to be repaired or to be modified;
and
 - (b) to have any inspection or test as such authority may deem necessary conducted on the vehicle on a date and at a time and place mentioned in the instruction.

9. Penalties

Any person who contravenes or fails to comply with a provision of regulation 3, 4 or 5, shall be guilty of an offence and liable on conviction to a fine not exceeding R20 000, or to imprisonment for a period not exceeding two years, or to both such fine and such imprisonment, and, in the event of a continuing contravention, to a fine not exceeding R250, or to imprisonment for a period not exceeding twenty days, or to both such fine and such imprisonment, for each day on which such contravention continues.

10. Commencement

These Regulations shall come into operation on the date of publication.

BS EN 13231-1:2013



BSI Standards Publication

Railway applications — Track — Acceptance of works

Part 1: Works on ballasted track — Plain
line, switches and crossings

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 13231-1:2013. It supersedes BS EN 13231-1:2006 and BS EN 13231-2:2006 which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RAE/2, Railway Applications - Track.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Amendments issued since publication

Date	Text affected
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13231-1

May 2013

ICS 93.100

Supersedes EN 13231-1:2006, EN 13231-2:2006

English Version

**Railway applications - Track - Acceptance of works - Part 1:
Works on ballasted track - Plain line, switches and crossings**

Applications ferroviaires - Voie - Réception des travaux -
Partie 1: Travaux de voie ballastée - Voie courante et
appareils de voie

Bahnanwendungen - Oberbau - Abnahme von Arbeiten -
Teil 1: Arbeiten im Schotteroberbau - Gleise, Weichen und
Kreuzungen

This European Standard was approved by CEN on 14 March 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 13231-1:2013) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13231-1:2006, EN 13231-2:2006.

This European Standard is one of the series EN 13231 "*Railway applications – Track – Acceptance of works*" as listed below:

- *Part 1: Works on ballasted track — Plain line, switches and crossings* (the present document)
- *Part 3: Acceptance of reprofiling rails in track*
- *Part 4: Acceptance of reprofiling rails in switches and crossings*
- *Part 5: Procedures for rail reprofiling in plain line, switches, crossings and expansion devices*

NOTE Part 2 does not exist in this series.

The following technical modifications have been introduced during the revision:

- merging of EN 13231-1:2006 and EN 13231-2:2006, taking into account the similarities between them;
- definition of the absent tolerances for some existing parameters;
- revision of the tolerances already set up on the former version;
- definition of new parameters and the respective tolerances.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the minimum technical requirements and the tolerances for the acceptance of works on ballasted track situated on plain line and on switches and crossings and rail expansion devices, as part of the track, for 1 435 mm and wider track gauge railways, concerning construction of new track, track renewal and track maintenance. More particularly, this standard gives the requirements for the documentation of work parameters, for the tolerances for relative track geometry and absolute track position and for the acceptance procedures.

This standard does not deal with contractual and legal aspects and it does not cover either works related to reprofiling the railhead nor the associated measurements, except for some measurements related to safety, since these works are covered by other parts of EN 13231 series.

Related works, e.g. platform reconstruction, formation, drainage, level crossings are not covered by this standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13450, *Aggregates for railway ballast*

EN 13848-1, *Railway applications — Track — Track geometry quality — Part 1: Characterisation of track geometry*

EN 13848-2, *Railway applications — Track — Track geometry quality — Part 2: Measuring systems — Track recording vehicles*

EN 13848-3, *Railway applications — Track — Track geometry quality — Part 3: Measuring systems — Track construction and maintenance machines*

EN 13848-4, *Railway applications — Track — Track geometry quality — Part 4: Measuring systems — Manual and lightweight devices*

EN 13848-5, *Railway applications — Track — Track geometry quality — Part 5: Geometric quality levels — Plain line*

EN 14587 (series), *Railway applications — Track — Flash butt welding of rails*

EN 14730 (series), *Railway applications — Track — Aluminothermic welding of rails*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

works on ballasted track (including switches and crossings)

works on ballasted track cover:

- construction of new track;
- renewal or partial renewal and maintenance of rails, sleepers, ballast and other components;

- removing and relaying existing track because of works on substructure (e.g. bridges, tunnels, earthworks, etc.);
- renewal or partial renewal and maintenance of switches and crossings (switch rail/stock rail, crossing, etc.), bearers and ballast;
- works to correct track geometry, e.g. track tamping/levelling/lining;
- dynamic stabilising;
- ballast cleaning;
- stressing work;
- welding

3.2

plain line

any section of ballasted track excluding switches and crossings

3.3

acceptance

declaration of the customer to the contractor that the work has been achieved in accordance with the contract

3.4

tolerance

permissible deviation from reference or designed value

3.5

relative track geometry

group of parameters defining the position of the rails, usually comprising the following: track gauge, alignment, longitudinal level, twist and cross level

Note 1 to entry: These parameters are described in EN 13848 series.

3.6

design track position

position of the track defined in the track design process

Note 1 to entry: The design position is defined in the geodetic reference system.

Note 2 to entry: The control of the design studies and layouts for new or upgraded tracks according to EN 13803-1 and EN 13803-2 or other regulations is not part of this standard.

3.7

actual track position

position of the track when measured from external absolute references

EXAMPLE Network of geodetic reference points.

3.8

deviation from design track position

vertical and lateral difference between the design track position and the actual track position

3.9

nominal track gauge

single value which identifies the track gauge but may differ from the design track gauge

3.10

design track gauge

single value which is obtained when all the components of the track conform precisely to their design dimensions, or their median design dimension, when there is range

Note 1 to entry: It may differ from nominal track gauge. The design track gauge is specified by the customer taking into account the materials, the method of measurement and whether the application is on plain line or in switches and crossings.

3.11

new track

new constructed track applying new materials, including formation

3.12

renewal

complete replacement of all the components of the track (rails, sleepers, fastenings, switches and crossings, rail expansion devices and ballast) applying new materials, including the formation if necessary

3.13

partial renewal

replacement of one or more (but not all) track components in a track section

3.14

maintenance

all other works than design track gauge, new track and renewal

3.15

bearer

sleeper for switches and crossings

3.16

stagger

deviation in longitudinal relative position between the rail joints in the left and the right rails

4 Acceptance of works on plain line and on switches and crossings and rail expansion devices

4.1 General

The requirements of this European Standard apply to works as defined in 3.1, to the extent that they are within the scope of the work.

An acceptance form shall be prepared for each item of work outlining the results achieved.

Acceptance is not given until the work is completed in accordance with the requirements of the contract.

4.2 Acceptance deadlines

Acceptance shall not be carried out until the track has been subjected to an appropriate passing tonnage described and defined by the customer. However, acceptance should occur within a period not exceeding six weeks or after the passage of a maximum of 1,500 000 tonnes after the completion of the works, although the customer may extend this timescale to permit any follow-up tamping to be carried out.

4.3 Acceptance measurements, checks and related documentation

Before acceptance, the following measurements or checks shall be carried out when applicable (manually or by automatic means), and shall be documented:

- relative track geometry of plain line, switches and crossings as specified in 4.4;
- absolute track position of plain line, switches and crossings as specified in 4.5;
- sleeper or bearer position, voiding of sleepers or bearers as specified in 4.6.2, 4.6.3, 4.6.4 and 4.6.5;
- correct assembly and integrity of the rail fastenings, pads and insulators as specified in 4.6.6;
- welds as specified in 4.6.7 (running surface and running edge);
- joint gaps, dips and staggers as specified in 4.6.8;
- insulated joints as specified in 4.6.9;
- ballast cross section as specified in 4.6.10;
- stressing work as specified in 4.6.11;
- specific measurements or checks for switches and crossings and rail expansion devices as specified in 4.7 and 4.8;
- tamping work as specified in 5.2;
- dynamic stabilising work as specified in 5.3;
- ballast compaction as specified in 5.4;
- ballast replacement / cleaning work as specified in 5.5;
- damage caused to rails, sleepers, bearers, fastenings, cables and other equipment, or where the work process has displaced the sleepers, the bearers or the rail pads;
- all track materials compliance with the customer's relevant acceptance criteria or specifications, in particular acceptance of associated works as well as approval and acceptance of the material provided by the supplier.

The customer may request additional documented measurements or checks if contractually agreed.

The customer may also restrict the choice of measuring devices if contractually agreed.

Relative track geometry shall be measured by a track recording vehicle or by a track construction and maintenance machine fitted with measuring equipment, both in accordance with series EN 13848. If the measuring equipment fails, or is not available, corresponding light weight or manual devices measurements shall be taken and documented. Other use of light weight or manual devices measurements shall be in accordance with series EN 13848.

If track works affect track geometry, measurement of relative track geometry according to series EN 13848 shall be performed before allowing commercial trains to run.

For the purpose of acceptance, every section and switch and crossing shall be inspected by the experts as nominated by the customer and the contractor.

The contract shall define who should perform the measurements and how they shall be documented.

4.4 Relative track geometry

4.4.1 Parameters

4.4.1.1 General

Measurements as defined in EN 13848-1.

4.4.1.2 Track gauge and cross level

Measurement:

- by track recording vehicles according to the requirements of EN 13848-2; or
- by track construction and maintenance machines according to the requirements of EN 13848-3; or
- by track measuring trolleys or manually operated devices, according to the requirements of EN 13848-4, with a minimum of 10 measurements on successive sleepers, every 100 m.

4.4.1.3 Longitudinal level and alignment

Measurements for longitudinal level should preferably be undertaken on both rails. Measurement for alignment should be undertaken on both rails on straight track and shall be undertaken on the outer rail in curves:

- by track recording vehicles according to the requirements of EN 13848-2; or
- by track construction and maintenance machines according to the requirements of EN 13848-3; or
- by track measuring trolleys or manually operated devices, according to the requirements of EN 13848-4.

4.4.1.4 Twist

Measurement:

- by track recording vehicles according to the requirements of EN 13848-2; or
- by track construction and maintenance machines according to the requirements of EN 13848-3; or
- by track measuring trolleys or manually operated devices, according to the requirements of EN 13848-4, measurements should be performed at least every 3 m.

4.4.2 Tolerances

Accepted track shall comply with the tolerances shown in Tables 1 and 2.

The tolerances in Tables 1 and 2 are for loaded track measurements, which are recommended. For unloaded track measurements, the customer shall specify the tolerances for the relative track geometry parameters, which should be stricter.

All measurements shall be sampled at constant distance based intervals not larger than 0,5 m.

For track construction and maintenance machines that move non-continuously and measure track geometry whilst working, the sampling interval may be extended up to 1,5 m. For track gauge, values shown in Tables 1 and 2 apply to both isolated defects of track gauge and mean track gauge as defined in EN 13848-1.

The track gauge between any two adjacent sleepers shall not vary by more than 1 mm, unless otherwise specified by the customer (only applicable for hand measurements).

For measurements made by track recording vehicles, track construction and maintenance machines or track measuring trolleys, the track gauge shall not vary by more than 3 mm per 1,5 m, unless otherwise specified by the customer.

Concerning the longitudinal level and alignment for plain line and switches and crossings:

- a) the customer shall decide if 10 m chord measurement results or $D1$, $D2$ or $D3$ results according to EN 13848-1 should be used;
- b) the analysis method shall be "mean-to-peak";

Recording vehicles and track construction and maintenance machines delivered prior to the issue of this standard may use the analysis method "peak-to-peak". The values of the tolerances should be set by the customer.

For special analysis of track geometry during and after tamping and stabilising work as on short sections with difficult track geometry and on switches and crossings, track construction and maintenance machines may use the analysis method "peak-to-peak". The values of the tolerances should be set by the customer.

- c) for chord measurements the following applies:
 - 1) At chord measurement results, the sliding mean for each point shall be taken in a length not longer than 40 m considering a symmetric interval.
 - 2) For alignment, the corridor as defined by the mean and the tolerances shall include the design value; if not, the defect shall be taken between the design value and the peak.
 - 3) Chord measurements by recording vehicles or track construction and maintenance machines shall be made by an asymmetrical chord with a ratio of 40 % to 60 %, which should be 10 m long; for measurements by trolleys or manually operated devices a symmetrical chord with 10 m (in curves) and 20 m (in straight tracks) may be allowed.
 - 4) Recording vehicles and track construction and maintenance machines delivered prior to the issue of this standard may use a symmetrical chord as well.
 - 5) For measurements made by a chord system with base lengths other than 10 m, the results shall be converted to 10 m asymmetrical chord (40 % to 60 %) results.

The twist base length shall normally be 3 m, and the analysis method shall be "zero-to-peak". In transition curves with design twist, the tolerances shall be considered from the design twist, but not from the zero line, without exceeding the intervention limit values of EN 13848-5.

Where a twist base length other than 3 m is used, the customer shall specify the acceptance tolerances.

For tracks built with used materials, including switches and crossings, the tolerances for the parameters shall be specified by the customer.

In case of partial renewal, the customer shall specify if Table 1 or Table 2 or a combination of both is applicable.

Table 1 — Acceptance tolerances for loaded track – Renewals and new track (including switches and crossings)

Parameters	Type class				
	I	II	III	IV	V
	Speed range (km/h)				
	$V \leq 80$	$80 < V \leq 120$	$120 < V \leq 160$	$160 < V \leq 230$	$230 < V \leq 360$
Track gauge for plain line (mm) (deviation from design value)	+ 4/- 3	+ 4/- 3	+ 4/- 2	+ 4/- 2	+ 3/- 2
Track gauge for switches and crossings (mm) (deviation from design value)	+ 4/- 3	+ 4/- 3	+ 4/- 3	+ 4/- 3	+ 4/- 3
Cross level (mm) (deviation from design value)	± 3	± 3	± 3	± 2	± 2
10 m chord longitudinal level (mm) (mean-to-peak)	± 6	± 4	± 4	± 3	± 3
D1 Longitudinal level (mm) (mean-to-peak)	± 4	± 3	± 3	± 2	± 2
D2 Longitudinal level (mm) (mean-to-peak)	N/A	N/A	N/A	± 3	± 2
D3 Longitudinal level (mm) (mean-to-peak)	N/A	N/A	N/A	N/A	Reserved
10 m chord alignment (mm) (mean-to-peak)	± 5	± 3	± 3	± 3	± 3
D1 Alignment (mm) (mean-to-peak)	± 4	± 2	± 2	± 2	± 2
D2 Alignment (mm) (mean-to-peak)	N/A	N/A	N/A	± 3	± 2
D3 Alignment (mm) (mean-to-peak)	N/A	N/A	N/A	N/A	Reserved
Twist over 3 m (mm) (deviation from design value to peak)	$\pm 4,5$	± 3	± 3	± 3	± 3

Table 2 — Acceptance tolerances for loaded track – Maintenance (including switches and crossings)

Parameters	Type class				
	I	II	III	IV	V
	Speed range (km/h)				
	$V \leq 80$	$80 < V \leq 120$	$120 < V \leq 160$	$160 < V \leq 230$	$230 < V \leq 360$
Track gauge for plain line (mm) (deviation from design value)	+ 7/- 3	+ 5/- 3	+ 5/- 2	+ 5/- 2	+ 4/- 2
Track gauge for switches and crossings (mm) (deviation from design value)	+ 7/- 3	+ 5/- 3	+ 5/- 3	+ 5/- 3	+ 5/- 3
Cross level (mm) (deviation from design value)	± 5	± 4	± 4	± 3	± 3
10 m chord longitudinal level (mm) (mean-to-peak)	± 7	± 5	± 5	± 4	± 4
D1 Longitudinal level (mm) (mean-to-peak)	± 5	± 4	± 4	± 3	± 3
D2 Longitudinal level (mm) (mean-to-peak)	N/A	N/A	N/A	± 4	± 3
D3 Longitudinal level (mm) (mean-to-peak)	N/A	N/A	N/A	N/A	Reserved
10 m chord alignment (mm) (mean-to-peak)	± 7	± 5	± 5	± 4	± 4
D1 Alignment (mm) (mean-to-peak)	± 5	± 4	± 4	± 3	± 3
D2 Alignment (mm) (mean-to-peak)	N/A	N/A	N/A	± 4	± 3
D3 Alignment (mm) (mean-to-peak)	N/A	N/A	N/A	N/A	Reserved
Twist over 3 m (mm) (deviation from design value to peak)	± 4,5 ^a	± 4,5	± 4,5	± 3	± 3
In special constructions, e.g. switches and crossings and rail expansion devices, exceedances of the above mentioned values may occur due to the special design of these devices.					
^a In jointed track: ± 6.					

4.5 Absolute track position

4.5.1 General

Requirements and tolerances in 4.5 shall be applied for new track and track renewal (including switches and crossings).

It is voluntary for the customer to apply requirements and tolerances in 4.5 for acceptance after maintenance of the track.

When defined by the customer, distance between tracks shall comply with tolerances in Table 3 for the lateral position of the track.

4.5.2 Tolerances

Accepted track shall comply with selected classes (AP1 to AP 4) in Table 3. Classes shall be specified by the customer.

Table 3 — Tolerances for the deviation from design track position – Renewals and new track

Class	Vertical position (mm)	Lateral position (mm)	Longitudinal position of the switches and crossings (mm)
AP 1	± 10	± 10	± 10
AP 2	± 15	± 15	± 15
AP 3	± 20	± 20	± 20
AP 4	± 25	± 25	± 25
Combination of classes in Table 3 is permitted, for instance due to requirements for thermal forces, structure gauge, tracks in interaction with platforms and other fixed installations. Class AP 1 tolerances may be reduced in order to allow for restricted structure gauges.			

4.5.3 Compliance measurements

When requirements and tolerances for the deviation from design track position are applied, following items shall be specified by the customer:

- Compliance measurements shall refer to defined survey point in the track. The survey point defines the absolute track position. The survey point and spacing of control measurements shall be defined by the customer.
- The external reference system, normally a network of geodetic reference points, and geodetic measurements for verification of the absolute track position shall be specified by the customer. Guidelines for specification of requirements for geodetic measurements are given in Annex A.

The absolute track position shall be measured from geodetic reference points, e.g:

- total station measurements;
- levelling:
 - satellite measurements;
 - measurement tape or equivalent.

4.6 Other parameters and verifications for plain line and switches and crossings

4.6.1 General

Requirements and tolerances in 4.6 apply to new track, renewal and maintenance work.

4.6.2 Sleeper spacing

Permissible deviation from the designed sleeper spacing shall be ± 20 mm (except at welds or other justifiable cases) and shall be checked by sampling. Checking shall be made at least every 200 m.

The number of sleepers within 1 000 m shall be within 0,5 % of the designed number.

4.6.3 Bearer spacing

Permissible deviation from the designed bearer spacing in individual cases shall be ± 10 mm.

4.6.4 Out of squareness of the sleepers

This sub-clause is only applicable on request from the customer.

Permissible deviation from squareness of the sleepers shall be ± 10 mm.

4.6.5 Voiding of the sleepers and bearers

This sub-clause is only applicable on request from the customer.

The quality of the tamping shall be checked by sampling 10 % of the sleepers and bearers.

All sleepers and bearers shall be fully supported under the rails (not voided).

When tamping machines are not used, 5 % voided sleepers are permitted, but the following shall apply:

- no more than two adjacent voided sleepers shall be permitted;
- voided sleepers shall not be permitted at joints or other sensitive locations;
- the voided sleepers shall be marked;
- voided bearers shall not be permitted.

NOTE Experienced personnel will identify voided sleepers and bearers by the sound when striking them with a rubber coated iron ball.

4.6.6 Rail fastenings

All fastening systems shall be complete and correctly fitted.

4.6.7 Welds

The acceptance of welding work in conjunction with track works is covered by EN 14730 series and EN 14587 series.

Further non-destructive testing shall be required to verify the integrity of the welds if specified by the customer.

4.6.8 Fishplated joints

The acceptance tolerance for the nominal value, set by the customer, of the total sum of gaps for the number of joints corresponding to a section of 100 m of track, is ± 5 mm.

Maximum permissible values of dips shall be 0,5 mm on railhead and 0,5 mm on running edge, both measured over 1 m.

Maximum permissible staggers, in squared joints, shall be 10 mm.

4.6.9 Insulated joints

The customer shall specify the acceptance criteria for installation of insulated joints.

Maximum permissible values of dips shall be 0,5 mm, on railhead and 0,5 mm, on running edge, both over 1 m.

4.6.10 Ballast cross section

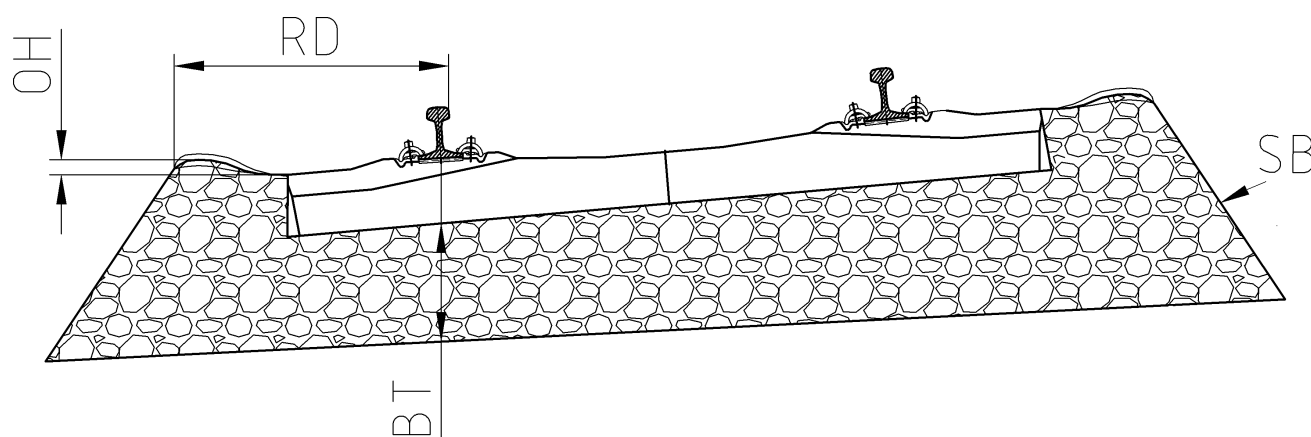
Accepted track ballast cross section shall comply with the tolerances in Table 4.

If not specified otherwise by the customer, the upper surface of the ballast shall be at the same level as the upper sleeper surface.

No ballast is allowed on top of sleepers.

Table 4 — Tolerances for ballast cross section – New track, renewal and maintenance work

Parameter	Deviation from design value
Ballast thickness (BT) ^a	+ 15 % / 0 %
Distance between the running edge of the rail and the ballast shoulder (RD)	+ 10 cm / 0 cm
Ballast slope inclination (SB)	± 10 %
Ballast shoulder over height (OH)	+ 2 cm / 0 cm
^a Minimum distance between the formation surface and the lower base of the sleeper, measured under the inner rail in curves.	



Key

BT ballast thickness

RD distance between the running edge of the rail and the ballast shoulder

SB ballast slope inclination

OH ballast shoulder over height

Figure 1 — Ballast cross section

4.6.11 Stressing work

Stressing work shall be documented as specified by the customer.

Stress-free temperature shall be in the specified range for the neutral temperature area, which shall not exceed 12 °C.

The destressing records and the records about the installation temperature of the switches and crossings shall be provided for the acceptance inspection.

The position and condition of the anti-creep device shall be checked during acceptance inspection.

If the customer requires the achieved stress-free temperature to be measured as part of the acceptance process, he shall specify the method of doing so.

4.7 Specific measurements for switches and crossings and rail expansion devices

4.7.1 General

The tolerances given in 4.7 apply to new, as well as used switches and crossings, and related maintenance works.

4.7.2 Free wheel passage in switch area

The tolerance for the designed value of free wheel passage in switch area (F_{wps} in Figure B.1) shall be maximum + 3 mm, not exceeding the maximum value as specified by the customer.

4.7.3 Fixed common crossing and obtuse crossing nose protection

The permissible tolerance for the designed value of fixed common crossing (N_{pcf} in Figure B.2) and of fixed obtuse crossing nose protection (N_{pof} in Figure B.3) shall be ± 2 mm.

4.7.4 Free wheel passage in fixed obtuse crossing

The tolerance for the designed value of the free wheel passage in fixed obtuse crossing (F_{wpof} in Figure B.3) shall be maximum + 1 mm.

4.7.5 Free wheel passage at check rail entry and at wing rail entry

The tolerance for the designed value of the free wheel passage at check rail entry and at wing rail entry (F_{wpcr} in Figure B.4) shall be maximum + 4 mm.

4.7.6 Flangeway width

The tolerance for the designed value of the flangeway width (f_{cr} in Figure B.2) shall be ± 1 mm.

4.7.7 Flangeway depth

The tolerance for the designed value of the flangeway depth (d_{cr} in Figure B.2) shall be maximum - 3 mm.

4.7.8 Vertical gap of switch rail base or movable frog base at sliding chairs

The tolerance for the vertical gap of switch rail base or movable frog base at sliding chairs (F_{vgs} in Figures B.5 and B.6) shall be maximum + 1 mm.

4.7.9 Horizontal gap of switch rail to stock rail or of movable frog to wing rail

The tolerance for horizontal gap of switch rail to stock rail or of movable frog to wing rail (F_{hgs} in Figure B.5) shall be maximum + 1 mm.

4.7.10 Horizontal gap between switch rail and distance block (switch stud)

The tolerance for horizontal gap between switch rail and distance block (F_{hbs} in Figure B.6) shall be maximum + 1 mm.

4.7.11 Vertical displacement of switch rail to stock rail

The tolerance for the vertical displacement of switch rail to stock rail shall be maximum 1 mm (F_{vd} in Figure B.6). It shall be measured near the first distance block looking from the switch tip.

4.7.12 Check for possible wheel face overlapping with the switch tip of switches and crossings and rail expansion devices

To prevent dangerous contact between a worn wheel and the switch tip, the free wheel passage at the switch tip shall be proved with a gauging tool defined by the customer (Figure B.7).

The measurement method for the overlap check shall be defined by the customer.

4.7.13 Variation of track gauge on a base distance equivalent to 3 bearers

The tolerance for deviation of track gauge on a base distance equivalent to three bearers shall be maximum 3 mm (4 mm for maintenance work) ($G_n - G_{n+1}$ in Figure B.8).

In special constructions, exceedances of the above mentioned tolerance may occur to the special design of these devices.

4.8 Specific quality checks for switches and crossings and rail expansion devices

4.8.1 Longitudinal displacement of stock rails in switches and crossings

The longitudinal displacement of stock rails to each other shall be checked with a double angle bracket at the punch marks, if available (D_{st-st} in Figure B.9). The tolerance for longitudinal deviation between the straight and the branch stock rail shall be maximum 2 mm.

4.8.2 Longitudinal displacement of stock rail to switch rail in switches and crossings

The longitudinal displacement of stock rail to switch rail shall be checked with a double angle bracket at the punch marks (D_{st-sw} in Figure B.9). The tolerance for punch mark displacement at switch heel from the rectangular connecting line to punch mark on stock rail shall be maximum 2 mm.

4.8.3 Longitudinal displacement of fixed rails in rail expansion devices

The longitudinal displacement of fixed rails shall be checked with an angle bracket (D_{fr} in Figure B.10). The tolerance for displacement between the fixed rails shall be maximum 2 mm.

4.8.4 Adjustment dimension for moveable rails in expansion devices

The position of the moveable rails depends on the ongoing temperature of the bridge or rails. With respect to the measured temperature at the time of inspection the tolerance of installed position of the moveable rails compared with the designed position (D_{mr} in Figure B.10) shall be ± 3 mm.

5 Working parameters

5.1 General

Because working parameters cannot be checked after completion of works, and because they have influence on the quality and the durability of track works, the items listed below should be measured when carrying out track works.

5.2 Tamping working parameters

5.2.1 General

Tamping machines should be equipped with systems able to measure tamping working parameters.

The customer shall define in the contract if he accepts the work performed by tamping machines not or partly equipped with such systems.

The quality of the work of tamping machines shall be evaluated and documented by measuring the relative track geometry.

Information about uncertainty and resolution of the working parameters shall be documented in the machine manufacturer's manual. Calibration and validity checks shall be carried out according to the manufacturer's manual.

5.2.2 Lift of track

The maximum lift of track per tamping pass is dependent on the construction of the track (type of rails and sleepers), the geometrical dimensions of the tamping machine (bending line of the rail) and the required compaction level.

The maximum lift of track per tamping pass shall be set by the customer.

The lift value shall be recorded for each rail at each tamping cycle.

NOTE The lift of track in this clause describes the lifting by means of the tamping tools during operation, not the real lifting achieved.

5.2.3 Shift of track

The maximum shift of track per tamping pass is dependent on the construction of the track (type of rails and sleepers), the geometrical dimensions of the tamping machine (tensile stress in the rail) and the required compaction level.

The maximum shift of track per tamping pass shall be set by the customer.

The maximum shift value shall be documented.

NOTE The shift of track in this clause describes the shifting by means of the tamping tools during operation, not the real shifting achieved.

5.2.4 Work depth of tamping tools

The work depth of the tamping tools is dependent on the construction height of the track (height of rails, sleepers and rail fastening systems).

The distance of the upper line of the tamping tool plate to the lower face of the sleeper (including under sleeper pads) shall be in the range of 15 mm to 30 mm. Change of the track structure height requires adjustment of the tamping depth. This adjustment shall be documented.

The values for the work depth shall be set by the customer.

5.2.5 Squeezing time of tamping tools

The squeezing time of the tamping tools is dependent on the type of ballast and the lift of the track.

One measurement per squeezing shall be carried out. The squeezing time shall not be less than 0,8 s. The recommended value range is from 1,0 s to 1,2 s.

The values for the squeezing time shall be set by the customer.

5.2.6 Documentation of functioning of the controlling system / device

Prior to and after every tamping work a functional check of the controlling system/device should be carried out according to the manufacturer's manual.

The results of this functional check shall be documented.

5.3 Dynamic stabilising working parameters

5.3.1 General

Dynamic stabilising machines should be equipped with systems measuring working speed, vertical load and frequency.

The customer shall define in the contract if he accepts the work performed by dynamic stabilising machines partially equipped with such systems.

The quality of the work of dynamic stabilising machines shall be evaluated and documented by measuring the relative track geometry and the lowering of the track.

Information about uncertainty and resolution of the parameters mentioned above shall be documented in the machine manufacturer's manual. Calibration and validity checks shall be carried out according to the manufacturer's manual.

Values of dynamic stabilising machines working parameters (working speed, vertical load and stabilising tools frequency) should be set all together and adapted to the actual condition of the track before stabilisation, e.g. height of tamping lift, type of sleepers, ballast depth, maintenance or renewal works, etc. If they are not, either the quality of track geometry may not be acceptable with respect to this standard or the stabilisation of the track may not be completed properly.

5.3.2 Working speed

Working speed is dependent on the construction of the track (type of rails and sleepers and ballast conditions) and the required compaction level.

The range of the working speed is to be set by the customer.

5.3.3 Vertical load

The maximum load on the track by the stabilisation tools is dependent on the construction of the track (type of rails and sleepers and ballast conditions), the required compaction level and the type of substructure and infrastructure along the track.

The measurement shall be effected on both rails.

The values of the vertical load shall be defined by the customer.

5.3.4 Stabilising tools frequency

Stabilising tools frequency is dependent on the construction of the track (type of rails and sleepers and ballast conditions) and the required compaction level.

The range of the stabilising tools frequency shall be set by the customer.

5.3.5 Lowering of track

The lowering range of the track is dependent on the construction of the track (type of rails and sleepers) and the required compaction level.

The lowering range of the track shall be set by the customer.

The final position of the track shall be verified against external references, using the tolerances shown in Table 3 concerning vertical position.

5.4 Ballast compaction working parameters

5.4.1 General

Machines equipped with ballast compaction (ballast shoulder and ballast between sleepers) devices should also be equipped with systems able to measure ballast compaction working parameters. Information about uncertainty and resolution of the working parameters shall be documented in the machine manufacturer's manual. Calibration and validity checks shall be carried out according to the manufacturer's manual.

The customer shall define in the contract if he accepts the work performed by ballast compaction machines unequipped or partially equipped with such systems.

NOTE Work done by tamping machines with compaction tools close to the tamping tools is not covered by this requirement.

5.4.2 Duration of compaction work

The duration of the compaction shall be set by the customer (e.g. 4 s).

5.4.3 Compaction tools frequency

The frequency of the compaction shall be set by the customer (e.g. between 45 Hz and 50 Hz).

5.4.4 Compaction dynamic pressure

The dynamic pressure of the compaction shall be set by the customer (e.g. 12 N/cm²).

5.5 Ballast replacement/cleaning working parameters

5.5.1 General

Ballast replacement/cleaning machines should be equipped with systems able to measure ballast replacement/cleaning working parameters. The requirements in this clause do not apply if other type of equipment is used. In this case, the customer shall specify the requirements.

The customer shall define in the contract if he accepts the work performed by ballast replacement/cleaning machines unequipped or partially equipped with such systems.

Information about uncertainty and resolution of the working parameters shall be documented in the machine manufacturer's manual. Calibration and validity checks shall be carried out according to the manufacturer's manual.

5.5.2 Depth and inclination of ballast cutting bar

During work, depth and inclination of the ballast cutting bar shall be measured and documented. For the machines not equipped with measuring systems, manual measurement, as specified by the customer, shall be carried out and documented.

The desired values of the depth and inclination shall be specified by the customer.

5.5.3 Lowering of the track

During work, lowering of the track in relation to the track surface before cleaning work shall be measured. At least one measurement per metre shall be carried out and documented.

The desired value of the lowering shall be specified by the customer.

5.5.4 Ballast-size distribution curve and degree of purity

The ballast size distribution of the cleaned ballast and the degree of purity shall be controlled at least every 500 m, according to the relevant regulations specified by the customer and the requirements of EN 13450.

In switches and crossings, specific control distances should be defined by the customer.

6 Acceptance responsibilities

6.1 Preliminary procedure to acceptance

After the completion of work, the contractor shall inform the customer in writing that the preliminary procedure to the acceptance may be carried out.

The customer shall carry out the preliminary procedure to the acceptance of the works.

The preliminary procedure to the acceptance consists of the following operations:

- checking the list and quantification of the works carried out;
- checking the records of the measurements and tests according to the contract;
- checking of documents according to the contract (e.g. drawings, notes of calculations, certificates, quality control, etc.);
- listing of works not performed although agreed in the contract;
- listing of non-conformities.

The personnel and the equipment requested by the customer to allow the carrying out of the preliminary procedure to the acceptance shall be made available by the contractor according to the contract.

6.2 Consequences of the preliminary procedure to the acceptance

The consequences of the preliminary procedure to the acceptance shall be as follows:

- acceptance is granted; or
- acceptance is granted with reservations; or
- acceptance is granted with allowance.

If the acceptance is granted, the decision shall be notified to the contractor.

If the acceptance is granted with reservations, the decision shall be notified to the contractor, who shall then take the necessary actions to correct the defects within the period of time as agreed in the contract. After taking these actions, the preliminary procedure to the acceptance shall be applied again to the corrected defects.

If the customer decides that the defects, if any, shall not be corrected, the acceptance shall be granted with allowance according to the contract or shall be subject to a negotiation between both parts. The decision shall be notified to the contractor.

7 Warranty

The warranty periods and conditions shall be specified in the contract.

Annex A (informative)

Guidelines for specification of requirements of geodetic measurements

This annex provides an example of requirements of geodetic measurements.

The Technical Specification for a network of geodetic reference points should include requirements for:

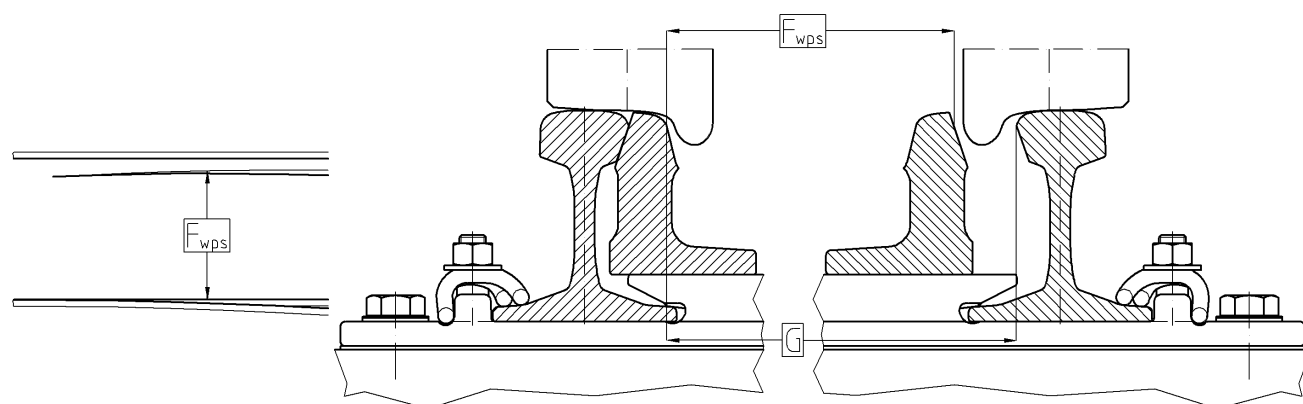
- placing, interval and permanent marking of the geodetic reference point;
- uncertainty and calibrations of measuring and ancillary equipment;
- uncertainty in measurements;
- analysis and final calculation between geodetic reference points;
- documentation.

The Technical Specification for compliance geodetic measurements should include requirements for:

- uncertainty and calibrations of measuring and ancillary equipment;
- establishment of total station over a geodetic reference point or free stationing;
- uncertainty in measurements;
- interval in geodetic measurements in the track;
- method for quality assurance regarding continuous geometry, e.g. overlapping measurements when changing the reference station;
- limitation for length in observations;
- documentation.

Annex B (informative)

Switches and crossings measurements and checks

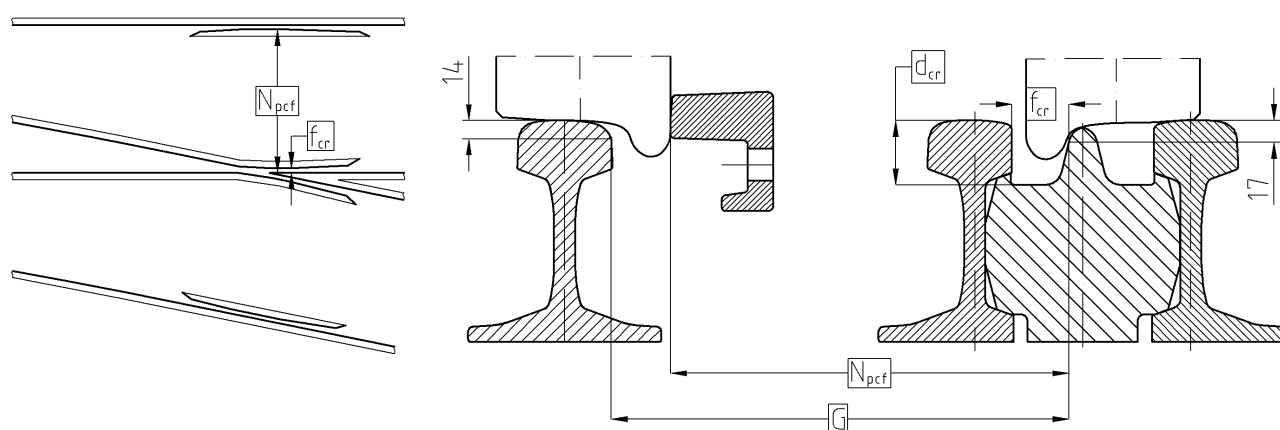


Key

F_{wps} free wheel passage
G track gauge

Figure B.1 — Measurement of free wheel passage in switches

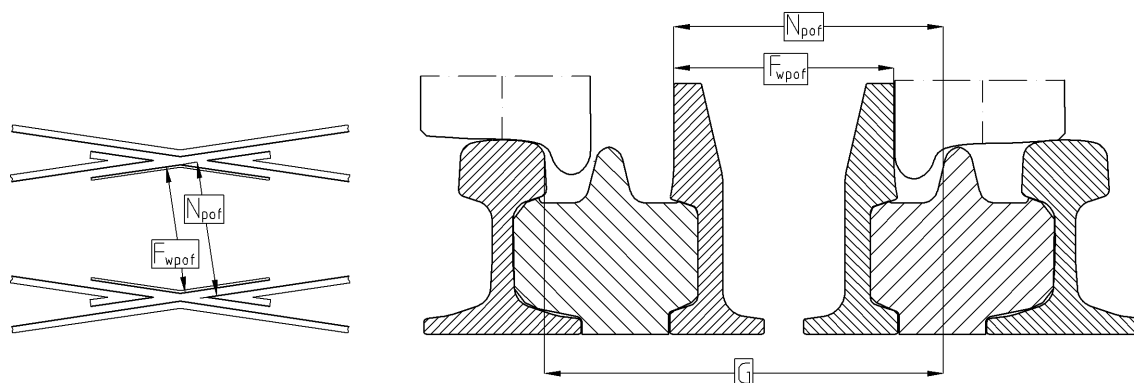
Dimensions in millimetres



Key

N_{pcf} nose protection at fixed common crossings
 f_{cr} flangeway width
 d_{cr} flangeway depth

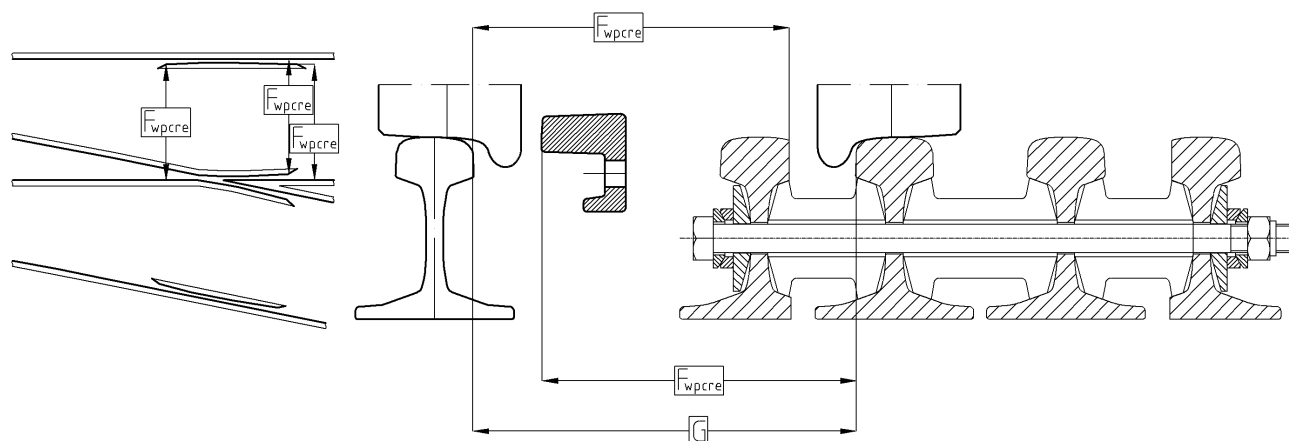
Figure B.2 — Fixed common crossing nose protection



Key

N_{pof} nose protection at fixed obtuse crossings
 F_{wpof} free wheel passage in obtuse crossings

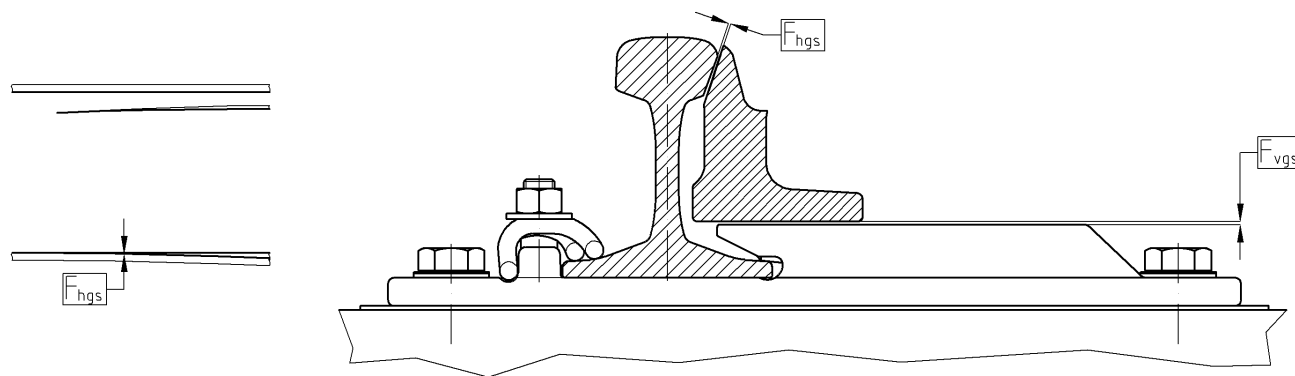
Figure B.3 — Free wheel passage in fixed obtuse crossing



Key

F_{wpcre} free wheel passage at check and wing rail entry

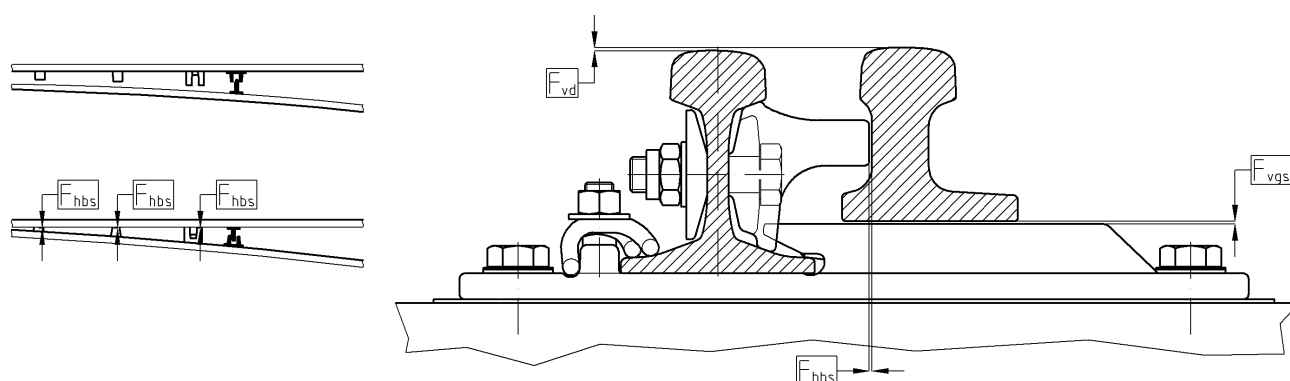
Figure B.4 — Free wheel passage at check rail entry and wing rail entry



Key

- F_{vgs} vertical gap at sliding chairs
 F_{hgs} horizontal gap of switch rail to stock rail or of movable frog to wing rail

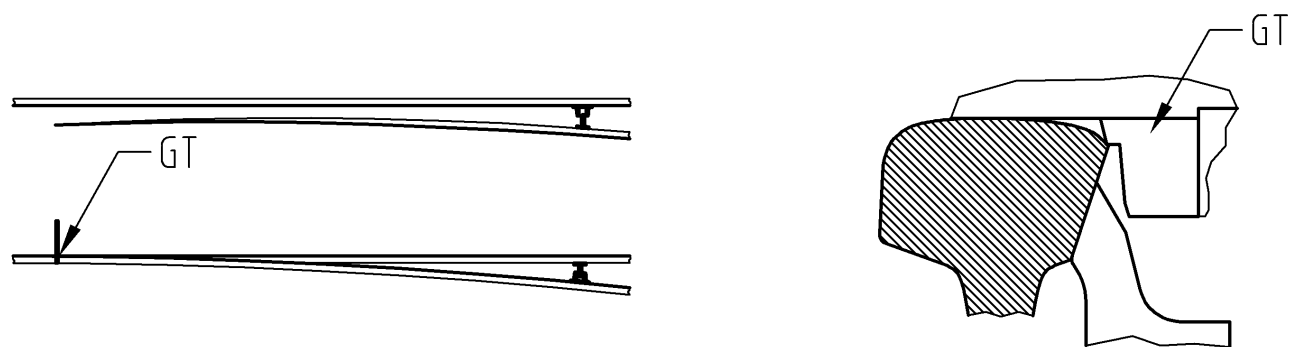
Figure B.5 — Vertical and horizontal gap of switch rail or movable frog base



Key

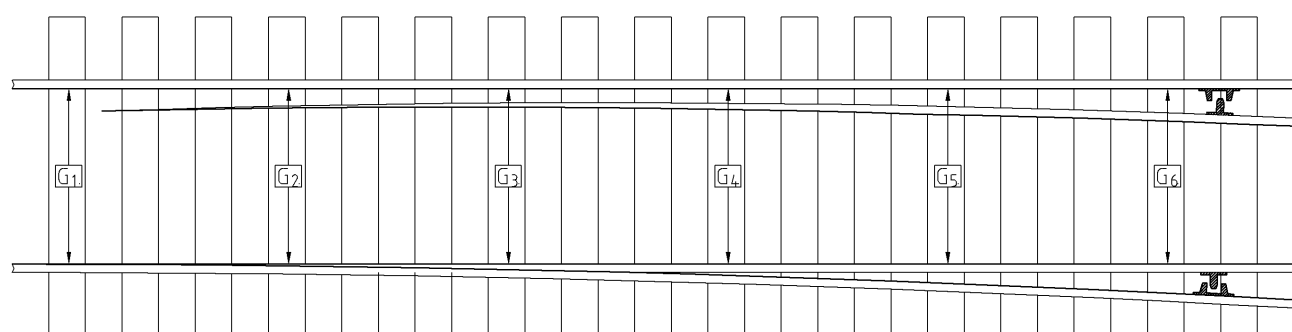
- F_{vgs} vertical gap at sliding chairs
 F_{hbs} horizontal gap between switch rail and distance block
 F_{vd} vertical displacement of switch rail to stock rail

Figure B.6 — Vertical and horizontal gaps of switch rail and vertical displacement of switch rail to stock rail



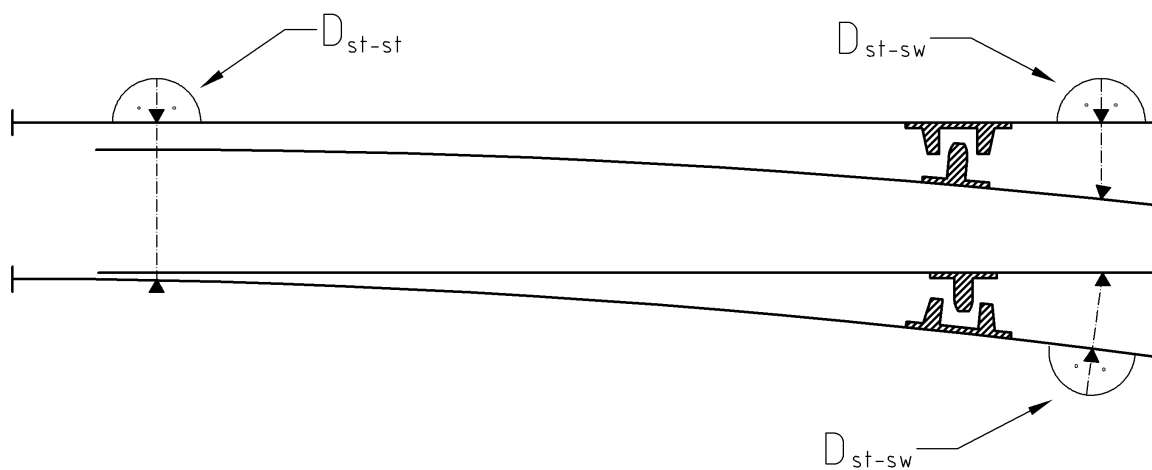
Key
GT gauging tool

Figure B.7 — Check for possible wheel face overlapping



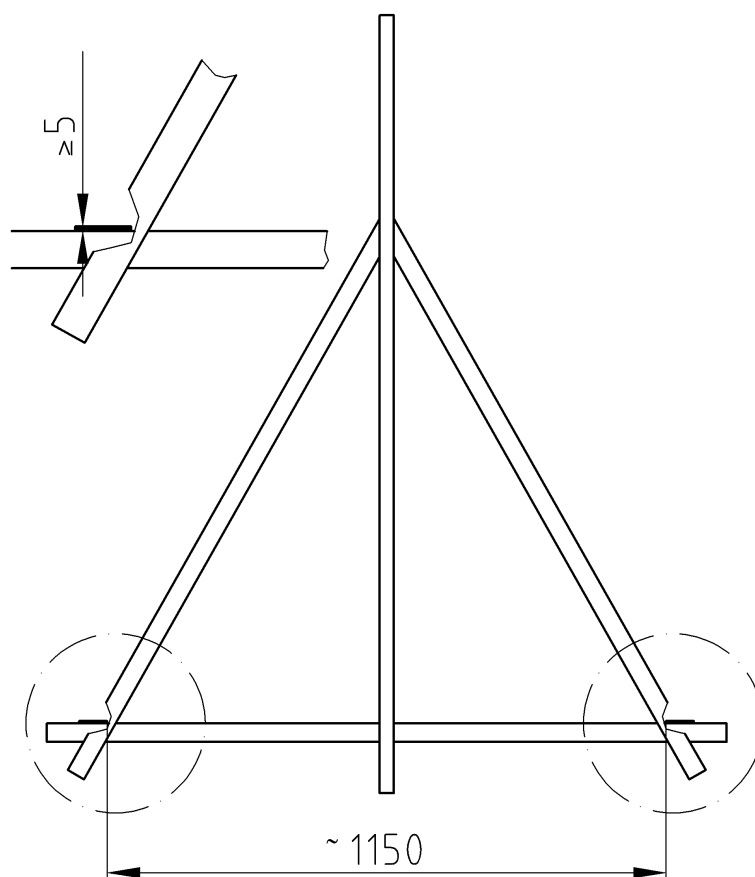
Key
 $G_n - G_{n+1}$ variation of designed track gauge between 3 sleepers

Figure B.8 — Variation of track gauge

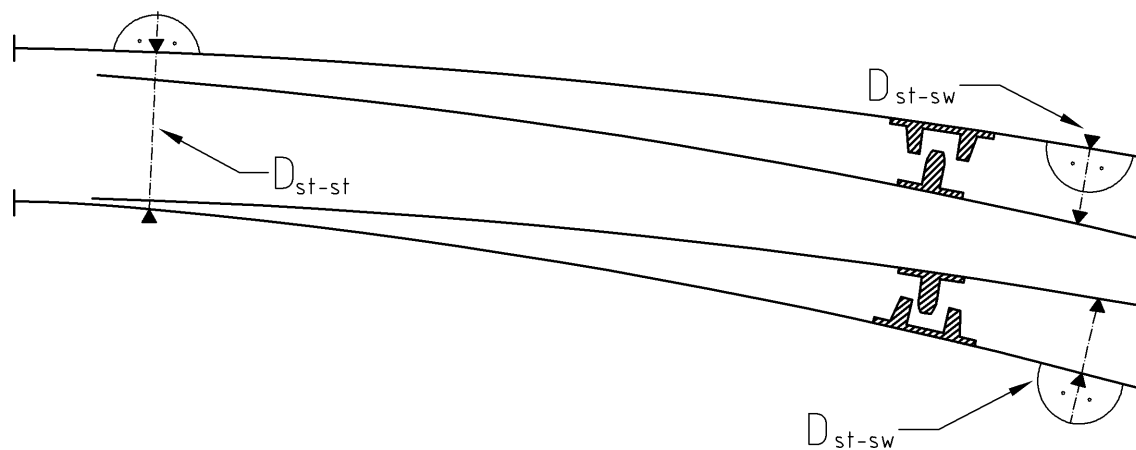


a) Common turnout

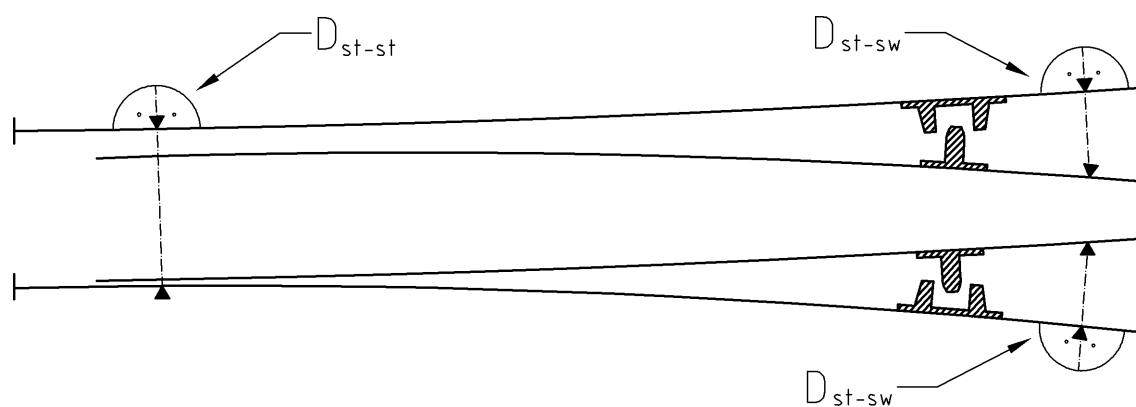
Dimensions in millimetres



b) Double angle bracket



c) Inside curved turnout

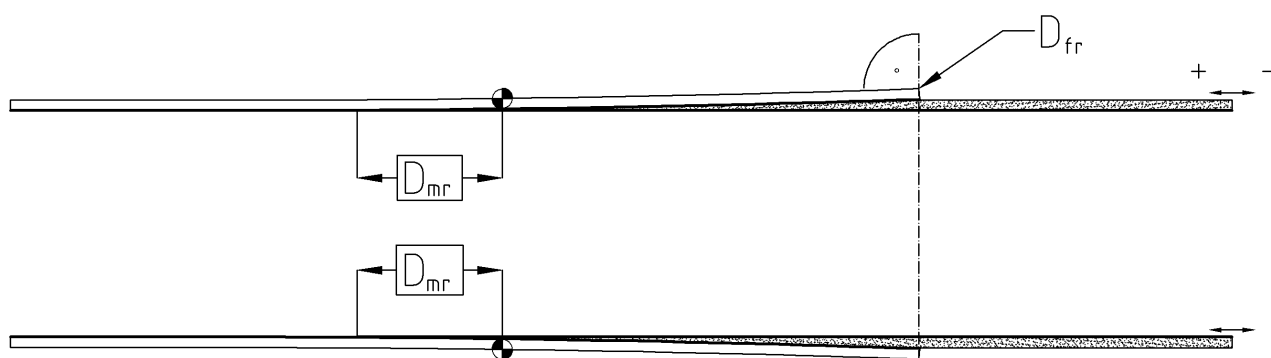


d) Contraflexure turnouts

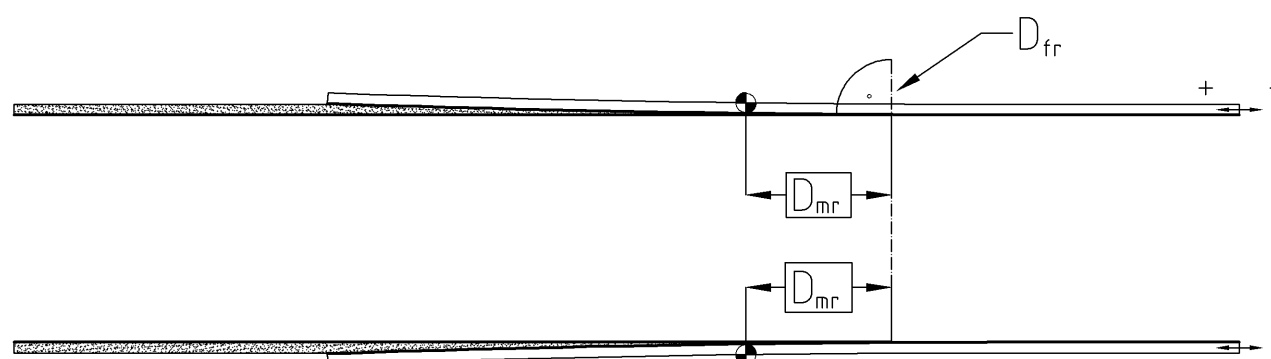
Key

- D_{st-st} longitudinal displacement between the straight and the branch stock rail
- D_{st-sw} longitudinal displacement between stock rail and switch rail
- ▲ punch mark

Figure B.9 — Longitudinal displacement of rails in turnouts



a) Moveable switch rails



b) Moveable stock rails

Key

D_{fr}

longitudinal displacement of fixed rails

D_{mr}

installed position of the moveable rails related to the reference point



reference point

Figure B.10 — Longitudinal relationship of fixed rails to each other and adjustment dimension for moveable rails in expansion devices

Bibliography

- [1] EN 13803-1, *Railway applications — Track — Track alignment design parameters — Track gauges 1 435 mm and wider — Part 1: Plain line*
- [2] EN 13803-2, *Railway applications — Track — Track alignment design parameters — Track gauges 1 435 mm and wider — Part 2: Switches and crossings and comparable alignment design situations with abrupt changes of curvature*

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BS EN 13231-3:2012



BSI Standards Publication

Railway applications — Track — Acceptance of works

Part 3: Acceptance of reprofiling
rails in track

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National foreword

This British Standard is the UK implementation of EN 13231-3:2012. It supersedes BS EN 13231-3:2006, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RAE/2, Railway Applications - Track.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Date	Text affected
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Acceptance of reprofiling rails in track**

Applications ferroviaires - Voie - Réception des travaux -
Partie 3: Critères de réception des travaux de reprofilage
des rails en voie

Bahnanwendungen - Oberbau - Abnahme von Arbeiten -
Teil 3: Abnahme von reprofilierten Schienen im Gleis

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Foreword

This document (EN 13231-3:2012) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13231-3:2006.

The changes with respect to the previous document (EN 13231-3:2006) include:

- a) a reduced number of acceptance criteria for the longitudinal profile (only one instead of three) in line with current European practice;
- b) reference points for interpretation of transverse profiles corresponding with the gauge recording points;
- c) simplified methods to prove measurement systems (for reference and approved instruments as described in Annexes A and B);
- d) introduction of a procedure to routinely demonstrate acceptability of approached instruments in Annex D;
- e) integration of normative Annexes A, B, C and D.

This European Standard is one of the series EN 13231 "Railway applications — Track — Acceptance of works" as listed below:

- *Part 1: Works on ballasted track — Plain line, switches and crossings*
- *Part 3: Acceptance of reprofiling rails in track*
- *Part 4: Acceptance of reprofiling rails in switches and crossings*

NOTE Part 2 does not exist in this series.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the technical requirements and the measurements to be made for the acceptance of work to reprofile longitudinally and/or transversely the heads of railway rails. For acceptance purposes, two classes of longitudinal profile and three classes of transverse profile tolerance are defined.

Annexes describe procedures to verify reference instruments to be used for these measurements as well as methods to approve non-reference instruments to be used for measurements.

This European Standard applies to reprofiled vignole railway rails 46 kg/m and above.

It does not apply for acoustic rail reprofiling.

A form of acceptance documentation that may be used is given in Annex E.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3274, *Geometrical product specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments (ISO 3274:1996)*

EN ISO 3611, *Geometrical product specifications (GPS) — Dimensional measuring equipment: Micrometers for external measurements — Design and metrological characteristics (ISO 3611:2010)*

EN ISO 4287, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287:1997)*

EN ISO 4288, *Geometrical product specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture (ISO 4288:1996)*

EN ISO 10360-2, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 2: CMMs used for measuring linear dimensions (ISO 10360-2:2009)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

angle of inclination of rail

nominal angle at which rail is laid (see Figure 1 b)), e.g. 0° (vertical rails), 2,86° (1:20 inclination), 1,91° (1:30 inclination), 1,43° (1:40 inclination), etc., inclined towards the centre of the track

NOTE For rail which is laid in non-canted track, the angle of inclination of the rail is equal to the angle between the vertical and the centre-line of the inclined rail.

3.2

approved instrument

instrument for measurement of longitudinal or transverse profile the usage of which is justified by correlation of its performance with that of a reference instrument in accordance with the defined procedure

NOTE For procedure to demonstrate correlation, see Annex B.

3.3

characteristic length

length on the rail travelled during one rotation of a grinding stone or milling wheel

3.4

class 1, class 2

classes of longitudinal profile differentiated by the proportion of a reprofiling site reaching a specified standard

NOTE For longitudinal profile, see 4.3.

3.5

class Q, class R, class S

classes of transverse profile differentiated by the proportion of a reprofiling site reaching a specified standard

NOTE For transverse profile, see 5.3.

3.6

cut-off wavelength

wavelength of a sinusoidal profile of which 50 % of the amplitude is transmitted by the profile filter

NOTE Profile filters are identified by their cut-off wavelength value, see EN ISO 11562.

3.7

deviation of the measured profile

deviation between the measured transverse profile and the reference rail, measured normal to the surface of the reference rail when the measured transverse profile and the reference rail are aligned at points A and B₁ or A and B₂, without rotation of either profile; the deviation is considered positive when the measured transverse profile is above the reference rail

NOTE For deviation, see Figure 3.

3.8

facet

approximately plane sector of the profile of a reprofiled rail produced by the reprofiling tool

3.9

filtered profile

profile which results from applying a profile filter to the primary profile

3.10

percentage exceedance

percentage length of a test site over which a measurement of the amplitude of the filtered profile exceeds a prescribed limit

3.11

phase correct profile filter

profile filter which does not cause phase shifts which lead to asymmetrical profile distortions

NOTE For profile filter, see EN ISO 11562.

3.12

primary profile

representation of the measured longitudinal profile before application of any profile filter

3.13

profile filter

electronic device or signal processing which separates profiles into long-wave and short-wave components, or into components within a specified wavelength range

3.14

rail crown line

that line on the rail head surface that is corresponding to the Y-Y axis of the rail profile

3.15

range of deviation

difference between the maximum and minimum values of the deviation of the measured transverse profile

NOTE For measured profile, see Figure 3.

3.16

reference instrument

instrument for the measurement of longitudinal or transverse profile the performance of which has been verified in accordance with the procedure defined in Annex A

3.17

reference line

line normal to the track's longitudinal axis and tangent to the heads of both rails

3.18

reference point A

point towards the gauge side of a reference rail at which the angle between the reference line and the tangent to the profile is equal to the specified angle of inclination

NOTE For specified angle of inclination, see Figure 1.

3.19

reference point B₁

point on the gauge face of a reference rail which lies 14 mm below that line that is parallel to the reference line and which passes through reference point A

NOTE For reference point, see Figure 1 a).

3.20

reference point B₂

point on the gauge corner of a reference rail at which a line which is tangent to the rail lies at an angle of 45° to the reference line

NOTE For reference point, see Figure 1 b).

3.21

reference profile

transverse profile to which rail is to be reprofiled, within the specified tolerances

3.22

reference rail

rail with the reference profile, at the desired angle of inclination relative to the reference line

NOTE For reference rail, see Figure 1 a).

3.23

reprofiling

action that is undertaken to modify the longitudinal or transverse profile of a rail

3.24

reprofiling site

continuous length of track where the rail is to be reprofiled excluding level crossings and switches and crossing work within the length of track

3.25

reprofiling zone

area of the railhead of a reference rail between the point at which the tangent to the rail lies at an angle of 70° to the reference line, measured towards the gauge side of the rail, and the point at which the tangent to the rail lies at an angle of 5° to the reference line, measured towards the field side of the rail

NOTE For side of the rail, see Figure 2.

3.26

sampling interval

distance between successive points on the rail at which a continuous record of the traced profile is sampled in order to produce the primary profile

3.27

test instrument

instrument whose use as a reference instrument or an approved instrument is being tested

3.28

traced profile

profile of the rail as recorded by the measuring system

3.29

transition length

initial or final section of a length of track where the validity of a measurement of longitudinal or transverse profile is questionable for a variety of reasons, including settling of electronic and digital components and circuits

4 Longitudinal profile

4.1 Principle

Measurements are made using either a reference instrument, see 3.16, or an approved instrument, see 3.2. Approved instruments do not offer the same accuracy as reference instruments but are generally adequate for the purpose of demonstrating compliance with the requirements of this European Standard.

NOTE An example of an approved instrument is the type of system used for routine corrugation measurement. Some of the systems used on reprofiling trains fall into this category.

In accordance with current practice, limits are set on the magnitude of the irregularities that can remain in track after a reprofiling operation. It is recognised, however, that it can be uneconomic to achieve 100 % compliance with these, particularly where isolated rail running surface defects, such as wheel burn, exist prior to reprofiling. Two classes are therefore offered, differentiated by the percentage of the reprofiled track meeting the specified criteria. Where isolated top faults exist, class 2 offers a lower cost option compared to class 1 as it will be achieved with fewer passes. However, a larger number of isolated non-compliant zones will remain in the reprofiled site.

Class 1 also includes limits for very short (10 mm to 30 mm) and very long (300 mm to 1 000 mm) wavelength residual irregularities; these are not included in class 2. Where it is required that corrugations in these shall be removed it will also be necessary to specify class 1.

For the necessary annual metrological check, see Annex D.

4.2 Measurements required

The longitudinal profile of the finished reprofiled rail shall be recorded continuously using either a reference instrument or an approved instrument. Where independent verification is required a reference instrument shall be used. All measurements undertaken in order to demonstrate compliance with 4.3 shall be recorded.

Longitudinal profile measurements shall be made within a distance of 15 mm laterally on the rail from the rail crown, to produce the traced profile.

NOTE It is recommended that a digital form of the traced profile, the primary profile, be used for subsequent analysis.

Measurements should be undertaken immediately after work. Measurements shall be undertaken at the latest within 8 days of reprofiling or before the track has carried 0,3 MGT (Million Gross Tonnes) of traffic, whichever occurs sooner.

4.3 Acceptance criteria for longitudinal profile

4.3.1 General

The acceptance of reprofiled sites shall be on the basis of percentage of irregularities shown in Table 1.

4.3.2 Peak-to-peak value

The percentage of any site in which the amplitude of the filtered profile exceeds the value specified in Table 1 shall be calculated.

The primary or traced profile shall be processed to provide a filtered profile within each of the wavelength ranges given in Table 2.

Table 1 — Acceptance criteria for longitudinal profile expressed in terms of allowable percentages of exceeding

Wavelength range (mm)	10 to 30	30 to 100	100 to 300	300 to 1 000
Class 1	5 %	5 %	5 %	5 %
Class 2	No requirement	10 %	10 %	No requirement

Table 2 — Acceptance criteria for peak to peak limits

Wavelength range (mm)	10 to 30	30 to 100	100 to 300	300 to 1 000
Limit of peak-to-peak values (mm)	± 0,010	± 0,010	± 0,015	± 0,075

The classification concerns the total length of each reprofiling section, where level crossings and switches and crossing work within the length of track are to be excluded.

5 Transverse profile

5.1 Principle

Measurements are made using either a reference instrument, see 3.16, or an approved instrument, see 3.2. Approved instruments do not offer the same accuracy as reference instruments but are generally adequate for the purpose of demonstrating compliance with the requirements of this European Standard.

Reprofiling can be undertaken for a variety of reasons. Where reprofiling is undertaken purely for the removal of corrugation, there may be less need for the rail to be reprofiled with precision. In other cases, it may be necessary for the reprofiled rail to match closely the ideal profile, represented by the reference rail, see 3.22. A range of classes is therefore included to enable the client to specify the level of precision that is appropriate for the site to be reprofiled.

NOTE Where reprofiling is undertaken to improve conicity, class Q, see 5.3, is likely to be appropriate.

The match between the reprofiled rail and the profile of the reference rail is determined by aligning the two at two points and measuring maximum difference between them, see Figure 3. For straight track, these points of alignment generally approximate to the rail crown and the gauge point. On the high rail of curves, this method is not applicable if side wear has occurred and an alternative method of alignment is therefore used.

For the necessary annual metrological check, see Annex D.

5.2 Measurements required

The rail's transverse profile shall be measured using either a reference instrument or an approved instrument. Where independent verification is required a reference instrument shall be used. All measurements undertaken in order to demonstrate compliance with 5.3 shall be recorded.

Measurements should be undertaken immediately after work. Measurements shall be undertaken at the latest within 8 days of reprofiling or before the track has carried 0,3 MGT (Million Gross Tonnes) of traffic, which ever occurs sooner.

NOTE It is preferable for measurements to be made immediately after reprofiling.

The transverse profile of each finished, reprofiled rail shall be measured sufficiently frequently to ensure compliance with the requirements stated in 5.3. The transverse profile shall be recorded at least once per reprofiling site or at an interval of not more than 500 m on a reprofiling site greater than 500 m long.

Where independent verification is required, measurements of each rail shall be made at an interval of not less than 10 m throughout the reprofiling site.

5.3 Acceptance criteria for the transverse profile

Each measured profile shall be aligned with the appropriate reference rail so that the reference points A and B₁, or A and B₂, on the reference rail coincide with points on the measured profile. The alignment shall be undertaken without rotation of either profile.

Reference points A and B₂ shall be used on side-worn rails and A and B₁ elsewhere.

The transverse reprofiling shall be specified as one of three classes as shown in Table 3. For each class one range of deviation and division of this range between a positive and negative tolerance shall also be specified. The percentage of measurements for which the deviation exceeds the stated range shall not exceed the value given in Table 3 for the class specified.

E.g. if reprofiling of class R and a tolerance range of 1,0 mm apportioned as + 0,4 mm/- 0,6 mm were specified, at least 85 % of measurements should deviate by less than + 0,4 mm/- 0,6 mm from the prescribed reference profile.

The maximum positive deviations shall be specified, e.g. for the range of deviation 0,6 mm: + 0,3 mm/- 0,3 mm, + 0,2 mm/- 0,4 mm.

Table 3 — Minimum proportion of measurements within the specified range

Range of deviation (mm)	0,6	1,0	1,7
Class Q	90 %	95 %	98 %
Class R	No requirement	85 %	98 %
Class S	No requirement	No requirement	75 %

On the field side of the rail outside the reprofiling zone, see 3.25, reprofiling shall be undertaking to – 0,8 mm tolerance.

6 Metal removal

6.1 Measurements required

Measurements of metal removal from the railhead are required only if there is a requirement in the contract to demonstrate a minimum or maximum depth of metal removal. All measurements undertaken in order to demonstrate compliance with 6.2 shall be recorded.

The height of the rail shall be measured using a micrometer whose accuracy is in accordance with EN ISO 3611.

The rail height or height of the rail-head shall be measured before and after reprofiling at a minimum of 5 positions on each rail at distance of no less than 0,5 m apart. Measurements shall be made within a month of reprofiling or one MGT what ever comes first. The rail shall be marked to ensure that measurements before and after reprofiling are made within a distance of 10 mm of each other along the rail. If the rail is initially corrugated, measurements shall be undertaken in the trough of the corrugation.

Measurement of the rail height or depth of the railhead shall be processed so as to provide the depth of metal removed within 15 mm transversely of the rail crown, or elsewhere on the railhead as agreed between client and contractor.

NOTE Measurements should be recorded once per week or as required by the contract.

6.2 Acceptance criteria for metal removal

The minimum or maximum depth of metal removed shall be as required by the contract at the minimum percentage of measurement positions specified by the contract.

7 Surface roughness

Roughness shall be measured using an instrument that complies with EN ISO 3274.

NOTE 1 Alternative instruments may be used for production control processes.

Measurements shall be made immediately after reprofiling along the rail's longitudinal axis within 15 mm of the rail crown. Where applicable, measurements shall be made on the same facet. A roughness sampling length, $l_r = 2,5$ mm and a roughness evaluation length, $l_n = 12,5$ mm, as defined in EN ISO 4288, shall be used.

At least 6 contiguous measurements shall be taken. Where applicable, sufficient measurements shall be made to cover at least one complete characteristic length on the facet.

The arithmetic mean surface roughness (R_a), as defined in EN ISO 4287, of each measured section, shall be calculated.

Unless specified otherwise in the contract, in no more than 16 % of the measured lengths (or 1 in 6, if only 6 measurements are made) shall R_a exceed 10 μm .

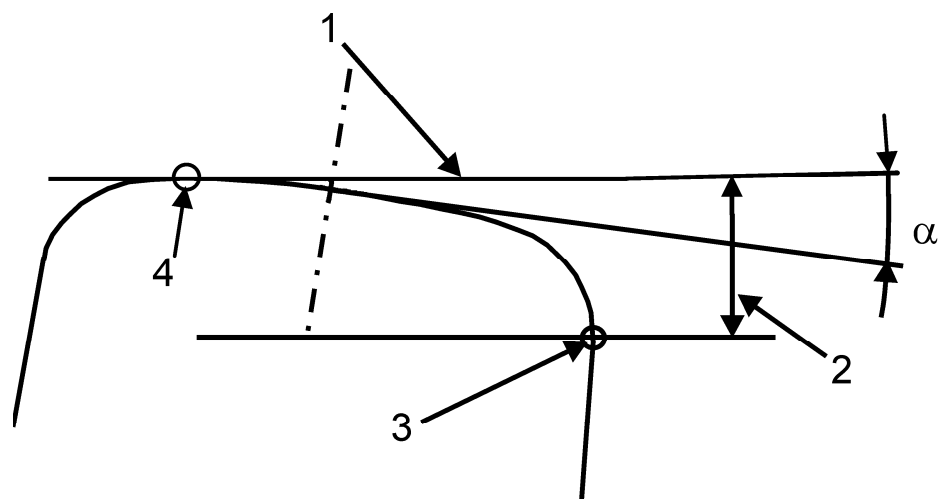
NOTE 2 Other values of surface roughness may be required where reprofiling is undertaken for the purpose of noise abatement or the improvement of adhesion.

8 Visual appearance: acceptance criteria

Where facets are produced by the reprofiling operation, the maximum facet width shall be 4 mm on the gauge corner, 7 mm on the shoulder and 10 mm within 10 mm of the rail crown. The reprofiling zone shall be blended smoothly into the parent rail.

The maximum variation in facet width over a 100 mm length of rail shall be 25 % of the maximum width of the facet.

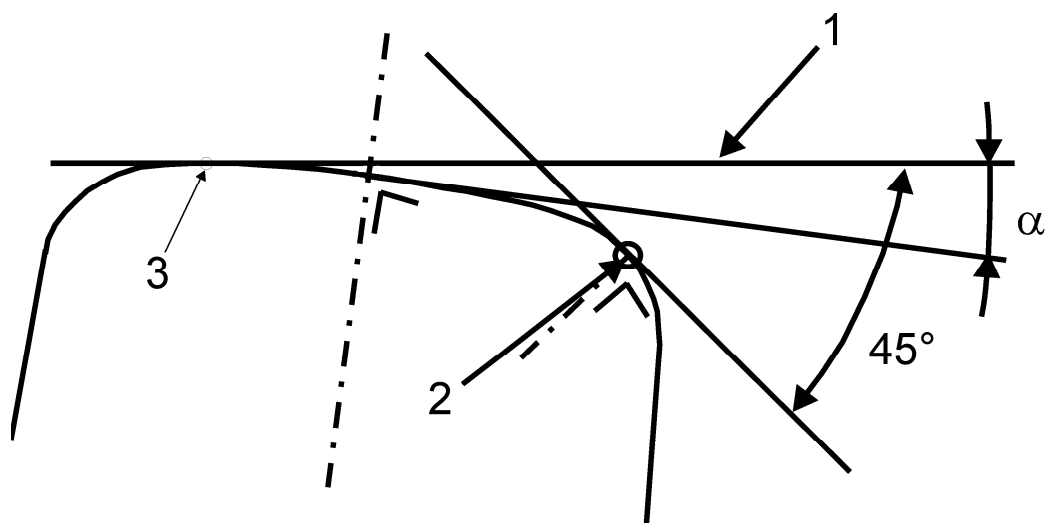
There shall not be continuous blueing in the reprofiling zone.



a) Detailed section of railhead, showing reference points A and B₁ (α : angle of inclination of the rail)

Key

- 1 reference line
- 2 14 mm
- 3 reference point B₁
- 4 reference point A

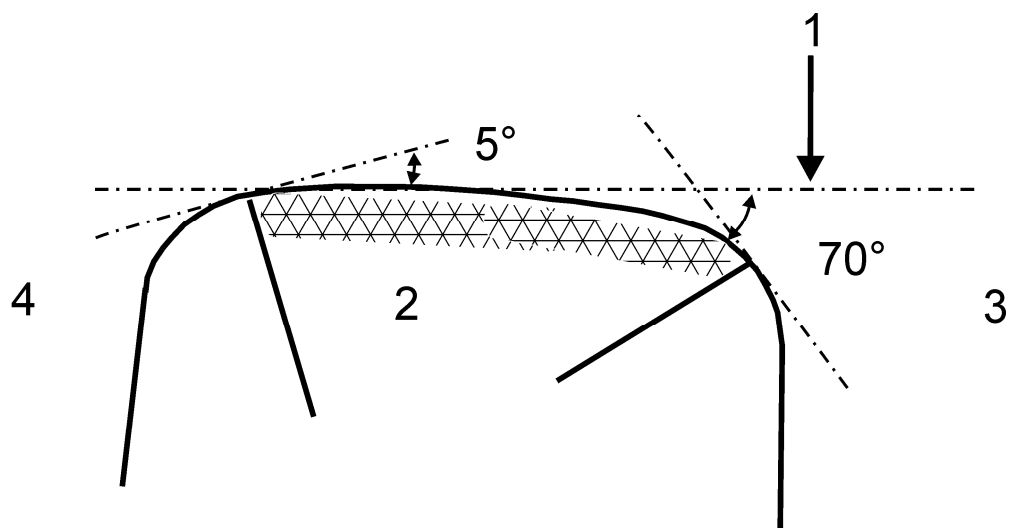


b) Detailed section of railhead, showing reference point A and B₂ (α : angle of inclination of the rail)

Key

- 1 reference line
- 2 reference point B₂
- 3 reference point A

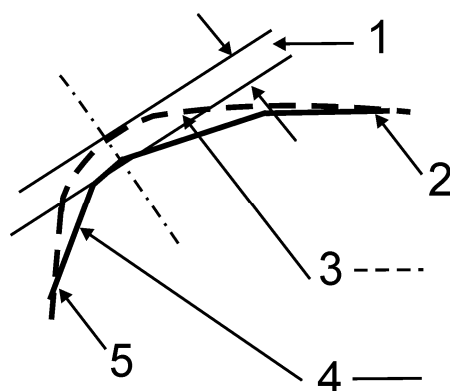
Figure 1 — Definition of terms, and determination of reference points A, B₁ and B₂ on the transverse profile



Key

- 1 reference line
- 2 re-profiling zone
- 3 gauge side
- 4 field side

Figure 2 — Reprofilng zone



Key

- 1 range of deviation
- 2 point A
- 3 reference profile - - -
- 4 measured profile - - - - -
- 5 point B₁ or B₂

NOTE In this example, the range of deviation is negative (measured profile below the reference rail).

Figure 3 — Deviation of measured transverse profile from reference profile

Annex A (normative)

Procedures to verify reference instruments

A.1 Longitudinal profile

A.1.1 Principle

The longitudinal profile of a machined strip on a purpose built beam is measured using both the test instrument and a Coordinate Measuring Machine (CMM). The test instrument is assessed for its ability to make peak amplitude measurements of the profile of the test strip.

The test instrument is deemed to be verified as a reference instrument for the acceptance of rails on the basis of peak values if there is satisfactory agreement between the peak values obtained using the test instrument and those made using the CMM.

A test instrument accepted as a reference instrument for the acceptance of rails on the basis of peak values is also deemed to be verified for the acceptance of rails on the basis of the percentage of irregularities exceeding a specified amplitude.

The procedure involves the assessment of the test instrument for all wavelength ranges and all rail acceptance criteria. Acceptance of the test instrument as a reference instrument may however be limited to specified wavelength ranges

NOTE Verification takes place at ambient temperature. Users of reference instruments are recommended to seek the guidance of the instrument manufacturer as to the temperature range over which the verification can be expected to remain valid.

A.1.2 Calibration beam

The machined strip on the calibration beam shall be not less than 20 mm wide and at least as long as the maximum wavelength for which the test instrument is to be verified.

Irregularities of the wavelength and peak to peak amplitudes shown in Table A.1 shall be present on the machined strip.

NOTE 1 An additional running-in length at each end of the machined strip may be desirable to avoid the possibility of transient effects corrupting the beginning of a profile record.

Table A.1 — Calibration beam irregularities

Wavelength range (mm)	10 to 30	30 to 100	100 to 300	300 to 1 000
Peak-to-peak amplitude (mm)	0,005 to 0,015	0,005 to 0,05	0,020 to 0,8	0,080 to 2,0

An example of a calibration beam suitable for the verification of instruments for wavelengths up to 1 000 mm is shown in Figure A.1. The longitudinal profile along the nominal centre-line of the machined strip of this beam is shown in Figure A.2. The longer wavelength irregularities can be produced by traversing the strip under a working (grinding) head and incrementing the working (grinding) head up and down. The shorter wavelength irregularities can be produced by finishing. The precise form of the irregularities is not critical.

A.1.3 Coordinate Measuring Machine (CMM)

The CMM shall be operated in accordance with the procedures in the manufacturer's operating manual. The maximum error E according to EN ISO 10360-2 shall not exceed 1 μm .

A.1.4 Measurement of the calibration beam using the CMM

Clamp the calibration beam in the CMM, taking care to minimize irregularities in the beam arising from the holding arrangement.

A measuring probe with a head diameter in the range 3 mm to 6 mm shall be used.

Sufficient time shall be allowed, before measurements are taken, for electronic systems to stabilize and for the calibration beam to come to thermal equilibrium with its surroundings.

Make three records of the traced profile of the calibration beam along nominally the same path in one direction.

A.1.5 Data analysis

Produce a primary profile from each of the traced profiles. The sampling interval along the calibration beam and the digitisation increment of the primary profile shall be recorded. The sampling interval shall be no greater

than 1 mm and the digitisation increment no greater than 1 μm .

A.1.6 Measurement of the calibration beam using the test instrument

Immediately following the measurement of the calibration beam using the CMM, the calibration beam shall be measured with the test instrument under same installation and temperature conditions. Make three records of the traced profile of the calibration beam along nominally the same path and same direction. Switch on the test instrument in sufficient time for its electronic circuits to stabilize before the measurements are taken. The measurement speed shall be constant to avoid kinematic failures.

A.1.7 Data analysis using the test instrument

Produce a primary profile from each of the traced profiles and compare the results of each traced profile with results of the CMM.

A.1.8 Acceptance criteria for reference instruments

For instruments for the measurement of peak-to-peak amplitude and for rail acceptance based on percentage of exceedances of specified peak-to-peak amplitudes the maximum difference between the measurements of the CMM and the test instrument shall be no greater than $\pm 2 \mu\text{m}$ and the total number of exceedances shall be no greater than 2 % of the total number of measurement points per measurement line.

A.1.9 Test report

The following shall be recorded:

- manufacturer and serial number or other means of identification of the CMM and the test instrument;
- temperature of test;
- CMM probe identification and head diameter;
- orientation of the beam relative to the x, y and z axes of the CMM;
- primary profiles obtained by both the CMM and the test instrument.

A.2 Transverse profile

A.2.1 Principle

Two rail sections are mounted in a calibration jig, which holds the sections at a known inclination. A support should be placed at the opposite side at a distance within the range of gauges for which a reference instrument would be used. The profile of one rail section is close to a reference profile, while that of the other differs significantly from the reference profile. The transverse profile of nominally the same line across the two rail sections is measured using both the test instrument and a Coordinate Measuring Machine (CMM), the accuracy of which has been verified. The test instrument is deemed to be verified as a reference instrument for measurement of the transverse rail profile if there is satisfactory agreement between measurements made using the test instrument and the CMM.

NOTE Verification should take place at ambient temperature. Users of reference instruments are recommended to seek the guidance of the instrument manufacturer as to the temperature range over which the verification can be expected to remain valid.

A.2.2 Calibration jig

The calibration jig shall consist of two short rail lengths. They shall be held to one another at nominally the same inclination, held sufficiently rigidly and should be long enough to hold the test instrument.

The transverse profile of one of the rails shall be such that it deviates from a reference rail of choice, at an inclination of choice, by less than $\pm 0,3$ mm throughout the reprofiling zone. The transverse profile of the other rail shall be such that it deviates from the reference rail of choice, at the inclination of choice, by at least 0,5 mm at two or more points in the reprofiling zone.

A.2.3 Coordinate measuring machine (CMM)

The CMM shall be operated in accordance with the procedures in the manufacturer's operating manual. The maximum error E according to EN ISO 10360-2 shall not exceed $1 \mu\text{m}$, where L is the nominal dimension being measured in mm.

A.2.4 Calibration jig verification

Hold the calibration jig in the CMM rigidly. The two rails shall be measured using the CMM and a measuring probe with a head diameter in the range 3 mm to 6 mm. Sufficient time shall be allowed, before measurements are taken, for electronic systems to stabilize and for the calibration jig to come to thermal equilibrium with its surroundings.

The rails shall be shown to comply with the requirements of A.2.2.

A.2.5 Rail measurements using the test instrument

Immediately following the measurement of the jig using the CMM, the jig shall be measured with the test instrument under same installation and temperature conditions. Make three records of the traced profile of the jig.

Switch on the test instrument in sufficient time for its electronic circuits to stabilize before the measurements are taken. Remove the test instrument from the rail between measurements.

A.2.6 Acceptance of test instruments

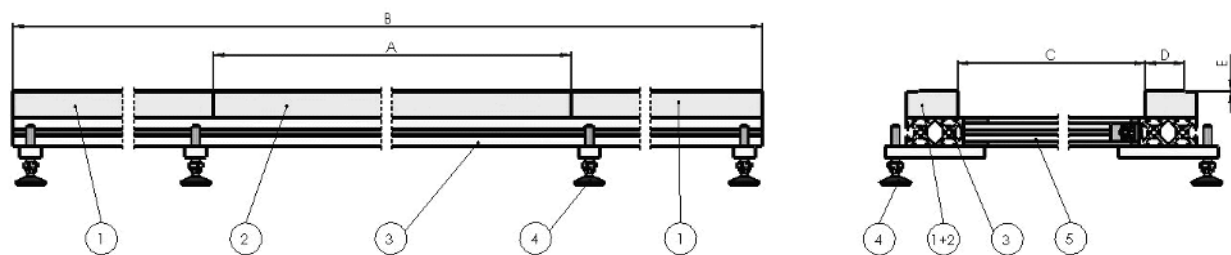
From each traced profile, both those produced by the CMM and those produced by the test instrument, create a primary profile. The sampling interval when the CMM is used shall be no greater than 1,0 mm throughout the reprofiling zone and the digitisation increment no more than 10 µm.

Compare the primary profiles for each rail from the test instrument measurements with that from the CMM as though the latter were a reference rail. The maximum positive and negative deviations shall be less than 0,05 mm throughout the re-profiling zone. No exceedances are allowed.

A.2.7 Test report

The following shall be recorded:

- serial number and manufacturer or other means of identification of the CMM and the test instrument;
- temperature of test;
- CMM probe identification and head diameter;
- orientation of the calibration jig relative to the x, y and z axes of the CMM;
- primary profiles obtained by both the CMM and the test instrument;
- whether the test instrument complies with the requirements of A.2.6.

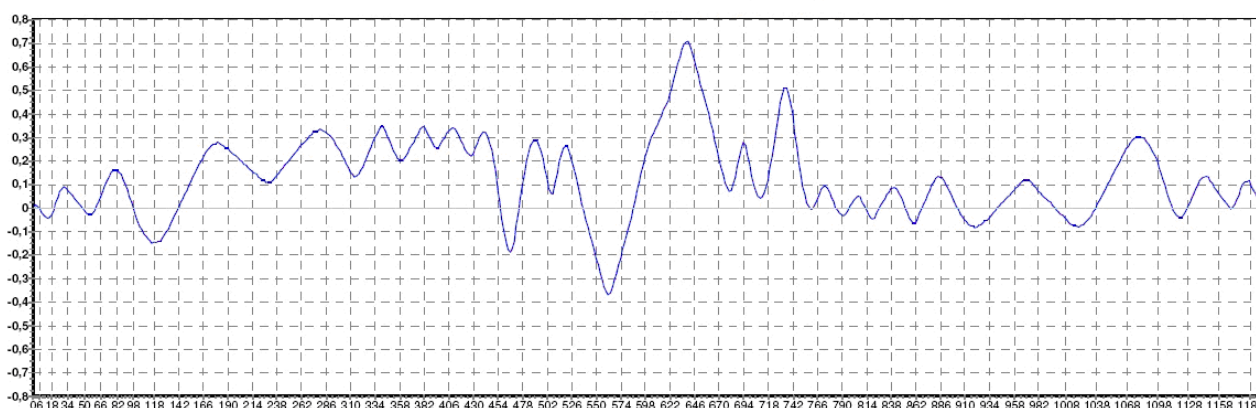


Key

- A calibration beam
- B total length of installation
- C track gauge
- D machined strip
- E plane running surface

- 1 running-in track
- 2 calibration beam
- 3 support
- 4 level adjustment
- 5 transverse joint

Figure A.1 — Schematic diagram of a calibration beam for longitudinal profile measuring equipment



NOTE The values are shown in mm.

Figure A.2 — Longitudinal profile of a calibration beam

Annex B (normative)

Procedures to demonstrate correlation of approved and reference instruments

B.1 Longitudinal profile

B.1.1 Principle

The train-borne systems used for the routine measurement of the rail's longitudinal profile are not normally accurate enough to enable compliance with this specification to be demonstrated directly. Their use is, however, the only practical option if extensive measurements are to be made. This annex sets out the procedure to be used for the approval of systems for routine measurements.

The basis of approval is that the use of such a system shall not generally lead to the acceptance of track that would have been rejected if a reference instrument had been used. To provide assurance of this, the performance of a test instrument for which approval is sought is compared to that of a reference instrument under a variety of test conditions. However, if acceptance of the test instrument as an approved instrument is only required for one speed and for one direction of train travel, testing may be limited to these conditions.

The procedure given involves the assessment of the test instrument for all wavelength ranges and for the acceptance of rails on the basis of peak amplitudes, in general see 4.3. As the test instrument will also be used to provide information on rail condition prior to re-profiling, a similar procedure to that described here shall be used to verify its suitability for that purpose but with measurements made on un-reprofiled sites.

NOTE The test instrument is approved on the basis of a comparison between measurements made on rails at ambient temperature. Users of approved instruments are recommended to seek the guidance of the instrument manufacturer as to the temperature range over which the instrument may reliably be used and whether other weather conditions could affect its performance.

B.1.2 Characteristics of the test sites

Three sites are required, as follows:

- (S1) straight track;
- (L1) a left hand curve of nominal radius no greater than 800 m;
- (R1) a right hand curve of nominal radius no greater than 800 m.

The length of each site shall be no less than 200 m.

NOTE Additional transition lengths at the beginning and the end of the measured length may be necessary.

All sites shall be shown to comply with the requirements of class 1 of 4.3 using a reference instrument.

B.1.3 Measurements required

Measurements shall be taken through the test sites for a continuous length of at least 200 m. If either the reference instrument or the test instrument requires a transition length at either the beginning or the end of the measurement, the transition length shall lie outside the measured length.

The longitudinal profile of both rails at each test site shall be recorded using a reference instrument.

The longitudinal profile of both rails at each test site shall be recorded using the test instrument at its maximum speed of use. Measurements shall also be made on site S1 at the minimum speed of use, if the test instrument is to be used at other than its maximum speed. If the test instrument is to be used with the train travelling both forwards and backwards, measurements shall be made with the train travelling in both directions.

All measurements shall be taken three times in both directions.

B.1.4 Data analysis

The primary profiles for each rail at each site obtained using the reference instrument shall be processed, as specified in Clause 4, to give peak amplitudes, for each wavelength range for which approval of the test instrument is sought.

The primary profiles obtained using the test instrument shall also be processed to give peak amplitudes using the electronics and software inherent in the test instrument.

For each filtered profile obtained by the test instrument and the reference instrument, the percentage of the measured length for which peak amplitudes exceeds the values respectively, shall be calculated.

B.1.5 Acceptance criteria for approved instruments

B.1.5.1 General

An instrument can be approved for all or a limited range of wavelengths, for one, specified, direction of train travel or for both. Within its specified limits of use, a test instrument is required to meet all the criteria set out below for all the profiles measured.

A test instrument which has only been shown to comply with the requirements of B.1.5 at its maximum speed of operation is deemed approved for that speed of operation only.

A test instrument which, additionally, complies at its minimum speed of operation is deemed to comply at both its maximum and minimum speeds and at all intermediate speeds.

B.1.5.2 Acceptance criteria for peak-to-peak measurements

For specified test conditions of speed and direction of travel, the percentage exceedance values obtained using the test instrument at the amplitudes given in Table B.1 for all the profiles recorded, shall not be less than those obtained using the reference instrument on the same measured lengths.

Table B.1 — Peak to peak amplitudes at which test instrument percentage exceedances are not less than those obtained using a reference instrument

Wavelength range (mm)	10 to 30	30 to 100	100 to 300	300 to 1 000
Amplitude (µm)	10	10	30	100

The percentage exceedances for the test instrument for each of the amplitudes given in Table B.1 shall also be included in a deviation range of at most 5 % of the exceedance percentage before rail reprofiling and 1 % exceedances after reprofiling rails obtained using the reference instrument.

B.1.6 Test report

The following shall be recorded:

- serial number and manufacturer or other means of identification of the reference instrument and the test instrument;
- nominal radii of sites L1 and R1;
- ambient temperature and weather conditions, including the relative humidity;
- direction of measurement with the reference instrument on each site and rail;
- direction(s) of measurement with the test instrument on each site and rail;
- speed(s) of measurement with the test instrument;
- primary and filtered profiles obtained by both the test and reference instrument.

If variable, the sampling interval, digitisation increment and filter characteristics of the test instrument during its evaluation.

The speed(s), direction(s) of travel and wave-length ranges for which the requirements of B.1.5.2 are complied with by the test instrument.

B.2 Transverse profile

B.2.1 Principle

The train mounted measuring systems used for the routine measurement of the rail's transverse profile are not normally accurate enough to enable compliance with this specification to be demonstrated directly. Their use is, however, the only practical option if extensive measurements are to be made. This annex sets out the procedure to be used for the approval of systems for routine measurements.

The basis of approval is that the use of such a system shall not generally lead to the acceptance of track that would have been rejected if a reference instrument had been used. To provide assurance of this, the performance of a test instrument for which approval is sought is compared to that of a reference instrument under a variety of test conditions. However, if acceptance of the test instrument as an approved instrument is only required for one speed and for one direction of train travel, testing may be limited to these conditions.

NOTE 1 The test instrument is approved on the basis of a comparison between measurements made on rails at ambient temperature. Users of approved instruments are recommended to seek the guidance of the instrument manufacturer as to the temperature range over which the instrument may reliably be used and whether other weather conditions could affect its performance.

NOTE 2 If the test instrument will also be used to provide information on rail condition prior to re-profiling, a similar procedure to that described here could be used to verify its suitability for that purpose but with measurements made on un-re-profiled sites.

B.2.2 Characteristics of the test sites

Two test sites are required, as follows:

- (S) straight track;
- (C) curve of nominal radius no greater than 800 m.

The measured length of each site shall not be less than 10 m.

NOTE 1 Additional transition lengths at the beginning and the end of the measured length may be necessary.

When measured using a reference instrument, the range of deviation of all sites shall be within the limits specified in 5.3 for class Q, and the maximum deviation shall be within the limits relative to the user-defined reference profile.

NOTE 2 Different user-defined reference profiles may be used for each site and rail.

B.2.3 Measurements required

Measurements shall be taken through the test sites for a length of at least 10 m after re-profiling. If the test instrument requires a transition length at either the beginning or the end of the measurement, the transition length shall lie outside the measured length.

Measurements with the test instrument shall be made at equal intervals in a range of 0,20 m to 0,30 m.

Measurements with the reference instrument shall be made using the same interval how did with the test instrument.

The profiles shall be recorded using the test instrument at its characteristic speed of use. If the test instrument is to be used with the train travelling both forwards and backwards, measurements shall be made with the train travelling in both directions.

All measurements shall be taken with the test instrument three times and with the reference instrument once.

B.2.4 Data analysis

The comparison of the measured profiles and the user-defined reference profile shall be done regarding to Figure B.1.

Determine the deviations of the measured profile and the user-defined reference profile for the railhead positions Y-30, Y-25 and Y+14 of each rail at each site both for measurements with the test instrument $\Delta T_{n,m}$ (with n – measurement point Nr.; m – Nr. of acquisition) and the reference instrument ΔR_n (with n – measurement point Nr.).

Firstly, the averages $M\Delta T_n$ of all acquisitions m shall be calculated for each measurement point n and each railhead position shown in Table B.2.

After that the averages $MM\Delta T$ of all $M\Delta T_n$ and the averages $M\Delta R$ of all ΔR_n shall be calculated for each railhead position of each rail and each site shown in Table B.3.

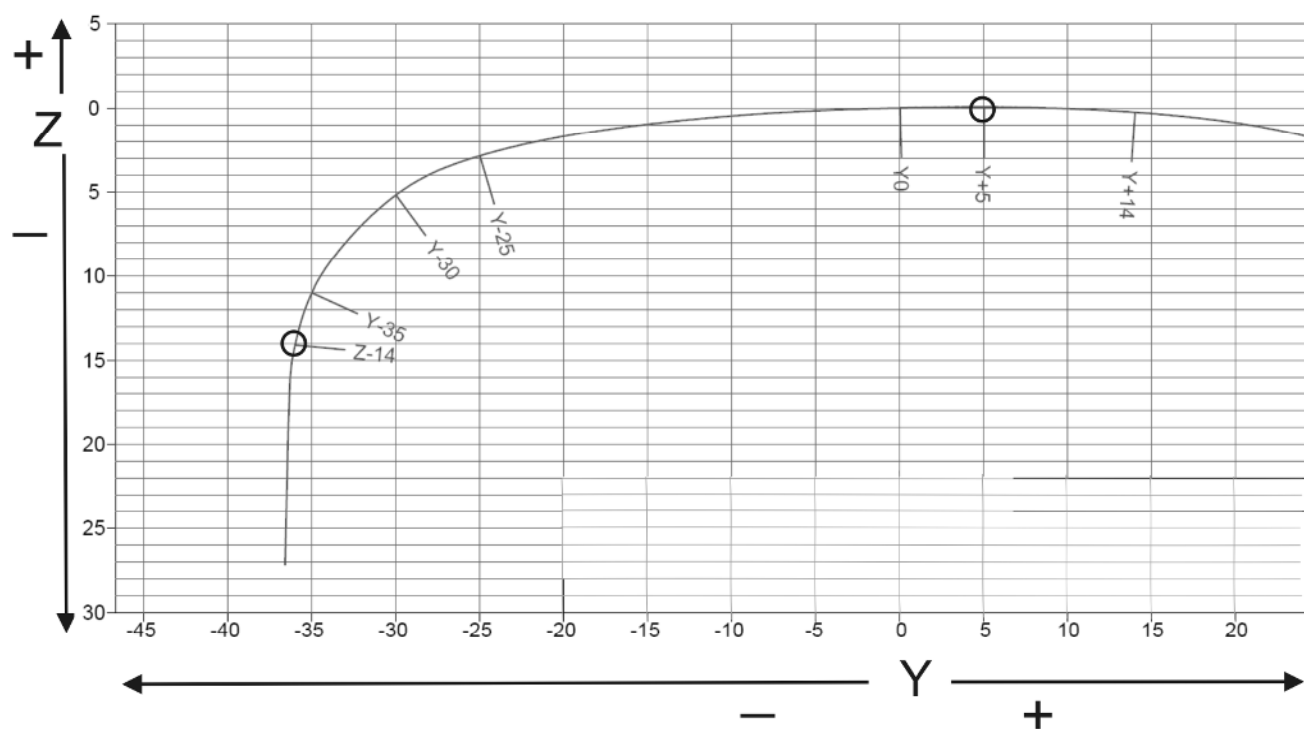


Figure B.1 — Reference profile

Dimensions in millimetres

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Table B.3 — Average of the deviation of the measured profile and an user-defined reference profile for different rail head positions of a 10 m track section

Dimensions in millimetres

Measurement point / rail head position	Test instrument		Measurement point / rail head position	Reference instrument	
	left rail	right rail		left rail	right rail
	MMΔT	MMΔT		MΔR	MΔR
Y-30	0,22	0,65	Y-30	0,22	0,67
Y-25	0,00	0,52	Y-25	0,00	0,55
Y+14	- 0,37	- 0,57	Y+14	- 0,37	- 0,52

B.2.5 Acceptance criteria for approved instruments

The maximum deviations $\max\Delta$ for all railhead positions shall be less or equal than 0,1 mm between the averages $MM\Delta T$ and the averages ΔR calculated for a 10 m track section:

$$\max\Delta = MM\Delta T - M\Delta R \leq 0,1 \text{ mm}$$

The difference between any measurement and any other measurement at the same measurement point and railhead position must not exceed 0,2 mm.

B.2.6 Test report

The following shall be recorded:

- serial number and manufacturer or other means of identification of the reference instrument and the test instrument;
- nominal radii of sites L1 and R1;
- ambient temperature and weather conditions, including the relative humidity;
- direction(s) of measurement with the test instrument on each site and rail;
- speed(s) of measurement with the test instrument;
- primary profiles obtained by both the test and reference instrument.

The test report shall state the speed(s) and direction(s) of travel, for which the requirements of B.2.5 are complied with by the test instrument.

Annex C (normative)

Calculation of peak to peak values

C.1 Calculation of the percentage of exceedances

The percentage of exceedances is given by the routine:

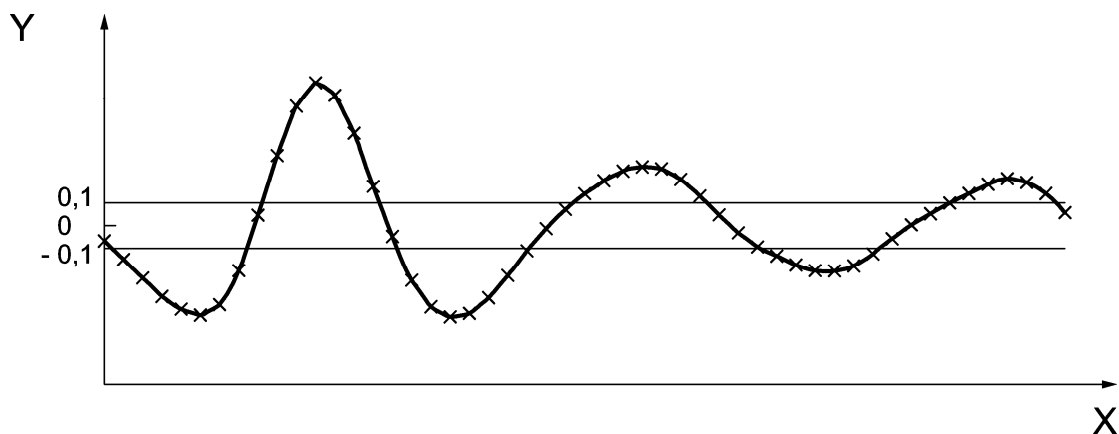
```
z1(Y1, start, end, tolerance) =
    s1 ← 0
    for i ∈ start .. (end)
        s1 ← s1 + 1 if |Y1i| > tolerance
    s1
```

In the specific case shown per example:

$z1(Y1, start, end, tolerance) = 38$ $percentage = \frac{z1(Y1, start, end, tolerance)}{(end - start) + 1} \cdot 100$ $percentage = 74,5$	38 samples are out of tolerance. In this example, the length is reduced to 51 samples. 74,5 % of the measurements are out of tolerance.
---	--

NOTE Y1 profile.

Dimensions in millimetres



Key

X measured length (samples)

Y deviation

x = sample (e.g. 51 samples)

Figure C.1 — Percentage of exceedances

Annex D (normative)

Method of periodic verification

D.1 Method of periodic verification of approved instruments

D.1.1 Principle

The approval of train mounted measuring system (approved instrument) is based on Annex B for every recording system and for an unlimited period. In order to keep the approval valid over time, every system shall undergo at least an annual metrological check or more frequently according to the demands of the client. The aim of these actions is to guarantee the correct functioning of the approved instrument, to prevent deviations and to undertake corrective actions in time. These metrological actions shall be designed in a way to be done on site with a simple instrumentation.

A quality controller, independent of the machine (internal or external according to e.g. EN ISO 9001), shall follow the correct execution of these metrological actions. The verifications shall be documented and accessible on board the machine. He also ensures that required corrective actions are undertaken within due time. At any moment, the client can ask to see the verification documents.

This confirmation interval is divided into two parts:

- 1) static metrological confirmation of the approved instrument;
- 2) dynamic metrological confirmation of the approved instrument.

The following chapters describe a method of verification, which might be adapted according to the specific requirements of each instrument.

D.1.2 Longitudinal profile

The verification of the approved instrument for longitudinal profile recording shall be done in two steps:

- 1) the static verification will allow ensuring the correctness of all the elements constituting the approved instrument such as probes, processing unit and reporting;
- 2) the dynamic verification will allow ensuring the repeatability of the approved instrument in its specific environment in both directions and at working speed.

D.1.3 Static verifications

D.1.3.1 Verification of measuring transducers

An appropriate metrological verification has to be established by the owner of the approved instrument in order to ensure, that each response of the measuring transducers is always correct. This verification needs to be documented.

D.1.3.2 Verification of processing chain

A simulator shall take the places of the measuring transducers in order to ensure, that the processing unit is always correct. This verification needs to be documented.

D.1.3.3 Documents of verification

The documents of verification shall be stored on the machine and made available for independent inspection for analyzing the conformity of the approved instrument.

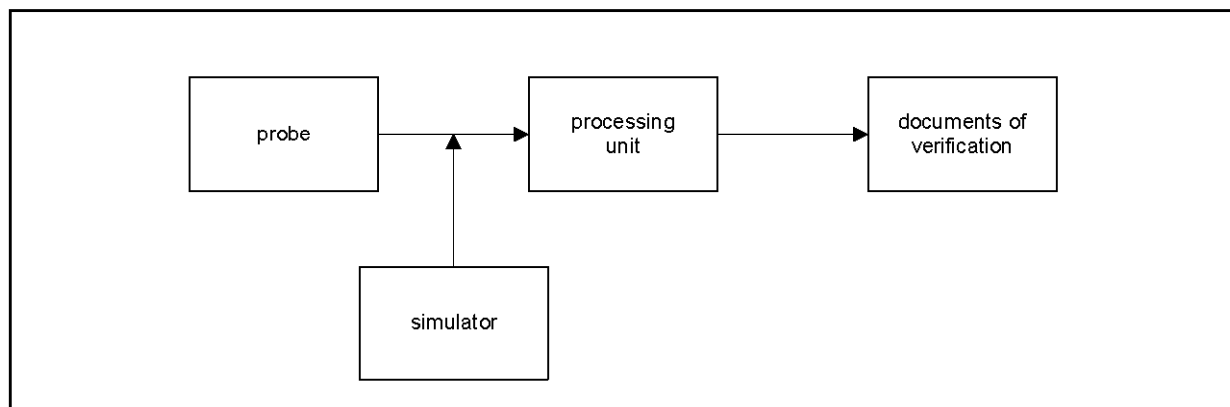


Figure D.1 — Process for documents of verification

D.1.4 Dynamic verification

D.1.4.1 General

The dynamic verifications shall be undertaken in track, both ground and not ground.

The recordings obtained in both working directions shall be compared either by comparison of the graphic outputs or electronically by comparison of the processed data.

D.1.4.2 Comparison of dynamic behaviour

One section of the track at least 300 m long shall be measured in both directions with the instrument(s) incorporated in the machine. A graphical superposition of the filtered profiles allows checking possible differences. In case of non-conformity a corrective action needs to be undertaken.

D.1.4.3 Comparison of statistical results

One section of the track at least 300 m long shall be measured once in each direction with the instrument(s) incorporated in the machine. Statistical analysis of the difference between the measured data for forward and backward measurement should be undertaken and if the data differs by more than 2 % corrective action is required.

The calculation of the exceedances should be undertaken according to Annex C and Table B.1.

Table D.1 — Example of comparison of statistical results

Wavelength mm	range	10 to 30	30 to 100	100 to 300	300 to 1 000	10 to 30	30 to 100	100 to 300	300 to 1 000
Forward, 300 m		98	95	99	100	97	98	98	99
Backward, 300 m		97	97	95	100	98	99	99	94
Difference in %		1	2	4 ^a	0	1	1	1	5 ^a
^a If the difference is greater than 2 %, a corrective action needs to be undertaken.									

D.2 Transverse profile

D.2.1 Principle

The verification of the approved instrument for transverse profile recording shall be done in two steps:

- 1) the static verification will allow ensuring the correctness of all the elements constituting the approved instrument such as probes, processing unit and reporting;
- 2) the dynamic verification will allow ensuring the repeatability of the approved instrument in its specific environment in both directions and at working speed.

D.2.2 Static verifications

D.2.2.1 Verification of probes and processing chain

The static verification is done by placing a reference profile under the approved instrument. The comparison of the reference profile against the measured profile within the range of the re-profiling angles used during work shall satisfy the correct conformity of the approved instrument and shall be documented.

D.2.2.2 Documents of verification

The documents of verification shall be stored on the machine and made available for independent inspection and for analyzing the conformity of the approved instrument.

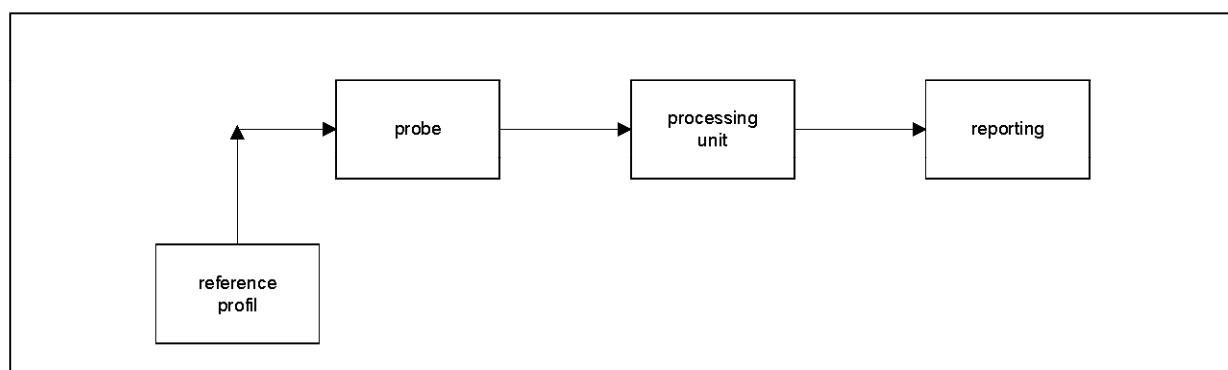
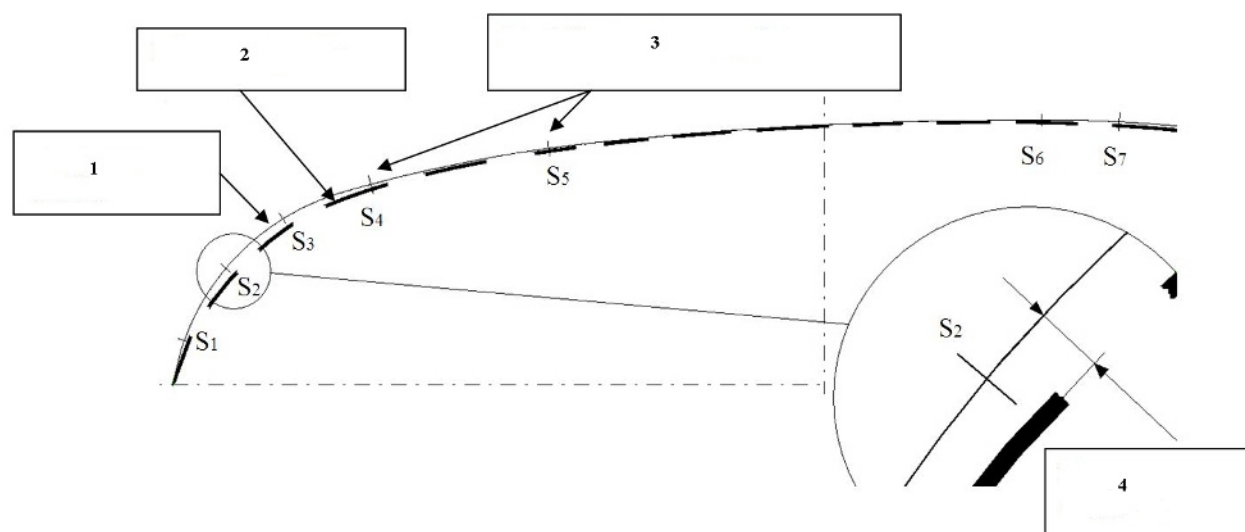


Figure D.2 — Process for reporting

D.2.3 Dynamic verification

The dynamic verifications shall be undertaken in track, either ground or not ground.

One section of the track at least 300 m long shall be measured once in each direction with the instrument(s) incorporated in the machine. Statistical analysis of the difference between the measured data for forward and backward measurement should be undertaken and if the data differs by more than 5 % corrective action is required as shown in Figure D.5.



Key

- 1 reference profile
- 2 measured profile
- 3 statistical reference points
- 4 range of deviation

Figure D.3 — Statistic interpretation for transverse profile

Measurements with the approved instrument shall be made at equal intervals in a range of 0,20 m to 0,30 m and shall be superimposed over the reference profile aligned at the reference points A and B.

The differences between the measured profiles and the reference profile are calculated for the points indicated as “statistical reference points.”

The position of each statistical reference point is defined on the reference profile by its inclination or a coordinate of the railhead.

For every statistical reference point the average difference shall be calculated for every meter measured and only the biggest absolute value of all the average values taken is memorized in the statistic table. The principle is shown in Figure D.4.

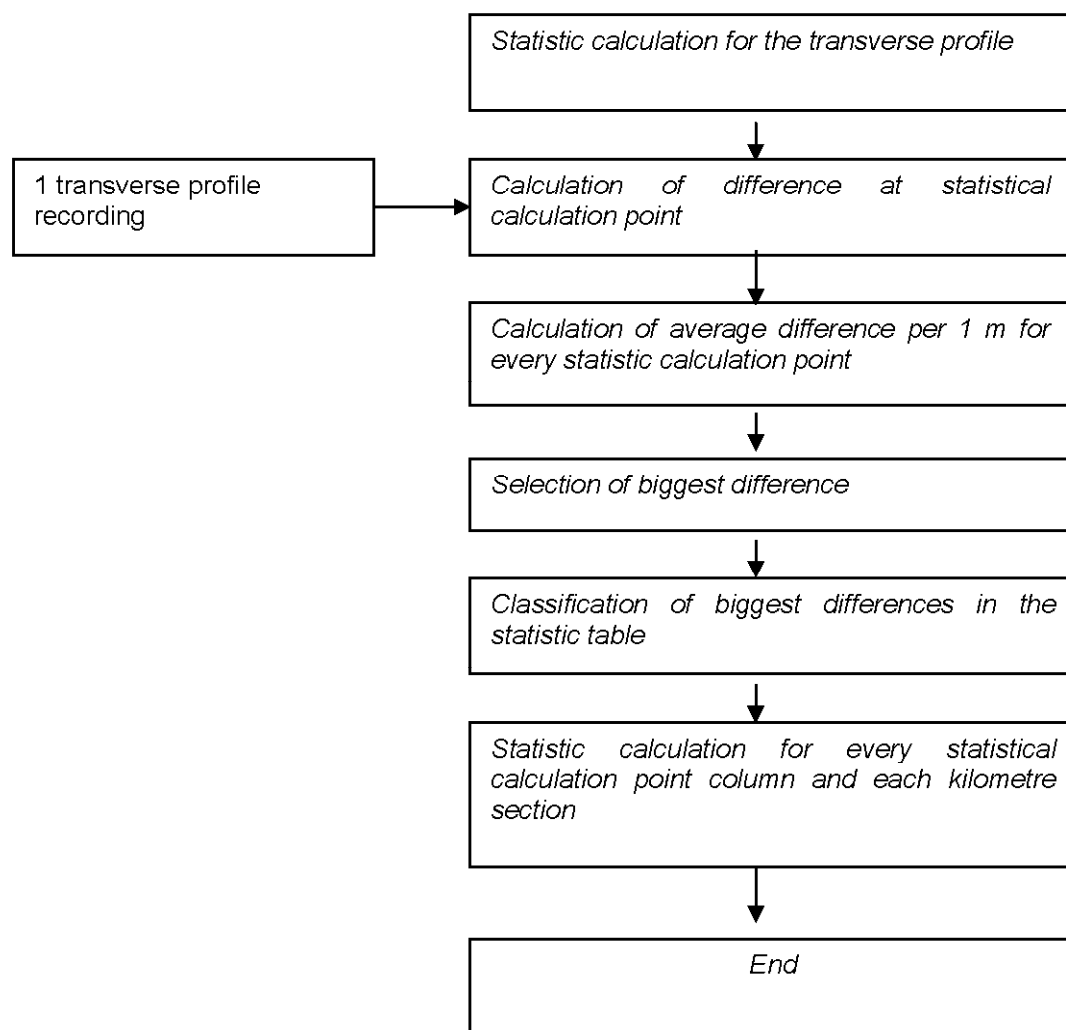


Figure D.4 — Principle of statistic verification

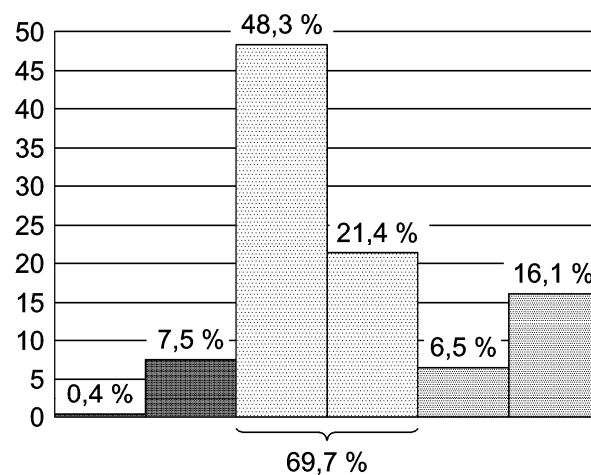
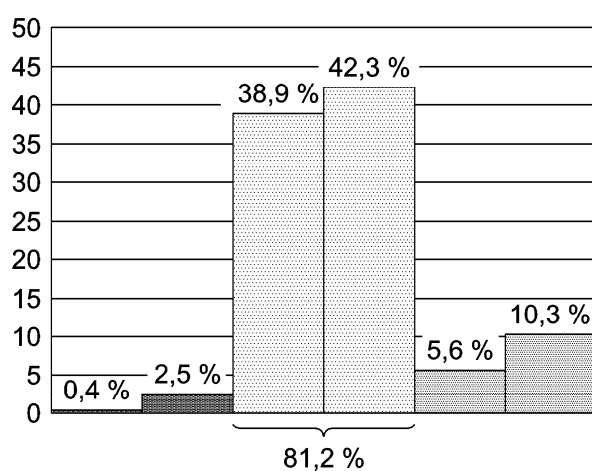
D.2.4 Report

The results are classified in a table as shown in Figure D.5.

The differences calculated by the method described above are classified according to their values in the corresponding column and counted.

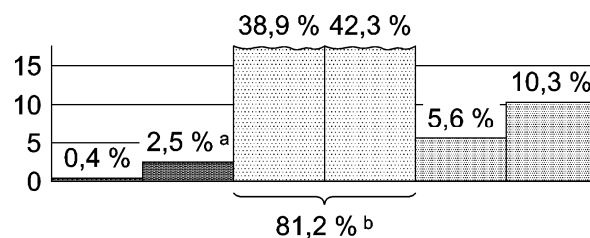
A histogram represents the results in graphic form.

Interval km	Interval of tolerance											
	mm											
	Left rail						Right rail					
	<-0,5	-0,5..-0,3	-0,3..0,0	0,0..0,3	0,3..0,5	>0,5	<-0,5	-0,5..-0,3	-0,3..0,0	0,0..0,3	0,3..0,5	>0,5
45,000..45,100	0	4	24	68	4	0	0	10	78	12	0	0
45,100..45,200	0	0	40	58	2	0	0	2	74	24	0	0
45,200..45,300	0	7	50	31	10	2	3	24	63	10	0	0
45,300..44,400	1	1	5	50	14	29	1	12	51	24	4	8
44,400..44,500	1	0	23	56	5	15	0	2	30	31	8	29
44,500..44,600	2	3	11	30	16	38	0	0	0	6	6	88
44,600..44,700	0	8	54	36	2	0	0	8	2	32	22	36
44,700..44,800	0	3	52	45	0	0	0	0	100	0	0	0
44,800..44,900	0	2	51	38	0	9	0	4	49	37	10	0
44,900..45,000	0	0	54	36	0	10	0	4	30	36	16	14
45,000..45,100	0	0	64	17	9	10	0	16	54	23	5	2
.....	..	..	..	..	..	..	..	..	..	..	..	..
.....	..	..	..	..	..	..	..	..	..	..	..	..



Interval km	Interval of tolerance mm					
	< -0,5	-0,5..-0,3	-0,3..0,0	0,0..0,3	0,3..0,5	> 0,5
	Number of differences taken for the tolerance interval of the length considered					
45,000 ..45,100	0	4	24	68	4	0
45,100 ..45,200	0	0	40	58	2	0
45,200 ..45,300	0	7	50	31	10	2
45,300 ..44,400	1	1	5	50	..	..
44,400 ..44,500	1	0	23	56	..	..
.....	..	..	..	..	..	..
.....	..	..	..	..	..	..

Histogram



Key

- ^a total percentage for the considered tolerance interval and for the total measured length
- ^b total percentage for the two considered tolerance intervals and the total measured length

Figure D.5 — Result and interval

Annex E (informative)

Example of acceptance documentation for rail reprofiling work

Network

Region

Protocol of acceptance

Re:

Track work

Type of work:

Line: from km to km

Track: from km to km

Station:

Switch Nr.:

Maintenance unit:

Order Nr.: dated:

Contractor:

Reception according to (Specification Nr.:) Date:

Participants

For railway:

For contractor:

Result

Work has been accepted *

Work has been accepted, but shortcomings have been listed at back-side *

Shortcomings have to be corrected until:

Date

Requests with regard to shortcomings possible.

* Cross off, what does not apply.

Documented shortcomings:

Nr.	Place	Type	Explanation	To be corrected by	Corrected Name/Date	Remark

Accepted:
Place Date

.....
Signature Representative Railway

.....
Signature Representative Contractor

Correction of shortcomings confirmed:

.....
Place Date Signature Responsible Track

NOTE The user of this form is allowed to copy this present form.

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BSI Standards Publication

Railway applications — Track — Acceptance of works

Part 4: Acceptance of reprofiling rails in
switches and crossings

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National foreword

This British Standard is the UK implementation of EN 13231-4:2013.

The UK committee submitted a negative vote at the Enquiry and Formal Vote stages of this standard, principally on the basis that the standard provides inadequate guidance regarding the measurements to be taken and acceptance criteria to be applied for the reprofiling of switch rails and rails within the crossing area. The proposed acceptance criteria, which are based on those for plain line, are not appropriate for the far more complicated reprofiling that is undertaken in switch and crossing work.

The UK participation in its preparation was entrusted to Technical Committee RAE/2, Railway Applications — Track.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Date	Text affected
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13231-4

April 2013

ICS 93.100

English Version

**Railway applications - Track - Acceptance of works - Part 4:
Acceptance of reprofiling rails in switches and crossings**

Applications ferroviaires - Voie - Réception des travaux -
Partie 4: Critères de réception des rails reprofilés dans les
appareils de voie

Bahnanwendungen - Oberbau - Abnahme von Arbeiten -
Teil 4: Abnahme von Reprofilierungsarbeiten in Weichen
und Kreuzungen

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Foreword

This document (EN 13231-4:2013) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2013, and conflicting national standards shall be withdrawn at the latest by October 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This European Standard is one of the series EN 13231, *Railway applications — Track — Acceptance of works*, as listed below:

- *Part 1: Works on ballasted track — Plain line;*
- *Part 2: Works on ballasted track — Switches and crossings;*
- *Part 3: Acceptance of reprofiling rails in track;*
- *Part 4: Acceptance of reprofiling rails in switches and crossings;*
- *Part 5: Procedures for rail reprofiling in plain line, switches, crossings and expansion devices (currently being elaborated).*

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1 Scope

This European Standard lays down the technical requirements and the measurements to be made for the acceptance of work for reprofiling longitudinally and/or transversely the heads of railway rails in switches, crossings and expansion devices.

For acceptance purposes two classes of longitudinal profile and three classes of transverse profile tolerance are defined.

It applies to reprofiled vignole railway rails and associated switch rails 46 kg/m and above.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13231-3:2012, *Railway applications — Track — Acceptance of works — Part 3: Acceptance of reprofiling rails in track*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13231-3:2012 apply.

For the definitions of measurement instruments also, see EN 13231-3:2012.

4 Longitudinal profile

4.1 Principle

Measurements are made using either a reference instrument, or an approved instrument, see EN 13231-3:2012, Annex A or Annex B. The approved instruments shall be verified according to EN 13231-3:2012, Annex D.

Approved instruments do not offer the same accuracy as reference instruments but are generally adequate for the purpose of demonstrating compliance with the requirements of this standard.

NOTE An example of an approved instrument is the type of system used for routine measurements on reprofiling trains. Some of the systems used for routine measurements on reprofiling trains fall into this category.

In accordance with current practice, limits are set on the magnitude of the irregularities that can remain in track after a reprofiling operation. It is recognised, however, that it can be uneconomic to achieve 100 % compliance with these, particularly where isolated top faults, such as wheelburn, exist prior to reprofiling. Two classes are therefore offered, differentiated by the percentage of the reprofiled track meeting the specified criteria. Where isolated top faults exist, class 2 offers a lower cost option compared to class 1 as it will be achieved with fewer passes. However a larger number of isolated non-compliant zones will remain in the reprofiled site.

Class 1 also includes limits for very short (10 mm to 30 mm) and very long (300 mm to 1 000 mm) wavelength residual irregularities; these are not included in class 2. Where corrugations in these wavebands are required to be removed it will also be necessary to specify class 1.

4.2 Measurements required

The longitudinal profile of the finished re-profiled rail in switches and crossings shall be recorded either with machine mounted or manual measuring systems, either a reference instrument or an approved instrument. Where independent verification is required a reference instrument shall be used. All measurements undertaken in order to demonstrate compliance with 4.3 shall be recorded.

Generally continuously working systems are to be used. In this case the rail containing the frog shall be measured only in "Zone G", see Figure 1, the opposite rail shall be measured in the total ground length. If such a system is out of order or not available recording details shall be settled in the contract.

NOTE For measurements in the wavelength range (10 mm to 30 mm), at present it is unlikely that instruments other than reference instruments will have sufficient accuracy.

Longitudinal profile measurements shall be made within a distance of 15 mm laterally on the rail from the rail crown for producing the traced profile.

It is recommended that a digital form of the traced profile, the primary profile, be used for subsequent analysis.

The measurements can be undertaken immediately after work or at the latest within 8 days of reprofiling or after the track has carried 0,3 MGT (Million Gross Tons) of traffic.

4.3 Acceptance criteria for longitudinal profile

4.3.1 General

The acceptance of reprofiled sites shall be on the basis of percentage of irregularities shown in Table 1.

4.3.2 Peak-to-peak value

The percentage of any site in which the peak-to-peak value exceeds the value specified in Table 1 shall be calculated.

The primary or traced profile shall be processed to provide a filtered profile within each of the wavelength ranges given in Table 2.

Table 1 — Acceptance criteria for longitudinal profile expressed in terms of allowable percentages of exceeding for continuous measuring

Wavelength range (mm)	10 to 30	30 to 100	100 to 300	300 to 1 000
Class 1	5 %	5 %	5 %	5 %
Class 2	No requirement	10 %	10 %	No requirement

Table 2 — Acceptance criteria for peak-to-peak limits

Wavelength range (mm)	10 to 30	30 to 100	100 to 300	300 to 1 000
Limit of peak-to-peak values (mm)	± 0,010	± 0,010	± 0,015	± 0,075

The classification concerns the total length (Zones F, G and H in Figure 1) of the rail opposite the frog and Zone G only of the rail containing the frog.

No exceedances are allowed for manual measurements.

5 Transverse profile

5.1 Principle

Measurements are made using either a reference instrument, see EN 13231-3:2012, 3.16 or an approved instrument, see EN 13231-3:2012, 3.2. Approved instruments do not offer the same accuracy as reference instruments but in general they are adequate for the purpose of demonstrating compliance with the requirements of this standard.

Reprofiling can be undertaken for a variety of reasons. Where reprofiling is undertaken purely for the removal of corrugation, there may be less need for the rail to be reprofiled with precision. In other cases, it may be necessary for the reprofiled rail to match closely the ideal profile, represented by the reference rail, see EN 13231-3:2012, 3.22. A range of classes is therefore included to enable the client to specify the level of precision that is appropriate for the site to be reprofiled.

NOTE Where reprofiling is undertaken to improve conicity, class Q, see 5.4, is likely to be appropriate.

The match between the reprofiled rail and the profile of the reference rail is determined by aligning the two at two points and measuring maximum difference between them, see EN 13231-3:2012, Figure 1. For straight track, these points of alignment generally approximate to the highest point of the rail and the gauge point. On the high rail of curves this method is not applicable if side wear has occurred and an alternative method of alignment is therefore used.

5.2 Areas in crossings which are limited for reprofiling

The areas where the switchblade touches stock rail (Zone F shown in Figure 1) and the frog area (Zone H shown in Figure 1) cannot be reprofiled completely. The infrastructure manager can define applicable restrictions.

5.3 Measurements required

The transverse profile of each finished, reprofiled rail shall be measured using either a reference instrument or an approved instrument. Where independent verification is required a reference instrument shall be used, whereby measurements of each rail shall be made at an interval of not less than 10 m throughout the reprofiling site. A deviation of 0,1 mm between the reference instrument and approved instrument would be acceptable according to EN 13231-3:2012, Annex B.

All measurements undertaken in order to demonstrate compliance with 5.3 shall be recorded.

The measurements can be undertaken immediately after work or at the latest within 8 days of reprofiling or after the track has carried 0,3 MGT (Million Gross Tons) of traffic.

NOTE It is preferable for measurements to be made immediately after re-profiling.

After reprofiling rails in switches and crossings and rail expansion devices specific measurements are required for running safety.

5.4 Acceptance criteria for the transverse profile

Each measured profile shall be aligned with the appropriate reference rail so that the reference points A and B₁, or A and B₂ according to EN 13231-3:2012, Figure 1, on the reference rail coincide with points on the measured profile. The alignment shall be undertaken without rotation of either profile.

Reference points A and B₂ shall be used on side-worn rails and A and B₁ elsewhere.

The percentage of measurements in which the range of deviation is less than 0,6 mm, 1,0 mm and 1,7 mm shall be calculated and shall not be less than the values given in Table 3 for the class specified.

When continuously working measurement systems are used the rail containing the frog shall be measured only in "Zone G", see Figure 1, and only if this area is longer than 30 m. The opposite rail shall be measured in the total ground length.

With spot-checks systems one recording per rail shall be made in front (measurement points 1 and 2) of the switch, one in the centre of the intermediate rail (measurement points 3 and 4 for the main track and - if applicable - measurement points 5 and 6) and one at the end of the switch (measurement points 7 and 8 and - if applicable - measurement points 9 and 10), see Figure 2. In this case no exceedances are allowed.

Table 3 — Minimum proportion of measurements within the specified range

Range of deviation (mm)	0,6	1,0	1,7
Class Q	90 %	95 %	98 %
Class R	No requirement	85 %	98 %
Class S	No requirement	No requirement	75 %

The maximum positive deviations shall be specified, e.g. for the range of deviation 0,6 mm: +0,3 mm/-0,3 mm, +0,2 mm/-0,4 mm.

The tolerance zone width tends towards 0 at the reference points, at the field side only negative tolerances are allowed in the reprofiling zone.

6 Material removal

See EN 13231-3:2012, Clause 6.

7 Surface roughness

See EN 13231-3:2012, Clause 7.

8 Visual appearance: acceptance criteria

See EN 13231-3:2012, Clause 8.

9 Acceptance documentation

For the documentation, see EN 13231-3:2012, Annex E.

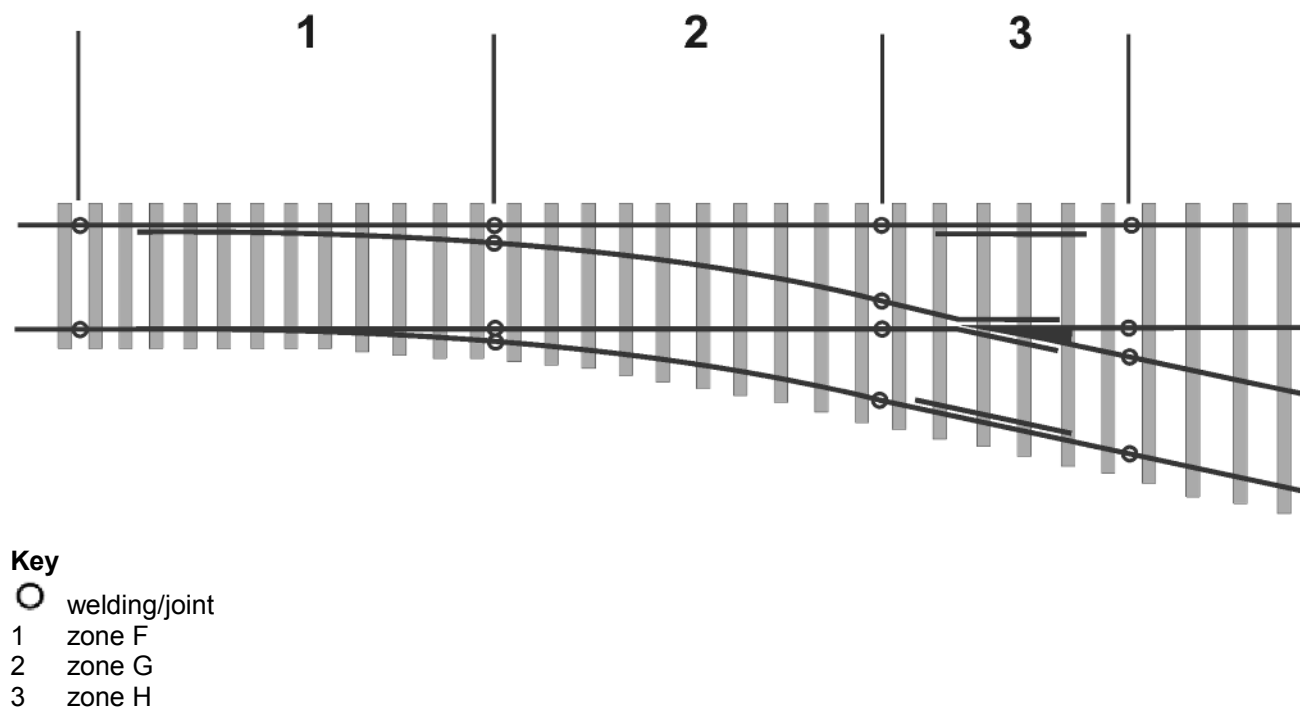
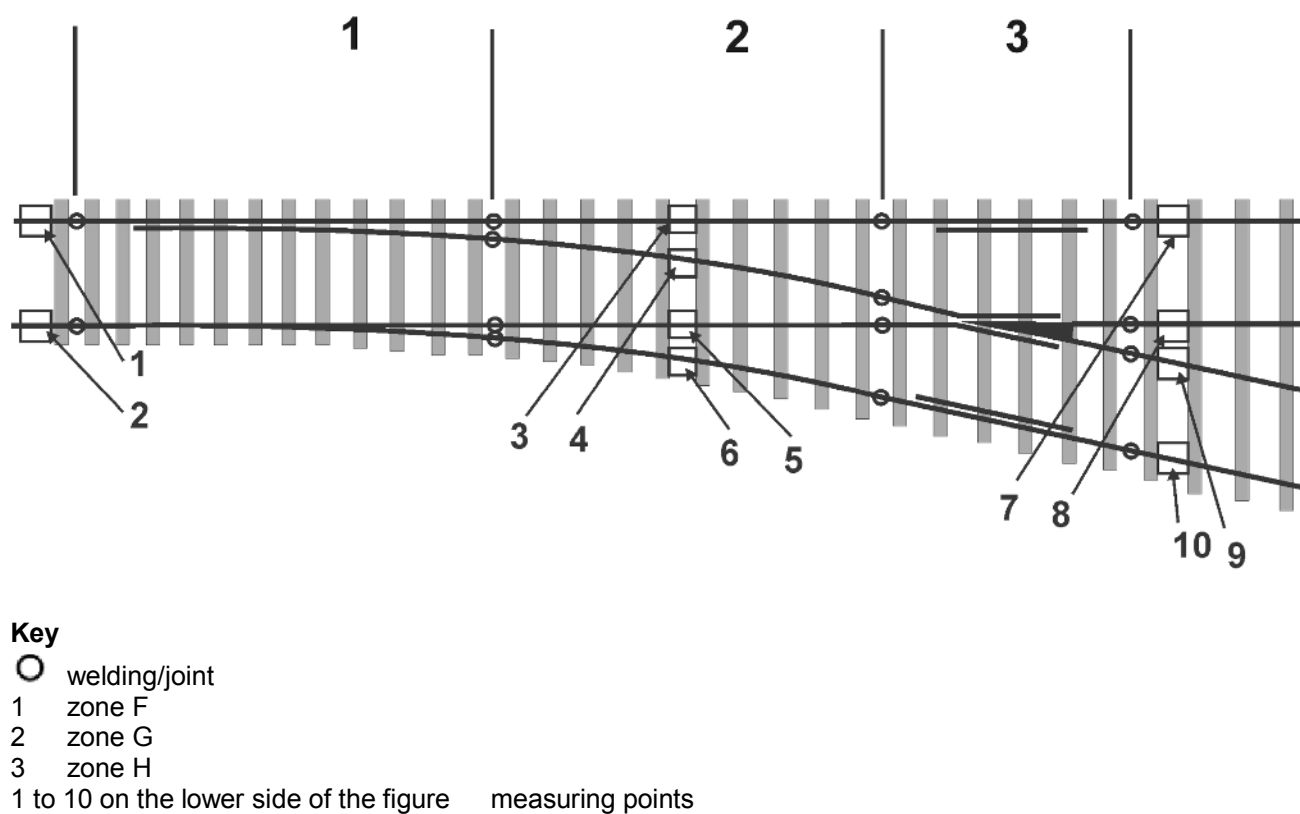


Figure 1 — Reprofilng zones in switches



NOTE Point 1 is always on the left facing the switch towards the frog.

Figure 2 — Measuring points for transverse profile for hand-measuring systems in switches

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Railway applications – Track – Acceptance of works

Part 5: Procedures for rail reprofiling in plain line,
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**Railway applications - Track - Acceptance of works - Part
5: Procedures for rail reprofiling in plain line, switches,
crossings and expansion devices**

Applications ferroviaires - Voie - Réception
des travaux - Partie 5 : Procédures pour
le reprofilage de rails en voie courante, en
appareil de voie et en appareil de dilatation

Bahnanwendungen - Oberbau - Abnahme
von Arbeiten - Teil 5: Prozedere zur
Schienen-Reprofilierung in Gleisen, Weichen,
Kreuzungen und Schienenauszügen

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European foreword

This document (EN 13231-5:2018) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2018, and conflicting national standards shall be withdrawn at the latest by December 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative [Annex ZA](#), which is an integral part of this document.

This document is one of the series EN 13231, *Railway applications — Track — Acceptance of works* as listed below:

- *Part 1: Works on ballasted track - Plain line, switches and crossings;*
- *Part 3: Acceptance of reprofiling rails in track;*
- *Part 4: Acceptance of reprofiling rails in switches and crossings;*
- *Part 5: Procedures for rail reprofiling in plain line, switches, crossings and expansion devices (the present document).*

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1 Scope

This document specifies the procedure for planning and execution of rail reprofiling work including description of rail surface defects. It concerns work in both plain lines and switches and crossings generally done with machines according to the EN 14033 series and EN 15746 series.

It applies to vignole railway rails of 46 kg/m and above according to [EN 13674-1](#).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[EN 13231-3:2012](#), *Railway applications — Track — Acceptance of works — Part 3: Acceptance of reprofiling rails in track*

[EN 13231-4:2013](#), *Railway applications — Track — Acceptance of works — Part 4: Acceptance of reprofiling rails in switches and crossings*

3 Terms and definitions

For the purposes of this document the terms and definitions given in [EN 13231-3:2012](#) and [EN 13231-4:2013](#) and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 anti-head check profile

AHC Profile

rail head profile with a geometry to prevent and reduce head checking

3.2 rolling contact fatigue

RCF

rail damage caused by the complex stresses that are characteristic of rail wheel contact

3.3 head checking

HC

small parallel cracks on the rail head near or on the gauge corner

3.4 Belgrospi

network of cracks developing on the rail head of track with speed greater than 160 km/h affected by short pitch corrugation

3.5 squat

rolling contact fatigue defect whose main characteristics are a blackish patch on rail head, a lateral flow of steel and a collapsed and widened rolling band

3.6 flaking

surface condition consisting of the gouging of metal on the rail head

3.7

spalling

cracking and chipping on the top of the rail

Note 1 to entry: Occurs commonly on low rails.

3.8

transverse profile deformation

plastic metal flow on the rail head

3.9

side cutting

wear occurring on high rails in small radius curves where wheel flanges contact the rail

3.10

lippings

plastic metal flow occurring on the rail head under conditions of high axle load and high gross tonnage

3.11

short pitch corrugation

quasi-periodic irregularities on the running surface

Note 1 to entry: The wavelength usually is 10 mm to 100 mm. Covering hereby two jointed wavelength according to the EN 13231 series.

3.12

short wave corrugation

depressions in the running surface which are pronounced

Note 1 to entry: The wavelength usually is 30 mm to 300 mm. Covering hereby two jointed wavelength according to the EN 13231 series.

3.13

long wave corrugation

irregular unevenness on the running surface

Note 1 to entry: The wavelength usually is 300 mm to 1 000 mm.

3.14

imprint

damage resulting from a small object which has been pressed into the rail by the wheel

3.15

wheel burn

abrasive, plastic and thermal damage occurring in zones where trains start to move

Note 1 to entry: Occurs e.g. at signals.

4 Basics

4.1 Technical Introduction

The complexity of vehicle-track interaction generates high stresses at the rail-wheel contact, the severity of which is governed by local track characteristics, vehicle type and other operational conditions. The repeated application of these stresses results in the development of fatigue cracks usually referred to as RCF manifested as head checks, gauge corner cracking, or squats. Although rail metallurgy offers a key mitigation measure against such fatigue degradation, there are no rail steels currently in use that could fully withstand the repeated application of such contact stresses. Furthermore the majority of rails in track today, despite their adequate but lower fatigue resistance, have an appreciable residual

life span, which makes it more economic to maintain them in an appropriate manner to extend their life rather than to change them.

Management of rail profile and condition is therefore a prerequisite for safe and cost effective operation of railways. Predictable work – at least in a medium time horizon – organized in a strategic way needs to be defined to extract the maximum benefit from existing technologies and to guide the industry for future development. However, it is essential to ensure that the chosen approach provides enough flexibility to adapt to changing situations in both senses: increased requirements for maintenance due to higher loads and dynamic forces, reduced requirements for maintenance due to lower loads (improved vehicle characteristics) and better performing rails (reduced fatigue development).

The life expectancy of a rail is influenced by its interactions with the other parts of the train-track system. The faster and more frequent train services, higher axle loads and new generations of vehicles with greater primary yaw stiffness have significantly increased the critical track forces that promote more rapid degradation of the rail (and wheel) leading to more frequent and costly maintenance interventions and even rail renewal. Significant research into rail metallurgy has resulted in the development of rail steels with much higher resistance to wear and RCF. Nevertheless rail maintenance by reprofiling is an essential requirement for efficient and safe functioning of railway track. The combination of rail grade selection and maintenance strategy considering local track and traffic characteristics ensures effective control of any kind of rail surface defects.

4.2 Background of rail reprofiling

Reprofiling strategy is a planned maintenance activity usually defined by the infrastructure maintainer. In theory it is independent of available technologies, but in practice it is often influenced by the equipment that is easily accessible to or proposed by the contractors.

Work is programmed depending on damage having reached predetermined intervention thresholds such as corrugation depth, deviation from the transverse profile and depth of cracks.

Alternatively work is executed in cycles which are derived from experience and influenced by availability of machines, track possession times and similar factors such as traffic, usually expressed in mega gross tonnes (MGT), months, seasons, etc. Often work is combined with other maintenance activities (e.g. after rail replacement, after tamping or when the line is closed for other work, etc.).

Before the execution of rail maintenance work, specifications (i.e. the results that need to be achieved) shall be defined for:

- defect repair (metal removal);
- longitudinal profile (tolerance);
- transversal profile (target and tolerance);
- surface condition (roughness, facet widths, etc.).

Rail reprofiling as described in this document refers to rail rectification using currently available technologies such as grinding, milling, planing, etc.

4.3 Specific reprofiling strategy

In addition to the use of the appropriate rail steel grade the consecutive reprofiling cycles are also dependent on other important parameters, such as existing reprofiling capacity (e.g. maximum/minimum metal removal rates, sections lengths, etc.) and available working intervals (possession times, route reprofiling capabilities, etc.). For the development of an optimized reprofiling strategy these parameters shall also be taken into account.

Shorter reprofiling intervals result in smaller metal removal requirements, consequently in such short periods the development of RCF and irregularities such as corrugation and resulting track deterioration is limited.

NOTE For some Infrastructure Managers in Europe, the preferable strategy is preventive cyclic reprofiling with small metal removal requirements applying profiles with moderate gauge corner relief. If the interval between reprofiling cycles is appropriately matched with the initiation and subsequent growth of cracks, metal removal can be adjusted for a one-pass regime which is operationally the best option.

In order to maintain RCF-sensitive sections economically, a certain damage level can be accepted (as intervention threshold or as remaining depth after treatment). However, this damage needs to be kept low enough to be removed pre-emptively and thereby avoiding safety issues. A rail reprofiling strategy requiring metal removal rates of up to 0,6 mm at the critical gauge area and a maximum of 0,2 mm in the centre of the rail head shall be programmed.

Several Infrastructure Managers (IMs) utilize these metal removal specifications to control HC in standard carbon rail (R260) based on reprofiling cycles at 15 MGT for curves and 45 MGT for tangent track. For harder heat treated rails (e.g. R350HT) the intervals may be doubled depending on track and traffic characteristics.

If squats need to be controlled in tangent track due to traffic and vehicle characteristics (stiffness, traction and braking) shorter cycles may be required.

The reprofiling interval and the related average metal removal should depend on actual HC measurements which need to be checked again during reprofiling work. Such a policy optimizes the magnitude of artificial wear by reprofiling and hence prolongs rail life.

5 Rail surface defects

5.1 General

Each irregularity causes a higher dynamic load on the surface of the rail and consequently an impact occurs at each wheel passage. Consequently the rail is subjected to high stresses and the damage often progresses at a significant rate.

Not only is the rail affected but also the whole track system. As the rail cannot always absorb the energy from the impact, the shock load continues further into the track. Local damage to fastenings, pads and sleepers may result. Ultimately the ballast becomes locally overloaded and disturbed and the stability of the track can no longer be ensured.

5.2 Rolling contact fatigue

5.2.1 Head check

Head checking is characterized by small parallel cracks on the rail head near the gauge corner or on the gauge corner (see [Figure 1](#)). The exact localization of the head check depends on the contact conditions. It appears mainly on the high rail on large radius curves but can occur on small radius curves or tangent track. The orientation and periodicity of the cracks depends on rail grade and track geometry. However the cracks are generally oriented from the top of the rail to the gauge in the direction of traffic. In the vertical section through the cracks their orientation is from the top of the rail to the bottom of the rail in the direction of traffic.



Figure 1 — Head check

5.2.2 Belgrospi

A network of cracks may develop on rail of track speed greater than 160 km/h affected by short pitch corrugation (see [Figure 2](#)). The cracks appear at short pitch corrugation with a depth of 0,03 mm. If not removed in time they may grow and develop into squats (see [5.2.3](#)).

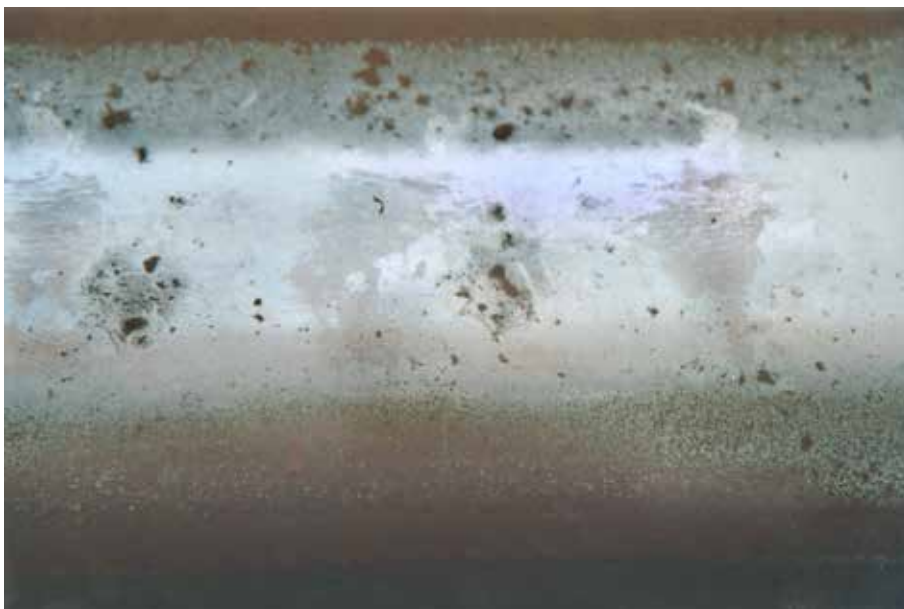


Figure 2 — Belgrospi

5.2.3 Squats

Squat defects (see [Figure 3](#)) are rolling contact fatigue defects whose main characteristics are:

- a blackish patch on rail head;
- a lateral flow of steel;

- a collapsed and widened rolling band.

Under this defect a network of cracks grows from two main horizontal cracks and may lead to a severe and unexpected rail breakdown. This network of cracks makes it difficult to analyse the defect.



Figure 3 — Squat

5.2.4 Flaking (Gauge corner cracking)

Flaking is a surface condition consisting of the gouging of metal on the rail head. It is indicated by small chipping and cavities (see [Figure 4](#)). It is a progressive horizontal separation on the running surface of rail near the gauge corner with scaling or chipping of small slivers. Flaking should not be confused with shelling as the flaking takes place only on the running surface usually near the gauge corner of the rail and is not as deep as shelling.



Figure 4 — Flaking

5.2.5 Spalling

Spalling (also known as snake skin) appears as a network of cracks on the rail head (see [Figure 5](#)) commonly on the low rail of a curve. The cracks are parallel and linked by transverse cracks. The spalling may result in loss of material or in rail delamination.



Figure 5 — Spalling

5.3 Transverse profile deformation

5.3.1 Flattened transverse profile

If the transverse profile is not the correct shape (see [Figure 6](#)), high stresses occur on the surface and internal to the rail and the wheel which cause deformations at the rail in various directions resulting in plastic metal flow (see [5.3.3](#)) and other deformations.



Figure 6 — Flattened transverse profile

5.3.2 Side cutting

Side cutting occurs on high rails in small radius curves due to wheel flanges contacting the rail (see [Figure 7](#)).



Figure 7 — Side cutting

5.3.3 Lipping

Lipping can occur on the rail head under conditions of high axle load and high gross tonnage resulting in the formation of lips on the gauge and field side of the head (see [Figure 8](#)).



Figure 8 — Lipping

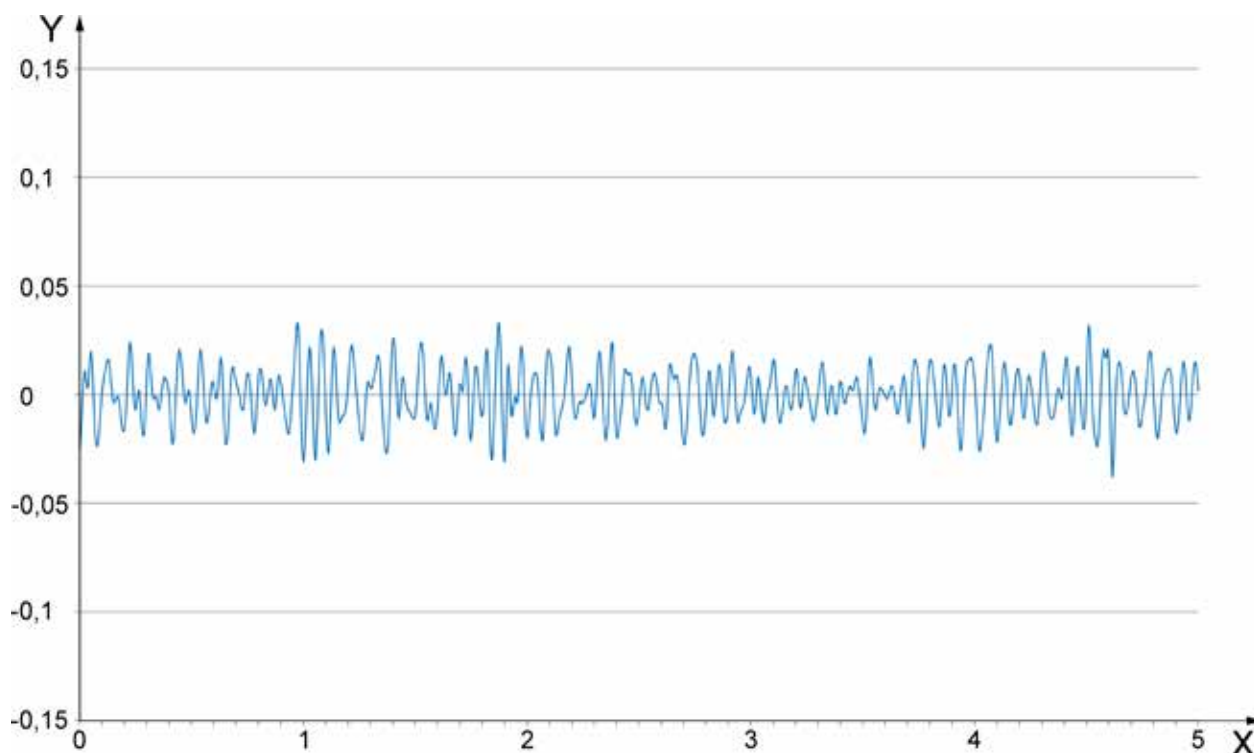
5.4 Periodical defects in longitudinal profiles

5.4.1 Short pitch corrugation

Short pitch corrugation is characterized by quasi-periodic irregularities on the running surface (see [Figure 9](#)). The irregularities appear as a sequence of bright ridges and dark hollows. The pitch generally varies between 10 mm and 100 mm (see [Figure 10](#)). The short pitch corrugation is typically encountered in straight track on both rails and in large radius curves on the high (outside) rail.



Figure 9 — Short pitch corrugation



Key

- X length in metres
- Y amplitude in millimetres

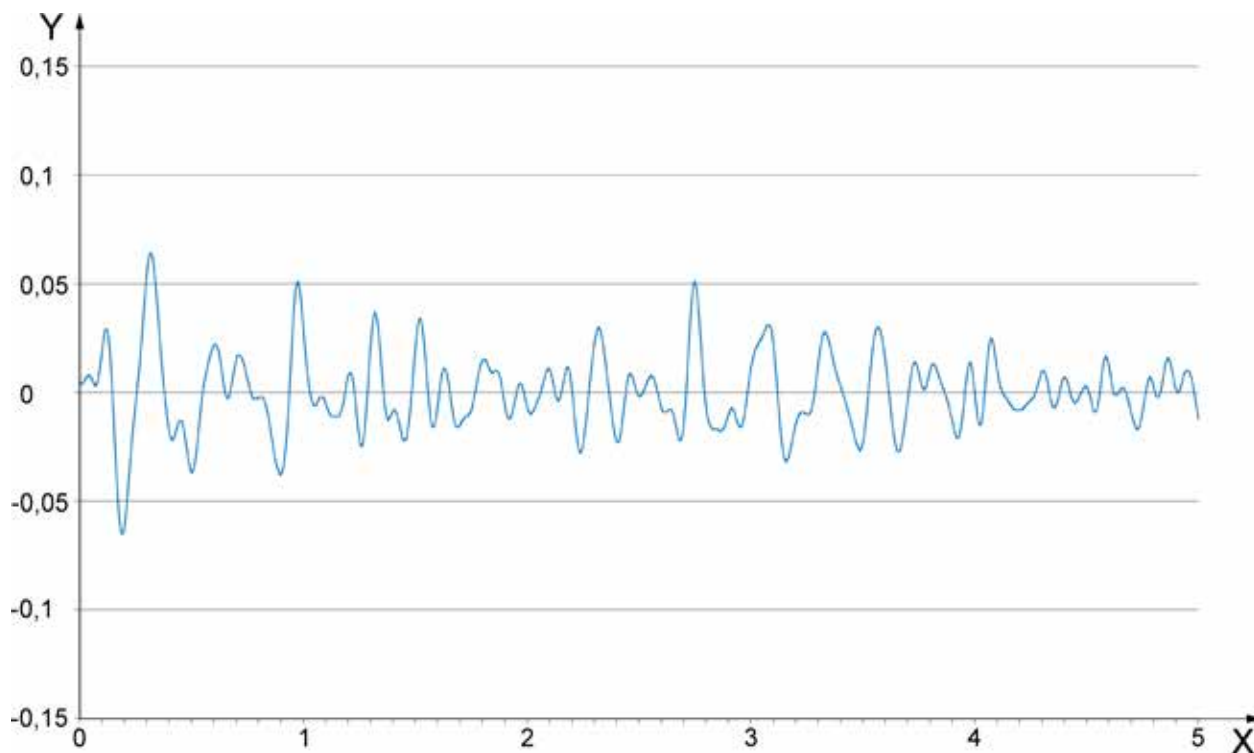
Figure 10 — Short pitch corrugation - Graph for example

5.4.2 Short wave corrugation

Short wave corrugation is characterized by a series of depressions in the running surface which appear as a sequence of bright ridges and hollows (see [Figure 11](#)). The pitch may vary between 30 mm and 300 mm (see [Figure 12](#)). Short wave corrugation is typically encountered in curves on the low rail.



Figure 11 — Short wave corrugation



Key

X length in metres
Y amplitude in millimetres

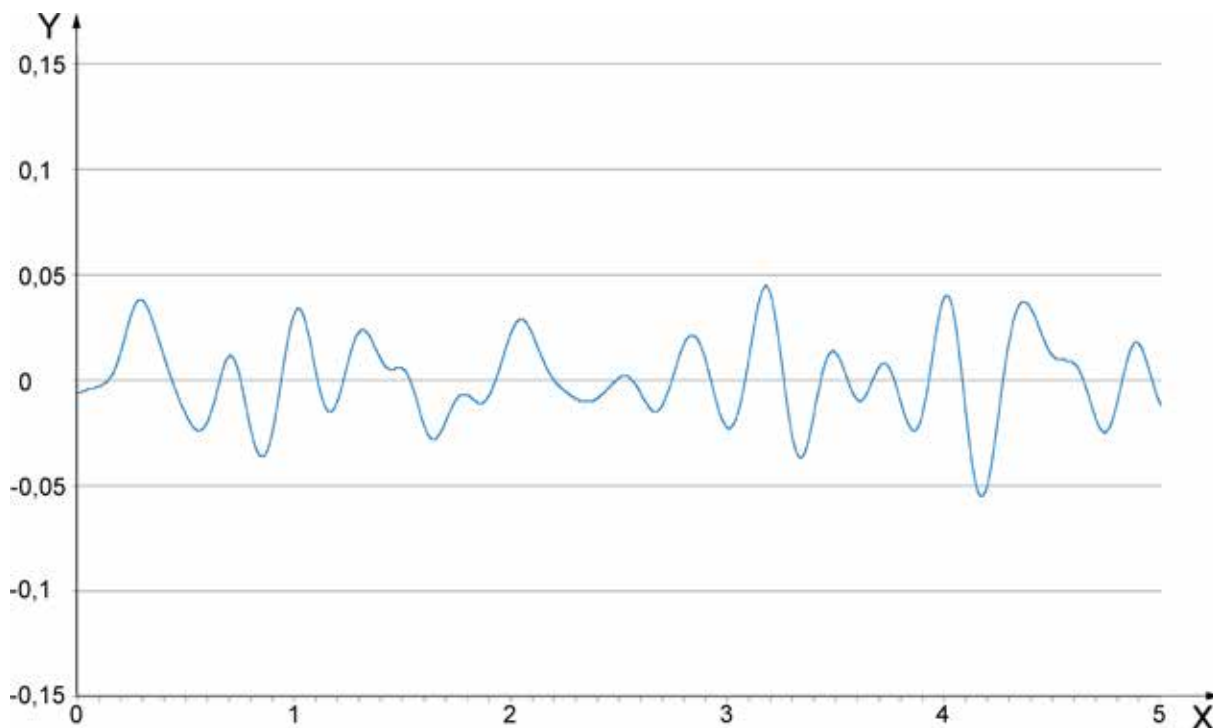
Figure 12 — Short wave corrugation - Graph for example

5.4.3 Long wave corrugation

Long wave corrugation is characterized by irregular unevenness on the running surface (see [Figure 13](#)). The ridges and hollows look equally bright. The pitch varies between 300 mm and 1 000 mm (see [Figure 14](#)). The long wave corrugation may be encountered in all sections of track.



Figure 13 — Long wave corrugation



Key

X length in metres

Y amplitude in millimetres

Figure 14 — Long wave corrugation - Graph for example

5.5 Surface damage

5.5.1 General

Isolated surface defects may develop into significant surface damage. Surface damage may occur in clusters (e.g. wheel burns near signals); or may spread over a whole section of track (e.g. ballast stone imprints). If the defects are isolated and/or are of considerable size it may not be economic to correct them by machine reprofiling.

5.5.2 Imprints

An imprint is damage resulting from a small object which has been pressed into the rail by the wheel (see [Figure 15](#)). Small imprints may develop into serious defects if not removed.

On high-speed lines ballast can be lifted and crushed into the rail by the wheels. The imprints in the rail surface can be up to 0,5 mm deep.



Figure 15 — Imprints

5.5.3 Wheel burns

Wheel-burns (see [Figure 16](#)) occur in zones where trains start to move, e.g. at signals. They may occur in clusters.

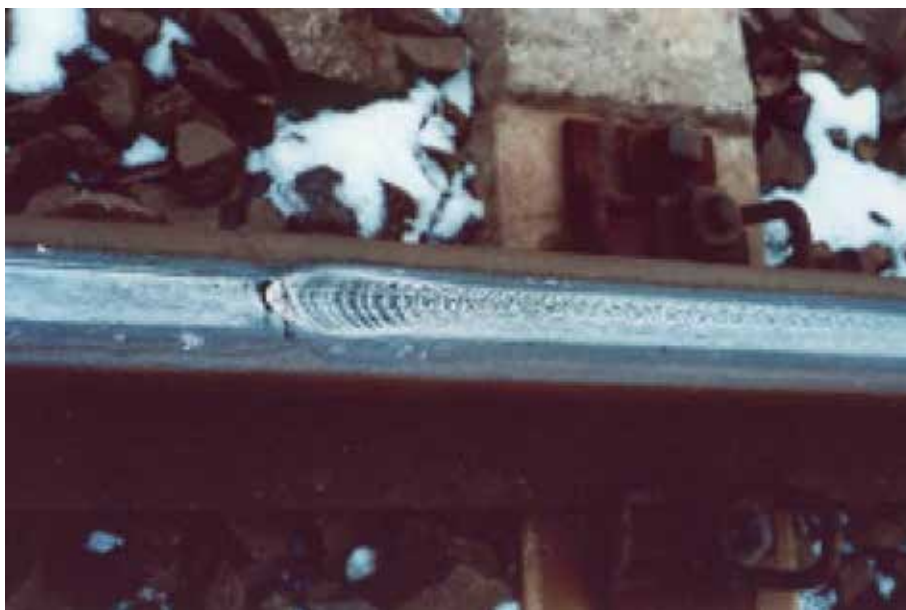


Figure 16 — Wheel burns

6 Reprofilng procedure

6.1 Inspection

Rail maintenance policy requires knowledge of the track condition therefore regular inspection is necessary. Such inspection provides information regarding the transverse profile, the longitudinal

profile and rail surface defects. Inspection can be undertaken by machine integrated, or manually operated devices and by visual inspection.

6.2 Intervention thresholds

6.2.1 Longitudinal profile

Measurement of the magnitude of corrugation (amplitude and wavelength) permits more precise identification of the track segments that require reprofiling and more effective planning of the necessary interventions and track access requirements.

The intervention threshold should be set according to [Table 1](#) and [Table 2](#). Beyond these values noise levels increase with growing corrugation depth and dynamic forces and track vibrations start to damage the ballast structure. Some specific types of defect (e.g. Belgrospi) require a lower intervention threshold of 0,03 mm.

The intervention values for short wave corrugation in short radius curves are chosen between 0,1 mm to 0,3 mm by some Infrastructure Managers (IM) dependent on the rate of track deterioration.

Intervention thresholds given below reflect practice in use on European networks for economic reasons. As the longitudinal profile is not normally considered to be safety critical the values are not mandatory.

Table 1 — Thresholds for longitudinal profile (peak to peak value)

Track speed km/h	Defect type	Wavelength	Threshold for planning	Threshold for execution
		Range mm	Depth mm	Depth mm
$v \leq 80$	Short pitch corrugation	10 to 100	0,10	0,20
$80 < v \leq 120$			0,07	0,15
$120 < v \leq 160$			0,05	0,10
$v > 160$			0,02	0,04
$v \leq 80$	Short wave corrugation	30 to 300	0,20	0,30
$v > 80$			0,10	0,20
urban rail $v \leq 120$			0,35	0,7
$v > 160$	Long wave corrugation	300 to 1 000	0,40	0,50

NOTE Wavelength ranges for intervention thresholds are different from wavelength ranges for acceptance criteria for rail reprofiling work due to different reprofiling and measurement technologies.

6.2.2 Transverse profile

The transverse profile is not generally a criterion for programming of rail reprofiling work. However it plays an important role in the development of rail surface defects such as corrugation and rolling contact fatigue due to the wheel/rail contact. The recommended thresholds for planning and execution can be found in [Table 2](#).

Table 2 — Thresholds for transverse profile, applies only for radii > 5 000 m and straight track

Track speed km/h	Maximal radial deviation from target profile (mean value over 100 m)	
	Threshold for planning mm	Threshold for execution mm
$v \leq 120$	no requirement	
$120 < v \leq 160$	+ 0,7	+ 1,3
$v > 160$	+ 0,5	+ 0,7

6.2.3 Rolling Contact Fatigue (RCF)

6.2.3.1 Introduction

In addition to material wear, the service life of rails is often limited by Rolling Contact Fatigue. RCF, the most common rail degradation mechanism, is a form of rail damage caused by the complex stresses that are characteristic of rail wheel contact. RCF, whether manifested as Head Check (see [Figure 1](#)), Belgrospi (see [Figure 2](#)), Squats (see [Figure 3](#)), Flaking (see [Figure 4](#)) or Spalling (see [Figure 5](#)) is an increasingly widespread damage phenomenon on European tracks. Despite the use of rail steels with increased resistance to wear or RCF, a reprofiling strategy will be required.

6.2.3.2 General strategy

RCF can be controlled when the shape of the rail head profile matches the prevailing wheel profiles and when the fatigued rail surface is regularly removed at appropriate intervals. Reprofilng should always be carried out as soon as possible after re-railing in order to optimize the condition of the rail surface (removal of decarburized layer, removal of damage from the installation process, straightness at welds, etc.) and the target profile (wheel-adapted or AHC profiles).

6.3 Specification of work

6.3.1 Metal removal

6.3.1.1 General

Metal removal is required for either the elimination of geometric defects in the longitudinal direction, e.g. corrugation, or the removal of fatigued layers from the rail head.

The transition between profiles shall be applied with a maximum slope of 1/1 000 ($v \leq 160$ km/h) or 1/3 000 ($v > 160$ km/h).

6.3.1.2 Corrugation removal

Any wave-like defects need to be completely removed therefore the required metal removal is at least the peak-to-peak value measured before reprofiling plus 0,1 mm. For practical reasons verification of sufficient metal removal may be based on the values given in [EN 13231-3](#) and [EN 13231-4](#) for acceptance of rail rectification work.

6.3.1.3 RCF removal

For cyclic preventive or cyclic corrective rail rectification fixed metal removal rates should be specified by the Infrastructure Managers (IMs) based on experience or recordings.

A rail reprofiling strategy requiring metal removal rates of up to 0,6 mm at the critical gauge area and a maximum of 0,2 mm in the centre of the rail head may be programmed. The metal removal rate in the centre of the rail head shall be at least 0,1 mm.

Maximum values may be considered by the Infrastructure Manager (IM) to limit artificial wear caused by rail reprofiling.

RCF reduction or elimination respectively may be verified by recording systems (usually based on eddy-current technology). As head checks (and fatigue cracks in general) are not uniform either in shape or depth it may be difficult to specify complete or partial crack removal in absolute terms (maximum remaining damage depth) or relative terms (percentage of length affected by head checks after reprofiling), similar to geometric tolerances and percentage of exceedances.

The acceptance criteria shall be established through co-operation between the Infrastructure Manager (IM) and the contractor before the work commences.

6.3.2 Target profile

6.3.2.1 General

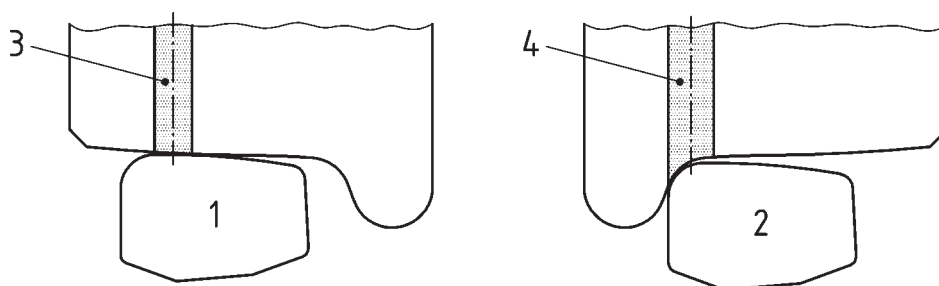
Standard target profiles are usually applied when reprofiling rails. These profiles are normally identical to the as-rolled profiles. For special applications different target profiles are in use such as profiles to reduce lateral wear of high rails in sharp curves and gauge widening profiles to change the equivalent conicity. In order to control RCF in head check sensitive areas the use of an AHC profile is recommended.

NOTE In switch and crossing work, with rails laid vertically, it may be desired to reprofile the rail so that its head profile matches that of the adjacent plain line in which rails are inclined at e.g. 1:20. In this case, the angle of inclination of the reference rail will be $2,86^\circ$ (1 in 20).

6.3.2.2 Specific wear reducing profile

Wear reducing profiles, often referred to as “asymmetric profiles” may be used to control excessive lateral wear on high rails in curves (over 2 mm per year). These profiles shift the contact band on the high rail closer to the gauge corner and on the low rail closer to the field side.

It is usually sufficient to apply the nominal profile on the low rail allowing only negative tolerances and to concentrate reprofiling on the high rail from the centre line of the rail head to the field side.



Key

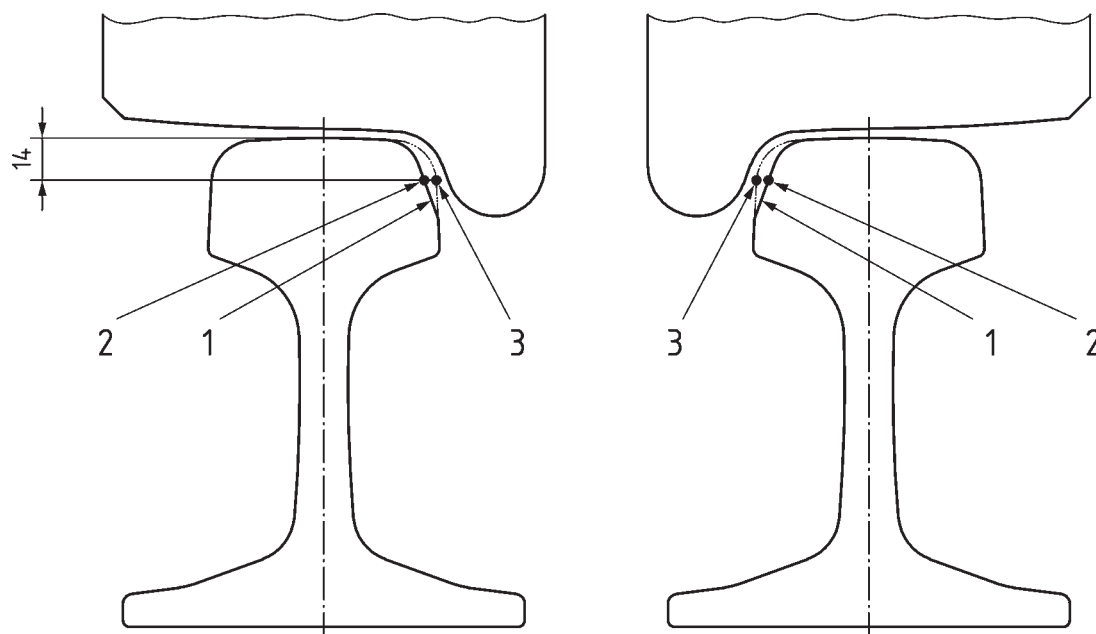
- 1 low rail
- 2 high rail
- 3 contact band on low wheel
- 4 contact band on high wheel

Figure 17 — Wear reducing profile

Inserting plug rails requires special attention with regard to the transition zone.

6.3.2.3 Gauge widening profile

Gauge widening profiles may be applied where the actual gauge width is below the specified value. In this case the nominal profile is shifted towards the field side by the desired value (e.g. 2,5 mm at each rail to achieve a 5 mm gauge widening). The transition from the original profile towards the new one shall be made by a 70° inclined facet at the gauge side (see [Figure 18](#)).



Key

- 1 70° inclined facet
- 2 gauge point 14 mm under rail head
- 3 maximum gauge widening point (2,5 mm at gauge point 14 mm under rail head)

Figure 18 — Gauge widening profile

6.3.2.4 AHC profile

AHC profiles, appropriate for the track, rail grade and traffic characteristics of the particular network, should be used to control the initiation and growth of RCF cracks located close to the gauge corner of high rail in curves.

An AHC profile providing a minimum of 0,3 mm gauge corner relief is recommended as such a profile delays the initiation of head checks. This value may vary depending on the reprofiling cycle (e.g. influenced by HC growth rate and/or available machine capacity).

Production tolerances of $\pm 0,3$ mm with respect to the chosen AHC target profile should be specified.

6.4 Execution of work

The rail reprofiling specification (and any supporting procedures) shall be supplied by the Infrastructure Manager (IM).

The contractor is responsible for the execution of the reprofiling work applying the procedures specified by the Infrastructure Managers (IM). More details are given in [Annex A](#).

The acceptance of the work is described in [EN 13231-3](#) and [EN 13231-4](#).

6.5 Documentation of work

The documentation of the reprofiling work (daily work reports and recordings) shall be provided by the contractor according [EN 13231-3](#), [EN 13231-4](#) and the Infrastructure Manager (IM) procedures.

Annex A **(informative)**

Programming of reprofiling work

A.1 General reprofiling programme

A.1.1 General

The basic steps for establishing a reprofiling programme are:

- selecting the sites to be reprofiled (depending on gross tonnage, defect severity, intervention thresholds, existing reprofiling plans and location);
- estimating track occupation time at each site;
- determining a schedule (allowing for any access difficulties).

The remaining service life of the rail (based on head dimension limits) should be considered when determining a reprofiling programme.

A.1.2 Reprofiling applications

A.1.2.1 Initial reprofiling

Rails in new lines should be processed before commencing operation. Rails should be processed as soon as possible after re-railing (preferably within six months).

A.1.2.2 Preventive versus corrective reprofiling

Heavy corrective work occupies machine capacity for longer periods during which other rails may develop defects, whereas strategically planned cyclic work can cover considerably longer track sections under normal conditions. Preventive measures should therefore have priority. After correcting the more serious defects the rails should be maintained by a preventive regime. This maximizes the technical and economic effects of rail maintenance.

It has been shown by major Infrastructure Managers (IMs) that preventive maintenance is usually more cost effective than corrective maintenance.

Historically corrective reprofiling was given the highest priority. It concentrated on problematic areas often dispersed geographically. As the stabling points for the reprofiling machines are located at considerable distances (sometimes over 10 km) from worksites, the reprofiling machines are transferred every day over long distances (usually as low priority trains), thus precious working time is lost. Due to the heavy organizational work on site for activating pre-programmed processes, additional time is lost during the work shift.

The timing of rectification should consider minimizing costs. Minimum overall cost occurs when the sum of the cost caused by the faulty rail condition and the cost of rectification is lowest. Rectification costs can be reduced significantly if the interventions are planned to provide maximum effective production time ("spark time" in the case of grinding) with the minimum time lost for transiting the machine. Furthermore the optimum timing of rail maintenance work is crucial. Delaying reprofiling risks increased cost due to defects whereas reprofiling prematurely results in excessive rectification cost.

Reprofiling interventions require significant track possession time. If the reprofiling technology used matches all the requirements, high production rates at comparatively low cost can be achieved.

A cyclic programme to control one type of defect (corrugation, imprints, head checks, squats, etc.) will also reduce or eliminate other types of defect present in the rail head.

A.1.2.3 Cyclic reprofiling interventions to control RCF

Reprofiling to control RCF should be programmed strategically. An ideal maintenance plan consists of the following points:

- a preventive cyclical reprofiling programme covering a whole line;
- possession times arranged for maximum utilization of the machines;
- stabling points equipped for servicing and maintenance of the machines at strategic locations;
- reprofiling machines to start from the stabling point and move over the line to profile where required;
- working speed and number of passes dependent on required metal removal;
- recording equipment capable of documenting the work undertaken and its quality by minimizing the need to check the result by additional staff walking on the track;
- organization of daily reprofiling work to ensure that the ratio of working period to effective reprofiling time is maximized.

A.1.3 Selection of machine type

Reprofiling contracts are normally based on daily costs (shift prices), which determine the cost per finished kilometre. When the reprofiling equipment is used over short sections (e.g. problematic curves) many kilometres apart, and the intended corrective work requires a higher number of working passes, the cost per finished metre is high.

High-production machines should be used for cyclical reprofiling work assuring finished rail conditions with the least number of working passes. High-production machines should work in long uninterrupted sections.

Short reprofiling sections requiring multiple passes that cannot be finished in the basic cycle should be treated using more flexible compact machines. Similarly corrective work in critical shorter zones, often needing more frequent intervention, is better undertaken by such machines.

As machines with enhanced capability are used for reprofiling in special trackwork areas such as switches and level crossings, the reprofiling plan should take into account the types of machine required for each section.

Due to the long-term characteristics of strategic rail maintenance plans, reprofiling contracts should cover periods of several years, allowing lower basic annual rates for daily shifts and further reducing costs per finished metre.

A.1.4 Combination of reprofiling activities with other track maintenance work

Rail rectification work reduces dynamic forces and vibration and thus helps to reduce track degradation. Whenever possible it should be coordinated with other track maintenance activities, particularly following lining and levelling.

A.2 Detailed reprofiling plan

To establish a detailed reprofiling plan the following information is required:

- a) rail condition:
 - 1) longitudinal irregularities (depths, length);

- 2) surface defects (severity / depth);
- 3) transverse profile shape;
- b) the specifications for the finished product (metal removal, defect reduction/elimination, target profile);
- c) the performance of the rail reprofiling machine (production capacity, environmental issues, clearance gauge, obstacle negotiation, etc.);
- d) operational conditions (track occupation times, distances to stabling points and other operational and logistical issues).

For the longitudinal profile the required work depends on the depth of the irregularities (corrugation) and for RCF on the depth of cracks. However as the transverse profile should be brought within the specifications it may be the determining factor for the production rate. Rectification planning shall be based upon the worst rail condition.

Optimized planning increases the overall efficiency therefore it is essential to provide:

- short transfer distances from one site to the next;
- appropriate geographical sequencing of sites;
- long-term contracts for machines planned well in advance with only short idling periods.

NOTE Co-operation between train control and site is essential to achieve maximum output during the possession time. Planned modification of train times may contribute to lower maintenance costs.

EXAMPLE The extension of a working interval by a short period might allow completion of the current reprofiling work. Not granting that extension could result in the machine waiting for a longer time for the next working interval. Exact planning beforehand and utmost flexibility on site are the keys to cost reduction.

Annex B **(informative)**

Reprofile methods

B.1 General

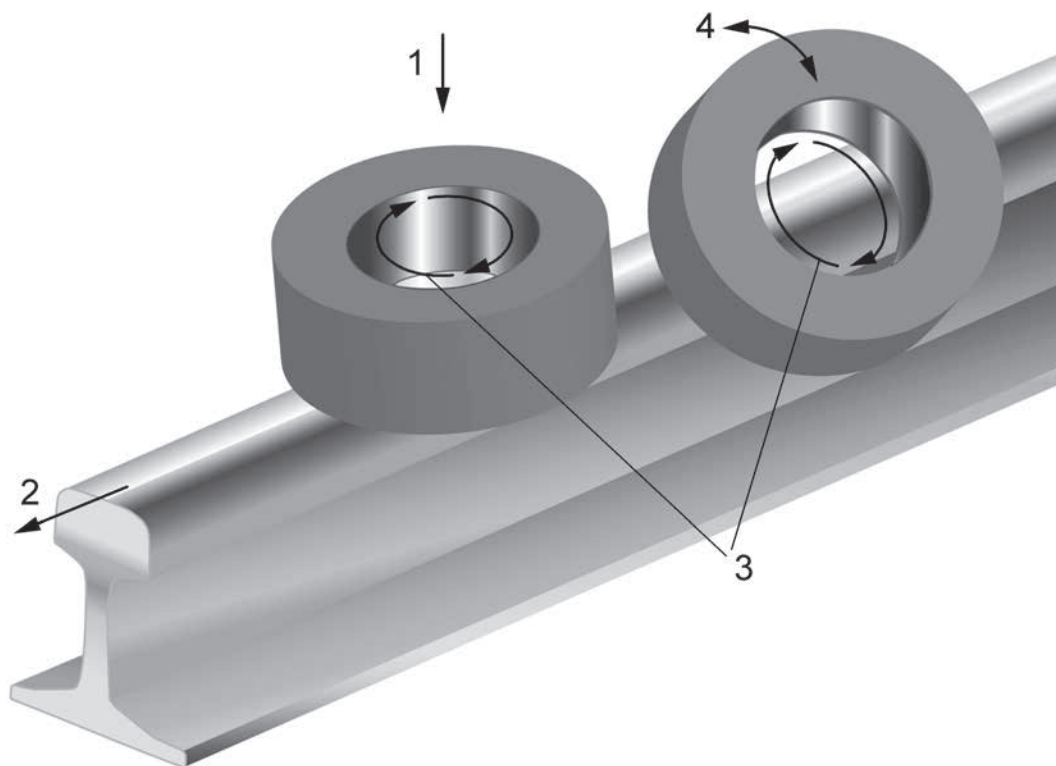
The technologies described are well established but are under constant development. The user should request further information from the provider of these technologies regarding the specific application and potential limitations.

B.2 Rotating grinding

B.2.1 Principle of work

Material removal is achieved by rotational movement of the grinding wheels around an axis which is vertical to the track direction and their forward or backward movement along the track. Grinding is done by selection of a “pattern” in the machine computer. The “pattern”, which is pre-determined, sets the grinding angle and stone pressure separately for each module and grinding speed. The grinding modules are individually adjustable over at least the range specified in [EN 13231-3](#), i.e. from 70° gauge side to 5° at the field side. Both the pressure and the grinding angle are continuously monitored. The appropriate arrangement of the grinding stones around the rail head produces a multi-faceted surface complying with the specified target profile. Because the angle of the grinding module may be adjusted, almost any target profile may be achieved for the rail head independently for both rails. Depending on the machine size one or more grinding passes are required to achieve the desired metal removal and the final profile.

The machines are designed to limit the effects of sparks and dust produced by the process. Grinding modules can be adjusted in order to avoid specific track equipment such as axle counters and similar devices. Modules with enhanced functionality are used for grinding in special track work (switches, crossings, check rails, etc.).



Key

- 1 stone pressure
- 2 uniform forward or backward movement
- 3 stone rotation
- 4 stone inclination

Figure B.1 — Principle of rotating grinding

B.2.2 Performance

Metal removal depends on the configuration and size of the machine and the grinding speed. The operational speed is between 3 km/h and 15 km/h. The volume of removed material depends on the number of grinding modules, module power and working speed. The performance is also determined by the requirements (standard or modified profiles, tolerances on longitudinal and transverse profile) and operational factors (available working time, interference with other services on track).

B.2.3 Results

The processed transverse rail head profile is characterized by a polygon with small facets. The accuracy that is achieved for the transverse and longitudinal rail head profile and other criteria corresponds to the requirements of [EN 13231-3](#) and [EN 13231-4](#).

B.2.4 Application

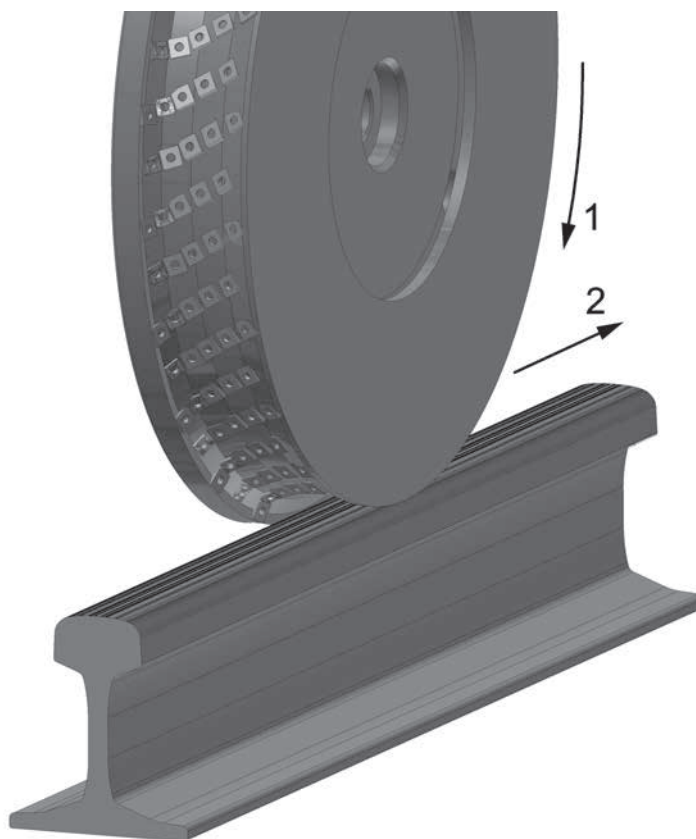
Rotating grinding applications are initial, preventive and corrective grinding both for rails in track and switches for correction of longitudinal profile and transverse profile, control of RCF, surface defect removal, change of rail transverse profile and gauge widening.

B.3 Milling

B.3.1 Principle of work

Rail milling utilizes circumferential climb milling technology. It is a machining process whereby rail milling cutter heads, equipped with carbide tipped tools, rotate in the longitudinal direction of the rail head. Metal chips are thereby cut out of the rail head. The arrangement of the milling carbides around the rail head creates a facet contour on the running surface and a rounded contour on the running edge complying with the specified target which is pre-determined and fixed covering the range specified in [EN 13231-3](#) i.e. from 70° at the running edge to 5° at the field side. The finished product is usually achieved in a single pass.

Remaining irregularities are removed by a following grinding module. Specific track equipment such as axle counters and similar devices might not have to be removed. Milling chips and grinding dust are collected with suction systems.



Key

- 1 milling rotation
- 2 milling direction

Figure B.2 — Principle of milling

B.3.2 Performance

Rail Milling is characterized by the large volume of metal removed. The volume of material removed is determined by the number of milling units, their capacity, their working and cutting speed and by the form of the damaged transverse profile. The machines are equipped with 2 to 6 milling units and are supplemented with a final finishing grinding unit. The working speed is between 500 m/h and 1 500 m/h.

B.3.3 Results

The accuracy that is achieved for the transverse and longitudinal rail head profile and other criteria correspond to the requirements of [EN 13231-3](#). Milling heads are equipped with the desired profile of the rail head and ensure a very high dimensional stability.

B.3.4 Application

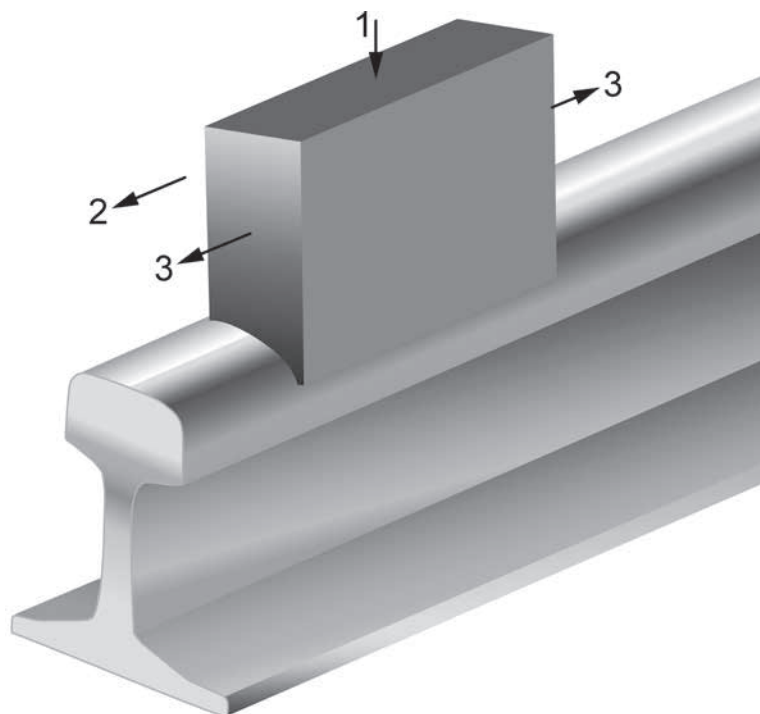
Milling applications are mainly corrective (removal of rolling contact fatigue and transverse / longitudinal profile defects), also change of rail transverse profile, gauge widening and initial reprofiling.

B.4 Oscillating grinding

B.4.1 Principle of work

Material removal is achieved by two components: Grinding stones perform oscillating movements along the longitudinal direction of the rail and the machine moves forward at the same time. Oscillating grinding is a wet-grinding method. The grinding stones are fixed in a grinding frame which may include between 2 and 6 grinding stones and have a length of up to 2 m. Rails are ground in the area between 45° at the running edge and 5° at the field side. Targeted changes to the transverse profile are not possible.

This method permits grinding without spark or dust formation. Specific track equipment such as axle counters and similar devices may not have to be removed.



Key

- 1 stone pressure
- 2 uniform forward or backward movement
- 3 oscillating movement

Figure B.3 — Principle of oscillating grinding

B.4.2 Performance

The volume of material removed is determined by the number and size of the grinding stones, the grinding pressure, the grinding speed and the rail hardness. The machines are equipped with 24 to 72 grinding stones. Several grinding passes are required to achieve the desired final product. The working speed with oscillation is 1 200 m/h. In “rigid sliding block mode”, i.e. without oscillation, working speed is 15 km/h.

B.4.3 Results

After grinding the longitudinal profile, the surface roughness and the visual appearance correspond to the requirements of [EN 13231-3](#) and [EN 13231-4](#).

B.4.4 Application

Oscillating grinding applications are initial reprofiling and corrective work with regard to the longitudinal profile for rails in tracks and switches.

B.5 Planing

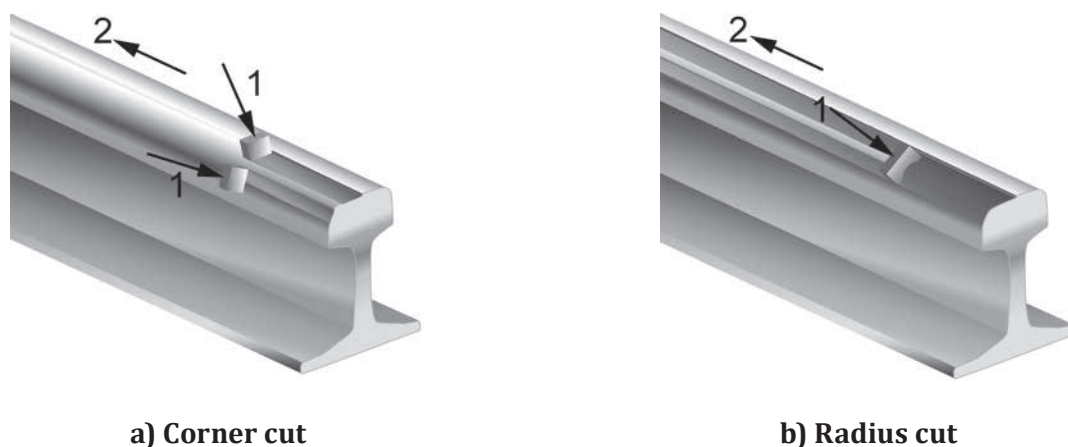
B.5.1 Principle of work

Rails are planed with a chip removing process by straight and radial cutting plates inserted in cartridges that are adapted to the rail profile. Rails are planed in the range specified in [EN 13231-3](#), i.e. from 70° at the running edge to 5° at the field side. Additional and mirror-inverted cuts also permit working the rails at both sides at up to 70°. Any pre-determined transverse profile contour can be manufactured.

Rails are processed without spark and dust formation. Specific track equipment such as axle counters and similar devices shall be removed.

To achieve the desired final product various planing passes are required in both working directions. Depending on the material to be removed one planing cycle (processing of the complete rail head) includes five planing passes.

Planed surfaces have a low surface roughness. The majority of planing chips are collected with magnetic drums.



Key

- 1 pressure of the planing tool
- 2 uniform forward or backward movement

Figure B.4 — Principle of planing, two from five cuts

B.5.2 Performance

This method is suited for material removal from 0,2 mm up to 2,5 mm in separate passes (up to 3,0 mm at the gauge corner), while material removal as low as 0,2 mm is also possible. Working speed is between 4 km/h and 5 km/h.

B.5.3 Results

Defects that were not removed remain visible. The processed transverse rail head profile is characterized by a curve at the running edge and facets in the running surface. The accuracy that is achieved for the transverse and longitudinal rail head profile and other criteria corresponds to the requirements of [EN 13231-3](#).

B.5.4 Application

Planing applications are mainly corrective (removal of rolling contact fatigue and transverse/longitudinal profile defects) and change of rail transverse profile and gauge widening.

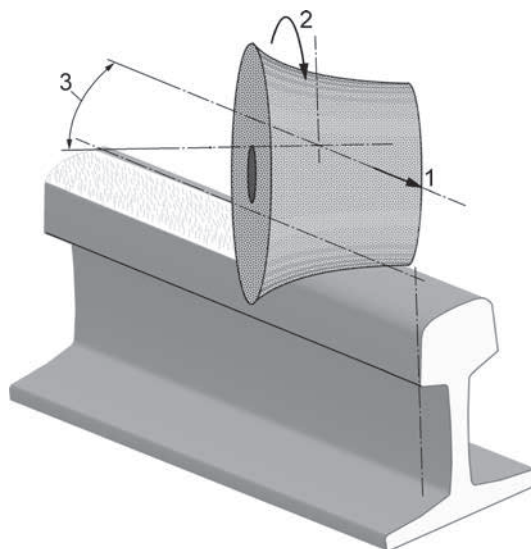
B.6 High speed grinding

B.6.1 Principle of work

High Speed Grinding (HSG) is based on the principle of tangential grinding. The grinding stones are not driven by motors but dragged rolling along the rail. The angle-offset of the stones results in a relative motion lateral to the rail head and thus enables grinding. Grinding stones are grouped in sets of 2×12 stones on each grinding trolley which are pressed on the rail simultaneously, with each set covering a width of the rail head of 20 mm to 30 mm. The radial orientation of each set of grinding stones can be preset allowing the rail head to be ground between 70° at the running edge and 8° at the field side. Within the targeted scope of material removal limited changes to the profile are possible. Both the grinding pressure and the grinding angle are continuously monitored. With the stones adapting to the shape of the rail head, a smooth, facet-free grinding contour is possible.

Grinding operation is conducted from 50 km/h to 80 km/h. Specific track equipment such as axle counters and similar devices may not have to be removed if grinding is done in the area of 45° to 8° .

The machines are designed to limit the effects of sparks and dust produced by the process. Grinding modules can be lifted and lowered in order to pass specific track equipment (such as switches, crossings, check rails, etc.).



Key

- 1 forward motion
- 2 induced rotation
- 3 angle-offset

Figure B.5 — Principle of High Speed Grinding

B.6.2 Performance

Metal removal depends on grinding pressure and the number of grindstones. Grinding is conducted at speeds between 50 km/h and 80 km/h within the regular traffic. HSG is a preventive grinding technology. Depending on the machine size one or more grinding passes are required to achieve the desired metal removal. HSG can be conducted without closing the line if grinding is done in the area of 45° to 8°.

B.6.3 Results

Results of HSG grinding regarding the longitudinal profile and surface roughness correspond to the requirements of [EN 13231-3](#).

B.6.4 Application

HSG is mainly used for preventive rail grinding to control rolling contact fatigue and corrugation. The technology cannot be used for corrective rail maintenance or reprofiling. A major precondition for the effectiveness of this technology is a largely consistent rail profile.

Annex C **(informative)**

A reprofiling strategy

C.1 General

In order to ensure long rail life and consequently low Life Cycle Costs (LCC), the consecutive reprofiling cycles need to be programmed from the date of rail installation or from a corrective reprofiling intervention taking account of the installed steel grades. Use of harder heat treated rail grades may influence the interval between reprofiling cycles due to change in deterioration rates.

C.2 Specific reprofiling strategy

Consecutive reprofiling cycles are also dependent on other important parameters, such as existing reprofiling capacity (e.g. maximum/minimum metal removal rates, sections lengths) and available working intervals (possession times, route reprofiling capabilities, etc.).

These parameters shall be taken into account in the development of an optimized reprofiling strategy. Shorter reprofiling intervals generally result in smaller metal removal requirements. Furthermore in such short periods the development of RCF and irregularities such as corrugation and resulting track deterioration is limited.

The optimum strategy for control of RCF is preventive cyclic reprofiling with small metal removal requirements applying profiles with moderate gauge corner relief. Provided the interval between reprofiling cycles is appropriately matched with the initiation and subsequent growth of cracks, metal removal can be adjusted for a one-pass regime which is operationally the best option.

In order to maintain RCF sensitive sections economically a certain damage level may be accepted (as an intervention threshold or as remaining depth after treatment). However, this level needs to be kept small enough to be removed in a short time and to minimize economic and safety risks.

For RCF that can be measured before and during profiling processing, like HC, the reprofiling interval and the related average metal removal should depend on actual HC measurements which need to be checked again during reprofiling work. Such a policy optimizes the magnitude of artificial wear by reprofiling and hence prolongs rail life.

C.3 Moving from corrective to preventive reprofiling

The move to a preventive reprofiling strategy requires that the given track section, line or network be treated by corrective reprofiling to a condition that is commensurate with the preventive strategy i.e. the profile is within the prescribed tolerance and the crack depths are within the defined threshold. This implies a heavy initial investment in maintenance followed by economically beneficial cyclic measures.

In order to move from a corrective maintenance regime to a preventive cyclic one, the following steps are required:

- a) measurement and documentation of the degree of RCF;
- b) classification of the track sections in the following categories:
 - 1) preventive cyclic reprofiling is sufficient;

- 2) corrective reprofiling is required;
- 3) rail renewal required (where metal removal to the desired profile and “crack-free” integrity is not a pragmatic option);
- c) prioritization of required corrective actions:
 - 1) corrective to zero (preventive mode) in one step (preferred scenario);
 - 2) corrective to zero (preventive mode) in several steps (in case of limited budget or reprofiling capacity);
- d) all existing and corrected sections to be kept in a preventive cyclic mode;
- e) prioritization of preventive cyclic work over corrective actions.

Annex ZA (informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/483 to provide one voluntary means of conforming to the essential requirements of Directive 2008/57/EC on the interoperability of the rail system (recast) and with the associated TSIs.

Once this standard is cited in the Official Journal of the European Union under that Directive 2008/57/EC, compliance with the normative clauses of this standard given in [Table ZA.1](#) for Infrastructure TSI, confers within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations and with the TSI requirements.

Table ZA.1 — Correspondence between Directive 2008/57/EC, Commission Regulation (EU) No 1299/2014 of 18 November 2014 on the technical specifications for interoperability relating to the 'infrastructure' subsystem of the rail system in the European Union (published in the Official Journal L356/1 on 12/12/2014) and this European Standard

Articles/§/annexes of the Directive 2008/57/EC	Chapter/§/annexes of the TSI	Clause(s)/ subclause(s) of this European Standard	Comments
Annex III – Essential Requirements –	2. Definition and scope of subsystem	Clause 5	
1. General requirements	2.5 Relation to the safety management system.	Rail surface defects	
1.1. Safety	4. Description of the Infrastructure subsystem	Clause 6	
1.1.1 - 1.1.2. (first sentence).- 1.1.3	4.2. Functional and technical specifications of subsystem	Reprofiling procedure	
1.2 Reliability and availability	4.2.8. Immediate action limits on track geometry defects		
1.4 Environmental protection	4.2.8.4. The immediate action limit of track gauge as an isolated defect		
1.4.4 – 1.4.5	4.2.8.6. The immediate action limits for switches and crossings		
1.5. Technical compatibility	4.5. Maintenance rules		
	6. Assessment of conformity of interoperability constituents and EC verification of the subsystem		
	6.4. Assessment of maintenance file		

WARNING 1 Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 Other Union legislation may be applicable to the products falling within the scope of this standard.

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- [4] EN 15746 (all parts), *Railway applications — Track — Road-rail machines and associated equipment*

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Contractor Health and Safety Specification

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1. Purpose

This specification identifies and encompass the working behaviours and safe work practices that are expected of all Transnet SOC Ltd employees, Contractors, Consultant, Visitors and Suppliers, engaged on Transnet managed contracts as required by Occupational Health and Safety Act 85 of 1993, Construction Regulation of 2014, National Railway Safety Regulator Act 16 of 2000 (including applicable SANS standards) and Transnet Contractor Management Procedure.

All contractors and service providers must take careful note of these requirements and must ensure that adequate provision has been made to ensure compliance. This Specification has been compiled to cover a wide range of construction/ work activities. In order to determine which requirements are applicable, the contractor must conduct a health and safety risk assessment specific to the project and specific to the contractor's scope of work. All applicable requirements must be addressed in the Contractor's Health and Safety Management Plan.

This Specification will be reviewed and updated periodically as and when necessary to address and / or include:

- Changes in legislation;
- Client requirements;
- Leading practices; and
- Lessons learnt from incidents.

The specification provides the minimum site specific specification requirements.

2. Scope

This Specification applies to all work sites, and to all persons working on or visiting the Transnet managed work sites. The requirements specified in this document are applicable to the contractor as well as any sub-contractors, EPCM Contractors, Consultant, Vendors and Visitors that may be appointed by Transnet as an Employer. It is the contractor's responsibility to ensure that all sub-contractors comply fully with all legal requirements as well as the requirements of this health and safety specification. It applies to Request for Information on Strategy, capacity and proposal for advanced technology in railhead transverse profile corrective and preventative through railhead surface material removal for a period of five years

3. Definitions

Acceptable Risk

A risk that has been reduced to a level that can be tolerated having regard for the applicable legal requirements and the Health and Safety Policy adopted for the project.

ALARP (As Low As Reasonably Practicable)

The concept of weighing a risk against the sacrifice needed to implement the measures necessary to avoid the risk. With respect to health and safety, it is assumed that the measures should be implemented unless it can be shown that the sacrifice is grossly disproportionate to the benefit.

Applicant (Permit to Work)

A person requesting permission to perform work for which a Permit to Work is required. Applicants must be authorised (in writing) to receive (or accept) Permits to Work and must be competent to

do so by virtue of their training, experience and knowledge of the area or plant in which the work is to be performed.

Authorised Person (Permit to Work)

A person (typically a Project employee or an employee of the client) who has been authorised (in writing) by the Transnet Contract Manager to issue Permits to Work within the scope of his designation. A person may only be appointed to issue Permits to Work if he has undergone training and has been assessed and found competent in systems, plant and equipment operation within the scope of his designation.

Barricade

A temporary structure that is erected as a physical barrier to prevent persons from inadvertently coming into contact with an identified hazard.

Consequence

The outcome of an event expressed qualitatively or quantitatively.

Contractor

An employer (organisation) or a person who performs **ANY** work and has entered into a legal binding business agreement contract to supply a product or provide services to Transnet. This applies to the Suppliers, Vendors, and Consultants, Service providers or Contractors performing construction work (includes Principal Contractor)

NB: A Contractor is an employer in his/her own right

Contract Manager

Transnet employee appointed to liaise with the contractor to ensure that the specifications of the contract are met (with special emphasis on safety, technical specifications, inspection of quality and quantity of work). It includes a Technical Officer, Depot Engineering Manager, Engineering Technician, Engineer, Maintenance Supervisor's etc

Competent Person

A person who has in respect of the work or task to be performed the required knowledge, training, experience and qualification (as per Construction Regulation, 2014).

Confined Space

An enclosed, restricted or limited space in which because of its construction, location or contents, or any work activity carried on therein, a hazardous substance may accumulate or an oxygen deficient atmosphere may occur, and includes any chamber, tunnel, pipe, pit sewer, container, valve, pump, sump, or similar construction, equipment, machinery or object in which a dangerous concentration of gas, vapour, dust or fumes may be present.

Construction Supervisor

A competent person responsible for supervising construction activities on a construction site

Clearance Certificate

A signed declaration by an Isolation Officer that a specified hazardous energy source associated with a particular system, plant or item of equipment has been isolated in accordance with an approved Isolation and Lockout Procedure.

Discipline Lock (many locks with a restricted number of identical keys)

Attached at a Lockout Station or at a Local Isolation Point in order to lock out a system, plant or equipment. A Discipline Lock (e.g. A Low Voltage Electricity Discipline Lock) is owned by an Isolation Officer who has been authorised in writing to isolate and lockout a particular hazard (e.g. Low voltage electricity).

Equipment Lock (many locks with one unique key)

Attached directly to pieces of equipment in order to lock them out. Equipment Locks may only be used by Isolation Officers who have been authorised in writing to perform isolation and lockout procedures. The key must have a solid key ring that fits over an Isolation Bar.

First-Aid Injury (FA)

A first-aid injury is any one time treatment and any follow up visit for observation of minor scratches, cuts, burns, splinters and the like which do not normally require medical care. Such treatment is considered to be first aid even if administered or supervised by a medical practitioner. First aid includes any hands on treatment given by a first aider. (E.g. Band-Aid, washing, cleansing, pain, relief).

Rail Road Vehicle

Means a vehicle that can travel on rail and road

Hazard

A source of potential harm in terms of human injury or ill health, or a combination of these.

Hierarchy of Controls

A sequence of control measures, arranged in order of decreasing effectiveness, used to eliminate or minimise exposure to workplace health and safety hazards:

- Elimination – Completely removing a hazard or risk scenario from the workplace.
- Substitution – Replacing an activity, process or substance with a less hazardous alternative.
- Isolation (Engineering) Controls – Isolating a hazard from persons through the provision of mechanical aids, barriers, machine guarding, interlocks, extraction, ventilation or insulation.
- Administrative Controls – Establishing appropriate policies, procedures and work practices to reduce the exposure of persons to a hazard. This may include the provision of specific training and supervision.
- Personal Protective Equipment – Providing suitable and properly maintained PPE to cover and protect persons from a hazard (i.e. Prevent contact with the hazard).

Isolation and Lockout Procedure

A plant or equipment-specific procedure that describes the method, and sequence to be followed, for rendering equipment, plant and systems safe to work on.

Isolation Bar

A device used at a Lockout Station to which anyone is able to attach a Personal Lock making it impossible for an Isolation Officer to remove the key to the Equipment Locks, thus preventing the de-isolation of a system, plant or equipment while it is still being worked on. A Discipline Lock must always be the first lock attached to an Isolation Bar and last to be removed.

Isolation Officer

A person (typically a Project employee or an employee of the client) who has been authorised (in writing) by the Transnet Contract Manager to perform isolation and lockout procedures. A person may only be appointed as an Isolation Officer if he has undergone training and has been assessed and found competent in the isolation and lockout of systems, plant and equipment within the scope of his designation.

Incident

An event (or a continuous or repetitive series of events) that results or has the potential to result in a negative impact on people (employees, contractors and visitors), the environment, operational integrity, assets, community, process, product, legal liability and / or reputation.

Likelihood

A description of probability or frequency, in relation to the chance that an event will occur.

Lost Time Injury (LTI)

Any occurrence that resulted in a permanent disability or time lost from work of one day/shift or more.

If an employee is injured and cannot return to work in the next shift (will ordinarily miss one whole shift), and the department brings the employee in to only receive treatment by the Supervisor/ Return to Work Coordinator in that shift, this is still considered an LTI.

Lost Time Injury Frequency Rate (LTIFR) - Number of LTI's multiplied by 1 million or 200,000 and divided by labour hours worked.

Light Vehicle

A vehicle that:

- Can be licensed and registered for use on a public road;
- Has four or more wheels, and seats a maximum of 12 adults (including the driver);
- Requires the driver to hold only a standard civil driving licence; and
- Does not exceed 4.5 tonnes gross vehicle mass (GVM), which is the maximum loaded mass of the motor vehicle as specified by:
 - ♦ The vehicle's manufacturer; or
 - ♦ An approved and accredited automotive engineer, if the vehicle has been modified to the extent that the manufacturer's specification is no longer appropriate.

Examples of light vehicles include passenger cars, four-wheel drive vehicles, sports utility vehicles (SUVs), pick-ups, minibuses, and light trucks.

Any vehicle falling outside of this definition must be considered mobile equipment.

Medical Treatment Injury (MTI)

A work injury requiring treatment by a Medical Practitioner and which is beyond the scope of normal first aid including initial treatment given for more serious injuries. The procedure is to be of an invasive nature (e.g. Stitches, removal of foreign body).

Mobile Equipment

A vehicle (wheeled or tracked) that generally requires:

- The driver to hold a specific state or civil license; or
- The operator to hold a nationally recognized certificate of competency.

Examples of mobile equipment include, but are not limited to, dump trucks, water trucks, graders, dozers, loaders, excavators, forklifts, tractors, back-actors, bobcats, mobile cranes, tele-handlers, drill rigs, buses and road-going trucks.

Near Hit

An incident that has occurred that did not result in any injuries, illnesses, environmental or property damage but had the potential to cause an injury, illness, environmental or property damage.

Occupational Health Practitioner

An occupational medicine practitioner or a person who holds a qualification in occupational health recognised as such by the South African Medical and Dental Council as referred to in the Medical, Dental and Supplementary Health Service Professions Act, 1974 (Act No. 56 of 1974), or the South African Nursing Council as referred to in the Nursing Act, 1978 (Act 50 of 1978)

Personal Lock

A single lock with one unique key controlled by the owner. Used for personal protection.

Principal contractor

An employer appointed by the client to perform construction work

Regulation

In the context of this guideline, 'Regulation(s)' refers to the Construction Regulations, 2014 required by Section 43 of the Occupational Health and Safety Act 85 of 1993, published under Government Notice R 84 in Government Gazette 37305 of February 2014.

Risk

A combination of the likelihood of an occurrence of a hazardous event or exposure and the severity of injury or ill health that can be caused by the event or exposure.

Risk Assessment

A process of evaluating the risk arising from a hazard, taking into account the adequacy of any existing control measures, and deciding on whether or not the risk is acceptable.

Risk Management

The systematic application of management policies, processes and procedures to identifying hazards, analysing and evaluating the associated risks, determining whether the risks are acceptable, and controlling and monitoring the risks on an ongoing basis.

4. Abbreviations

DSTI - Daily Safety Task Instruction
 CR – Construction Regulations
 EPCM - Engineering Procurement and Construction Management
 HIRA - Hazard Identification and Risk Assessment
 HEALTH AND SAFETY - Integrated Management System
 MS - Management System
 OHS Act - Occupational Health and Safety Act
 SOC - Safety Observation and Conversation
 VFL - Visible Felt Leadership
 OHS - Occupational Health and Safety

5. SHE Management Plan

The contractor must prepare, implement and maintain a contract-specific SHE Management Plan. The plan must be based on the requirements set out in this specification, risk assessment as well as all applicable legislation. It must cover all activities that will be carried out on the project site(s), from mobilisation and set-up through to rehabilitation and decommissioning.

The plan must demonstrate the contractor's commitment to HEALTH AND SAFETY and must, as a minimum, include the following:

- A copy of the contractor's **Health and Safety Policy**;
- Procedures concerning **Hazard Identification and Risk Assessment**, including both Baseline and Task-Based Risk Assessments;
- Arrangements concerning the identification of applicable **Legal and Other Requirements**, measures to ensure compliance with these requirements, and measures to ensure that this information is accessible to relevant personnel;
- Details concerning **Health and Safety Objectives** – a process must be in place for setting objectives (and developing associated action plans) to drive continual improvement;
- Details concerning **Resources, Accountabilities and Responsibilities** – this includes the assignment of specific health and safety responsibilities to individuals in accordance with legal or project requirements, including the appointment of a Project Manager, Health and Safety Officers, Supervisors, Health and Safety Representatives, and First Aiders;
- Details concerning **Competence, Training and Awareness** – a system must be in place to ensure that each employee is suitably trained and competent, and procedures must be in place for identifying training needs and providing the necessary training;
- **Communication, Participation and Consultation** arrangements concerning health and safety, including Safety Observations and Coaching, Toolbox Talks, Daily Safe Task Instructions, project health and safety meetings, and notice boards;
- **Documentation and Document Control** – project-specific documentation required for the effective management of health and safety on the project must be developed and maintained, and processes must be in place for the control of these documents;
- Processes and procedures for maintaining **Operational Control**, including rules and requirements (typically contained in Safe Work Procedures) for effectively managing health and safety risks, particularly critical risks associated with working at heights, confined spaces, mobile equipment and light vehicles, lifting operations, hazardous chemical substances, etc.;
- **Emergency Preparedness and Response** procedures;
- **Management of Change** – a process must be in place to ensure that health and safety risks are considered before changes are implemented;
- **Sub-contractor Alignment** procedures – a process must be in place for the assessment of sub-contractors and suppliers with regard to health and safety requirements and performance (before any contract or purchase order is awarded);
- **Measuring and Monitoring** plans, including a plan for the measuring and monitoring of employee exposure to hazardous substances or agents (e.g. Noise, dust, etc.) In order to determine the effectiveness of control measures;
- **Incident Reporting and Investigation** procedures describing the protocols to be followed with regard to incident reporting, recording, investigation and analysis;
- **Non-conformance and Action Management** procedures concerning the management of corrective actions;

- **Performance Assessment and Auditing** procedures concerning health and safety performance reporting, monthly internal audits to assess compliance with the project health and safety requirements, and daily site health and safety inspections; and
- Details concerning the **Management Review** process followed to assess the effectiveness of health and safety management efforts.

Prior to mobilisation, the SHE Management Plan must be forwarded, to the Transnet Contract Manager for review. The plan will be audited for completeness and, if found to be adequate, will be accepted (typically "with comments"). Work may not commence until the plan has been accepted.

Any proposed amendments or revisions to the contractor's SHE Management Plan must be submitted to the TFR Contract Manager for acceptance.

Should it be identified that the contractor has overlooked a high risk activity, and as a result has omitted the activity and associated control measures from the SHE Management Plan, the plan will not be approved.

6. Policy

The contractor must develop, display and communicate a Health and Safety Policy that clearly states the contractor's values and objectives for the effective management of health and safety as required by OHS Act of 1993, 7(3) and SANS 3000-1:2016.

The policy must be signed and dated, and must be reviewed annually. The policy must commit to:

- Compliance with all applicable legal requirements;
- The effective management of health and safety risks;
- The establishment of measurable objectives for improving performance, and the provision of the necessary resources to meet these objectives;
- The prevention of incidents; and
- Achieving continual improvement with regard to health and safety performance.

All employees of the contractor as well as the employees of any sub-contractors that may be appointed by the contractor must be made aware of the policy. This must be done through Health and Safety Induction Training and Toolbox Talks.

A copy of the policy must be displayed.

7. Hazard Identification and Risk Assessment.

Detailed hazard identification and risk assessment processes must be followed for all work to be performed as well as for all associated equipment and facilities as required by legislation.

7.1 Baseline Risk Assessments

The client must conduct a detailed Baseline Risk Assessment identifying foreseeable hazards and risk scenarios associated with the contractor's scope of work on the work site(s) as required by legislation and Transnet Contractor Management Procedure. The baseline risk assessment shall be used to develop this specification.

7.2 Task-Based Risk Assessments

The contractor must ensure that effective procedures and risk assessment processes are in place to control hazards and to mitigate risks to levels that are as low as is reasonably practicable.

The contractor must carry out detailed project-specific Task-Based Risk Assessments which must be facilitated by a competent person who has been appointed in writing. The contractor's site management representatives, supervisory personnel, technical experts (as required) and workforce personnel directly involved with the task being examined must participate in the risk assessment process. An attendance register must be completed and retained.

A Task-Based Risk Assessment must at least:

- Be accompanied by a Work Method Statement (describing in sufficient detail how the specific job or task is to be performed in a logical and sequential manner);
- Provide a breakdown of the job or task into specific steps;
- Identify the hazards and potential risk scenarios associated with each step;
- Include consideration of possible exposure to noise, heat, dust, fumes, vapours, gases, chemicals, radiation, vibration, ergonomic stressors, or any other occupational health hazard or stressor;
- Describe the control measures that will be implemented to ensure that the risks are managed to levels that are as low as is reasonably practicable; and
- Assign an initial risk rating (without taking any control measures into consideration) and a residual risk rating (taking the identified control measures into consideration) to each risk scenario.

A Task-Based Risk Assessment must be reviewed and, if necessary, updated:

- On an annual basis (as a minimum);
- When changes are made to the associated Work Method Statement;
- Legislative changes; and
- Following an incident.

7.3 Pre-Task Hazard Assessments

A pre-task hazard assessment must be completed before commencement of a task or whenever a change is identified while carrying out an activity. Before carrying out the particular task that involves the identified change, a few minutes must be spent identifying the hazards and risks associated with that task as well as suitable control measures. Any deviation from what was discussed during the Daily Safe Task Instruction (prior to the activity commencing), or anything that was not discussed, constitutes a change.

8. Legal and Other Requirements

The Contractor must comply with the requirements of all applicable legislation as well as Transnet and contract-specific standards and procedures as amended from time to time.

The Contractor must compile and maintain a register of all legal and other requirements applicable to the work that will be carried out and / or services that will be provided. This register must be updated regularly to ensure that it remains relevant.

Applicable laws and standards must be appropriately communicated to all employees of the contractor (as well as the employees of any sub-contractors that may be appointed by the contractor) through training, Toolbox Talks, and Daily Safe Task Instructions.

The Contractor shall submit proof of registration and Letter of Good Standing with the compensation fund or with a licensed compensation insurer as contemplated in the Compensation for Occupational Diseases Act , 1993 (Act No. 130 of 1993) for his company and each of his sub-contractors’.

No contractor may do any work for TFR without a valid letter of good standing. The Contractor must ensure that the Letter of Good Standing remains valid for the duration of the contract period. The letter of good standing must reflect the name of the Contractor and/or Sub-contractor, registration number and, expiry date

9. Objectives

In order to drive continual improvement, the contractor must set contract-specific and measurable objectives, and develop improvement action plans to achieve these objectives. These objectives must be aligned with the objectives set for the contract as a whole.

Eliminating hazards, minimising risks, preventing incidents, injuries and illnesses, and ensuring legal compliance must be the primary considerations for setting objectives.

When setting objectives, consideration must be given to the following:

- Leading indicators such as inspection findings, audit findings, hazard reporting, and observations;
- Lagging indicators (i.e. Incidents including Near Hits);
- Leading practices and lessons learnt; and
- Injury frequency rates with due understanding that the goal is “no harm”.

The improvement action plans must specify adequate resources required to achieve the objectives, the person’s responsible, and realistic timeframes for completion.

The objectives and associated improvement action plans must be documented and communicated to all contractor employees. Furthermore, to ensure that the objectives remain relevant, they must be reviewed on a yearly basis and whenever significant change has taken place (i.e. Changes to activities, scope of work, operating conditions, etc.).

Performance reviews must be carried out at quarterly intervals to assess and document performance against these personal or team objectives.

If a reward or incentive scheme is introduced, it must be designed in such a manner that health and safety performance is not compromised in order to maximise financial reward.

10. Resources, Accountabilities and Responsibilities

The Contractor must adequately allocate resources, responsibility and accountability to ensure the effective implementation, maintenance and continual improvement of the contractor’s HEALTH AND SAFETY management system for the contract. The contractor must comply with the requirements of all applicable legislation concerning health and safety related appointments and delegations for the contract

An organogram specific to the contract must be documented and maintained. All roles that carry HEALTH AND SAFETY accountability and / or responsibilities must be included, and all individuals that carry health and safety appointments must be clearly identified and appointed in writing. Documented proof of each appointment must be retained.

The contractor's managers and supervisors at all levels must demonstrate their commitment and support by adopting a risk management approach to all health and safety issues. These individuals must consistently take immediate and firm action to address violations of health and safety rules, and must actively participate in day to day activities with the objective of preventing harm.

The contractor's management representatives are responsible and accountable for health and safety performance. All costs associated with meeting these responsibilities shall be borne by the contractor.

Any cost associated with any work stoppage due to non-compliance with a health and safety requirement shall be for the contractor's account.

10.1 Contractor Construction Manager

The Contractor must appoint a competent Construction Manager who shall be responsible for the successful and safe completion of all work to be carried out by the contractor, including the duty of ensuring occupational health and safety compliance.

The appointed Construction Manager may not manage any work on or in any site other than the site in respect of which he or she has been appointed.

The contractor must upon having considered the size of the project, in writing appoint one or more Assistant Construction Managers for different sections thereof: Provided that the designation of any such person does not relieve the Construction Manager of any personal accountability for failing in his or her management duties in terms of this regulation.

10.2 Contractor Health and Safety Officers

The contractor must appoint a full-time Construction Health and Safety Officer for the duration of the contract who is registered with the SACPCMP (The South African Council for Project Construction Management Professions).

The Construction Health and Safety Officer shall have sound knowledge of the Occupational Health and Safety Act and its regulations, SANS 3000-1:2016, National Environmental Management Act, and associate environmental requirements such as Waste and Water Acts and Hazard Identification and Risk Management processes.

The contractor must ensure that each Construction Health and Safety Officer is adequately equipped to enable him to perform his duties effectively.

10.3 Contractor Supervisors

The contractor must ensure that all works are supervised at all times by an adequate number of qualified, competent and appointed supervisors who have experience in the type of work being carried out.

No work may be carried out without an appointed supervisor being physically present in the work area and daily safety task instruction. The Construction Supervisor appointed may not supervise any work on or in any site other than the site in respect of which he or she has been appointed: Provided that if a sufficient number of competent employees have been appropriately designated under on all the relevant sites, the appointed construction supervisor may supervise more than one site.

Each supervisor must accept these responsibilities in writing as part of his appointment and must be provided with all the necessary equipment to enable him/her to perform his responsibilities.

The contractor must, upon having considered the size of the work to be performed, in writing appoint one or more competent employees for different sections thereof to assist the construction supervisor, and every such employee has, to the extent clearly defined by the contractor in the letter of appointment, the same duties as the construction supervisor: Provided that the designation of any such employee does not relieve the construction supervisor of any personal accountability for failing in his or her supervisory duties in terms of this regulation

10.4 Health and Safety Representatives

The team of employees on site must have a health and safety representative deployed on the work site(s), a Health and Safety Representative must be elected and appointed. Taking into consideration the number of employees deployed, the geographical area in which the work is taking place, the different work disciplines, and the shift pattern (if applicable), the contractor must ensure that an adequate number of Health and Safety Representatives (at a minimum ratio of one Health and Safety Representative per 50 employees) are elected and appointed to effectively represent all site personnel as required by the OHS Act 85 of 1993, section 17 - 18.

Each Health and Safety Representative must attend a training course for health and safety representatives. The cost of this training shall be for the contractor's account.

The contractor must make the necessary allowances for the Health and Safety Representatives to carry out their duties as specified in the applicable legislation.

The contractor must ensure that an appropriate method of identification of each Health and Safety Representative by employees on site.

10.5 First Aiders

The Contractor shall ensure that their employees receive prompt first aid treatment in case of injury or emergency. The Contractor must have the necessary equipment and/or facility on site for treatment of injured persons.

If 10 or more employees are deployed on the work site(s), at least one trained and competent First Aider must be in place and appointed. Taking into consideration the number of employees deployed, the geographical area in which the work is taking place, the different work disciplines, and the shift pattern (if applicable), the contractor must ensure that an adequate number of First Aiders (at a minimum ratio of one First Aider per 50 employees) are in place and have been appointed to administer first aid treatment should this be required.

First Aid training must be done through an accredited training institution. The cost of this training shall be for the contractor's account.

The contractor must ensure that an appropriate method of identification of each First Aider by employees.

10.6 Operational legal appointment letters

The contractor must ensure other legal appointment letter are compiled and be submitted with the Contractor compliance plan. Below is some appointment required as per the legislation, the appointment letters varies based on the scope of work;

- OHSA Sec 16(2)
- Sec 17,18,19 SHE Representative
- GSR 3(4) First Aider
- GAR 9(2) Incident investigator

- GMR 2(1) Supervisor of machinery
- GMR 2(7) Assistant Supervisor of machinery
- CR 4(1)(c) Principal Contractor
- CR 8(1) Construction Manager
- CR 8(2) Assistant Construction Manager
- CR 8(7) Construction Supervisor
- CR 8(8) Assistant Supervisor of construction work
- CR 8(5) Construction Health and Safety Officer
- CR 9(1) Construction Risk Assessor
- CR 10(1)(a),(b) Fall protection plan Developer
- CR 10(2)(d) Inspector of fall arrest system
- CR 14(2) Scaffolding Supervisor
- DMR 17(2),18 Inspector of lifting machinery
- CR17(8) Material hoist Inspector
- CR 19(2)(g)(i) Explosive powered tool issuer
- CR 23(1)(k) Construction vehicle and mobile plant Inspector
- CR 24(d) Temporary Electrical Installation Controller
- CR 24(e) Temporary Electrical Installation Inspector
- CR 28(a) Stacking and storage Supervisor
- CR 29(h) Fire extinguisher inspector
- EMR 8(8) Appointment for electrical installation in hazardous location- Master Electrician (Inspector)
- EIR 9 Installation Electrician appointment

11. Cost of health and safety

The Contractor shall ensure that it has made adequate provision for the cost of health and safety measures in the tender offer. The Contractor shall ensure that its subcontractors have made adequate provision for the cost of health and safety measures in the tender offer.

12. Competence, Training and Awareness

Each employee (including sub-contractor employees) must be suitably trained and competent, and must understand the health and safety hazards, risks and control measures associated with his work.

The contractor must implement systems and procedures to ensure that the necessary competencies required by employees are identified (by occupation), along with selection, placement and any training requirements;

Please Note: Specific competency profiles and selection criteria (fitness for work) must be developed for all roles where significant health or safety risk exists.

Please Note: A formal training needs analysis must be carried out based on the competency profiles and a training matrix must be developed for the scope of work.

Roles requiring technical certification, registration or licensing are identified and documented, and these roles are filled only by suitably qualified personnel;

All employees hold and maintain the required competencies and are under competent supervision. Refresher training is carried out as required. Records of education, qualifications, training, experience and competency assessments are maintained on site for all employees. The effectiveness of training is reviewed and evaluated;

Prior to the commencement of any work, including mobilisation and site set-up activities, the contractor must provide, to the satisfaction of the nominated contract management representative, current documentation verifying that the contractor's employees, as well as the employees of any appointed sub-contractors, are competent and have the necessary qualifications, certificates, licences, job skills, training and experience (as required by this specification and applicable legislation) to safely carry out the work that is to be performed.

The Contractor and sub-contractor must ensure that all identified training as per training matrix takes place.

A contractor must at all times keep on his or her work site, records of the health and safety induction training and such records must be made available on request to an inspector, the client, the client's agent or the principal contractor;.

An Employee Profile (dossier) must be completed for each employee who will be performing work on site. All documentation pertaining to an employee's competence (i.e. certified copies of qualifications, certificates and licences as well as proof of job skills, training and experience) must be maintained in this dossier.

If it is determined through observation that an employee is not yet competent to carry out a particular task in a safe and capable manner, the employee will be required to cease work immediately and must either be reassigned or be retrained at the contractor's expense.

The contractor must ensure that the training institutions and trainers that are used are appropriately registered with a governing authority. Foreign qualifications held by employees in health and safety critical roles must be verified against the requirements of local legislation.

12.1 Induction Training

Each employee must attend all mandatory induction Training applicable to the work activities and Health and safety induction training pertaining to the hazards prevalent on the site at the time of entry. No employee will be permitted to enter any work site until he has attended this training. The contractor must keep the proof of induction on the contractor compliance file.

Furthermore, employees must attend (where applicable) Area/job-Specific Training pertaining to the particular hazards identified in the area(s) where the employees will be working. No employee will be permitted to enter a work area until he has attended the relevant area/job-specific training.

12.2 Specific Training and Competency Requirements

An employee must be trained, assessed and found competent before he will be given authorisation to perform certain tasks or fill certain roles.

The contractor shall make arrangements with the Transnet Contract Manager for training that are only offered or unique to Transnet. Such training shall be for the cost of the contractor.

13. Communication, Participation and Consultation

The contractor must establish and maintain effective communication and consultative processes for the duration of the contract to ensure that employees are kept up to date with regard to critical, health and safety related information and prompt feedback is provided.

13.1 Toolbox Talks

The contractor must prepare a Toolbox Talk on a weekly basis and must share it with all personnel for which the contractor is responsible (including all sub-contractors). Toolbox Talks must address health and safety issues that are relevant to the work performed on the work site(s) and must include information and / or knowledge sharing, lessons learnt from incidents that have occurred, information concerning specific hazards and / or risks and control measures to prevent injury, etc.

Attendance records must be kept and maintained in the contractor's compliance file.

13.2 Daily Safe Task Instructions (DSTI's)

At the start of each day or shift, prior to the start of any work, each appointed supervisor must inspect the work area for which he is responsible and ensure that it is safe. He must then conduct a Daily Safe Task Instruction (DSTI) with his work team specifically concerning the tasks that they will be performing during the course of the day or shift. The relevant Task-Based Risk Assessment for the activity must be used as the basis for the discussion. The correct work method must be reiterated and the identified hazards, risks and control measures must be discussed with the team.

If the work method changes after activities have already begun, the DSTI must be revisited and updated with the team, and the changes must be signed off by the relevant contractor Construction Manager.

Every member of the work team must sign the DSTI attendance register and records must be kept and maintained in the contractor's health and safety file.

The contractor's Health and Safety Officer must evaluate the content of the DSTI's to ensure that they are task-specific.

13.3 Suggestions

All employees must be encouraged to submit suggestions to enhance health and safety management on the work site(s). A process must be in place for documenting, evaluating, implementing (as appropriate), archiving and recognising the improvement ideas.

13.4 Meetings

13.4.1 Contractor health and safety (OHS Act Section 19)

The contractor must schedule and hold health and safety meetings at least quarterly and keep minutes of each meeting and attendance records in the contractor compliance file.

The meeting must address the following as a minimum:

- New incidents for the period and corrective actions taken or to be taken;
- Implementation status of outstanding actions associated with previous incidents;

- SOC's, PTO's and DSTI's carried out for the period and action required to correct trends identified;
- Results of any audits, inspections (including H&S Rep inspections) or site visits carried out;
- A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work;
- Risk Assessments, Safe Work Procedures, etc. That are outstanding or due for review (as well as the quality of these documents); and
- Any other health and safety related matter.

13.4.2 Site Meetings

In addition to the contractor health and safety meetings, the Transnet Contract Manager will schedule and chair monthly Site Meetings that the contractor must attend.

The meeting will address the following as a minimum:

- Feedback from the contractor concerning health and safety performance for the period;
- New incidents for the period and corrective actions taken or to be taken;
- Implementation status of outstanding actions associated with previous incidents;
- SOC's, PTO's and DSTI's carried out for the period and action required to correct trends identified;
- Results of any audits, inspections or site visits carried out;
- A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work;
- Risk Assessments, Safe Work Procedures, etc. That are outstanding or due for review (as well as the quality of these documents); and
- Any other health and safety related matter.

13.5 Health and Safety Notice Boards

The contractor must where practicable, provide and maintain a Performance Board that must display the health and safety performance indicators, and a site plan indicating evacuation routes and emergency assembly point locations.

13.6 Involvement (Other)

The participation of all contractor (and sub-contractor) employees in activities that promote improvements in health and safety performance must be encouraged. In particular, this must include their appropriate involvement in:

- Hazard identification, risk analysis and determining control measures;
- Incident investigation; and
- Reviewing policy and objectives.

14. Documentation and Document Control

The contractor must establish a process for the systematic control of health and safety records and related data. Controls must be in place for the creation, receipt, secure storage, maintenance, accessing, use and disposal of such records and data.

The document control process must:

- Provide for the review, revision and version control of documents;
- Uniquely identify documents (as appropriate) to control their use and function;
- Require approval of the documents for adequacy prior to issue;

- Clearly identify changes and record the status of any revisions to documents; and
- Provide for the effective distribution of documents to, and where necessary the timely removal of obsolete documents from, all points of issue and use.

Each record must be legible, identifiable and traceable, and must contain adequate information and data for its purpose. The retention, confidentiality and security of records and data must be maintained in a manner that is appropriate for the nature of the records and data, and in accordance with any applicable data or privacy protection legislation.

Personal information originating from medical surveillance and occupational hygiene monitoring must be reported in a form that respects the privacy of the individual, but enables management to fulfil their duty of care obligations to employees.

14.1 Contractor compliance File Requirements (Health and Safety File)

The contractor must compile and maintain a file containing all necessary compliance related documentation. Transnet should provide construction work permit and to be kept on site at all times. The contents of the file will be audited by a Transnet Contract Manager or any person delegated by him on a monthly basis.

Required documentation includes, but is not limited to, the following:

- Letter of Good Standing from the Compensation Commissioner or Licensed Insurer;
- Proof of Public Liability Insurance;
- Scope of Work under the contract;
- List of Contacts and their Telephone Numbers;
- Health and Safety Policy;
- SHE Management Plan;
- Client Health and Safety Specification
- Section 37(2) Mandatory Agreement
- Legal Register;
- Organisational Chart for the contract;
- Appointment Letters (appointment of the contracting company, and appointments for all persons with health and safety related responsibilities);
- Notifications to the relevant authorities that construction work is in progress;
- Task-Based Risk Assessments;
- Health and Safety Objectives, and associated Improvement Action Plans;
- Safe Work Procedures, Work Instructions and Work Method Statements;
- Planned Task Observations;
- Fall Protection Plan (for work at height);
- A dossier (Equipment Profile) for each fuel-driven vehicle or machine;
- Inspection Registers, Forms and Checklists;
- PPE Issue Registers;
- Material Safety Data Sheets;
- Emergency Response Procedures;
- Incident Records;
- A dossier (Employee Profile) for each employee containing: a copy of the employee's Identity Document or Passport, Valid Medical Certificate of Fitness, Training Records, Certificates of Competency; and Copies of Licences;
- Meeting Minutes;
- HEALTH AND SAFETY Performance Reports;

- Copies of Inspection and Audit Reports; and
- Daily Safe Task Instructions (DSTI's) and Toolbox Talks.

The contractor must ensure that an equivalent file is compiled and maintained by each appointed sub-contractor. A copy of the compliance file must be provided to the Transnet at the end of the contract.

15. Notification of Construction Work

A contractor who intends to carry out any construction work other than work contemplated in Construction Regulation 3(1), must at least 7 days before that work is to be carried out notify the provincial director in writing in a form similar to Annexure 2 if the intended construction work will—

- include excavation work;
- include working at a height where there is risk of falling;
- include the demolition of a structure; or
- include the use of explosives to perform construction work.

A contractor who intends to carry out construction work that involves construction of a single storey dwelling for a client who is going to reside in such dwelling upon completion, must at least 7 days before that work is to be carried out notify the provincial director in writing in a form similar to Annexure 2 of the CR regulations.

16. Operational Control

For contract operations and activities, the contractor shall implement and maintain:

- Operational controls, as applicable to the organization and its activities;
- The organization shall integrate those operational controls into its overall OH&S Management System;
- Controls related to purchased goods, equipment and services;
- Controls related to contractors and other visitors to the workplace;
- Documented procedures, to cover situations where their absence could lead to deviations from the OH&S policy and the objectives;
- Stipulated operating criteria where their absence could lead to deviations from the OH&S policy and objectives.

16.1 Safe Work Procedures

The contractor must develop, document and implement Safe Work Procedures for all activities involving significant health or safety risk. These procedures must detail the control measures required to effectively manage the health and safety risks associated with the work activities.

Each Safe Work Procedure must be consistent with the Task-Based Risk Assessment completed for the activity.

Every person engaged in an activity for which a Safe Work Procedure has been developed must receive suitable training on the procedure.

Furthermore, the contractor must develop, document, communicate and implement formal procedures, work instructions and / or programmes for the operation, maintenance,

inspection and testing of all plant and equipment (including protective systems and devices) brought onto the project site(s).

16.2 National Railway Safety Regulator Act / Railway Safety

The Contractor shall ensure that its equipment, machinery and employees when on TFR premises complies fully with all applicable railway safety requirements and/or regulations of the National Safety Regulator Act 16 of 2002 and the relevant SANS Codes of Practice.

The Contractor when engaging subcontractor must review the capability of the proposed contractor to comply with specified railway safety requirements and/or regulations.

The Contractor and/or his subcontractors must grant TFR access, during the term of the contract, to review any railway safety related activities, including the coordination of such activities across all parts of the organisation.

The Contractor shall ensure that where applicable, such work is performed by person who has the necessary competencies as required in terms of any applicable railway safety standard or code of practice

The Contractor shall ensure that all his employees are protected from the risk of being hit by moving trains.

The Contractor shall ensure that on track machines are only operated with the Transnet Track inspector/Track master in charge of on-track machine present on the machine. Transnet Track inspector/Track master in charge of on-track machine must have passed the appropriate road knowledge, theoretical and practical examinations and must be licenced competent.

16.3 Planned Task Observations

All contractor, management supervisors must perform Planned Task Observations (PTO's) to verify that the control measures that have been identified in Safe Work Procedures (and associated Risk Assessments) are being adhered to and are being properly implemented, and to provide guidance where deviations are noted.

Each supervisor must complete at least one PTO per day involving one or more employees in his work team.

When an unsafe act or condition is identified, the supervisor must coach the work team to correct the act or condition in line with the Safe Work Procedure.

Where valid changes to the work method are identified, the supervisor must ensure that the Safe Work Procedure and Risk Assessment are updated to reflect the current practice.

Transnet Contract Manager may carry out PTO's on contractor employees on an ad hoc basis. Should deviations from the contractor's Safe Work Procedures be observed, the work may be stopped until these deviations are rectified.

16.4 General Rules of Conduct

All persons are required to conform to the following rules of conduct while on the site.

The following acts are prohibited:

- Engaging in practical jokes, horseplay, scuffling, wrestling, fighting, or gambling;
- Assault, intimidation, or abuse of any person;

- Insubordination towards any supervisor or manager;
- Refusing to carry out a reasonable and lawful instruction concerning health and safety;
- Entry into any restricted area (including barricaded areas), unless authorised to do so by the responsible person;
- Unauthorised use / operation of any equipment or machinery;
- Negligently, carelessly or wilfully causing damage to any property;
- Destroying or tampering with safety devices, signs, or signals;
- The use of water from fire hydrants or hose reels for any purpose other than extinguishing a fire;
- The wilful and unnecessary discharging of fire extinguishers;
- Refusing to give evidence or deliberately making false statements during incident investigations;
- Bringing alcohol, drugs, or any other intoxicating substance onto site;
- Bringing a firearm, ammunition, or any other offensive weapon onto site;
- Bringing animals onto site;
- Running, except in an emergency;
- The use of an ipod (or similar) whilst working on site;
- Sleeping on the job;
- Building fires on site, unless in a suitably constructed barbequing facility; and
- Pouring / pumping / flushing any substance (chemical / hydrocarbon / waste water) into a storm water drain, onto bare soil, or into any area where the substance is not effectively contained.
- Walking, sitting or sleeping on the rail
- Touching of any loose lying electric wires
- Coming into close proximity to live OHTE (maintain clearance of 3 metres)

Any of the above actions may result in the temporary or permanent removal of the offending person(s) from site, as well as possible prosecution. The decision of the Transnet Contract Manager shall be final and binding in respect of any dispute that may arise from the interpretation of these requirements.

16.5 Site Access

The Contract Manager shall issue a site access certificate to the contractor after he has evaluated and is satisfy with the contractor compliance file.

16.5.1 Access Control and Security

The contractor must comply with all access control, procedures and systems applicable to the work site. Failure to comply with these requirements will be viewed as a serious safety breach and may result in the permanent removal of the individual(s) / contracting company from site or suspension without payment.

No access card will be issued unless valid proof of identification is provided. For foreign labour, an access card will only be issued if a valid work visa is produced.

The contractor must assess the security risks and implement appropriate measures. Where such measures include hiring of contract security services, the Contractor must inform the Transnet Contract Manager and obtain written authorisation. All contractors are to strictly adhere to all security requirements on the premises.

16.5.2 Trespassing

The contractor must ensure that no employee (including sub-contractor employees)

trespasses on any land lying beyond the boundaries of the work site. The contractor's activities must be confined to the specified work areas, and access to these areas may only be by means of specified routes.

If instructed by a Transnet Contract Manager to do so, the contractor must remove any employee who fails to comply with this requirement from the work site.

16.5.3 Visitors

Visitors (including reps and suppliers) must be advised in advance of the mandatory Personal Protective Equipment (PPE) requirements for the site, and must arrive with all of this PPE.

All visitors must sign in the visitor's register and undergo a visitor induction briefing before entering the site. A visitor access card will be issued to each visitor on conclusion of the induction briefing.

Whilst on site, visitors must be accompanied at all times by an appropriately senior employee who has been inducted fully.

When leaving the site, each visitor must return his or her visitor access card to the security personnel posted at the entrance / exit. A visitor will not be permitted to leave the site until he or she produces the access card that was issued.

Note: Any request (typically made by a government official) to carry out a site inspection must be referred to the Transnet Contract Manager. The contractor must not arrange any such inspection without prior approval from the Transnet Contract Manager.

16.5.4 Alcohol, Drugs and Other Intoxicating Substances

The contractor must ensure that all personnel under his authority do not at any time enter the site or perform any work whilst under the influence of alcohol, a drug, or any other intoxicating substance. Selling or possessing drugs, alcoholic beverages or any other intoxicating substance on the site is strictly prohibited.

A drugs and alcohol testing program will be implemented. Persons entering the site will be randomly tested. Any person who tests positive for alcohol or drug consumption will be subject to disciplinary action and shall be permanently removed from the site.

Any person have the opportunity to rather report that he/she is under the influence before accessing the work site – in these case the employee may only be send home for the day but will then be tested for the following five days (each day) on his return to the site. If it is found that the same person is frequently reporting that he/she is under the influence before even accessing the work site. It shall be the responsibility of the Transnet Contract Manager to take disciplinary action and remove such a person's form the site.

Should the actions and / or demeanour of an employee suggest possible narcosis or drunkenness, the employee must be removed from the site. This may be done without testing.

Note: All personnel involved in an incident / accident must immediately be subjected to an alcohol test and a drug test as part of the investigation.

16.5.5 Firearms, Ammunition and Offensive Weapons

Firearms, ammunition, and offensive weapons of any kind are strictly prohibited. No person may enter /shall not be permitted to enter the site carrying any such item.

16.5.6 Vehicles

All vehicles brought onto site must meet the safety requirements. All road-going vehicles used by the contractor on the site must be roadworthy and registered with the relevant traffic authority. A vehicle will not be permitted to enter the site in an un-roadworthy condition.

No vehicle shall be permitted to enter the site unless it is duly authorised. Access permits are vehicle-specific and may not be transferred between vehicles.

The contractor must allow any vehicle that is brought onto site (including privately owned vehicles) to be searched at any time while on the premises, or when entering or leaving the premises. The contractor is solely responsible for the safety and security of all vehicles (including private vehicles) that he brings onto the site.

The driver / operator of any vehicle / mobile equipment must carry a copy of his appointment with him at all times. Each driver / operator must:

- Comply with all site rules and regulations pertaining to traffic and the safe operation of vehicles / mobile equipment;
- Obey all road signs;
- Obey all instructions given by security or emergency services personnel;
- Remain within the boundaries of the site; and
- Ensure that the vehicle that he is operating is never overloaded, and that loads are always properly secured.

In the interest of safety, only the minimum number of vehicles required by the contractor to complete the work under the contract will be permitted to enter the site.

When not in operation, the contractor's vehicles / mobile equipment must be parked within the boundaries of his lay-down area or yard. Parking is only permitted in designated parking areas. All cars are parked on site at the owner's risk.

In the event of a vehicle accident on site, the driver(s) must report the incident immediately and must remain at the scene until a Transnet Contract Manager arrives, or until a Transnet Contract Manager authorises him to leave (unless, of course, the driver requires medical attention).

16.6 Mobile Equipment and Light Vehicles

Contractor must ensure all light vehicles and mobile equipment to be used (including, but not limited to, lift and carry cranes (or mobi-lifts), mobile cranes, forklifts, mobile elevating work platforms (e.g. Cherry pickers), tractors, dozers, dump trucks, haul trucks, graders, excavators, loaders, back-actors, drill rigs, and road-going cars, light delivery vehicles, and trucks) comply with the requirements of all applicable legislation. The contractor remains responsible for meeting this requirement even if the equipment to be used is leased or provided by a sub-contractor (i.e. not owned directly by the contractor).

An Equipment Profile (dossier) must be compiled for each light vehicle and each item of mobile equipment to be used on the site.

All mobile equipment and light vehicles (used for work purposes) must be subject to a risk assessment. The assessment must involve operators and maintenance personnel and address all aspects of safe operation including handling, vehicle selection, vehicle journey, driver vision, brake failure, tyre blow out, and access and egress for operators and maintenance personnel.

Each light vehicle and each item of mobile equipment must be serviced and maintained as prescribed by the manufacturer of the vehicle or equipment.

No major repairs or services may be carried out on site. No repairs may be carried out by a driver or operator. Only suitably qualified and competent persons may carry out repair work.

An appropriate pre-operation safety check based on a risk assessment must be carried out for each light vehicle or item of mobile equipment driven or operated for work purposes. For each vehicle or equipment type, an approved checklist must be in place (and must be used). The pre-operation check must include, but not be limited to, inspection and / or testing of the following safety critical features:

- Brakes (testing method must be provided);
- Wheels and tyres (including the spare);
- Lights and indicators;
- Steering;
- Seats and seat belts; and
- Windscreen and windows, including windscreen wipers and washers.

Should any critical feature be defective or damaged, the vehicle or equipment may not be operated until it has been fully repaired.

Supervisors must review the completed checklists on a daily basis to satisfy themselves that there are no major deficiencies that could place a driver or operator at risk and that faults are attended to immediately. Records of inspections must be kept in vehicle or mobile equipment.

No person may drive or operate any light vehicle or item of mobile equipment without authorisation. All drivers and operators must be appointed in writing by the contractor's Construction Manager. No driver or operator may be appointed without proof that the individual has been trained, tested and found competent, or is currently licensed. Contractor must implement a system for renewal of licences.

The appointment letter must specify the type of vehicle or equipment for which authorisation is being given and must clearly confirm that the driver or operator:

- Is 18 (eighteen) years of age or older;
- Has undergone a medical examination and has been declared fit for work by an occupational health practitioner; and
- Has received suitable training and has been found competent, or is in possession of a valid driving licence issued by a state, provincial or civil authority that is applicable to the class of vehicle or equipment that is to be driven or operated.

The principal accountability for preventing accidents and incidents lies with the driver or operator of a light vehicle or item of mobile equipment, as he is in full control of any given situation at any given time. It must be stressed to each driver and each operator that safety is his prime responsibility – this must be clearly instructed and understood.

Drivers and operators must be empowered to stop driving or operating immediately should an unsafe condition arise, and refuse to drive or operate any light vehicle or item of mobile equipment that is defective and / or has any inoperative safety features. Similarly, a supervisor must never force a driver or operator to drive or operate a defective vehicle or item of equipment.

If a driver or operator does not adhere to the site rules and regulations, his appointment must be withdrawn and he must not be permitted to continue with his duties. If necessary, site access will be denied (either temporarily or permanently) to any driver or operator who is deemed to not be adhering to site requirements.

No person may drive or operate a light vehicle or item of mobile equipment if he suffers from a medical condition that places both him and those around him at risk of injury. A fit-for-work policy must be in place, incorporating clearly defined maximum levels of drugs (including prescribed medication) and alcohol permitted in the system of a driver or operator. Daily alcohol testing and random drug testing must be carried out.

Supervisors must regularly check on the physical condition of drivers and operators during the course of a shift. A system must be in place to manage driver fatigue.

No eating or drinking is permitted while driving or operating a light vehicle or item of mobile equipment.

A mobile phone, whether hands-free or not, may only be used by the driver or operator of a light vehicle or item of mobile equipment when the vehicle or equipment is stationary and in a safe location.

Behaviour-based observations and coaching must include the operation of light vehicles and mobile equipment.

A site-specific traffic management plan must be compiled and submitted to the Transnet Contract Manager for approval. The design and layout of the road system (including entrance and exit points, intersections and other potential points of interaction between pedestrians, light vehicles and mobile equipment) must be reviewed periodically. A risk assessment must be carried out prior to any changes being made to traffic movements or road systems.

Designated walkways (both indoors and outdoors) must be provided for pedestrians, and pedestrians must make use of these walkways. Good lighting must be provided along all walkways, particularly at road junctions. Wherever possible, rigid barricading must be used to separate pedestrians from moving light vehicles and / or mobile equipment.

No pedestrians are permitted on haul roads (or as far as this can reasonably be achieved in situations where a haul road runs through an area occupied by a local community). All personnel must be transported to site and must be dropped off at a designated area. Pedestrians and cyclists must give way to light vehicles and / or mobile equipment except at pedestrian crossings.

Controls must be in place to ensure the safety of people working on roads, including those working on broken-down vehicles.

Speed limits and traffic rules must be reviewed regularly and must be rigorously enforced. Local traffic rules must be complied with at all times.

All light vehicles and mobile equipment must give way to emergency vehicles. Pedestrians and light vehicle drivers must be made aware of the blind spots associated with mobile equipment.

The driver or operator of a light vehicle or item of mobile equipment must stop the vehicle or equipment and sound the horn before proceeding at blind corners, where his view of the path or intended path is obstructed, and when entering or leaving a building.

Whenever a light vehicle or item of mobile equipment is stopped or parked, the handbrake (if applicable) must be applied. Measures (such as chocking or the use of ditches or trenches) must be in place for the immobilisation of parked mobile equipment. A parked light vehicle must be chocked in situations where the vehicle would roll forwards or backwards if placed in neutral with the handbrake disengaged.

No light vehicle or item of mobile equipment may be left unattended with the engine running or with a key in the ignition.

No light vehicle or item of mobile equipment may be parked so as to cause an obstruction to any roadway, passage or access way. No light vehicle or item of mobile equipment may be parked within 50 metres of a loading or off-loading point.

Light vehicles and mobile equipment must be loaded safely. All loads must be secure and must be within the load limit of the vehicle or equipment. A load must be properly secured before the vehicle or equipment is set in motion. Adequate precautions must be taken for any overhanging load.

No unauthorised light vehicle or item of mobile equipment may enter a restricted area or building.

16.6.1 Light Vehicles

All Contractors must ensure that Light vehicles have the following minimum safety features:

- Fixed seats and suitable seat (safety) belts for all occupants (i.e. Driver and all passengers);
- Roll-over protection for all vehicles intended to be driven on dirt or steep roads;
- Cargo barriers and load restraints for all vehicles designed for carrying loads other than passengers), or that are unable to have cargo separated from the occupant-carrying space of the vehicle; and

- An air bag on the driver's side, and where available as a manufacturer fitted item, a passenger's air bag;
- A Reverse Alarm.

All Contractors must ensure that Light vehicles that interact with mobile equipment are equipped or fitted with:

- Systems that enable positive communication with the equipment operators (e.g. a two-way radio);
- A high visibility flag (e.g. A whip flag or buggy whip);
- An amber flashing light (revolving or strobe);
- Reflective taping; and
- High visibility signage (i.e. Vehicle call numbers) facilitating easy and positive identification from a reasonable distance.

All Contractors must ensure that Light vehicles carry:

- Emergency roadside triangles or beacons (three of either);
- Chock blocks for preventing uncontrolled movement of the vehicle when parked;
- A flashlight;
- A fire extinguisher (2.5kg DCP);
- A first aid kit; and
- Survival or emergency equipment (e.g. a vehicle recovery kit) suitable for the operating environment.

A change management process must accompany all vehicle modifications, including the attachment of any equipment.

Should any safety critical feature be defective or damaged, the vehicle must be withdrawn from service until it has been fully repaired. Inspection and maintenance must be undertaken on critical features such as:

- Wheels and tyres (including the spare);
- Steering, suspension and braking systems;
- Seats and seat belts;
- Lights, indicators and reflectors;
- Windscreen and windows, including windscreen wipers and washers;
- The vehicle structure itself; and
- Other safety-related items on the vehicle body, chassis or engine, including instrumentation.

Persons may only be transported in vehicles equipped with manufacturer fitted or approved seats and seat belts. Seat belts must be worn by all occupants of a light vehicle (i.e. the driver and all passengers) at all times.

Only the driver and one passenger are permitted in the cab (front) of a light delivery vehicle. No personnel may be transported in the load-bin of a light delivery vehicle, even if the vehicle is fitted with a canopy. Only tools and equipment may be transported in the load-bin. Furthermore, no persons may be transported in a trailer behind a vehicle.

Light vehicle running lights (low-beam headlights) must be switched on at all times when the vehicle is in operation.

All Contractors must have a system in place to ensure that drivers receive adequate training to ensure that the vehicle intended to be operated or driven can be operated or driven safely.

16.6.2 Mobile Equipment

All Contractors must ensure that Mobile equipment have the following minimum safety specifications:

- Fixed seats and seat belts for all occupants;
- Adequate lighting, including headlights, tail, turn and brake lights, and an amber flashing light (revolving or strobe);
- An identified isolation and lockout point;
- Adequate walkways, railings, steps and grab handle combinations, and boarding facilities including an alternative path of disembarking in the event of an emergency;
- Collision-avoidance technology and / or procedures;
- A reversing alarm or warning device;
- Chock blocks for preventing uncontrolled movement of rubber-tyred equipment when parked;
- A horn;
- Effective windscreen wipers;
- Effective guarding on accessible moving parts;
- A speedometer (if the mobile equipment is capable of exceeding the lowest applicable speed limit);
- High visibility signage (i.e. Mobile equipment call numbers) facilitating easy and positive identification from a reasonable distance; and
- A security system to prevent unauthorised operation.

Mobile equipment must have the following minimum safety specifications, unless a risk assessment stipulates otherwise:

- Approved or certified roll-over protection;
- Fail-to-safe brakes;
- A fire detection and suppression system capable of being activated from both ground level and cabin level (for certain types of mobile equipment, a suitably sized fire extinguisher may be adequate);
- A non-handheld two-way radio or another form of communication;
- Falling object protection (a protective structure over the operator cabin);
- An enclosed and tight-sealing air-conditioned cabin with suitable protective glass; and
- A means of moving supplies and personal items into and out of the operator cabin that enables an operator to continuously maintain three points of contact while boarding and disembarking the equipment (e.g. A backpack or shoulder strap bag).

When purchasing or hiring equipment, the ergonomics of the cabin must be considered, specifically with regard to the seating, operator controls and retrofitted devices.

Fleet and control consistency must be considered in order to minimise the possibility of operator error when changing machines.

Procedures must be in place to ensure that mobile equipment is only operated on sufficiently stable surfaces and on gradients that are within the limits of safe operation.

Seat belts must be used in all cases, by all occupants. Apart from the driver or operator, only an appointed flagman may be transported in mobile equipment (with the exception of buses) and **only if** the equipment is fitted with a passenger seat. No passengers are permitted on a lift and carry crane (or mobi-lift), mobile crane, forklift, mobile elevating work platform (e.g. A cherry picker), tractor, dozer, dump truck, grader, excavator, loader, back-actor, drill rig, or similar.

Procedures must be in place for the safe isolation and lockout of mobile equipment.

Where two or more items of mobile equipment must be operated in proximity to each other, or where an item of mobile equipment must be operated in proximity to persons on foot, a risk assessment involving all persons who will be working in the area must be conducted prior to the work commencing. In such a work area:

- No item of mobile equipment may be driven to within 5 metres of another item of mobile equipment without the operator first making eye contact with, and signalling his intentions to, the other operator who must acknowledge that he understands and that it is safe to proceed.
- No person on foot may work or be positioned within 5 metres of an item of mobile equipment that is in operation. Before approaching mobile equipment on foot, a person must make eye contact with, and clearly signal his intentions to, the operator of the equipment. The operator must cease to operate the equipment, and must indicate that he understands and that it is safe to approach.

In certain circumstances (determined through risk assessment), mobile equipment may only move and operate with dedicated flagmen in place:

- Where flagmen are used, it must be ensured that the flagmen, mobile equipment operators, and all other personnel working in the vicinity of the mobile equipment, receive suitable training with regard to signals and signalling to ensure effective communication. The training must be formal and recorded, and competency must be tested.
- A flagman and the mobile equipment operator that he is directing must maintain eye contact. The flagman must never position himself where the equipment operator cannot see him.
- Should a mobile equipment operator lose sight of his flagman, he must stop his activities immediately until contact has been re-established.

Operators must report conditions and practices that do not conform to procedure.

16.6.3 Tyre and Rim Safety

A Tyre Management Plan must be established to address issues including fire, heating, explosion, electrical contact, separations, maintenance, tyre changes, etc. and reviewed every twelve months. Safe Work Procedures must be in place for all tyre maintenance and servicing activities and for tyre fire emergency response.

16.6.4 Roads

Roads with high risks activities and traffic interface shall be controlled by trained flagman, No road may be closed without permission from a Transnet Contract Manager.

A dust control plan must be in place for the site and, in particular, for all roads. Any spillage in a roadway must be cleaned up immediately. Ground pollution (e.g. Oil, diesel or hydraulic fluid spillages) must not, and will not, be tolerated. If substances are spilled on a road or any other portion of the site, the contaminated ground must be dug out and the resulting hole back-filled with clean material which must be suitably compacted. The contaminated soil must be disposed of as required by the applicable legislation.

16.7.6 Rail Road Vehicles (RRV)

The Contractor shall ensure that Road-rail Vehicle (RRV) is only operated by a person who is competent and licensed to operate such RRV.

The Contractor shall ensure that the RRV is operated with the Transnet Track Inspector/Track Master in charge of on-track machine present on the RRV. Transnet Track Inspector/Track Master in charge of on-track machine must have passed the appropriate road knowledge, theoretical and practical examinations and must be licenced competent..

The Contractor shall ensure that the RRV is properly maintained and in a serviceable condition to operate on road and railway line.

16.7 Signs and Notices

The contractor must ensure that all required safety signs and notices comply and are prominently displayed in accordance with the applicable legislation, national standards and good safety practice.

No person may deface or damage any safety sign or notice. No person may remove or alter any safety sign or notice unless authorised to do so.

16.8 Machinery

The contractor must ensure that all plant and equipment brought onto the site is:

- Appropriate for the type of work to be performed
- Approved, inspected, tested, numbered and tagged (if appropriate) before being brought onto site
- Properly maintained in accordance with the manufacturer's recommendations; and
- Placed on a register and checked at least once per month or as required by the applicable legislation.
- Only operated by persons who have been trained to operate such machinery.

The contractor must supply, at his cost, all items of plant and equipment necessary to perform the work and must maintain all items in good working order. Should any plant or equipment become inoperable for a period that is having or will have a significant impact on the work schedule, the contractor must, on instruction from the Transnet Contract Manager, remove the out of service plant or equipment and replace it with similar fully operational plant or equipment at no additional cost.

No item of plant or equipment delivered to site for use on the contract may be removed from the site prior to the completion of the contract without approval in writing from the Transnet Contract Manager.

Items of plant or equipment brought onto site by the contractor or his sub-contractors may be inspected by a Transnet Contract Manager. Should the Transnet Contract Manager determine that any item is inadequate, faulty, unsafe or in any other way unsuitable for the safe and satisfactory execution of the work for which it is intended, the contractor must, on instruction from the Transnet Contract Manager, immediately remove the item from the site and replace it with a safe and adequate substitute. In such a case, the contractor or his sub-contractor shall not be entitled to additional payments or deadline extensions in respect of any delay caused.

16.9 Barricading

All applicable legislation concerning barricading must be complied with at all times.

Each contractor required to erect barricading on the work site(s) must develop, document and implement Safe Work Procedures that are aligned with the requirements of this specification.

Barricading must be erected to:

- Prevent persons from making contact with an identified hazard;
- Provide warning of the existence of a hazard;
- Prevent unauthorised access (by people, vehicles and mobile equipment) into an area where a hazard exists or where a hazardous activity is being carried out;
- Define the boundaries of a hazardous location and / or restricted area; and
- Allow a work team to perform hazardous tasks without persons unfamiliar with the hazard(s) accessing the area.

Although not limited to these situations, barricading must be erected or installed:

- Around excavations (trenches, pits, etc.) (refer to the Excavation Standard);
- To protect openings and edges (to prevent persons from falling, all openings and edges associated with floors, stairs, and the open sides of buildings and structures during the course of construction must be protected by sturdy, rigid barriers capable of withstanding a force of at least 110 kilograms applied in any direction at any point) (refer to the Working at Heights Standard);
- To prevent access into areas where overhead work is in progress;
- To route vehicles safely through (or around) construction areas; and
- To protect members of the public who may be in the vicinity of a work or construction site (by preventing access).

A barricade must present a sturdy physical barrier to entering an area. Therefore, plastic cones, post and chain systems, "danger tape" and "snow netting" will not be accepted as barricading and may only be used for the purposes of low risk demarcation.

Regardless of the type of barricade used, the following requirements must be met:

- The installation, alteration and removal of barricades must be supervised by a competent person;
- The barricading must be uniformly and intelligently configured;
- The barricading must be stable, conspicuous and effective;



- The barricading must completely surround the work or hazardous area;
- General access requirements around the work or hazardous area (such as pedestrian walkways, operational access, or general thoroughfares) must be taken into consideration when erecting a barricade;
- The extent of the area that is barricaded must be kept to a minimum so as not to unnecessarily restrict access to other areas. If access routes to other areas are blocked by the barricade, alternative routes must be identified and signposted
- All barricaded areas must have properly designated points of entry and exit for persons and / or vehicles. Each pedestrian access point must be fitted with a self-closing gate. A sign indicating, "DESIGNATED ACCESS POINT – AUTHORISED PERSONNEL ONLY", must be fitted to each gate;
- Additional signage providing warning of specific hazards (e.g. falling objects, electricity, etc.) Including, "NO UNAUTHORISED ENTRY", must be attached to all gates and, where required, to the barricading itself. The signage must be visible from all angles and must be large enough to be read from a distance of 10 metres;
- Barricading must be clearly visible at all times (day and night). If necessary, flashing warning lights must be used;
- Tags must be attached to the barricading displaying the name and cell phone number of the person responsible for the barricade, and specifying the reason for the barricading and the date on which it is scheduled to be removed;
- Should a person require access to a barricaded area, authorisation must be obtained from the person responsible for the erection of the barricade. The hazards that are present and the Personal Protective Equipment that must be worn within the barricaded area must be communicated to the person seeking access;
- Each barricade must be listed in a register, and each must be inspected daily to ensure that it is still intact and that its positioning is still effective;
- All barricades must be properly maintained and repaired as required;
- When the work has been completed and the hazard has been eliminated, all barricading must be removed without delay. A barricade may not be left in place if no hazard exists;
- Before a barricade is removed (allowing general access), the area must be inspected by the person responsible for the work that was carried out, to ensure that the area is once again safe. If applicable, the person accepting the area back for general use shall do so on completion of his own safety inspection;
- Authorisation to remove (or modify) a barricade may only be granted by the person responsible for the erection of the barricade.

16.10 Permit to Work

All personnel must comply with the Permit to Work system applicable to the scope of work. A Permit to Work must be obtained before carrying out any work that involves:

- A hazardous energy source or system, including electricity, compressed fluids (e.g. hydraulics and pneumatics), chemical substances (e.g. toxic, corrosive, flammable or explosive gases and liquids), heat (e.g. steam), radiation, and machinery or materials with potential energy (gravitational and elastic) – isolation and lockout may be required;
- Confined space entry;
- Working at height;
- A critical lift;
- Hot work outside of designated workshops;

- Excavation; or
- A service (e.g. water supply, fire suppression systems, etc.).

Note: A Permit to Work may only be issued by an Authorised Person, and may only be received (or accepted) by an appointed Applicant (see Definitions).

Each Permit to Work that is issued must make reference to an approved Task-Based Risk Assessment for the work that is to be carried out.

The Permit to Work system that is employed must incorporate the following basic procedures:

- Prior to meeting with the Authorised Person, the Applicant must familiarise himself with all of the hazards associated with the system, plant, equipment, structure or area on or in which the work must be performed. He must also consider the risks that may arise as a result of the tasks that will be carried out. A Task-Based Risk Assessment must be in place;
- The Applicant must then request permission to carry out the work and must meet with the Authorised Person to discuss and document the scope of the work as well as the hazards, risks and associated control measures. Isolation and lockout requirements must be identified (if applicable). The isolation and lockout process must be initiated by the Authorised Person who must contact the necessary Isolation Officers.

Note: The Applicant must ensure his own safety and that of his team, and has the right to accompany the Isolation Officers to verify that all of the necessary locks have been fitted to all of the isolation and lockout points in accordance with the applicable plant or equipment-specific Isolation and Lockout Procedure.

- Once all of the necessary isolations have been completed and the necessary Clearance Certificates have been issued by the Isolation Officer(s) (if applicable), and the Authorised Person is satisfied that the system, plant, equipment, structure or area is safe to work on or in provided all identified precautions are observed by the Applicant, then he must issue (sign) the Permit to Work to the Applicant;
- The Applicant must accept (sign) the Permit to Work. If equipment has been isolated, the Applicant must attach his Personal Lock to the relevant Isolation Bar (or Local Isolation Point) and must ensure that every other person working on the isolated equipment also attaches his or her Personal Lock to the Isolation Bar (or Local Isolation Point) before starting any work;
- Before commencing with any work, the Applicant must discuss the hazards, risks, control measures, precautions and limitations as stated in the Permit to Work (and associated Task-Based Risk Assessment) with all personnel who will be carrying out the work. A register must be kept and all persons must sign the register once they have been briefed by the Applicant;
- The work performed must be limited to what is described in the Permit to Work;
- When a particular employee has completed his work, he must sign the personnel register to this effect and (if applicable) must remove his Personal Lock from the Isolation Bar (or Local Isolation Point);
- Once all work is complete, the Applicant must:

- Ensure that all machine guards have been replaced;
- Ensure that all tools and materials have been removed from the work area;
- Ensure that the work area is clean and tidy;
- Ensure that all Personal Locks (including his) have been removed from the Isolation Bar or Local Isolation Point (if applicable);
- Inform the Authorised Person that the work has been completed; and
- Sign off the Permit to Work.
- Once the work is complete and the Applicant has signed off the Permit to Work, the Authorised Person must:
 - Ensure that the relevant Isolation Officers perform all of the necessary de-isolations (if applicable);
 - On completion of the de-isolations, sign off the Permit to Work accepting the system, plant, equipment, structure or area back for service; and
 - Inform all relevant personnel that the system, plant, equipment, structure or area is ready to use.
 - Where the work must continue over more than one shift, the Permit to Work must be reviewed at every shift change by an Authorised Person. If the scope of work has changed, the permit must be cancelled and a new permit must be issued.

If any of the original conditions or precautions pertaining to the work is not being complied with, is no longer adequate or is no longer applicable, the Authorised Person must cancel the Permit to Work and must ensure that all work stops until full compliance with either the original or amended (as required) conditions and precautions is achieved and a new permit has been issued.

The Applicant must ensure that the Permit to Work (including the personnel register) is kept where the work is being carried out (i.e. posted on a portable Health and Safety Notice Board) and that the work is monitored against the permit conditions.

All Permit to Work records must be retained and must be made available for inspection when required.

The implementation of the Permit to Work system applicable to the project must be audited on a regular basis by a Transnet Contract Manager. Furthermore, planned task observations must be carried out periodically.

Note: In addition to obtaining Permits to Work as and when required for specific hazardous activities (identified in this specification), each contractor must obtain a General Work Authorisation from a Transnet Contract Manager on a monthly basis. A General Work Authorisation is valid for one calendar month and authorises the contractor's planned work activities. In order to obtain a General Work Authorisation, the contractor must provide a documented work plan for the month together with the necessary Task-Based Risk Assessments.

16.11 Isolation and Lockout

Isolation and lockout procedures that make it impossible to inadvertently energise any system, plant or equipment so isolated, must be in place for all work where hazardous energy sources exist, including electricity, compressed fluids (e.g. hydraulics and

pneumatics), chemical substances (e.g. toxic, corrosive, flammable or explosive gases and liquids), heat (e.g. steam), radiation, and machinery or materials with potential energy (gravitational and elastic). These procedures must be strictly enforced and complied to by all personnel.

All Isolation and Lockout Procedures must incorporate the following basic requirements:

- The issuing of a formal Permit to Work for any work that requires the isolation of any system, plant or equipment;
- The use of defined Equipment, Discipline and Personal Locks (see Definitions), and multiple lockout systems (i.e. Isolation Bars and lockout hasps);
- Clear identification of all isolation and lockout points ensuring there is no duplication;
- Isolation of the main energy source;
- The use of slip plates or the blanking off of pipelines or ducting, in addition to the chaining and locking of valves, as determined by a risk assessment;
- Suitable methods of preventing the movement of equipment; and
- Methods to test the effectiveness or completeness of the isolation.

Note: No work may commence on a system, plant or equipment until a Permit to Work has been issued by an Authorised Person.

Note: A Permit to Work may only be issued by an Authorised Person once all required Clearance Certificates have been issued by appointed Isolation Officers.

The isolation and lockout system that is employed must incorporate the following basic procedures:

- In accordance with a system, plant or equipment-specific Isolation and Lockout Procedure, an appointed Isolation Officer(s) must isolate all points that need to be isolated in order to render the system, plant or equipment safe to work on. An Equipment Lock (and a suitable, highly visible warning tag) must be attached to each isolation point;
- On completion of an isolation (and lockout), the Isolation Officer must clear the area of all persons and must then carry out tests to ensure that the isolation is effective. This may be done by pressing a start button or by asking a control room operator to try to start the equipment. Special care must be taken to ensure that the attempted starting of the equipment has not been deactivated by another interlock forming part of the system, or by a different up-stream isolation. Alternatively, appropriate equipment may be used to test for energy (e.g. voltage verification or continuity tests).

Note: In the case of electrical isolation, a test for voltage must be carried out, after the switching device, to ensure the absence of voltage.

- The Isolation Officer must place the key to the Equipment Locks on an Isolation Bar (at a Lockout Station) and must then attach a Discipline Lock (to prevent the key from being removed) before issuing a Clearance Certificate;
- The Discipline Lock must remain in place when handing over to subsequent shifts. All Discipline Locks for a particular discipline (e.g. low voltage electricity) must be keyed-

alike so that any Isolation Officer appointed for that discipline (and issued with a key) can open any of the Discipline Locks used for that discipline.

This enables an Isolation Officer to de-isolate equipment that may have been isolated by another Isolation Officer during an earlier shift. Appointed Isolation Officers for a particular discipline are the only persons permitted to hold keys to the Discipline Locks used for that discipline.

Note: Local isolations do not require the use of Equipment Locks (a Discipline Lock may be attached to the Local Isolation Point by the Isolation Officer, followed by the necessary Personal Locks).

Note: For local isolations, if the Isolation Officer is the only person who will be working on the isolated equipment, then he must attach his Personal Lock to the Local Isolation Point.

- Once all required Discipline Locks are in place (i.e. attached to the Isolation Bar) and all Clearance Certificates have been issued, the Permit to Work may be issued by the Authorised Person;
- Each person who will be working on the isolated system, plant or equipment must then attach his or her Personal Lock to the Isolation Bar before starting any work (including the Isolation Officer, if he intends to work on the isolated unit);
- The attachment of a Personal Lock to the Isolation Bar prevents the removal of the key to the Equipment Locks even if the Discipline Lock is removed;
- When called (by an Authorised Person) to de-isolate the system, plant or equipment (on completion of the work under the Permit to Work), the Isolation Officer must ensure that all Personal Locks have been removed from the Isolation Bar before removing the Discipline Lock and the key to the Equipment Locks;
- Before removing the Equipment Locks and de-isolating the energy source, the Isolation Officer must inspect the system, plant or equipment that was worked on to ensure that it is safe to perform the de-isolation. This includes guard inspections, housekeeping, ensuring that all doors and covers are in place, and most importantly, ensuring that no persons are present;
- Once all Equipment Locks have been removed and the system, plant or equipment is safe for use, the Isolation Officer must cancel the Clearance Certificate and inform the Authorised Person that the unit has been de-isolated.

Where a system, plant or equipment is sequence interlocked and a hazard could be created through the inadvertent start up or shut down of a system, plant or equipment lying before or after the unit to be worked on, then that system, plant or equipment must also be isolated and locked out.

Redundant or out of service equipment must, in addition to being isolated and locked out using the relevant Discipline Lock, be fitted with a tag indicating why it is out of service, who performed the lockout, and the hazards associated with that equipment.

Where it is necessary to work on live equipment for the purposes of commissioning, testing, adjusting and sampling, such work must be carried out in accordance with a written Safe Work Procedure and controls must be in place to prevent unauthorised access into the work area.

The implementation of the isolation and lockout system and procedures applicable to the project must be audited on a regular basis by a Transnet Contract Manager. Furthermore, planned task observations must be carried out periodically.

16.11.1 Personal Locks

A Personal Lock must be such that it can only be unlocked by the person to whom it belongs. Combination locks may not be used. A Personal Lock, as well as the key(s) to the lock, must be kept under the exclusive control of the person to whom the lock belongs.

A Personal Lock must be issued to each person who requires one, and the person's details must be clearly and permanently engraved directly onto his Personal Lock. Alternatively, a thick durable plastic identification tag may be used that clearly displays the company's name, the employee's name, the employee's company number, and a contact telephone number (the tag must be securely fastened to the Personal Lock). Where the above is hand written, it must be done using a permanent marker pen and it must be legible.

Each person issued with a Personal Lock must be trained and certified competent in the correct use of such a lock.

A Personal Lock may NEVER be removed by anyone other than the person to whom it belongs, except if the removal (cutting) of the lock is authorised by the Transnet Contract Manager (in the absence of this person, authorisation can only escalate upwards). Furthermore, the removal of the lock must be done under the personal supervision of the Transnet Contract Manager, and in accordance with a written procedure. The removal (cutting) of a Personal Lock may be required if the person who applied the lock is unable or unavailable to remove it on completion of the work (e.g. lost his key, failed to remove his lock before going home, etc.).

16.12 Electrical Safety

The contractor must ensure compliance with Electrical Installation Regulations, Electrical Machinery Regulations, OH&S Act, TFR Electrical Safety Instructions, TFR E7/1 Specification for Works On, Over, Under or Adjacent to Railway Lines and Near High Voltage Equipment and all applicable SANS Codes and Practices.

All electrical work must be carried out by competent personnel in accordance with all legal requirements, codes, design criteria and safety standards applicable to the scope of work.

Each contractor carrying out electrical work on the site(s) must develop, document and implement Safe Work Procedures that are aligned with the requirements of this standard.

All persons who will be carrying out electrical work must be certified against the requirements of job and equipment-specific electrical competency standards for the project, which must address job and equipment-specific Safe Work Procedures.

Each person potentially exposed to electrical hazards must receive electrical hazard training at the commencement of his employment on site and thereafter on an annual basis. The training must address the equipment and conditions specific to the area where the individual will be working. The training material must be documented and training records must be kept.

16.12.1 Electrical Installations

Each electrical installation (temporary or permanent) installed or worked on by a contractor must be inspected by a Transnet Contract Manager to ensure that the installation complies with all statutory requirements, codes, design criteria and safety standards applicable to the project.

A Transnet Contract Manager must approve all electrical work before the installation is energised. Any installation deemed unsatisfactory by a Transnet Contract Manager must be removed, repaired or modified by the contractor at his expense.

For every permanent or temporary electrical installation, a certificate of compliance must be issued by a competent and appropriately qualified electrician. These certificates must be available for inspection.

Single line diagrams (with supporting documentation) must be produced and maintained for all electrical installations. This information must include system fault calculations, equipment details, electrical protection discrimination curves, and cable ratings.

Work on electrical installations (new installations, and modifications or repairs to existing installations) may only be carried out by qualified and authorised personnel (i.e. electricians).

Electrical safety devices (specifically, earth leakage protection and overcurrent protection) must be installed on all distribution circuits and the settings must be established by suitably qualified personnel.

A suitable numbering and / or labelling system must be used so that each circuit breaker or earth leakage device can be clearly and readily matched with the outlet or equipment that it protects.

To ensure the safety of the user, each distribution panel must be completely enclosed, must be of the dead-front type, and must be properly constructed and earthed.

All electrical cabling must be covered (e.g. in cable trenches) or elevated (in cable trays) to protect it from damage and to eliminate tripping hazards.

All permanent and temporary electrical installations (cabling, sockets, distribution panels, transformers, switchgear, etc.) must be inspected and tested by a competent and suitably qualified electrician on a monthly basis. The testing must include a grounding (earthing) continuity test and testing of the electrical safety devices. Details of these inspections and tests must be recorded in a register which must be made available to the Transnet Contract Manager for inspection.

A rigorous Isolation, Lockout and Permit to Work system must be applied to all electrical work (i.e. work on electrical installations, machinery or equipment). All personnel must comply with the system and procedures applicable to the project.

Before any work on an electrical installation or equipment is carried out, the installation or equipment must be de-energised.

No electrical work may be performed live, regardless of the voltage, unless written approval is obtained from the Transnet Contract Manager (a justification as to why it is necessary for the work to be carried out with the equipment in an energised state must be provided).

For all energised electrical work, a Safe Work Procedure must be in place and, with the exception of voltage testing and where no tools are used, a Permit to Work (specifically authorising energised electrical work) must be issued. When carrying out any energised electrical work, approved electrically insulated gloves, blankets, mats and other protective equipment must be used.

Control centres, switchgear rooms, substations, generators, transformers, capacitor banks, and other similar electrical plant and equipment must be appropriately guarded and labelled and, with the exception of emergency shut-off mechanisms, must be made inaccessible to unauthorised personnel (i.e. plant or equipment of this nature must be positioned within rooms or fenced enclosures which must be kept locked).

Appropriate warning signage must be prominently displayed within, and at all entrances to, these rooms or enclosures. The signage must indicate that unauthorised persons are prohibited from entering, that unauthorised persons are prohibited from handling or interfering with any electrical plant or equipment, the procedure to be followed in the event of a fire, and the first aid procedure to be followed should a person suffer electric shock. Suitable fire-fighting equipment must be provided in all such rooms or enclosures.

All electrical panels must be kept locked (using keyed-alike padlocks). Keys may only be issued to authorised personnel.

All un-insulated (bare) or partially insulated conductors must be enclosed and protected to prevent accidental contact therewith. Measures must be taken to prevent unauthorised access and appropriate warning signage must be conspicuously displayed.

Only authorised persons may enter rooms or enclosures housing electrical plant or equipment, and only authorised persons may access electrical panels or cabinets, and cable ducts or trenches. If any work must be carried out in such an area or on such equipment, a Permit to Work must first be obtained from the Transnet Contract Manager.

No connection to any electrical system may be made without prior approval and a valid Permit to Work from the Transnet Contract Manager.

No electrical equipment or apparatus may be modified without written authorisation from the Transnet Contract Manager.

Conductive ladders may not be used in proximity to non-insulated electrically energised lines or equipment.

All permanent and temporary electrical cables, whether energised or not, must at all times be handled as if they are energised.

Only appropriately certified intrinsically safe electrical equipment may be used in flammable or potentially explosive atmospheres such as in confined spaces. Any equipment or structure on which electric charges may accumulate (such as storage tanks) must be grounded (earthed).

Lightning protection must be provided on all tall structures and buildings. Grounding (earthing) and lightning protection systems and devices must be designed, engineered, selected and installed based on site-specific requirements.

Before carrying out any excavation work, a Permit to Work (specifically authorising the excavation activities) must be obtained from the Transnet Contract Manager. Such a permit must not be issued until it has been verified that no buried hazards or services exist where the excavation work is to be carried out (refer to the Excavation Standard).

16.12.2 Arc Flash Safety

Depending on the scope and nature of the work, a documented arc flash protection programme must be in place that specifies:

- The methodology for calculating incident energies and determining flash protection boundaries; and
- The PPE required (specific to a task and the equipment on which the task is performed) and associated procedures to mitigate the hazard.

The method of calculation must be based on regional electrical code requirements, or if none exist, the Institute of Electrical and Electronics Engineers (IEEE) Standard 1584, or the United States National Fire Protection Association "Standard for Electrical Safety in the Workplace" (NFPA 70E), or published equivalent.

An Arc Flash Hazard Assessment must be carried out based on accurate and current data. All electrical cabinets where the potential for an arc flash hazard exists must be labelled in accordance with the hazard assessment and the potential incident energies calculated.

A process must be in place for updating the Arc Flash Hazard Assessment and labelling as changes and electrical upgrades occur that might affect the available short circuit current on the system.

In order to mitigate the hazard, Safe Work Procedures must be in place and all persons potentially exposed to arc flash hazards must be trained in these Safe Work Procedures and must be supplied with appropriate arc flash PPE.

16.12.3 High Voltage Power Lines

Before any mobile equipment (such as a crane, bulldozer, back-actor, boom truck or drill rig) is mobilised to a work site, an assessment must be carried out (including a thorough inspection of the work site and the access route) in order to clearly identify any overhead or underground power lines.

A system must be in place to mitigate the risks associated with working in close proximity to power lines and suitable measures must be taken to prevent personnel or equipment from coming into contact with power lines. Extreme caution must be exercised.

Where possible, exclusion zones (based on minimum clearance distances specified by the electrical power utility or the Transnet Contract Manager) must be created with rigid barriers and warning signs.

Only in exceptional circumstances, and then only after a detailed method statement and risk assessment has been approved, all necessary mitigation or control measures are in place (including the use of a spotter), and a Permit to Work has been issued by the Transnet Contract Manager, may equipment be operated within one boom length of energised overhead power lines. Suitable protective insulating barriers may need to be used.

If possible, the power lines must be de-energised and isolated while the work is carried out.

All equipment operators and rigging personnel must be trained in the hazards and the applicable safe approach distances (exclusions zones) associated with overhead power lines.

A procedure must be in place for the evacuation of mobile equipment or a vehicle in the event of accidental contact with power lines. All operators must be trained in this procedure and must follow it implicitly.

Scaffolding may not be erected within 5 metres of power lines or overhead track equipment.

16.12.4 Portable Electrical Equipment

Prior to site establishment, each contractor must provide a complete inventory of all portable electrical equipment that he and his sub-contractors intend to use on the site (including plant, machines, appliances, generators, hand tools, lighting, extension cords, etc.). The nameplate data for each item of equipment must be included.

All portable electrical equipment to be used on the site must be supplied and maintained in a serviceable condition.

Any electrical equipment that is in poor condition or is not in proper operating order may not be used. Any electrical equipment that a Transnet Contract Manager deems to be unsafe or unsuitable must be removed from site.

Electrical repair work or diagnostic work on electrical equipment may only be performed by personnel who are competent and authorised to perform this work (i.e. qualified electricians).

With the exception of double-insulated equipment, all electrical equipment must have an equipment grounding (earthing) conductor that connects the frame of the equipment being utilised to the grounding (earthing) conductor of the electricity supply system.

All electrical equipment and all electricity supply systems used (including generators) must be inspected and tested by a registered and competent electrician to ensure that all equipment is properly grounded (earthed).

All electrical equipment used on site must be supplied electricity through (i.e. must be protected by) an approved and tested residual current device (or earth leakage device or unit). If a socket outlet does not have a residual current device in the circuit, a portable residual current device must be used. Outlets without residual current device protection must be labelled as such.

Any electrical equipment that causes an earth leakage device to trip or deactivate the circuit may not be used again until an electrician has inspected and tested the equipment and has recorded in a register that the equipment is safe to use.

Interlocks may never be removed or modified, and fuse terminals may never be bypassed to keep current flowing in any circuit.

All generators must be fitted with suitable overcurrent protective devices (i.e. circuit breakers or fuses).

All generators must be used in compliance with the manufacturer's requirements. Any proposed modification to a generator must be authorised in writing by the manufacturer prior to the modification being made.

Each welding machine used on site must be fitted with a Voltage Reduction Device (VRD). If this is not practical (i.e. for arc welding processes other than stick welding), a dead man's (isolation) switch in the electrode circuit (operated by a trained observer) may be used as an alternative. All welding machines must be properly grounded (earthed).

All portable electrical hand tools used on the site must be double-insulated.

Electrical equipment must be disconnected or unplugged when not in use.

Portable lights must be stable and each light bulb must be protected by a substantial guard.

Temporary festoon lighting must be double-insulated and must be supported at least 2.5 metres above the floor, if possible.

Handheld lights must be of the all-insulated type and must be extra low voltage (i.e. not exceeding 32V). 120V or 240V handheld lights are not permitted.

Any lighting used in hazardous locations (i.e. potentially explosive atmospheres, confined spaces, and damp or wet areas) must be operated at a maximum of 32 volts, unless earthed and protected by earth leakage devices.

No person may wear a watch or any jewellery, or carry any metal objects such as a lighter or keys, while working on any electrical system or equipment.

No person may work on or use electrical equipment if his clothing is wet or any part of his body is in contact with water.

No person may handle electrical equipment, equipment cords or extension cords with wet hands or if the floor or ground surface is wet.

Fire extinguishers filled with carbon dioxide must be used to fight electrical equipment fires (water may never be used). If possible, the electrical equipment should be de-energised before fire-fighting activities commence (refer to the Fire Protection and Prevention Standard).

When cleaning or performing maintenance work on an item of electrical equipment, the equipment must be unplugged.

Equipment may not be unplugged while that equipment is switched on. Nor may equipment be plugged into a receptacle (socket) with the equipment's switch turned on.

Electrical equipment that has a defective plug or wiring may not be used. Repair work to defective or damaged electrical equipment may only be carried out by a qualified electrician.

Extension cords may be used for temporary applications only. Permanent cabling must be installed for long-term needs. Extension cords may not be run through doors, windows, ceilings or holes in walls. An extension cord must be uncoiled completely before it is used. An extension cord must be of sufficient current-carrying capacity to power the equipment that it is supplying electricity to. Cords must not be overloaded.

Extension cords must be unbroken and continuous (i.e. no joins or splices in the cord are permitted). Extension cords may not be daisy-chained (i.e. one extension cord plugged into another extension cord). Extension cords and equipment cords may not be modified to fit a receptacle (socket).

Two-conductor extension cords may not be used. A three-conductor extension cord (i.e. a grounded or earthed cord) must be used even if the equipment that it is supplying electricity to uses a two-prong plug.

Extension cords that are frayed, have insulation tears, cracks or abrasions, have exposed conductors, or have bent, broken or "spread" plug prongs may not be used. Extension cords that will be used outdoors must have heavy duty insulation and must be weather and UV resistant.

All electrical equipment cords and extension cords must be covered or elevated to protect them from damage and to eliminate tripping hazards.

Each contractor is responsible for protecting his electrical equipment from the weather and from possible mechanical damage.

All portable electrical equipment (including generators) must be inspected, tested and tagged by a competent and appropriately qualified electrician on a monthly basis. Details of these inspections and tests must be recorded in a register which must be made available to the Transnet Contract Manager for inspection.

The inspection and testing must include a continuity test of the grounding (earthing) conductor (as applicable) and a complete examination of the equipment or system to assure safe use.

A colour coding system must be used for the tagging of all electrical equipment.

The tag placed on a piece of equipment must be traceable to an entry in a register where the following information concerning the inspection and testing of that piece of equipment must be recorded:

- Date of inspection and testing;
- Equipment description;
- Equipment owner;
- Equipment location;
- Name, signature and licence number of the electrician who carried out the inspection and testing; and
- Comments concerning the inspection and testing, and details of any repair work carried out or required.

Any item of electrical equipment that does not pass an inspection or test must be removed from service (and tagged, "Out of Service") immediately and must then either be repaired (if possible) or removed from site.

Any item of electrical equipment without a tag or with an out-of-date inspection or test may not be used.

Any item of electrical equipment found without a tag or with an out-of-date inspection or test must be removed from service until it has been inspected and tested. If it is found that more than one item of equipment being used by a contractor has not been inspected and tested as required, all work with electrical equipment must be stopped until it can be demonstrated to the satisfaction of the Transnet Contract Manager that the contractor's systems and controls are adequate and fully implemented.

In addition to the formal monthly inspections and testing carried out by an electrician, electrical equipment (particularly extension cords, portable hand tools, welding machines, compressors and pumps) must be visually inspected by the user on a daily basis prior to use. Users must be trained to look for cracks in casings, loose casings, outer cord sheathing that is not being held firmly in position at the equipment, cuts or cracks in cord or cable insulation, exposed conductors, damaged plugs or sockets, and missing covers. Damage and / or defects must be reported immediately.

Personnel must immediately stop using and report any electrical equipment or machinery that is shocking, sparking, overheating or smoking. Corroded outlets, switches and junction boxes must also be reported.

16.13 Confined Spaces

The contractor shall comply to the requirements of General Safety Regulation 5 with regard to confined space entry and working inside confined spaces. This includes working inside tunnels.

Entry into a confined space occurs when a person's whole body, upper body or head is within the confined space. This is not intended to prevent an authorised, competent person from inserting only his arm into the space to test for hazards using appropriate monitoring equipment. Precautions must be taken to prevent persons from being overcome by atmosphere escaping from the confined space.

Before any person enters a confined space, a detailed risk assessment must be carried out, including the need for an authorised person to assess such things as oxygen levels, contaminants, temperature extremes and concentration of flammable substances.

As a minimum the risk assessment shall address the following:

- Isolation and lockout procedures required for chemical substances, mechanical or electrical energy, steam, pressure, heat, gases, liquids and solids;
- Venting, purging, draining and cleaning prior to entering the confined space;
- Hazards created by carrying out particular tasks or through the use of chemical substances in the confined space. Task-Based (or Issue-Based) Risk Assessments and/or Written Safe Work Procedures must be available for work in confined spaces - in particular for abrasive blasting, welding, flame cutting, grinding, chemical/steam cleaning, rubber lining and painting;
- Entry, exit and escape routes as well as barricading;
- The electrical safety, intrinsic safety and other safety specifications of equipment to be used in the confined space (explosive atmospheres must be considered);
- The need to test for presence of toxic/asphyxiant substances, radioactivity, oxygen, temperature extremes and flammable substances prior to entry and during the performance of work;
- Provision of suitable mechanical ventilation and personal protective equipment e.g. lifejackets etc. and in particular the use of respiratory protection such as compressed air breathing apparatus; and
- A ventilation rate suitable for general use must take into account factors such as air contaminant type, rate of generation, rate of oxygen depletion, temperature, efficiency of ventilation distribution and contaminant removal from the breathing zone. Therefore each situation needs to be evaluated on its own merit by a risk assessment that will select a combination of ventilation method and respiratory protection that suits the particular circumstances. This must be achieved by consultation between competent operations personnel, engineers and a ventilation specialist.
- Lighting

Entry and work inside a permitted confined space must be controlled and regulated by the project Isolation / Lockout and Permit to Work control systems. The Authorised Person issuing the Permit to Work may only do so if the conditions applying to the specific confined space entry have been satisfied and documented.

As a minimum, the following must be included in the permitting process:

- Access barriers to prevent unauthorised entry;
- Isolation procedures for contaminants and other energy sources;
- The need for breathing apparatus / ventilation requirements;
- The sign-in and sign-out of all persons entering the confined space;

- Display of the permit;
- Communication procedures and/or equipment;
- Safety specifications of equipment to be taken into the confined space;
- Barricading of entrances and exits;
- Rescue plan and equipment;
- Standby person(s); and
- A completion and lock-in procedure (to ensure that space is evacuated and adequately secured).

The Permit to Work process must require competent rescue persons with suitable communication, rescue and firefighting equipment to be present where any of the following may exist:

- Compressed air breathing apparatus is required;
- There is a high risk of fires or explosions;
- The atmosphere can rapidly become unsafe for breathing purposes if the mechanical ventilation fails;
- There is a high risk of flooding or engulfment;
- Narrow tunnels or pipes are entered or where exit or escape routes cannot readily be accessed
- Work is done in remote areas; and
- A single person, who cannot be observed directly or is isolated from other workers, does the work.

Where testing for toxic/asphyxiate substances, radioactivity, oxygen, temperature extremes and other health hazards as well as for flammable substances is carried out, it may only be done by persons trained, tested and certified competent in writing to do so.

The ventilation method and quantity must be adequate to ensure oxygen levels and explosive or toxic gas levels remain within acceptable defined limits. Where ventilation is required, this must be covered by an approved documented procedure.

As a minimum standard, the volume of air pumped in and circulated in a confined space needs to be equivalent to 20 times the volume of the space per hour.

Where breathing apparatus or respiratory equipment is required, the contractor's Health and Safety Officer must be consulted with regard to the specification and selection of suitable equipment.

All persons required to use respiratory protection must be medically fit and trained in the correct use of the equipment.

Safe and convenient entry, exit and escape routes from the confined space must be provided where possible and practical. Where this cannot be achieved effectively, the risk assessment must determine if a competent rescue person must be on duty at the confined space when work is in progress.

Where a standby/rescue person is required, they will have no other duties and will be positioned outside the confined space entry point at all times while personnel are within the space.

16.14 Electrically Powered Tools and Equipment

All powered hand tools, such as circular saws, drills, chainsaws, percussion tools, jigsaws etc., must be equipped with a constant pressure switch that will shut off the power when the pressure is released. (Exception: this requirement does not apply to concrete vibrators, concrete breakers, powered tampers, jack hammers, rock drills, and similar hand operated power tools).

Electrical power tools must be of the approved double-insulated type. The electric cord, pneumatic or hydraulic supply line of powered tools must not be used for hoisting or lowering of the tool.

Loose clothing, jewellery or gloves that could get caught in the tool must not be worn when operating powered tools. Operators of powered tools who have long hair must keep their hair tied up.

The power source must be disconnected from the tool before making any repairs, servicing, adjustments, or replacing attachments such as drill bits.

16.15 Pneumatically Powered Tools and Equipment

Pneumatic powered tools must only be driven by filtered compressed air with an in-line lubrication system, or be lubricated prior to use if there is no in-line lubrication system. When using pneumatic powered tools the designated tool pressure must be attained by the use of a regulator.

Pneumatic powered tools must be disconnected when not in use. They must not be disconnected from the air supply until all the residual pressure has been released or contained by a shut-off device. Hoses must not be kinked as a means of containment.

Employees operating pneumatic powered tools, and any potentially affected employee in the vicinity of use, must wear suitable personal protective equipment.

All rotary compressed air tools (e.g. drills) must have the rated revolution per minute (RPM) permanently marked on the casing. Only attachments of compatible RPM must be used with these machines.

The actual RPM of the tool must be checked every three months to ensure that the speed is as rated to manufacture specifications.

Pneumatic powered tools must be secured to the air supply hose by an approved positive means to prevent the tool from becoming accidentally disconnected. Safety clips or retainers must be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 kPa pressure at the tool, must have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.

Compressed air must not be used for cleaning purposes except where reduced to less than 30 kPa, and then only with effective chip guarding and personal protective equipment in place. The 30 kPa requirement does not apply to concrete form, mill scale and similar cleaning purposes. Compressed air must not be pointed at any part of the body or used for cleaning clothing.

Airless spray guns of the type which atomize paints and fluids at high pressures must be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released. A diffuser nut which will prevent high pressure, high velocity release while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection must be provided in lieu of the above.

Abrasive cleaning nozzles must be equipped with an operating valve, which must be held open manually to enable operation. A support must be provided on which the nozzle may be mounted when it is not in use.

16.16 Hydraulically Powered Tools and Equipment

Hydraulic powered tools must use only approved fluid that retains its operating characteristics at the most extreme temperatures to which it will be exposed. The manufacturer's stated safe operating pressures for hoses, valves, pipes, filters and fittings must not be exceeded.

Only manufacturer approved hoses, valves, pipes, filters and fittings must be used.

16.17 Hand Tools

Employees required to use hand tools must receive training relevant to the tool and have their competency assessed in the operation, inspection and maintenance of the tool. Where necessary, additional applicable personal protective equipment must be worn when using hand tools.

Wrenches, including adjustable, pipe, end, and socket wrenches, must not be used when the jaws are sprung to a point where slippage occurs. Impact tools such as drift pins, wedges and chisels, must be kept free of mushroomed heads. The wooden handles of tools must be kept free of splinters or cracks.

Adjustable wrenches must not be used in lieu of ring or open-end type spanners, unless a risk assessment has been conducted and the use of the adjustable wrench is approved by the Transnet Contract Manager. Wherever possible, ring spanners must be used in preference to open end spanners.

Correct hand tools for the job must be used, e.g. screwdrivers must not be used as chisels, and pliers must not be used as hammers.

All wedges and drifts that may spring, fly or fall to lower levels upon impact must be fitted with an attachment which attaches a safety "lanyard" to a solid structure to restrain the impact tool from becoming a projectile.

All hand tools used in elevated areas, that may be dropped or fall to lower levels must be fitted with safety lanyards and attached to solid structures or in the case of podges, scaffold keys etc., attached by wrist lanyard to the user.

Purpose built tools and equipment may not be used unless a risk assessment has been conducted and authorised by the Transnet Contract Manager.

16.17.1 Stanley Knives / Utility Knives

A utility knife must be used as a last resort, when it is the safest tool to use. Always consider alternatives that pose less of a risk to the operator.

Whenever a utility knife is used, ensure that a complete risk assessment is done and that all possible hazards have been addressed.

Only utility knives with retractable blades are to be used. The blade is to be retracted at all times when the knife is not in use or is being stored.

Before using the utility knife, ensure that the tool is in a good condition and the blade is secure in the holder (seated correctly and that there is no play). Ensure that the blade is always sharp and in good condition. This will prevent the use of excessive force.

Always wear cut resistant gloves and safety glasses when using a utility knife. There is always a risk of the blade breaking under tension and becoming a projectile.

Always ensure that you cut away from your body, and that no part of your body is in the firing line.

Always ensure cleanliness of all equipment in use during the cutting operations.

16.18 Inspection of Equipment and Tools

All tools must be inspected by the user before, during and after use. If any faults are identified, the tool must be taken out of service and not used until repaired. Faulty tools that are not able to be repaired must be tagged "out of service" and removed from site.

16.19 Manual Handling and Vibration

Any handling or lifting task that can only be done manually must be planned and rehearsed before the task is done.

If more than one person is involved in a task a communication procedure must be agreed in advance. Lowering the load must be done in a controlled manner. Dropping a load is dangerous and must be avoided.

As a guideline 25 kg is considered to be the limit of what a person can safely handle. Where there are loads exceeding 25 kg the risk of handling the load must be mitigated to assure minimal potential for any injury. When mechanical lifting aids are provided, they should be used. Extra care should be taken when lifting awkwardly shaped objects.

Position the feet correctly. The feet should be placed hip-width apart to provide a large base. One foot should be put forward and to the side of the object, which gives better balance. Bend or 'unlock' the knees and crouch to the load. The weight will then be safely taken down the spine and the strong leg muscles will do the work.

Get a firm grip. The roots of the fingers and the palm of the hand should grip the load. This keeps the load under control and permits it to be distributed more evenly.

Risk Assessment with regards Manual Handling must be conducted and also take into consideration the task factors, physical demands and tools involved in the task.

As far as possible, exposure to vibration must be eliminated. However, if this is not possible, short-term solutions to decrease exposure include:

- Reducing the vibration levels;
- Removing the person from the vibrating equipment / tools;
- Reducing the period of time that the person works with the vibrating equipment / tools (at least 40 minutes break after 20 minutes working with a machine that vibrates excessively).

In order to reduce exposure to vibration:

- Consider buying equipment that operates effectively at lower speeds;
- Buy equipment with built-in damping materials;
- Buy lighter tools if they are available - they require less of a grip;
- Maintain the equipment;
- Make sure equipment is balanced and there are no worn parts;
- Use remote controls when they are available;
- Reduce your grip on the equipment when it is safe. The less time you actually have your hands on the equipment the better. Relax your hands during these brief breaks;
- Take scheduled breaks; and
- Do other tasks that allow you to move away from vibrating tools and equipment.

The workplace must be assessed by a competent person for compliance with good design, layout and practice, to avoid or minimise adverse health consequences due to manual handling and vibration issues.

Quantitative evaluations of vibration produced by specific equipment must include the following measurement parameters: direction of movement, frequency, intensity, and variation with time and duration, as per documented methods.

Employees and contractors must be informed of the results of assessments and instructed in appropriate manual handling techniques, where the risk assessment indicates a need.

Workplace vibration sources that could contribute to the exceedance of an Occupational Exposure Limit (hence potential for impact on worker musculo-skeletal fitness) must be identified and adequately characterised.

Manual handling tasks assessed as having the potential to cause a Lost Time Injury (i.e. with potential for impact on worker musculo-skeletal fitness) must be identified and adequately characterised.

Workplace manual / materials handling tasks risk rated as "significant" must be assessed and recorded to include biomechanical factors (e.g. posture, bending, twisting, repetitive motions, working overhead, and exerting force away from the body).

16.20 Personal Protective Equipment

PPE requirements for a particular job or for a particular area must be determined through a risk assessment for that job or area. Each contractor must provide each of his employees with all required PPE (at no cost to the employee). The specific PPE that is provided to a particular employee must be based on the nature of that employee's work and the location in which the work is performed (i.e. must be based on the hazards to which the employee is exposed). All applicable legislation concerning Personal Protective Equipment (PPE) must be complied with at all times.

As a minimum, the following PPE must be worn by all persons (including visitors) at all times whilst on site:

- Safety footwear with steel toe protection;
- Safety helmet (hard hat); and
- High visibility protective clothing with reflective taping (long trousers and long-sleeved shirts with collars and cuffs).
- Additional PPE requirements must be determined through hazard identification and risk assessment. This hazard-specific PPE (such as hand protection, hearing protection, hard hat, safety goggles, safety glass, face shield and respiratory protection) must be worn as required (e.g. when in a certain area, when performing a certain task, or when working with a certain substance);
- The correct PPE must always be worn;
- In accordance with site requirements (as indicated at the entrances to a site and at the entrances to buildings and / or designated areas on the premises);
- In zoned areas (e.g. noise zones and respirator zones); or
- As required by a Safe Work Procedure, or a Material Safety Data Sheet (MSDS).

Any employee who refuses to wear PPE or does not have all of the required PPE to perform his duties safely, will not be permitted to work.

Each employee must care for his PPE, maintain it in good condition, and inspect it on a daily basis. If an item of PPE has worn out, has become damaged, or is found to be defective in any way, it must be replaced by the contractor.

PPE must be stored in accordance with the manufacturer's requirements and / or recommendations.

Each employee must receive training in the use, maintenance and limitations of the PPE that is provided to him, and must be made aware of why the PPE is necessary as well as the consequences of not wearing it as instructed (i.e. the potential for injury and / or disciplinary action). Training records must be retained.

Symbolic signs indicating mandatory PPE requirements must be prominently displayed at the entrances to the work site and at the entrances to buildings and / or designated areas on the premises where additional PPE is required. These signs must comply with the applicable national standard (if one exists).

Each contractor must appoint an employee to control the issuing and replacement of PPE, keep an up-to-date register as proof of PPE issued (an employee must sign for the items that he receives, maintain PPE stock levels on site and carry out regular inspections to

ensure that PPE is being used correctly and maintained in a good, serviceable and hygienic state, and is not being shared between employees.

16.20.1 Head Protection

A safety helmet (or hard hat) worn correctly will help protect the head in the event of:

- An employee being struck on the head by a falling or flying object;
- An employee striking his head against a fixed or protruding object; or
- Accidental head contact being made with an electrical hazard.

A safety helmet must be worn in accordance with the manufacturer's requirements.

A safety helmet must be worn directly on the head. The wearing of a cap or other headgear beneath a safety helmet is prohibited unless the items have been specifically designed to be used in combination (i.e. the arrangement is approved by the safety helmet manufacturer).

The suspension system inside a safety helmet (that acts as a shock absorber) may not be removed.

The painting of safety helmets is prohibited.

Safety helmets may only be cleaned using a mild detergent and water. No solvents may be used.

16.20.2 Eye Protection

If an employee is carrying out, assisting with, or working adjacent to any activity where sparks or projectile particles are being generated, where chemical mists or fumes are being generated, where liquids may splash or spray, where harmful electromagnetic radiation (heat or light) is being generated, or where there is a risk of wind-blown particles entering the eyes, then suitable protective eyewear must be worn at all times (i.e. safety glasses, safety goggles, a face shield, a welding helmet, or a combination of these).

Such activities include:

- Working with rotating equipment (e.g. grinders, drills, mills, lathes, and saws);
- Welding and cutting;
- Chipping, chiselling or caulking;
- Using explosive powered tools;
- Abrasive blasting;
- Sanding; and
- Working with chemical substances (e.g. drilling fluids, acids, solvents, paints, pesticides, etc.).

For certain activities, special eye protection is required (e.g. a heat-resistant face shield is required when working near molten metal).

Double eye protection is required for activities such as:

- Grinding, cutting, chipping, chasing and reaming (employees must wear both a full face shield and safety glasses or goggles); and
- Arc welding (welders must wear both safety glasses and a welding helmet).

16.20.3 Hearing Protection

Regulations concerning occupational exposure to noise and the use of hearing protection must be complied with as a minimum. "Low noise" tools and machinery must be used wherever possible to reduce noise levels.

Where noise cannot be reduced to an acceptable level through engineering and work practice controls, measures must be put in place to minimise the exposure of employees to the noise (i.e. administrative controls and personal hearing protection).

Areas where it is likely that the 95% upper confidence limit of an eight hour L_{eq} mean exceeds 85dB(A), or areas where impulse noise exceeds 140dB(C), must be designated as noise zones. These noise zones must be clearly demarcated and mapped, signs must be posted, and all employees must be made aware of the requirements for working in such an area.

Suitable hearing protection must be worn in all designated noise zones and when carrying out (or working in the vicinity of) any activity where the noise level exceeds 85dB(A).

Where hearing protection is required, a hearing conservation programme (applicable to all personnel and visitors) must be implemented. The programme must include training in the correct use and proper storage of hearing protection devices as well as replacement requirements. Training must be provided when hearing protection is first issued to an employee and refresher training must be carried out at least annually thereafter. Training records must be retained.

At least two types of personal hearing protection must be made available to employees. The hearing protection devices provided must have adequate noise reduction ratings (i.e. must be able to attenuate the noise level to below 85dB(A)).

Personal hearing protection must be issued on an individual basis and must not be shared. In addition to personally issued hearing protection, suitable disposable hearing protection must be made available at the entrances to all noise zones.

All Hearing Protection Devices (except for disposable hearing protection) must be properly inspected and cleaned on a regular basis.

16.20.4 Respiratory Protection

Designated areas (respirator zones) must be established where:

- It is likely that the 95% upper confidence limit of a Similar Exposure Group's mean exposure concentration exceeds the relevant Occupational Exposure Limit (OEL) for agents resulting in chronic effects, such as total inhalable dust, respirable dust, respirable crystalline silica, PAH, fluorides, lead, mercury, asbestos or non-asbestos fibrous materials; or
- The concentration of an agent (particulate, vapour or gas) with an acute effect exceeds 50% of the relevant OEL.

Note: For a particular hazardous agent, the OEL to be adopted must be either the client's OEL or the OEL specified in legislation, whichever is the most stringent.

These areas must be clearly demarcated and mapped, signs must be posted, and all employees must be made aware of the requirements for working in such an area.

Suitable Respiratory Protection Devices (RPDs) must be worn in all designated respirator zones and when carrying out (or working in the vicinity of) any activity where the risk assessment has identified the need for respiratory protection.

Compatibility with the work tasks and other PPE, comfort (as it affects wear-time), and the ability to communicate adequately, must also be considered.

The risk assessment and method statement for the work to be performed, the information contained in the relevant Material Safety Data Sheets (MSDSs), and the results of any air monitoring associated with the substances to be worked with or activities to be carried out, must be used to ensure that the most suitable RPD is selected.

Only RPDs certified to a recognised standard and approved by the Transnet Contract Manager may be used.

Where respiratory protection is required, a respiratory protection programme (applicable to all personnel and visitors) must be implemented.

The respiratory protection programme must include:

- Periodic inspection of RPDs, including before each use;
- Periodic evaluation (by competent persons) of cleaning, sanitising, maintenance and storage practices;
- Performance of positive pressure and negative pressure fit checks by RPD wearers before each use to ensure that the respirator is functioning properly; and
- Training at first issue of a RPD and regular refresher training thereafter in accordance with regulatory requirements or at least once every two years (the training must cover fit testing, use, cleaning, maintenance, filter cartridge replacement, and storage). Training records must be retained.

RPDs must be used, maintained, and stored in compliance with the manufacturer's requirements as well as the respiratory protection programme.

Suitable facilities must be provided for the cleaning and sanitary storage of RPD's.

As a minimum, qualitative and documented fit testing must be carried out (although quantitative fit testing is preferred) to ensure that the use of negative pressure RPDs (including disposable RPDs) is effective. Fit testing must be performed by a competent person when an RPD is first issued and must be repeated periodically in accordance with legal requirements or every two years as a minimum. A policy must be in place requiring a clean shaven face when using a negative or neutral pressure RPD for routine tasks (otherwise a positive pressure RPD must be used). A medical evaluation including a pulmonary function test may be required to determine whether or not an individual is medically fit to wear a respirator.

For air-supplied RPDs, breathing air must be effectively filtered and / or isolated from plant and instrument air, and isolated from sources of potential contaminants. The supplied air must be tested to determine if the air quality complies with the requirements of applicable standards for breathing air.

For nuisance dust, dust masks with a protection level of at least FFP2 must be worn.

16.20.5 Hand and Arm Protection

Gloves must be worn when handling or working with equipment, materials or substances with the potential to cause injury or illness.

Suitable gloves must be selected based on the task to be performed and the specific hazard against which the employee requires protection, such as:

- Sharp edges;
- Sharp points and splinters;
- Abrasive surfaces;
- Hazardous chemical substances (toxic, corrosive, sensitising, etc.);
- Extreme temperatures; and
- Viruses, bacteria and parasites.

16.20.6 Foot Protection

Safety boots must be worn at all times whilst on site, with the exception of offices and office or administration buildings in which closed athletic, business or similar shoes may be worn. Sandals, slaps, slippers, open-toed and high-heeled shoes are not permitted on any work premises.

Safety boots must provide the following protection:

- Steel toe cap to protect against crushing (impact and compression forces);
- Leather uppers that provide resistance against water penetration and water absorption;
- Slip resistant soles;

And where a risk assessment identifies the need:

- Puncture resistant soles (i.e. steel midsoles) for protection against sharp objects;
- Chemical resistant soles for protection against spilt chemical substances (such as solvents, hydrocarbons, acids, and alkalis);
- Heat resistant soles for protection against hot surfaces or molten metal; or
- Electrical shock resistant soles for protection (insulation) against live electrical conductors.
- Gumboots with steel toe caps must be worn when working in water or very wet conditions.

16.20.7 Clothing

All employees working on a work site must wear high visibility protective clothing with reflective taping. Trousers must be long and shirts must be long-sleeved. Shirts must be buttoned at the neck and wrists.

Protective clothing must preferably be made of natural fibres.

Short pants, short-sleeved shirts, sleeveless shirts, and vests are prohibited as outer garments (with the exception of a high visibility vest worn over a long-sleeved shirt).

Loose clothing may not be worn where it may become caught in moving machinery or equipment.

For hot work (e.g. welding, cutting, etc.), work in the vicinity of molten metal, and any work carried out in the vicinity of an open flame, the protective clothing worn (shirt and trousers) must be made of a suitable fire retardant fabric. Underwear and socks must be made of natural fibres (preferably wool) or fire retardant fabric.

No employee may tuck his trousers into his boots when working in the vicinity of molten metal.

16.20.8 Body Protection

Suitable body protection must be provided as required to protect employees against specific hazards. A range of work activities require body protection in one form or another, including but not limited to:

- Working in extremes of temperature, such as firefighting, attending to a heating furnace, working with molten metal, working in refrigerated environments, etc.;
- Hot work (e.g. welding, burning, cutting and grinding);
- Working with hazardous chemical substances (e.g. acids, solvents, pesticides, etc.); and
- Clean up and disposal of hazardous materials and wastes (e.g. asbestos, hydrocarbons, etc.).

A wide variety of protective garments are available, such as firefighting suits, furnace suits, freezer jackets, leather aprons, leather spats, laboratory coats, chemical resistant aprons, chemical resistant (or hazmat) suits, and disposable coveralls.

16.20.9 Electrical Protective Equipment

To reduce the risk of electric shock, electrical insulating equipment appropriate for the voltage that may be encountered must be worn when working on energised electrical installations and when working within two metres of exposed energised conductors.

All rubber electrical insulating equipment (including gloves, sleeves, matting, covers, blankets, and line hoses) must be inspected for damage prior to and after each use, and immediately following any incident that can reasonably be suspected of having caused damage.

Rubber insulating equipment with defects and / or damage may not be used.

Rubber insulating gloves must be electrically tested before first issue and every 12 months thereafter as a minimum. Insulating gloves must also be given an air test along with the daily inspection. Essentially, this involves filling a glove with air and checking for any holes or leakage.

Insulating equipment that fails an inspection or electrical test may be repaired only as follows:

- Rubber insulating line hose may be used in shorter lengths with the defective portion(s) cut off;

- A rubber insulating blanket may be repaired using a compatible patch that results in the patched area having electrical and physical properties equal to those of the blanket;
- A rubber insulating blanket may be salvaged by cutting the defective area off the undamaged portion of the blanket;
- Rubber insulating gloves and sleeves with minor physical defects, such as small cuts, tears, or punctures, may be repaired by applying compatible patches. The patched areas must have electrical and physical properties equal to those of the surrounding material.

Repairs to gloves are permitted only in the area between the wrist and the reinforced edge of the opening.

Repaired insulating equipment must be retested before it is put back into use.

Insulating equipment must be cleaned as required to remove foreign substances (using a mild detergent).

Insulating equipment must be stored in such a location and in such a manner so as to protect it from light, temperature extremes, excessive humidity, ozone, and other damaging substances and conditions.

Leather protective gloves must be worn over rubber insulating gloves to provide mechanical protection against cuts, abrasions, and punctures.

Suitable arc flash PPE (e.g. voltage rated gloves, fire retardant clothing, arc rated face shield, arc flash hood, arc flash suit, etc.) must be worn whenever an employee is potentially exposed to an arc flash hazard. The appropriate level of PPE must be worn depending on the task and the potential energy exposure. These PPE requirements must be clearly specified as part of arc flash protection programme (refer to the Electrical Safety Standard).

16.20.10 Jewellery

Necklaces, dangling earrings, and bracelets may not be worn on a work site. No ring or watch may be worn where there is a risk that it may become caught in machinery or equipment. No jewellery or other conductive apparel (such as a key chain or watch) may be worn when carrying out energised electrical work.

16.20.11 Hair

Scalp hair that is longer than the top of the shoulders must be tied up and restrained within the person's safety helmet or within the collar of his or her overalls, shirt or jacket.

For negative or neutral pressure Respiratory Protection Devices, facial hair must not cause the seal between the respirator and facial skin to be broken (or prevent a seal from being formed in the first place).

16.20.12 Task-Specific PPE

In addition to the standard PPE required for a work site (including a safety helmet, safety glasses, safety boots, and high visibility protective clothing), the following task-specific PPE must be used as a minimum by any person carrying out or assisting with such a task:



- Grinding – safety glasses or goggles and full face shield (i.e. double eye protection), hearing protection, respiratory protection where dust or fumes may be generated, leather gloves, leather apron, and leather spats;
- Spray Painting – respiratory protection (air-supplied hood for confined spaces), safety goggles (if the respirator design does not provide this protection), hearing protection (where air compressors are used), chemical resistant gloves, and chemical resistant disposable coveralls.

16.21 Sun Protection

The contractor must ensure that all personnel are protected in sunlight through the use of long sleeve shirts, long trousers, brims, helmets and UV factored sunscreen. Shade structures must also be made available to all employees.

The contractor must conduct training and awareness sessions with his employees, advising on the risks associated with working in the heat (including dehydration) and the precautions to be taken (e.g. ensuring adequate fluid intake).

16.22 Fuel / Flammable Liquid Storage and Refuelling

No fuel (diesel, petrol, paraffin, etc.) or any other flammable liquid (paints, solvents, etc.) may be stored on site unless approved in writing by the Transnet Contract Manager.

If the on-site storage of a fuel or a flammable liquid is approved, the contractor must ensure the following:

- The quantity of fuel / flammable liquid to be stored on site must be kept to the minimum that is required;
- The storage area must be located in a well ventilated area at least 10 metres away from any building, drain, boundary or any combustible material;
- If more than 200 litres of fuel / flammable liquid is to be stored, the tank must be installed / the containers must be positioned within a bund (see Definitions);
- If the fuel / flammable liquid are to be stored in bulk tanks / vessels, then the minimum capacity of the bund must be 110% of the volume of the largest tank / vessel. If many small containers (e.g. 210 litre drums) are to be stored, the bund must be able to contain 25% of the total volume of the stored products;
- The bund must be impermeable. It must have a solid concrete floor and the walls must be constructed out of brick and must be plastered on the inside;
- The bund must be fitted with a lockable drain valve (for draining away rainwater), which must remain locked in the closed position. The valve may only be opened under supervision and in accordance with a written procedure;
- The fuel / flammable liquid storage area may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials (including rubbish, brush and long grass) at all times;
- Access to the storage area must be controlled (wire mesh fencing and gate);
- Appropriate warning signage (i.e. "Flammable Liquid", "No Smoking" and "No Naked Flames") must be prominently displayed at the storage area. The contents and volume of each tank must be indicated;
- In order to contain spillages, the offloading / refuelling bay at the fuel / flammable liquid storage area must have a solid concrete base surrounded by bund walls, ramps or humps and / or spill trenches (covered with steel grating) that lead into a sump;
- Fuel dispensing pumps must be protected against impact damage;



- All fuel / flammable liquid storage tanks and dispensing equipment must be electrically bonded and properly earthed;
- All electrical installations and fittings must be of an approved intrinsically safe type;
- Two 9kg dry chemical powder fire extinguishers must be mounted in an easily accessible position near the entrance gate to the fuel / flammable liquid storage area. Depending on the size of the storage area, additional fire extinguishers may be required to ensure that an extinguisher is no further than 15 metres away from any point on the perimeter of the storage area;
- A fire extinguisher must be at hand wherever refuelling is carried out;
- Smoking or open flames within 10 metres of a fuel / flammable liquid storage / refuelling area is strictly prohibited;
- No petrol or diesel powered vehicle or equipment may be refuelled while the engine / motor is running;
- Cellular phones must be switched off in fuel / flammable liquid storage / refuelling areas;
- Spill clean-up kits (containing a suitable absorbent fibre product) must be provided;
- Any spillages must be cleaned up immediately and all contaminated cleaning materials must be disposed of in accordance with the applicable legislation;
- If a flammable liquid is spilt or is leaking from a container / vessel, the area must be cordoned off and appropriate warning signage must be displayed to keep unauthorised personnel away from the affected area. Every effort must be made to contain the spillage. All hot work in the vicinity must be stopped immediately. If the spilt product is volatile and the possibility exists that a vapour cloud may form, or if the leak or spillage cannot be contained or stopped, then appropriate emergency response procedures must be activated (refer to Section 14) including the evacuation of all persons in the vicinity. Suitable firefighting equipment must be positioned ready for use should the spilt product ignite;
- The manual decanting of fuel or a flammable liquid from a large container should only be done using a stirrup pump (or similar) or a purpose-made frame which allows the container / drum to tilt for decanting and then return to the upright position;
- Drip trays must be used wherever required;
- All tanks, drums, cans, etc. containing flammable liquids must be tightly closed and properly sealed except for when a container is being filled or when a product is being decanted;
- The transport or storage of corrosive or flammable liquids in open containers is strictly prohibited
- Daily-use quantities of fuel (up to a maximum of 20 litres) must be handled in an approved safety can with a flash arresting screen, spring closing lid and spout cover that will safely relieve internal pressure if the can is exposed to fire;
- Where safety cans may be impracticable, only approved metal containers with screw caps may be used. Each container must be clearly labelled to indicate its contents;
- Only small quantities of flammable liquids (paints, solvents, etc.) may be stored within a building. Each product must be kept either in its original container or in an approved container which must be properly sealed. Each container must be clearly labelled to indicate its contents. When not in use, all such containers must be stored in a well-ventilated steel cabinet which must be kept locked to prevent unauthorised access;
- Not even small quantities of flammable liquids may be stored or dispensed in buildings or places of public assembly, in general warehouses, or in buildings containing sources

- of ignition such as space heaters, cooking devices, open electric motors, motor vehicles, or where welding, cutting, or grinding activities are being carried out;
- Safe Work Procedures must be compiled for the transportation (including delivery), offloading, storage, handling and use of any fuel / flammable liquid on site;
- All personnel that will be required to work with or may come into contact with a flammable liquid must be made aware of the hazards associated with the product and must be thoroughly trained in the safe transportation, use, handling and storage thereof.

16.23 Fire Protection and Prevention

The contractor must compile a Fire Protection and Prevention Plan for the work that will be carried out on site.

The contractor must assess / survey his area of responsibility and identify locations where the risk of fire is high. Cognisance must be taken of the fact that certain locations may need to be designated as high risk due to the presence of large quantities of flammable or combustible materials / substances. For all high risk areas, the contractor must ensure that additional precautions are taken to prevent fires and strict control is exercised over any hot work (i.e. welding, cutting, grinding, etc.) that is carried out.

The contractor must supply and maintain all required firefighting equipment. The type, capacity, positioning, and number of firefighting appliances must be to the satisfaction of the Transnet Contract Manager and must meet the requirements of the applicable legislation. Fire mains, hydrants and hose reels will rarely be available on site, so use must primarily be made of portable fire extinguishers.

Firefighting equipment, fixed and portable, must be strategically located with a view to being able to rapidly deploy the equipment in order to bring potentially dangerous and destructive fires under control while still in their infancy.

All fire extinguishers (and any other firefighting equipment) placed on site must be:

- Conspicuously numbered;
- Recorded in a register;
- Visually inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register and the competent person must sign off on the entries made); and
- Inspected and serviced by an accredited service provider every six months (the Transnet Contract Manager may require that this frequency be increased depending on the environmental conditions (e.g. high dust levels, water, heat, etc.) to which the fire extinguishers are exposed).

Any fire extinguisher that has a broken seal, has depressurised, or shows any sign of damage must be sent to an accredited service provider for repair and / or recharging. Details must be recorded in the register.

Firefighting equipment may not be used for any purpose other than fighting fires. Disciplinary action must be taken against any person who misuses or wilfully damages any firefighting equipment.

Access to firefighting equipment, fixed or portable, must be kept unobstructed at all times.

Approved signage must be in place to clearly indicate the location of each permanently mounted fire extinguisher, fire hose reel, etc.

The contractor must ensure that all persons working in / entering his area of responsibility are made aware of where all firefighting appliances and alarm points are located.

The contractor must ensure that his employees (and those of any appointed sub-contractors) are trained in firefighting procedures and the use of firefighting equipment.

The contractor must compile an emergency response procedure detailing the actions that must be taken in the event of a fire or a fire / evacuation alarm (see Section 14). All personnel working within the contractor's area of responsibility must be trained, and all visitors must be instructed, on this procedure. Copies of the procedure must be prominently displayed in the workplace in all languages commonly used on the site.

A person discovering a fire must extinguish the fire if he can do so safely, and then immediately report the incident to his supervisor. If the person cannot extinguish the fire, he must raise the nearest alarm and then report the fire as quickly as possible to his supervisor, the person responsible for the area, and / or Security.

On hearing a fire / evacuation alarm, all persons must make any operational plant or equipment safe, and then proceed to the nearest emergency assembly point and await instructions.

All incidents of fire (including the use or misuse of any firefighting equipment) must be reported to the Transnet Contract Manager immediately. Used fire extinguishers must be replaced by the contractor without delay.

No hot work (i.e. welding, cutting, grinding, etc.) or any other activity that could give rise to a fire may be performed outside of a designated workshop without a Permit to Work having been issued.

Wherever hot work is being carried out, a fire extinguisher must be at hand. Where the risk assessment determines that it is necessary, a fire watch must be stationed.

Supervisors must carry out workplace inspections regularly to ensure adherence to fire prevention measures and procedures.

At the end of every working period (i.e. before each tea / lunch break and at the end of every shift / day), the workplace must be thoroughly inspected to ensure that no material is left smouldering and no condition / situation exists that could give rise to a fire.

The contractor must ensure that all supervisors and all employees carrying out or assisting with any hot work or any other activity that could give rise to a fire have been trained in firefighting procedures and the use of firefighting equipment. The training must be conducted by an accredited training provider.

When using electrical equipment, all cables must be in good condition and the nearest convenient socket must be used.

No power socket may be loaded beyond its rated capacity through the use of adaptors, etc.

Makeshift electrical connections are not permitted under any circumstances.

Water-based firefighting equipment must not be used on electrical equipment or burning liquids.

Each vehicle used on site for work purposes and each item of mobile equipment with a diesel or petrol engine must be fitted with a permanently mounted fire extinguisher.

Smoking is only permitted in designated smoking areas. Cigarette ends / butts must be properly stubbed out in the ashtrays provided and never thrown into waste bins.

The contractor must ensure that good housekeeping practices are enforced, as this is crucial to the prevention of fires.

All combustible waste materials must be removed from the workplace on a daily basis (at the end of each shift) and placed in waste receptacles located at least 5 metres away from any structure.

The accumulation of waste materials in out-of-the-way places is prohibited. Offices, desks, cabinets, etc. must always be kept tidy and uncluttered. Waste paper bins must be emptied regularly.

The storage of combustible materials under stairways or in attics is prohibited. The storage of any materials against the exterior of a building or any other structure is prohibited.

All walkways, passages and stairways must be kept clear (i.e. must be unobstructed) at all times, as they may need to be used as a means of escape. The areas around and the routes to all exits, fire escape doors, fire hydrants, fire hose reels and fire extinguishers must be kept clear (i.e. must be unobstructed) at all times.

"No Smoking" signs must be conspicuously displayed in and around all storage areas / rooms.

Waste may not be burned under any circumstances.

No flammable liquid (such as petrol, acetone, alcohol, benzene, etc.) may be used for starting fires or as a solvent for cleaning clothes, tools, equipment, etc. Only solvents approved by the Transnet Contract Manager may be used for cleaning purposes.

Whenever any work is carried out involving the use of a flammable substance / material, the area must be cordoned off and appropriate warning signage (i.e. "No Unauthorised Entry", "No Smoking" and "No Naked Flames") must be displayed.

16.24 Smoking

The contractor must not permit smoking on site except within designated smoking areas selected in accordance with the applicable legislation. Such an area must be clearly demarcated and the required signage must be displayed.

Any person found smoking or discarding a cigarette butt outside of a designated smoking area may be removed (temporarily or permanently) from site. In all designated smoking areas, adequate non-combustible commercial ashtrays and / or cigarette butt receptacles (butt cans) must be provided.

Ashtrays and other receptacles provided for the disposal of smoking materials must not be emptied into rubbish bins or any other container holding combustible materials.

"No Smoking" signs must be strictly observed.

16.25 Housekeeping

The contractor must maintain all work areas in a tidy state, free of debris and rubbish. Unless directed otherwise, the contractor must dispose of all debris, rubbish, spoil and hazardous waste off site in a designated and authorised area or facility. The contractor must familiarise himself with the waste management plan for the site including collection and disposal arrangements, and must align his waste management activities accordingly.

In cases where an inadequate standard of housekeeping has developed and compromised safety and cleanliness, a Transnet Contract Manager may instruct the contractor to cease work until the area has been tidied up and made safe.

Neither additional costs nor contract deadline extensions will be allowed as a result of such a stoppage. Failure to comply will result in a clean-up being arranged through another service provider at the cost of the non-complying contractor.

The contractor must carry out housekeeping inspections on a weekly basis to ensure maintenance of satisfactory standards. The contractor must document the results of each inspection. These records must be maintained and must be made available to the Transnet Contract Manager on request.

The contractor must implement a housekeeping plan for the duration of the contract ensuring that the site housekeeping is maintained. Furthermore, at the end of every shift, the contractor must ensure that all work areas are cleaned, all tools and equipment are properly stored, and construction rubble is removed.

Where the contractor fails to maintain housekeeping standards, the Transnet Contract Manager may instruct the contractor to appoint a dedicated housekeeping team at the contractor's expense.

Littering is prohibited.

16.26 Waste Management

Waste may not be disposed of unless the disposal of that waste is authorised by law. The contractor must therefore ensure that all waste that is generated is handled, stored, transported and disposed of in accordance with the requirements of the applicable legislation / local authority.

No waste may be removed from the site to a waste storage or disposal facility unless that facility has been approved or licenced waste facility. Approved/licensed waste disposal service providers must be used for any waste removed from site. These service providers must be audited on a two-yearly basis (or more frequently if deemed necessary based on risk) in order to ensure compliance with legislation and to help ensure that no liabilities accrue to the contract.

An adequate number of waste bins and skips must be provided by the contractor and suitable arrangements must be made to ensure that these bins and skis are emptied regularly. Hazardous wastes must be kept separate from general wastes.

16.27 Stacking and Storage

All irregular shaped items will be stacked at floor / ground level in designated stacking areas on a level, firm base capable of withstanding the weight of the commodities being stacked and stacked in such a manner that the items do not topple over or change position due to subsidence or weight transfer when being moved.

Where these commodities are stacked on shelves or racks, the shelves or racks must be designed to carry the weight of the commodity being stacked.

All racks or shelves where heavy material or commodities are stacked will have a weight carrying limitation clearly marked on the structure and have a safety factor of at least +10% of maximum total carrying capacity.

All materials, commodities or articles, which could be damaged due to inclement weather, must be stored under cover.

Waste material that is combustible must not be allowed to accumulate in sufficient quantities to create a hazard.

No commodities or equipment may be stacked or stored within 500mm of rolling stock tracks or where mobile equipment travels.

The storage of material, small equipment, tools, files and general items in cupboards and on shelves must be neat and controlled at all times. Incompatible substances must not be stored in or on the same cupboard or shelf.

No equipment, tools, files or documents may be stored or stacked on top of cupboards which are higher than 1.5 metres in height.

16.28 Demarcation

Temporary demarcation in the form of hazard tape (red and white) may be used to demarcate areas where there is, for relatively simple reasons, restricted access.

Where hazards exist and entry must be specifically excluded for safety or health reasons, hazard tape in any form must not be used in isolation. A robust and substantial barrier of timber, rope or other material must be used in conjunction with barrier tape, to prevent entry to unauthorised persons.

Outside storage areas where it is impractical to use floor demarcation, demarcation may take the form of creosote poles and wire rope or similar. Spans between uprights should be painted yellow.

16.29 Facilities

The Contractor must in addition to Facilities Regulations 2004, provide at or within reasonable access of every site, clean, hygienic and maintained facilities.

Sanitary conveniences must be provided and maintained at a rate of at least one shower facility for every 15 workers, at least one sanitary facility for each sex and for every 30 workers, separate male and female changing facilities and sheltered eating areas. (Check SANS 10400 Part F).

Where chemical toilets are provided, one toilet for every twenty five employees must be allocated.

All toilets must be cleaned daily, disinfected and provided with toilet paper. All employees making use of these facilities have the responsibility to help keep the facilities neat, clean and hygienic.

Washing facilities, including soap and towels, must be made available for use by the contractor's employees.

Drainage from all washing / toilet facilities must be properly designed and constructed to prevent employee exposure to waste water (and the associated biological hazards). Waste water may not accumulate or stand in pools at any location on the project site.

Change rooms must be provided and must be kept clean and free from odours at all times.

No chemicals or equipment or items (other than those normally associated with for cleaning of these hygiene facilities) may be stored in the facilities.

All entrances must be constructed in a way to afford privacy to users.

Drinking water must be provided.

A sheltered (covered) area must be set aside on site to be used as a dining facility (eating area). Adequate seating must be provided for the maximum number of employees. The facility must be kept clean and tidy. Food may only be consumed in authorised sheltered areas.

A suitably sized, impervious receptacle (bin) must be provided for the disposal of waste food and other refuse generated at the dining facility. This bin must be emptied and cleaned regularly (i.e. promptly after meal times).

Adequate storage must be provided to the contractor's employees for the storage of food and drinks. Where fridges are provided, they must not be overstocked and must maintain sufficiently low temperatures.

16.30 Occupational Hygiene

The contractor must ensure that the exposure or potential exposure of his employees to any of the following stressors is assessed and measured to determine the effectiveness of control measures as well as compliance with legal and other requirements, particularly Occupational Exposure Limits.

- Noise;
- Thermal stress (heat and cold);
- Particulates (dust);
- Silica (free crystalline silica);
- Asbestos;
- Gases or vapours;
- Lead;
- Chemicals;
- Ionising radiation;
- Non-ionising radiation;
- Vibration (hand / arm vibration and whole body vibration);
- Ergonomics; and
- Illumination.

A baseline survey must be carried out by an Approved Inspection Authority: A plan for measuring and monitoring occupational exposure must be developed by the contractor. All monitoring results obtained must be analysed on a regular basis to:

- Identify trends and potential exceedances of legal or other requirements (such as Occupational Exposure Limits);
- Identify inconsistent or unusual results;
- Evaluate the effectiveness of existing control measures;
- Measure performance against stated objectives; and Identify continual improvement opportunities.

Each exceedance of a specified requirement or limit must be recorded, investigated and reported. Appropriate corrective actions must be identified and implemented

16.31 Lighting

For all work areas and access ways, if the natural lighting available is inadequate it must be supplemented by artificial lighting to meet the minimum levels required.

A lighting survey to determine luminance must be conducted for all work areas, at least once every two years and prior to work commencing for the first time in any area. Measurements do not need to be conducted by an Approved Inspection Authority for Occupational Hygiene

Emergency lighting must be provided in all indoor workplaces that do have adequate natural lighting or in which persons work at night. The emergency sources of lighting that are provided must be such that, when activated, an illuminance of not less than 0.3 lux is obtained at floor level, to enable employees to evacuate safely.

Where it is necessary to stop machinery or shut down plant or processes before evacuating the workplace, or where dangerous materials are present or dangerous processes are carried out, the illuminance must be not less than 20 lux.

Windows and translucent sheeting must be kept adequately clean and clear of obstructions as far as reasonably practicable. Light fittings, i.e. lenses and reflectors must be kept clean.

If a light intensity meter is used, a valid calibration certificate must be available.

Neon lights must not be installed in areas where moving parts of machinery or equipment cannot be fully guarded, i.e. lathes, bench grinders, etc. in order to eliminate the stroboscopic effect.

No person may use a portable electrical light where the operating voltage exceeds 50 volts, unless:

- It is fitted with a non-hydroscopic, non-conducting handle;
- All metal parts which may become live are protected against accidental contact;
- The lamp is protected by means of a guard firmly attached to the handle; and
- The cable can withstand rough use.

No person may use a portable electric light in damp or wet conditions or in closely confined spaces, inside metal vessels or when in contact with large masses of metal, unless:

- The lamp is connected to a source incorporating an earth leakage; and
- The operating voltage of the lamp does not exceed 50 volts.

16.32 Hearing Conservation

A hearing conservation program must be implemented and protection against the effects of noise exposure must be provided when the noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 decibels measured on the A-weighted scale of a standard sound level meter at slow response.

For the hearing conservation program to be effective it must include as a minimum:

- Monitoring of the workplace to determine the representative exposure of employees to excessive noise levels;
- An audiometric testing program for employees, which must include:
 - ♦ A baseline audiogram for all employees exposed to noise levels equal to or in excess of the standard;
 - ♦ Annual audiograms for each overexposed employee;
 - ♦ Analysis of audiogram results with retesting and/or referral to an otolaryngologist or qualified physician when a significant threshold shift (STS) occurs; and
 - ♦ Written employee notification of the STS.
- A training program for all employees exposed to noise;
- Provision of personal protective equipment to all affected employees when administrative or engineering controls fail to reduce sound levels to within the levels of the standards.

Monitoring of employee exposures to noise shall be conducted by an Approved inspection Authority. The monitoring requirement may be met by either area monitoring or personal monitoring that is representative of employee exposures. Personal monitoring is preferred, and may be required based on the type(s) of noise sources.

For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with legislation.

A person-task specification shall be available for every job category and shall be submitted with an employee for audiometric testing.

Audiometric testing and an annual audiogram shall be conducted by a competent person and provided as part of the regular medical examinations. Audiometric test results obtained from the pre-employment medical examination for a new employee shall be used as the baseline audiogram. Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise.

Hearing protectors shall not be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise. Employees shall be notified of the need to avoid high levels of non-occupational noise exposure during this 14-hour period.

Record-keeping for the audiogram shall include:

- Name and job classification of the employee;
- Date of the audiogram;
- The examiner's name;
- Date of the last acoustic or exhaustive calibration of the audiometer;
- Employee's most recent noise exposure assessment.

Audiometric test results shall be maintained in the employee's medical file.

Personal protective equipment shall be provided and replaced as necessary at no cost to employees. Supervisors shall ensure that hearing protective devices are worn by all employees who are exposed to a time-weighted average of 85 decibels or greater and who have experienced a significant threshold shift. Employees shall be given the opportunity to select their hearing protectors from a variety of suitable protectors.

Noise zones shall be indicated by means of signs at every entrance to such zones. When noise levels exceed 100 dB(A), a combination of earplug and earmuff may be required to achieve protection of the worker. Hearing Protection Devices should be worn for the full noise exposure period.

16.33 Particulate and Gas / Vapour Exposures

The concentration of an HCS in the air is, or maybe, such that the exposure of employees working in that workplace exceeds the recommended limit without the wearing of respiratory protective equipment, is zoned as a respirator zone.

Designated areas must be created where:



- It is likely that the 95 per cent upper confidence limit of a Specific Exposure Group's (SEG) mean exposure concentration for agents resulting in chronic effects (such as total inhalable dust, respirable dust, respirable crystalline silica, PAH, fluorides, lead, mercury, asbestos or non-asbestos fibrous materials) exceeds the relevant OEL; and
- Agents with an acute effect, such as particulate hazards, or gases (e.g. CO, SO₂, NH₃, HF, etc.), or vapours exceed 50 per cent of the relevant OEL.

Designated areas must:

- Be identified and mapped, signposted or otherwise clearly communicated to employees working in the area. Signposting, where necessary, must use appropriate wording or symbols on signs to identify the hazard;
- Have a documented respiratory protection programme based on suitable risk assessment and standards, which is applied to employees, contractors and visitors;
- Have regular monitoring of SEGs working in the area; and
- Have a formal review of the practicality of engineering controls at least every two years, or less where it is a critical control for a significant risk.

Particulate and gas / vapour monitoring must be appropriate to the exposure conditions and toxicants, and based on the use of equipment approved by local regulatory authorities, as per documented methods.

Where risk assessment indicates the possible presence of levels of gas or vapour sufficient to cause health effects in less than one shift (e.g. confined space entry), continuous monitoring is required as long as the potential for harm exists.

Employees and contractors must be covered by a medical surveillance programme when:

- Their Specific Exposure Group TWA mean exposure to respirable crystalline silica, total inhalable dust, respirable dust, lead or asbestos is greater than 50 per cent of the relevant OEL;
- The medical adviser considers that it is advisable; or
- There is a legal requirement for medical monitoring.

Where risk assessment indicates a risk of a respiratory condition, assessment programmes must include chest x-rays and / or lung function tests. The test or tests chosen must enable the earliest detection of adverse effects from the exposure of concern. Where indicated, they must meet the following standards:

- High quality chest x-rays will be taken every five years, unless local legislation requires these to be more frequent;
- All chest x-rays for pneumoconiosis surveillance will be read to International Labour Organisation (ILO) standards by an ILO B reader, wherever possible, and if not, by a competent radiologist using verifiable quality criteria;
- Any progression of more than one step on the ILO extended scheme to a reading above 1/0 will be reviewed by a physician;
- Any reading suggesting active lung disease will be reviewed by a physician; and
- All spirometry will be performed by trained staff following the American Thoracic Society guidelines or equivalent and be offered at a frequency determined by the likely rate of detectable change in lung function.

Controls must be of an adequate standard such that surfaces are adequately cleaned to avoid:

- Dust generation due to material dislodgment (e.g. windblown), where practicable; or
- Fume generation from accumulated dust during welding / heating or cutting operations.

Where risk assessment indicates the need to reduce exposures to toxic substances for employees or their families, good personal hygiene must be enforced. The programme must include:

- No smoking, eating or drinking in designated hazard areas;
- Washing of hands and face prior to drinking, eating or smoking;
- Showering at work post shift or after exposure to 'dirty' conditions; and
- Laundering of contaminated clothing by the contractor.

Abrasive blast cleaning must be conducted so as to protect worker health and minimise dust emissions. Substitutes must be used whenever practicable for abrasives containing crystalline silica. However, if such abrasives are used, workers must be aware of the hazards and exposure monitoring conducted. The hazardous properties of alternative materials must be considered before use.

Where required, training in the recognition of signs and symptoms of hazardous particulate and gas / vapour exposure, emergency procedures and preventative measures must be provided.

16.33.1 Respiratory Protection Devices

The selection of Respiratory Protection Devices (RPD's) must be based on:

- The potential particulate size distribution, gas / vapour types, substance toxicity and likely concentrations;
- Compatibility with the work tasks and other PPE; and
- Comfort (as it affects wear-time) and allowance for adequate communication.
- The type(s) of airborne contaminants that are present (gases, vapours, and particulates and aerosols including dusts, fumes, sprays, mists, and smoke);

Only RPD's approved by the Transnet Contract Manager may be used. Suitable facilities must be available for cleaning and sanitary storage of RPD's.

Half-mask and full-face air-purifying respirators must NOT be used where:

- The atmosphere is oxygen deficient (< 19.5 per cent);
- The atmosphere is immediately dangerous to life or health (e.g. in areas where CO concentrations are > 1500 ppm, HF > 30 ppm or NH₄ > 300 ppm);
- Gases and vapours are more than ten times their OEL or greater than 1000 ppm for half-mask respirators, or more than 100 times their OEL for full-face respirators; or
- Particulates are more than five times their OEL for half-mask respirators, or more than 50 times their OEL for full-face respirators.

For atmospheres that are oxygen deficient, or contain unknown hazards, or have concentrations of gases and vapours that are unknown, or could potentially exceed levels that are immediately dangerous to life or health, an air-supplied type respirator must be worn.

For effective use of negative pressure RPD's (including disposable RPD's), fit testing must be qualitative and documented as a minimum, although quantitative fit testing is preferred. Fit testing must be performed by a competent person when RPD's are first issued and must be repeated periodically according to legal requirements or two-yearly as a minimum frequency. There must be a policy requiring a clean shaven face when using a negative or neutral pressure RPD for routine tasks, or the use of a positive pressure RPD will be required. A pulmonary function test and medical evaluation may be required to determine whether or not an individual is medically fit to wear a respirator.

For air-supplied RPD's, breathing air must be effectively filtered and / or isolated from plant and instrument air, and isolated from sources of potential contaminants. The quality of the breathing air must be checked for conformance with applicable standards.

The respiratory protection programme must include:

- Periodic inspection of RPD's, including before each use;
- Periodic evaluation of cleaning, sanitising, maintenance and storage practices by competent persons;
- Performance of positive and negative fit checks before each use by RPD wearers to ensure that the respirator is functioning properly; and
- Training at first issue of a RPD and regular refresher training thereafter in accordance with regulatory requirements or at least once every two years.

16.33.2 Asbestos and Non-asbestos Fibrous Silicates

This section applies to asbestos and bio-persistent non-asbestos fibrous silicates that may display asbestos-like toxicity, related to fibre diameter and length. Local regulations must be followed as a minimum. The following requirements must be met:

- A management program must be in place and actively pursued;
- No new products containing these materials may be purchased;
- Installed materials of this type must be identified and assessed annually for current safety. Where 'safe in place', it should not be removed, unless there is an opportunity for removal during renovation or construction of buildings or equipment;
- Work areas must be barricaded off and signposted to restrict entry; and
- Contaminated material must be promptly placed in appropriate marked plastic disposal bags or covered containers for disposal to an approved landfill.

All workers exposed to these materials must be on a register. "Exposed" means working on or near such material that has been disturbed, abraded or cut. The register must contain details of their annual medical examination and the results of occupational hygiene monitoring.

Asbestos contractors must be competent, registered and have adequate equipment, procedures and monitoring.

Where required, the asbestos / bio-persistent non-asbestos fibrous silicates management programme must cover work practices, training, monitoring, medical surveillance, and waste handling and disposal.

Maintenance operations must be made aware of potential cristobalite exposure hazards when disturbing non-asbestos fibrous silicates that have undergone high temperature conditions.

The potential for occurrence of naturally occurring asbestos materials in exploration or mining production activities must be assessed, the risk of exposure determined and appropriate control measures implemented where required.

16.34 Hazardous Chemical Substances

No chemical substance may be brought onto site unless it appears on the Chemical Substances Register which will be developed and kept by the contractor.

The register will contain the following information:

- Trade name / product name of substance;
- Manufacturer / supplier of substance;
- Maximum inventory;
- Storage requirements and precautions;
- Inventory of special emergency items held for handling spillages, fires, etc. (e.g. reagents to neutralise spillages, firefighting foam, etc.); and
- Approved disposal methods.

The contractor must ensure that a Material Safety Data Sheet (MSDS) is obtained for each chemical substance brought onto site. A file, or files, containing all of the MSDS's must be maintained and must be readily available to all personnel on site (particularly first aiders) as well as other potentially affected parties (e.g. emergency services personnel, persons from the local community, etc.). The MSDS's must be in the language(s) commonly used on site.

The contractor must appoint a trained and competent Hazardous Chemical Substances Coordinator who understands and is able to evaluate the risks associated with a wide variety of substances. This person shall be responsible for:

- Assessing the hazardous properties and risks associated with all chemical substances brought onto site by the contractor and appointed sub-contractors (using the MSDS's);
- Determining precautions and safe practices for transportation, use, handling, storage and disposal (including PPE requirements) (using the MSDS's);
- Determining first aid and emergency response requirements / procedures (using the MSDS's);
- Maintaining the MSDS file;
- Managing and monitoring the consumption of inventory; and
- Providing an "as needed" service to site personnel and suppliers.

The risks associated with the transportation, use, handling, storage and disposal of all hazardous chemical substances brought onto site must be assessed and managed by the contractor through a process that incorporates risk reduction using the hierarchy of controls. The contractor must provide Safe Work Procedures for the transportation, use, handling, storage and disposal of all hazardous chemical substances to be used on site.

Whenever a task-based risk assessment is carried out, consideration must be given to the use of chemical substances (e.g. greases, solvents, etc.).

The contractor must provide his employees with all of the Personal Protective Equipment that is necessary to prevent exposure / injury while handling / using the hazardous chemical substances that they will be required to work with. Appropriate PPE must be selected with consideration given to the potential hazards, permeability, penetration, resistance to damage and compatibility with the work tasks.

The contractor's employees must be trained in the safe transportation, use, handling, storage and disposal of the hazardous chemical substances that they will be required to work with or may come into contact with. The training must specifically address PPE requirements (including the correct selection, fitment and use thereof).

All personnel must be trained to understand the potential health effects associated with exposure to hazardous chemical substances and therefore the importance of Safe Work Procedures and PPE. All personnel must be trained on emergency response procedures and first aid measures.

Behaviour-based observations and coaching must include the use / handling of hazardous chemical substances.

An appropriate occupational exposure monitoring and medical surveillance programme must be in place for all personnel potentially exposed to hazardous chemical substances which have the potential to cause immediate or long-term harm.

Emergency showers and eyewash stations must be provided where required by law, or where a risk assessment indicates a need. The emergency showers and eyewash stations must be appropriately located, signposted, and regularly tested and maintained. Employees must receive training on the location and use of the showers / eyewash stations.

An emergency response plan for incidents involving hazardous chemical substances must be in place. Regular and appropriately staged emergency drills (possibly involving external spill response and ambulance support services) must be held and lessons learnt must be incorporated into the emergency response plan.

The contractor must provide appropriate storage facilities for all hazardous chemical substances to be used on site. The storage facilities must be secure and protected from damage. They must also be designed for easy access for firefighting purposes. Where applicable, the storage facility must protect chemical containers from physical damage due to temperature extremes, moisture, corrosive mists or vapours, and vehicles.

The inventory of hazardous chemical substances stored on site must be kept to a minimum. The quantity of each chemical stored must be justifiable.

Storage and segregation requirements for all hazardous chemical substances to be used on site must be based on:

- The quantities of the substances stored;
- The physical state of the substances (solid, liquid or gas);

- The degree of incompatibility; and
- The known behaviour of the substances.

Access to areas where hazardous chemical substances are stored and handled must be limited and controlled.

Every chemical substance container must be adequately and clearly labelled to identify its contents, to indicate precautionary requirements for the substance, and to indicate the date of expiry (if applicable). Pipes used to transfer / convey / distribute chemical substances must be clearly identified (e.g. colour coding). Directional flow must be indicated where practical.

Before any item, equipment or empty container containing a chemical residue is disposed of as general waste, it must be properly decontaminated (where applicable). Before being disposed of, empty chemical containers must also be rendered unusable for carrying water (by puncturing, cutting or crushing them).

Hazardous chemical substance waste (i.e. redundant / expired hazardous chemical substances, containers containing residues, contaminated items / materials, etc.) must be disposed of in accordance with the applicable legislation.

Maintenance, inspection and testing schedules and procedures must be in place for critical equipment associated with hazardous chemical substances. A system must be in place to ensure that the risks are assessed before any changes are made to equipment and / or processes for the transportation, storage, handling, use or disposal of a hazardous chemical substance.

A programme must be in place to continually investigate possibilities / opportunities for replacing hazardous substances with safer alternatives.

16.35 Radiation

The risks associated with ionising (from naturally occurring radioactive minerals (NORM), radon, and man-made sources), ultra violet (UV) and electromagnetic field (EMF) radiation exposure must be assessed by a competent person.

There must be an inventory of all radiation sources that have the potential to cause adverse health effects. For each radiation source, the type of radiation (e.g. radioisotope, radon, x-ray, EMF, laser, etc.), the strength of the radiation, and the location must be recorded.

Where risk assessment indicates the need, a documented radiation management programme must be developed such that:

- All types of radiation sources are adequately characterised and described;
- Exposures are eliminated or reduced to as low as reasonably practicable (ALARP);
- A clearly defined chain of responsibility (with duties) is provided; and
- Education is provided for employees regarding radiation safety, including the radiation management programme elements.

The ionising radiation management programme must meet all applicable regulatory requirements, and as a minimum must include the following elements (as applicable):

- Surveyed radiation areas and quantification of exposure sources / levels;
- Exposure and medical monitoring programmes based on established investigation levels;
- Transport of radioactive materials in compliance with international radiation transport regulations, when no local regulations are in place;
- Waste monitoring and disposal programmes;
- Feedstock and equipment checks for naturally-occurring ionising radiation;
- Clearance and control procedures for all contaminated materials and equipment leaving or arriving at site (including scrap);
- Leak (wipe) tests on sealed radioactive containment equipment;
- Lock-out procedures for vessels and equipment containing radioactive sources and radon decay product measurement prior to entry;
- Emergency procedures;
- Environmental impact risk assessment (air, water, waste, foods, etc.);
- Product / waste life cycle control; and
- Dose assessment for employees and critical exposure groups, according to documented methods and by a competent person.

Areas with ionising radiation with annual doses greater than 5 milli Sieverts (mSv) must be designated as restricted access or controlled areas. These areas must be identified and mapped, signposted or otherwise clearly communicated to employees working in the area.

Each person whose potential exposure exceeds 5 mSv per annum or who is a designated radiation worker must undergo periodic personal radiation monitoring and medical surveillance designed to show continued fitness for radiation work.

All sources of ionising radiation must be managed in use and when they are either disposed of or securely stored in accordance with local regulations. Each operation where individual worker's exposures could exceed 5 mSv per annum must have a trained radiation protection adviser or ready access to a trained protection consultant.

There must be documented procedures for the inspection, assessment and maintenance of the controls, and emergency procedures to deal with incidents involving ionising radiation sources (including fire and explosions). All controls must be reassessed annually to ensure their continued effectiveness and that operating practices are in accordance with written procedures.

16.36 Thermal Stress

Hot areas or activities where employees have experienced or could experience excessive fatigue, muscle cramp, dehydration, dizziness and other symptoms of heat stress must be identified and described.

Where a risk of thermal stress is determined, a competent person must conduct monitoring surveys on site, in consultation with workers.

For defined extreme thermal conditions and job activities, medical examinations must include information about the operator's physiological and biomedical aspects, and an assessment of fitness for the working conditions.

Cold areas or activities where employees have experienced or could experience pain or loss of feeling in extremities, frostbite, severe shivering, excessive fatigue and other symptoms of cold stress must be identified and described.

Workplace thermal stress levels (temperature, air movement, humidity, etc.), activities (work level, etc.) and conditions (clothing, health, etc.) that have the potential to exacerbate thermal stress effects must be adequately characterised and described. Workplace exposure assessment must be repeated according to regulatory requirements or whenever there is a change in production, work organisation, process or equipment which may impact thermal stress levels.

Detailed heat stress assessment of identified tasks or jobs must be tiered to:

- Commence with the use of a simple heat stress index as a screening tool; then, if necessary;
- Use rational heat stress indices in an iterative manner to determine the 'best' control methods for alleviating potential heat stress; and
- Undertake physiological monitoring when exposure times are calculated to be less than 30 minutes, or where high level PPE that limits heat loss must be worn.

Detailed cold stress assessment of identified tasks or jobs must be conducted according to current appropriate guidelines that incorporate a cold stress index, to determine the 'best' control methods for alleviating potential cold stress.

When a risk of thermal stress is identified, the following exposure controls must be implemented:

- An acclimatisation period for new workers and those returning from extended leave or sickness;
- Training in the recognition of signs and symptoms of heat or cold stress, emergency procedures and preventative measures;
- Protective observation (buddy system or supervision); and
- A requirement for self-paced working.

The following exposure controls must be considered by a competent person:

- Work / rest regimes and job rotation based on measurements conducted;
- Suitable rest areas with a provision of cool drinking water and cool conditions for high temperatures, or provision of warm drinks and warm conditions for cold temperatures;
- Selection of appropriate clothing or other PPE for extreme temperature conditions;
- The use of engineering controls; and
- Undertake hot / cold tasks during a cooler / warmer time of the day.

Where thermal stress is assessed to be a risk, the operation must develop a suitable emergency response plan.

16.37 Fitness for Work and Fatigue Management

The contractor must develop and implement a programme to manage employee fitness for work. All employees working on site for whom the contractor is responsible (i.e. direct employees of the contractor as well as the employees of any appointed sub-contractors) must be subject to this programme.

All safety critical jobs (i.e. roles where fatigue or other causes of reduced fitness for work could lead to serious injury, illness or death to employees, significant equipment / plant damage, or significant environmental impact) must be identified and the risks associated with reduced fitness for work in these roles must be assessed.

A programme to manage these risks must be implemented, and it must include:

- Mechanisms for managing fatigue, stress and lack of fitness;
- An alcohol and other (including prescription, pharmaceutical or illicit) drugs policy that includes testing;
- An Employee Assistance Programme providing confidential access to resources and counsellors; and
- Training and awareness programmes.

Each employee has an obligation to present himself fit for work at the start of the day / shift, and to remain fit for work throughout the work period. Reporting for work under the influence of alcohol or any other intoxicating substance will not be tolerated. Any transgression concerning the alcohol and other drugs policy applicable to the project may result in the offending employee's access to the project premises being temporarily or permanently withdrawn.

Alcohol and drug testing on the project premises will be carried out randomly (as employees report for duty and during the course of the day / shift), following significant incidents (all persons involved), and whenever there is reasonable suspicion. Alcohol and drug testing may also be carried out as part of a Pre-Employment Medical Examination.

The Contractor must ensure that it complies to the requirements of RSR 00-4-1.2016 Edition 1, Part 4-1 Human Factors Management-Fatigue Management standard, Transnet Fatigue Risk Management Plan (FRMP) and Fatigue Risk Management System (FRMS).

The Contractor shall document, implement and maintain processes and procedures to identify, assess and mitigate the risks associated with fatigue's contributory factors.

The Contractor shall collect data and report on their management of fatigue as outlined in Clause 8.3 of Part 4-1 Human Factors Management-Fatigue Management standard.

Sleep deprivation during shift work or from excessive working hours is a known cause of fatigue. Fatigued employees are at increased risk of accidents. Shift system design must consider:

- The effect on worker fatigue;
- The effects of activities carried out during scheduled and overtime hours;
- The impact on sleep cycles of activities such as commuting to and from site; and
- The monitoring and control of working hours.

The contractor is responsible for the administration of the working hours of his employees and of any appointed sub-contractors. The maximum working hours per day and the minimum rest times between shifts must be specified in the contractor's SHE Management Plan and must comply with all applicable legislation.

All employees engaged in safety critical jobs must undergo fitness assessments (medical examinations) which must be carried out prior to the commencement of employment on the contract, prior to a change in role, periodically based on an employee's individual risk profile, and on termination of employment on the contract:

Note: The results of an Exit Medical Examination from previous employment will not be accepted as a Pre-Employment Medical Examination.

Note: The medical examinations described above may only be carried out by an occupational health practitioner.

A detailed job (role) description and an exposure profile (noise, dust, heat, fumes, vapours, etc.) must be provided for each employee or group of employees. The medical examinations that an employee undergoes must be based on (i.e. the employee's fitness must be assessed against) the information contained in these documents as well as the baseline risk assessment for the work. This information must be made available to the occupational health practitioner performing the medical examination.

For each role, the medical criteria for fitness must be documented and these must be based on an evaluation of the physical and medical requirements for the role.

Depending on the circumstances, certain vaccinations may need to be provided to employees.

The medical examinations carried out for all drivers and operators must include testing / assessment for medical conditions that could affect the safe operation of vehicles or equipment.

Specific testing / questioning must be carried out to determine if an individual:

- Suffers from epilepsy or any other medical condition deemed to be a risk by the occupational health practitioner;
- Makes use of chronic medication that could affect performance;
- Is colour-blind; or
- Has poor day or night vision.

The medical examinations carried out for employees that are required to work at height must include testing / questioning to determine if an individual suffers from epilepsy, hypertension (high blood pressure) or any other medical condition deemed to be a risk (with regard to working at height) by the occupational health practitioner. Electricians must be tested for colour-blindness.

With regard to the placement of new employees:

- Prospective employees must be referred to a suitable occupational medical practitioner (doctor) for a "Pre-Employment Medical Examination";
- If an individual is found to be medically "unfit for placement", the doctor will indicate which work activities cannot be performed by the person;
- The individual may still be employed on the project if his medical restrictions can be accommodated and provided that no legislation is transgressed.

A process must be established to manage medical restrictions that may be placed on an employee. For every employee with a medical restriction, regular follow up visits with the occupational health practitioner must be arranged to ensure that each case is proactively managed.

An employee in a safety critical job must report (to his supervisor) any condition that might impair his ability to safely perform the duties associated with his role. A mechanism must be in place for such reports to be referred to an occupational health practitioner to determine if the employee is fit to continue with his work.

Proof of all medical examinations (i.e. certificates of fitness signed by an occupational health practitioner) must be kept on site and these records must be readily available for inspection by the Transnet Contract Manager. An employee's certificates of fitness must be included in his Personal Profile (dossier). If an Employee Personal Profile (dossier) hasn't already been compiled for a particular employee, then this must be done without delay following the employee's Pre-Employment Medical Examination. No employee in a safety critical role may commence work on site without proof that he has undergone a Pre-Employment Medical Examination.

Occupational medical examinations and data interpretation may only be carried out by medical practitioners that are appropriately qualified and certified to do so. Occupational medical data contained in reports to management must be grouped and summarised to ensure that the confidentiality rights of each individual employee are maintained. All occupational medical data and records must be retained for at least 40 years.

16.38 Legionnaires Disease

All equipment with the potential for generating Legionella (such as cooling towers and associated equipment, air-handling systems, hot water services and showers) must be identified and the risks of contamination and aerosol generation assessed.

Where there is an assessed risk that Legionella could grow in the system and cause harm, a programme must be in place such that:

- All such equipment is identified on a register. The register must contain details of the regular maintenance, cleaning and checking programmes;
- Control measures are in place to minimise aerosol emissions;
- There must be a documented water treatment programme, including procedures for inspection, assessment and maintenance of the controls; and
- New or retrofitted equipment is designed and constructed to minimise the risk of Legionella growth.

Where available, the Legionella plate count test should be used if more effective methods are not available.

Good maintenance procedures must be followed to minimise the risk of significant contamination of equipment with other bacteria and microbial organisms.

Adequate procedures must be available for disinfecting systems if significant concentrations of Legionella bacteria are present. Once disinfected, systems must be retested to confirm effectiveness of treatment.

16.39 Operation of Rail Grinders

The contractor must assess the risks posed by operations of rail grinders. Appropriate mitigation strategies must be implemented as required, including fire prevention and protection measures.

The contractor shall ensure that the operations of rail grinders are undertaken in such a manner that it does not pose a risk to the health and safety of employees, members of the public or damage to property.

All employees involved in the operations of rail grinders activities are trained on the risks to their health and safety, appropriate mitigation strategies to be implemented including fire prevention and protection measures.

The contractor shall ensure that the operator of rail grinder is trained to operate such an equipment.

The contractor shall ensure that the rail grinders are properly maintained and inspected at appropriate intervals. General machine safety checks including brake tests shall be done once a month and reports shall be available on the contractor compliance file/safety file.

The contractor shall ensure that technical and safety audits of the machinery and equipment must be done at least twice a year and a report of such an audit is available in the contractor's compliance file.

17. Emergency Preparedness and Response

The contractor must develop, implement, test and maintain an Emergency Response Plan (incorporating emergency evacuation procedures) that focuses specifically on the contractor's team and work activities. The plan must be risk-based and must detail the procedures that must be followed when responding to all potential emergency scenarios such as a medical emergency (including first aid response), a fire, an explosion, a hazardous substance spill, flooding, rescue from height, rescue from a confined space, etc.

The contractor's Emergency Response Plan must be aligned with the Emergency Response Plan developed by Transnet.

Potential off-site emergency scenarios must be included (e.g. emergency scenarios related to the transport of personnel, the transport of hazardous materials, and personnel performing work in remote locations).

Consideration must be given to neighbours, and to the availability and capability of local emergency services. Details of any arrangements with external emergency response service providers must be included.

The Emergency Response Plan must satisfy and comply with all applicable legal requirements. The plan must be adequately resourced to ensure effective implementation. These resources must include appropriate personnel, external emergency response service providers, emergency response equipment, and warning devices. All equipment and warning devices must be identified, maintained and tested to ensure availability at all times.

Accountability for the Emergency Response Plan must be clearly defined. An Emergency Response Team (ERT) responsible for the implementation, management and execution of the Emergency Response Plan must be established. The roles and responsibilities of each team member must be clearly defined in the plan. Each team member must receive appropriate training to ensure that each role is performed competently.

The process for managing incident communication, notification, and reporting must be incorporated into the Emergency Response Plan. The responsible person(s) must be clearly identified, and the protocols for communicating with internal and external stakeholders must be defined.

Emergency evacuation procedures must be developed and included in the Emergency Response Plan. A copy of the plan must be provided to the Transnet Contract Manager for approval prior to site establishment.

The Emergency Response Plan must be formally reviewed (and amended if necessary) on at least an annual basis, and following any emergency situation, to ensure that it remains appropriate and effective.

At each work site:

- A suitable evacuation alarm (siren) must be provided. If work is to be carried out in proximity to an existing operational plant, the alarm provided by the contractor must be distinctly different (in terms of the sound that it generates) to any alarm installed in the operational plant. All persons working in an area where an evacuation alarm is sounded must respond to it immediately.
- Suitable fire-fighting equipment must be provided and maintained, and personnel must be trained in fire-fighting procedures and the use of fire-fighting equipment.
- Suitable first aid equipment and supplies must be provided and maintained, and an adequate number of appropriately trained First Aiders must be in place (refer to Section 14.2).
- Emergency assembly points positioned in safe locations away from buildings, plant and equipment must be designated (and conspicuously signposted). In the event of an evacuation, all persons (i.e. personnel and visitors) must assemble and be accounted for at these emergency assembly points.
- All personnel must receive awareness training on the applicable emergency response procedures, and all visitors entering the site must be properly instructed in these procedures.

- The emergency response procedures must be displayed on each notice board.
- A diagram (site plan) indicating evacuation routes, emergency assembly point locations, and the positioning of emergency equipment (fire extinguishers, first aid boxes, etc.) must be prominently displayed in all buildings and plants, in all offices, on all notice boards, and in other locations on the site as may be required.
- An up-to-date list of emergency telephone numbers must be compiled and maintained. A copy of this list must be posted at each site entrance, in each office, near each telephone, and on every notice board.
- Emergency response drills must be conducted to test the effectiveness of the emergency procedures and equipment, as well as the knowledge and proficiency of the response personnel. Where appropriate, drills must include liaison with and the involvement of external emergency response service providers. A variety of emergency scenarios must be tested including, but not limited to, medical emergencies, fires, rescues, and hazardous substance spills. A drill must be carried out one month after site establishment and six-monthly thereafter.

Each drill must be monitored and the outcomes (highlights and shortcomings) must be documented. Corrective actions must be identified and implemented to address the shortcomings, and the Emergency Response Plan and associated procedures must be amended as required.

17.1 First Aid Kits

A suitable first aid kit (i.e. appropriate to the level of training) must be readily available to each First Aider. All kits must be provided and maintained by the contractor.

Taking into account the type of injuries that are likely to occur in the workplace, each first aid kit must contain suitable equipment and supplies. First aid equipment and supplies required by applicable legislation must be provided as a minimum. Additional items / supplies may need to be provided depending on the nature of the workplace (specific hazards) and the level of training of the first aider in position of the kit.

The contents of each first aid kit must be kept clean and dry. Access to first aid equipment / supplies must be limited to train First Aiders only. Access to portable kit bags must be controlled and steel first aid boxes in the workplace must be kept locked.

Approved signage must be in place to indicate the locations of the first aid boxes / bags.

A record of each treatment administered must be kept in a suitable register.

18. Management Review

A review of the contractor's Health and Safety Management System must be completed annually to ensure that the system continues to be effective in managing health and safety performance and meeting project requirements.

The review must evaluate if there is any need for change and must identify actions to improve the system. The review must be led by senior management and the following must be considered:

- The suitability of the policy adopted for the project;
- The impact of changing legislation;

- The management of risk;
- Health and safety objectives and performance indicators;
- Changing expectations and requirements of relevant stakeholders;
- Changes to the contractor's scope, schedule, designs, etc.;
- Changes to the contractor's organisational structure;
- Communication and feedback (particularly from employees, Project representatives, and client representatives);
- The effectiveness of the management of change process;
- Workplace exposure monitoring and medical surveillance;
- The status of corrective actions;
- Performance statistics, including an annual summary of safety statistics, and occupational hygiene monitoring and medical surveillance results;
- Non-conformances (findings) from completed audits;
- Follow up on actions from previous management reviews; and
- Recommendations and opportunities for improving the effectiveness of the management system.

A record of each completed management review must be retained and it must include all decisions and identified actions concerning alterations, modifications or improvements to the management system that demonstrate a commitment to continual improvement.

19. Management of Change

To ensure that proposed changes do not give rise to unacceptable health or safety risk, the contractor must develop and implement a process for identifying and managing change in the workplace (e.g. changes to scope, schedule, procedures, work methods, site conditions, designs, plans, plant and equipment, materials, processes, etc.) that may impact on health or safety performance.

The management of change process must take into consideration that changes may be planned or unplanned, sudden or gradual, temporary or permanent.

The process must aim to ensure that:

- Changes are identified and assessed before they are implemented;
- Careful consideration is given to managing the risks associated with any change;
- Due diligence can be shown to have taken place;
- The number of unsatisfactory or unnecessary changes is minimised;
- The right people are involved in the change process; and
- All statutory requirements are met.

All risks associated with a proposed change must be evaluated and ranked. The risks that are ranked as moderate or higher must be managed to prevent serious injury or illness.

It must not simply be assumed that a change will not result in significant risks. All proposed changes must be formally evaluated. The evaluation or review must include:

- An appropriate level of technical expertise;
- The involvement of the workforce potentially affected by the proposed change; and
- Approval of the change by a person with at least the same level of authority as those who control the existing process or item being changed.

20. Sub-contractor Alignment / Stakeholder management

Processes must be in place to ensure that the health and safety risks associated with the procurement of materials, equipment, services and labour are identified, evaluated and effectively managed.

A process for evaluating a sub-contractor's (or supplier's) ability to provide materials, equipment, services and labour that meet defined specifications must be in place. A prospective sub-contractor's health and safety management expertise, experience and capability (including previous health and safety performance) must be formally assessed prior to any contract or purchase order being awarded.

Each appointed sub-contractor must develop and implement a detailed SHE Management Plan based on the requirements of the contractor's SHE Management Plan and the Health and Safety Specification for the contract. This plan must be reviewed and approved by the contractor prior to the commencement of any work.

The properties of all materials provided to the project must be adequately understood, documented and integrated into operating procedures where exposure to these materials presents a significant health or safety risk.

Procedures, commensurate with the evaluated risk, must be in place for the receiving, storing, dispatching and transporting of all equipment and materials.

Before work commences on any contract, all sub-contractor personnel must receive comprehensive orientation and induction training

All work carried out by a sub-contractor must be managed (activity supervised) throughout the contract period and performance must be reviewed (audited) on a monthly basis

21. Section 37(2) Mandatory Agreement

Transnet and the Contractor shall enter into an agreement in terms of section 37(2) of the Occupational Health and Safety Act to the arrangements and procedures between them to ensure compliance by the contractor with the provisions of the OHS Act.

The agreement shall be completed and signed by the contractor mandated representative as soon as possible and returned to the relevant Transnet Contract Manager for his/her signature on behalf of Transnet.

The contractor shall enter into a Section 37(2) Agreement with their respective sub-contractors. Signed copy of such agreement must be kept on the contractor's compliance file.

22. Incident Reporting and Investigation

All incidents referred to in Regulation 9 of General Administration Regulations of the OHS Act and in terms of National Railway Safety Act 6 of 2002 (and applicable SANS Codes) involving the contractor and his subcontractor on TFR premises, shall be reported to the TFR Contract Manager and Department of Labour as prescribed by the OHS Act

The contractor must establish a procedure for the management of all health and safety incidents. This procedure must define the responsibilities, methodologies and processes that must be followed for:

- Reporting an incident;
- Investigating an incident;
- Analysing an incident to determine the root cause;
- Identifying and implementing corrective actions to prevent a recurrence; and
- Communicating information concerning an incident to relevant persons and / or groups.

An incident may have multiple impacts. For each impact, the Actual Consequence and the Maximum Reasonable Outcome must be evaluated. Each impact must be evaluated independently, with the most significant classification forming the primary rating of the incident.

A Near Hit is an incident. All Near Hits must be reported.

An incident must be reported on the same work day or shift on which it occurs and preliminary details must be recorded. Depending on the Actual Consequence and Maximum Reasonable Potential Outcome of the impact(s), the relevant internal and external parties must be notified in accordance with specified protocols and timeframes, and legislative requirements.

In the event of a significant incident (i.e. an incident with an Actual Consequence of Moderate, Major or Catastrophic, or a Maximum Reasonable Potential Outcome of High or Extreme, work must cease and must only resume once the necessary actions (including the re-evaluation of any relevant risk assessments) have been taken to eliminate or reduce the risk of recurrence.

Work must only be permitted to recommence once formal authorisation has been granted by the Transnet Contract Manager. In the case of incidents with an Actual Consequence of Major or Catastrophic, work must not be permitted to recommence until authorisation has been granted by the relevant government authorities (i.e. the South African Police, the Department of Labour or the Department of Mineral Resources).

The Construction Manager must ensure that an investigation is completed within 7 calendar days for each incident that occurs, and that appropriately senior personnel participate in, and authorise the outcomes of, each investigation. Incident investigations must be facilitated by competent and experienced persons who have been trained in the appropriate methodology.

Each incident (including Near Hits) must be investigated to a level of detail that is appropriate for the Maximum Reasonable Potential Outcome of the incident. Each incident must be analysed to determine the root cause, and corrective actions must be identified and prioritised for implementation to eliminate or reduce the risk(s) in order to prevent recurrence of the incident.

For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified. Progress on implementing corrective actions (i.e. closing incidents) must be monitored and reported on. The implementation of corrective actions must be verified during monthly audits by the Health and Safety Officers but also no later than 30 calendar days after the conclusion of the incident investigation.

The contractor must document the results of each investigation and a report must be submitted to the Transnet Contract Manager within five working days of the incident occurring.

As a minimum, each incident report must include:

- The date, time and location of the incident;
- A detailed description of the incident, including photographs;
- The names of any injured persons;
- Injury details (if applicable);
- A summary of the first aid and / or medical treatment provided (if applicable);
- The current status of any injured persons;
- The root causes of the incident; and
- Detailed corrective actions, including responsible persons and target dates for implementation.

Each significant incident must be summarised for its lessons learnt following the investigation. This information must be reviewed by the contractor's Construction Manager to assure completeness, accuracy and relevance before it is shared with (communicated to) all project personnel.

23. Non-conformance and Action Management

The contractor must establish a process for identifying and recording corrective actions arising from:

- Incident investigations;
- Hazard identification and risk assessment;
- Measurement and monitoring;
- Improvement plans and suggestions;
- Managing change;
- Audits and inspections; and
- Safety observations and coaching (safety interactions).

The contractor must establish a procedure for managing actions that addresses:

- Identification, categorisation and prioritisation of actions;
- Formal evaluation and approval of actions (management of change process);
- Assignment of responsibilities, resources and schedules for implementation;
- Implementation of actions;
- Tracking and reporting on implementation status; and
- Monitoring and verifying the effectiveness of the actions.

24. Performance Assessment and Auditing

The contractor must establish and maintain programmes for measuring and monitoring HEALTH AND SAFETY performance on a regular basis. Metrics must include leading and lagging indicators, and be based on qualitative and quantitative data.

24.1 Reporting on Performance

Reports summarising the contractor's health and safety performance on the contract must be compiled and reported to the Transnet Contract Manager on a monthly basis.

The contractor must be prepared to discuss the content of these reports at scheduled health and safety meetings.

The reports must contain the following information:

- Number of contractor and sub-contractor employees on site;
- Total hours worked on site by contractor and sub-contractor employees (by company);
- Number of incidents by category (i.e. Near Hit, FAI, MTI and LTI);
- Lost Time Injury Frequency Rate (LTIFR) (project to date and 12-month rolling);
- Details of all new incidents for the reporting period and the corrective actions taken or to be taken;
- Feedback (progress updates) on all open incidents and outstanding corrective actions;
- Status and feedback on any employee that may have been injured and has not yet returned to work;
- Details of all health and safety training carried out during the reporting period;
- Number of SOC's (Safety Observations and Coaching) carried out during the reporting period;
- SOC trends identified and proposed action for the coming week or month to maintain positive trends and / or address negative trends;
- Details of all audits, inspections and site visits carried out during the reporting period, and the corrective actions taken (or to be taken) to address all non-conformances;
- Feedback (progress updates) on all open non-conformances and outstanding corrective actions;
- Number of Toolbox Talks conducted during the reporting period (monthly);
- Number of Planned Task Observations (PTO's) carried out during the reporting period (monthly);
- Details of all active risk assessments and Safe Work Procedures highlighting those that are due for review in the coming month (monthly);
- A look ahead (to the coming week, month or quarter) to ensure that appropriate health and safety planning and preparation is done for upcoming work;
- Challenges faced with regard to health and safety; and
- Any other health and safety related information specific to the project that may be required.

Leading indicators (e.g. audit findings, observations, etc.) must be analysed, and any negative trends identified with regard to unsafe behaviour or conditions must be appropriately addressed to prevent incidents.

Lagging indicators (e.g. injuries, illnesses, near hits, etc.) must be investigated in detail to determine the root causes. Corrective actions must be identified, implemented and integrated into Safe Work Procedures to prevent recurrences.

24.2 Audits and Inspections

On a monthly basis, the health and safety management system and workplace activities of the contractor will be audited by the Transnet Contract Manager, any person delegated by him or Transnet Health and Safety Specialist to assess compliance with the project health and safety requirements. Any deviation from these requirements (i.e. non-conformance) that places the health or safety of any person in immediate danger will result in the specific activity being stopped until the non-conformance is corrected.

For each non-conformance determined during any audit, the contractor must identify and implement appropriate corrective actions.

For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified. Progress on implementing corrective actions (i.e. closing non-conformances) must be monitored and reported on. The implementation of corrective actions will be verified during the monthly audits.

Should it be determined that the contractor's level of compliance is unsatisfactory, all work being performed by the contractor on the project site may be stopped (at the contractor's expense) until an investigation into the reasons for the poor performance has been carried out, a corrective action plan has been developed, and corrective actions have been implemented.

In addition to the audit carried out by the Transnet Contract Manager or Health and Safety Specialist, the contractor must carry out an internal audit on a monthly basis to assess compliance with the project health and safety requirements (including the requirements of this specification and the contractor's Health and Safety Management Plan). Furthermore, the contractor must ensure that each appointed sub-contractor is audited and measured to the same standard. Copies of these audit reports must be submitted to the Transnet Contract Manager on a monthly basis.

The contractor must carry out internal health and safety inspections as follows:

- General site health and safety inspections on a daily basis; and
- Inspections of plant, tools and equipment prior to establishment or use on site, and at least monthly thereafter.

All audits and inspections must be carried out by competent persons who have been appointed in writing.

A schedule of planned audits and inspections must be compiled and maintained ensuring that:

- All work areas and all activities are covered at regular intervals;
- All applicable legal requirements are complied with; and
- Areas or activities with significant associated hazards or risks receive greater attention.

26. Confidentiality

The Contractor must, at all times, consider all data or information given to him or that is required in connection with the work of the Company, as confidential and not make unauthorized use of it.

He/she must ensure that such data or information is not given to any non-employee of the contractor without written consent of the TFR Project Manager.

The Contractor shall be aware of the confidentiality of the mentioned information and is compelled to treat it accordingly.

The contractor must provide adequate physical protection for any confidential documents, etc, which were obtained from Transnet in connection with the contract work as well as any copies made thereof. If any documents or sketches are lost TFR must be notified immediately.



Transnet SOC Limited Registration Number 1990/00900/06

TRANSNET SPECIFICATION

E7/1 - SPECIFICATION FOR GENERAL WORK AND WORKS ON, OVER, UNDER OR ADJACENT TO RAILWAY LINES AND NEAR HIGH VOLTAGE EQUIPMENT

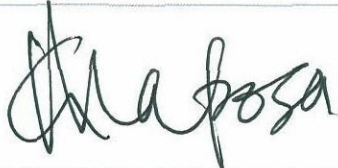
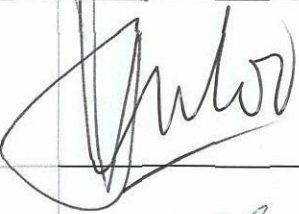
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SPECIFICATION FOR GENERAL WORK AND WORKS ON, OVER, UNDER OR ADJACENT TO RAILWAY LINES AND NEAR HIGH VOLTAGE EQUIPMENT

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Date: May 2011

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1.0 SCOPE

- 1.1 This specification covers the network operator's requirements for general work and works on, over, under or adjacent to railway lines and near high voltage equipment.

2.0 DEFINITIONS

The following definitions shall apply:

"Authorised Person" - A person whether an employee of the network operator or not, who has been specially authorised to undertake specific duties in terms of Transnet' publication Electrical Safety Instructions, and who holds a certificate or letter of authority to that effect.

"Barrier" Any device designed to restrict access to "live" high-voltage electrical equipment.

"Bond" - A short conductor installed to provide electrical continuity.

"Contractor" - Any person or organisation appointed by the network operator to carry out work on its behalf.

"Contract Supervisor" - The person or juristic person appointed by the network operator from time to time as the Contract Supervisor, to administer the Contractor's performance and execution of the Works according to the powers and rights held by and obligations placed upon the Contract Supervisor in terms of the Contract.

"Dead" - Isolated and earthed.

"Electrical Officer (Contracts)" - The person appointed in writing by the Project Manager in terms of this specification as the person who shall be consulted by the Contractor in all electrical matters to ensure that adequate safety precautions are taken by the Contractor.

"Executive Officer" - The person appointed by the network operator from time to time as the Executive Officer to act according to the rights and powers held by and obligations placed upon him in terms of the Contract.

"High-Voltage" - A voltage normally exceeding 1000 volts.

"Live" - A conductor is said to be "live" when it is at a potential different from that of the earth or any other conductor of the system of which it forms a part.

"Near" - To be in such a position that a person's body or the tools he is using or any equipment he is handling may come within 3 metres of "live" exposed high-voltage electrical equipment.

"Occupation" - An authorisation granted by the network operator for work to be carried out under specified conditions on, over, under or adjacent to railway lines.

"Occupation Between Trains" - An occupation during an interval between successive trains.

"Optical Fibre Cable" - Buried or suspended composite cable containing optical fibres used in:

- telecommunication networks for transmission of digital information and
- safety sensitive train operations systems.

"Project Manager" – As defined in the special conditions of the contract. The person or juristic person appointed by the network operator from time to time as the Project Manager, to administer the Contract according to the powers and rights held by and obligations placed upon him in terms of the Contract.

"Responsible Representative" - The responsible person in charge, appointed by a contractor, who has undergone specific training (and holds a certificate) to supervise (general or direct) staff under his control who perform general work or to work on, over, under or adjacent to railway lines and in the vicinity of high-voltage electrical equipment.

"Total Occupation" - An occupation for a period when trains are not to traverse the section of line covered by the occupation.

"Work on" - Work undertaken on or so close to the equipment that the specified working clearances to the "live" equipment cannot be maintained.

"Work Permit" - A combined written application and authority to proceed with work on or near dead electrical equipment.

"Works" – The contractual intent for the work to be done as defined in the contract at a defined work site.

PART A - GENERAL SPECIFICATION

3.0 AUTHORITY OF OFFICERS OF TRANSNET

- 3.1 The Contractor shall co-operate with the officers of the network operator and shall comply with all instructions issued and restrictions imposed with respect to the Works which bear on the existence and operation of the network operator's railway lines and high-voltage equipment.
- 3.2 Without limiting the generality of the provisions of clause 3.1, any duly authorised representative of the network operator, having identified himself, may stop the work if, in his opinion, the safe passage of trains or the safety of the network operator's assets or any person is affected. **CONSIDERATIONS OF SAFETY SHALL TAKE PRECEDENCE OVER ALL OTHER CONSIDERATIONS.**

4.0 CONTRACTOR'S REPRESENTATIVES AND STAFF

- 4.1 The Contractor shall nominate Responsible Representatives of whom at least one shall be available at any hour for call-out in cases of emergency. The Contractor shall provide the Contract Supervisor with the names, addresses and telephone numbers of the representatives.
- 4.2 The Contractor guarantees that he has satisfied himself that the Responsible Representative is fully conversant with this specification and that he shall comply with all his obligations in respect thereof.
- 4.3 The Contractor shall ensure that all contractor staff receives relevant awareness, educational and competence training regarding safety as prescribed.

5.0 OCCUPATIONS AND WORK PERMITS

- 5.1 Work to be done during total occupation or during an occupation between trains or under a work permit shall be done in a manner decided by the Contract Supervisor and at times to suit the network operator requirements.
- 5.2 The Contractor shall organise the Works in a manner which will minimise the number and duration of occupations and work permits required.
- 5.3 The network operator will not be liable for any financial or other loss suffered by the Contractor arising from his failure to complete any work scheduled during the period of an occupation or work permit.
- 5.4 The Contractor shall submit to the Contract Supervisor, in writing, requests for occupations or work permits together with details of the work to be undertaken, at least 21 days before they are required. The network operator does not undertake to grant an occupation or work permit for any particular date, time or duration.
- 5.5 The network operator reserves the right to cancel any occupation or work permit at any time before or during the period of occupation or work permit. If, due to cancellation or change in date or time, the Contractor is not permitted to start work under conditions of total occupation or work permit at the time arranged, all costs caused by the cancellation shall be born by the Contractor except as provided for in clauses 5.6 to 5.8.
- 5.6 When the Contractor is notified less than 2 hours before the scheduled starting time that the occupation or work permit is cancelled, he may claim reimbursement of his direct financial losses caused by the loss of working time up to the time his labour and plant are employed on other work, but not exceeding the period of the cancelled occupation or work permit.
- 5.7 When the Contractor is notified less than 2 hours before the scheduled starting time, or during an occupation or work permit, that the duration of the occupation or work permit is reduced, he may claim reimbursement of his direct financial losses caused by the loss of working time due to the reduced duration of the occupation or work permit.
- 5.8 Reimbursement of the Contractor for any loss of working time in terms of clause 5.6 and 5.7, shall be subject to his claims being submitted within 14 days of the event with full details of labour and plant involved, and provided that the Contract Supervisor certifies that no other work on which the labour and plant could be employed was immediately available.
- 5.9 Before starting any work for which an occupation has been arranged, the Contractor shall obtain from the Contract Supervisor written confirmation of the date, time and duration of the occupation.
- 5.10 Before starting any work for which a work permit has been arranged, the Responsible Representative shall read and sign portion C of the Work Permit, signifying that he is aware of the work boundaries within which work may be undertaken. After the work for which the permit was granted has been completed, or when the

work permit is due to be terminated, or if the permit is cancelled after the start, the same person who signed portion C shall sign portion D of the Work Permit, thereby acknowledging that he is aware that the electrical equipment is to be made "live". The Contractor shall advise all his workmen accordingly.

6.0 SPEED RESTRICTIONS AND PROTECTION

- 6.1 When speed restrictions are imposed by the network operator because of the Contractor's activities, the Contractor shall organise and carry out his work so as to permit the removal of the restrictions as soon as possible.
- 6.2 When the Contract Supervisor considers protection to be necessary the Contractor shall, unless otherwise agreed, provide all protection including flagmen, other personnel and all equipment for the protection of the network operator's and the Contractor's personnel and assets, the public and including trains.
- 6.2.1 The network operator will provide training free of charge of the Contractor's flagmen and other personnel performing protection duties. The Contractor shall consult with the Contract Supervisor, whenever he considers that protection will be necessary, taking into account the minimum permissible clearances set out in the Manual for Track Maintenance (Document no. BBB0481):
- Drawing no. BE-97 Sheet 1: Horizontal Clearances: 1065mm gauge (Annexure 1 sheet 1)
 - Drawing no. BE-97 Sheet 2: Vertical Clearances: 1065mm gauge (Annexure 1 sheet 2)
 - Drawing no. BE-97 Sheet 3: Clearances: Platform (Annexure 1 sheet 3)
 - Drawing no. BE-97 Sheet 5: Clearances: 610mm Gauge (Annexure 1 sheet 5)
- 6.3 The Contractor shall appoint a Responsible Representative to receive and transmit any instruction which may be given by the network operator personnel providing protection.

7.0 ROADS AND ROADS ON THE NETWORK OPERATOR'S PROPERTY

- 7.1 The Contractor shall take every reasonable precaution to prevent damage to any roads or bridges used to obtain access to the site, and shall select routes, use vehicles, and restrict loads so that any extraordinary traffic as may arise from the moving of plant or material to or from the site shall be limited as far as is reasonably possible.
- 7.2 The Contractor shall not occupy or interfere in any way with the free use of any public or private road, right-of-way, path or street unless the Contract Supervisor has obtained the approval of the road authority concerned.

8.0 CLEARANCES

- 8.1 No temporary works shall encroach on the appropriate minimum clearances set out in the Manual for Track Maintenance (Document no. BBB0481):
- Drawing no. BE-97 Sheet 1: Horizontal Clearances: 1065mm gauge (Annexure 1 sheet 1)
 - Drawing no. BE-97 Sheet 2: Vertical Clearances: 1065mm gauge (Annexure 1 sheet 2)
 - Drawing no. BE-97 Sheet 3: Clearances: Platform (Annexure 1 sheet 3)
 - Drawing no. BE-97 Sheet 5: Clearances: 610mm Gauge (Annexure 1 sheet 5)

9.0 STACKING OF MATERIAL

- 9.1 The Contractor shall not stack any material closer than 3m from the centre line of any railway line without prior approval of the Contract Supervisor.

10.0 EXCAVATION, SHORING, DEWATERING AND DRAINAGE

- 10.1 Unless otherwise approved by the Contract Supervisor any excavation adjacent to a railway line shall not encroach on the hatched area shown in Figure 1.

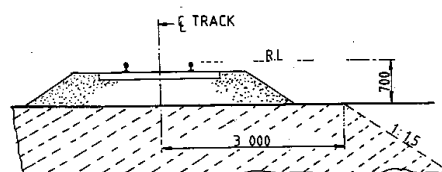


Fig. 1.

- 10.2 The Contractor shall provide, at his own cost any shoring, dewatering or drainage of any excavation unless otherwise stipulated elsewhere in the Contract.
- 10.3 Where required by the Contract Supervisor, drawings of shoring for any excavation under or adjacent to a railway line shall be submitted and permission to proceed, obtained before the excavation is commenced.
- 10.4 The Contractor shall prevent ingress of water to the excavation but where water does enter, he shall dispose of it as directed by the Contract Supervisor.
- 10.5 The Contractor shall not block, obstruct or damage any existing drains either above or below ground level unless he has made adequate prior arrangements to deal with drainage.

11.0 FALSEWORK FOR STRUCTURES

- 11.1 Drawings of falsework for the construction of any structure over, under or adjacent to any railway line shall be submitted to the Contract Supervisor and his permission to proceed obtained before the falsework is erected. Each drawing shall be given a title and a distinguishing number and shall be signed by a registered professional engineer certifying that he has checked the design of the falsework and that the drawings are correct and in accordance with the design.
- 11.2 After the falsework has been erected and before any load is applied, the Contractor shall submit to the Contract Supervisor a certificate signed by a registered professional engineer certifying that he has checked the falsework and that it has been erected in accordance with the drawings. Titles and numbers of the drawings shall be stated in the certificate. Notwithstanding permission given by the Contract Supervisor to proceed, the Contractor shall be entirely responsible for the safety and adequacy of the falsework.

12.0 PILING

- 12.1 The Contract Supervisor will specify the conditions under which piles may be installed on the network operator's property.

13.0 UNDERGROUND SERVICES

- 13.1 No pegs or stakes shall be driven or any excavation made before the Contractor has established that there are no underground services which may be damaged thereby.
- 13.2 Any damage shall be reported immediately to the Contract Supervisor, or to the official in charge at the nearest station, or to the traffic controller in the case of centralised traffic control.

14.0 BLASTING AND USE OF EXPLOSIVES

- 14.1 When blasting within 500m of a railway line, the Contractor shall observe the requirements stipulated in this specification.
- 14.2 No blasting shall be carried out except with the prior written permission of the Contract Supervisor and under such conditions as he may impose.
- 14.3 On electrified lines the Contractor shall also obtain the permission of the Electrical Officer (Contracts) before blasting, and shall give at least 21 days notice of his intention to blast. No blasting shall be done in the vicinity of electrified lines unless a member of the network operator's electrical personnel is present.
- 14.4 The Contractor shall arrange for the supply, transport storage and use of explosives.
- 14.5 The Contractor shall have labour, tools and plant, to the satisfaction of the Contract Supervisor, available on the site to clear immediately any stones or debris deposited on the track or formation by blasting, and to repair any damage to the track or formation immediately after blasting. Repairs to the track shall be carried out only under the supervision of a duly authorised representative of the network operator.
- 14.6 The Contractor shall notify the Contract Supervisor of his intention to blast at least 21 days before the commencement of any blasting operations.
- 14.7 Before any blasting is undertaken, the Contractor and the Contract Supervisor shall jointly examine and measure up any buildings, houses or structures in the vicinity of the proposed blasting to establish the extent of any existing cracking or damage to such structures, etc. The Contractor, shall, subject to the provisions stipulated in the Contract Insurance Policy, make good any deterioration of such buildings, houses, or structures, which, in the opinion of the Contract Supervisor, was directly caused by the blasting.
- 14.8 After completion of the blasting the Contractor shall obtain a written clearance from each landowner in

the vicinity of the blasting operations to the effect that all claims for compensation in respect of damage caused by the blasting operations to their respective properties, have been settled.

- 14.9 The Contractor shall provide proof that he has complied with the provisions of clauses 10.17.1 to 10.17.4 of the Explosives Regulations (Act 26 of 1956 as amended).
- 14.10 Blasting within 500m of a railway line will only be permitted during intervals between trains. A person appointed by the Contract Supervisor, assisted by flagmen with the necessary protective equipment, will be in communication with the controlling railway station.
- Only this person will be authorised to give the Contractor permission to blast, and the Contractor shall obey his instructions implicitly regarding the time during which blasting may take place.
- 14.11 The flagmen described in clause 14.10, where provided by the network operator, are for the protection of trains and the network operator's property only, and their presence does not relieve the Contractor in any manner of his responsibilities in terms of Explosives Act or Regulations, or any obligation in terms of this Contract.
- 14.12 The person described in clause 14.10 will record in a book provided and retained by the network operator, the dates and times:-
- (i) when each request is made by him to the controlling station for permission to blast;
 - (ii) when blasting may take place;
 - (iii) when blasting actually takes place; and
 - (iv) when he advises the controlling station that the line is safe for the passage of trains.
- 14.13 Before each blast the Contractor shall record in the same book, the details of the blast to be carried out. The person appointed by the Contract Supervisor and the person who will do the blasting shall both sign the book whenever an entry described in clause 14.12 is made.

15.0 RAIL TROLLEYS

- 15.1 The use of rail trolleys or trestle trolleys on a railway line for working on high voltage equipment will be permitted only if approved by the Contract Supervisor and under the conditions stipulated by him.
- 15.2 All costs in connection with trolley working and any train protection services requested by the Contractor shall, be borne by the Contractor, unless otherwise agreed.

16.0 SIGNAL TRACK CIRCUITS

- 16.1 Where signal track circuits are installed, the Contractor shall ensure that no material capable of conducting an electrical current makes contact between rails of railway line/lines.
- 16.2 No signal connections on track-circuited tracks shall be severed without the Contract Supervisor's knowledge and consent.

17.0 PENALTY FOR DELAYS TO TRAINS

- 17.1 If any trains are delayed by the Contractor and the Contract Supervisor is satisfied that the delay was avoidable, a penalty will be imposed on the Contractor as stipulated in the contract, for the period and number of trains delayed.

18.0 SURVEY BEACONS AND PEGS

- 18.1 The Contractor shall not on any account move or damage any beacon, bench mark, reference mark, signal or trigonometrical station in the execution of the Works without the written approval of the Contract Supervisor.

Should the Contractor be responsible for any such occurrence, he shall report the circumstances to the Contract Supervisor who will arrange with the Director-General of Surveys for replacement of the beacon or mark at the cost of the Contractor.

- 18.2 The Contractor shall not move or damage any cadastral or mining beacon without the written approval of the Contract Supervisor and before it has been referenced by a registered land surveyor. Any old boundary beacon, which becomes an internal beacon on creation of new boundaries, shall not be moved without the written approval of the Contract Supervisor.

Should the Contractor move or damage any cadastral or mining beacon without authority, he shall be responsible for having it replaced, at his cost, by a land surveyor.

- 18.3 The Contractor shall preserve all pegs and bench marks. Such survey points shall not be removed without the written approval of the Contract Supervisor. Should any peg or benchmark be removed without authority, the Contract Supervisor will arrange for its replacement and the cost will be recovered from the Contractor. No claim will be considered for delay in replacing any such peg or bench mark. Each peg replaced shall be checked by the Contractor.
- 18.4 Where a new boundary has been established, beacons on the fence line shall not be disturbed, and fence posts or anchors may not be placed or excavations made within 0,6 m of any beacon without the prior written approval of the Contract Supervisor.

19.0 TEMPORARY LEVEL CROSSINGS

- 19.1 The Contract Supervisor may, on request of the Contractor, and if necessary for the purpose of execution of the Works, permit the construction of a temporary level crossing over a railway a line at a position approved by the Contract Supervisor and at the Contractor's cost. The period for which the temporary level crossing is permitted will be at the discretion of the Contract Supervisor.

- 19.2 The Contractor will provide protection and supervise the construction of the road over the track(s) and within the railway servitude at the level crossing, as well as the erection of all road signs and height gauges. All cost to be borne by the applicant.

The Contractor shall exercise extreme caution in carrying out this work, especially in respect of damage to tracks, services, overhead power and communications routes and prevent contact with "live" overhead electrical equipment.

Unless otherwise agreed, the Contractor will provide the service deviations or alterations to the network operator's track-, structure-, drainage-, electrical-, telecommunications- and train authorisation systems to accommodate the level crossing.

- 19.3 The Contractor shall take all necessary steps including the provision of gates, locks and, where necessary, watchmen to restrict the use of the temporary level crossing to himself and his employees, his subcontractors and their employees, the staff of the network operator and to such other persons as the Contract Supervisor may permit and of whose identity the Contractor will be advised. If so ordered by the Contract Supervisor, the Contractor shall provide persons to control road traffic using the temporary level crossing. Such persons shall stop all road traffic when any approaching train is within seven hundred and fifty (750) metres of the temporary level crossing, and shall not allow road traffic to proceed over it until the lines are clear.
- 19.4 The Contractor shall maintain the temporary level crossing within the railway servitude in good condition for the period it is in use. A temporary agreement with the road authority to be concluded for the maintenance of the level crossing outside the railway servitude.
- 19.5 When the temporary level crossing is no longer required by the Contractor, or permitted by the network operator, the Contractor shall at his own cost remove it and restore the site and the network operator's track-, structure-, drainage-, electrical-, telecommunications- and train authorisation systems to its original condition. Work over the tracks and within the railway servitude will be supervised by the network operator.

20.0 COMPLETION OF THE WORKS

- 20.1 On completion of the works, the Contractor shall remove all the remaining construction plant and material from the site, other than material which is the property of the network operator, and leave the site in a clean, neat and tidy condition. If material and plant is required for the liability and maintenance period the Contract supervisor must authorise it's retention on site.

21.0 PROTECTION OF PERSONS AND PROPERTY

- 21.1 The Contractor shall provide and maintain all lights, guards, barriers, fencing and watchmen when and where necessary or as required by the Contract Supervisor or by any statutory authority, for the protection of the Works and for the safety and convenience of the public.

Red, yellow, green or blue lights may not be used by the Contractor as they can be mistaken for signals. Red, yellow, green or white flags shall only be used for protection by the Contractor. Within the precincts of a port the Contractor shall obtain the permission of the Port Captain before installing any light.

- 21.2 The Contractor shall take all the requisite measures and precautions during the course of the Works to:
- (i) protect the public and property of the public,
 - (ii) protect the property and workmen of both the network operator and the Contractor,
 - (iii) avoid damage to and prevent trespass on adjoining properties, and
 - (iv) ensure compliance with any instruction issued by the Contract Supervisor or other authorised person, and with any stipulation embodied in the contract documents which affects the safety of any person or thing.
- 21.3 The network operator will provide, at its own cost, protection for the safe working of trains during such operations as the Contract Supervisor may consider necessary. Protection by the network operator for any purpose whatsoever, does not absolve the Contractor of his responsibilities in terms of the Contract.
- 21.4 The Contractor shall take all precautions and appoint guards, watchmen and compound managers for prevention of disorder among and misconduct by the persons employed on the Works and by any other persons, whether employees or not, on the work site and for the preservation of the peace and protection of persons and property in the direct neighbourhood. Any relocation of camps because of disorder shall be at the Contractor's expense.
- 21.5 All operations necessary for the execution of the Works, including the provision of any temporary work and camping sites, shall be carried out so as not to cause veldt fires, ground and environmental pollution, soil erosion or restriction of or interference with streams, furrows, drains and water supplies.
- If the original surface of the ground is disturbed in connection with the Works, it shall be made good by the Contractor to the satisfaction of the land owner, occupier or responsible authority.
- 21.6 The Contractor shall take all reasonable steps to minimise noise and disturbance when carrying out the Works, including work permitted outside normal working hours.
- 21.7 Dumping of waste or excess materials by the Contractor shall, in urban areas, be done under the direction and control of, and at sites made available by the local authority. Dumping outside local authority boundaries shall be done only with the express permission and under the direction and control of the Contract Supervisor.
- 21.8 The Contractor shall comply with environmental protection measures and specifications stipulated by the Contract Supervisor and/or local and environmental authorities.
- 22.0 INTERFERENCE WITH THE NETWORK OPERATOR'S ASSETS AND WORK ON OPEN LINES**
- 22.1 The Contractor shall not interfere in any manner whatsoever with an open line, nor shall he carry out any work or perform any act which affects the security, use or safety of an open line except with the authority of the Contract Supervisor and in the presence of a duly authorised representative of the network operator.
- 22.2 The Contractor shall not carry out any work or operate any plant, or place any material whatsoever nearer than three metres from the centre line of any open line except with the written permission of the Contract Supervisor and subject to such conditions as he may impose.
- 22.3 Care must be taken not to interfere with or damage any services such as overhead wire routes, cables or pipes and optical fibre cable, except as provided for the work specified. The Contractor will be held responsible for any damage to or interruption of such services arising from any act or omission on his part or of any of his employees, or persons engaged by him on the Works. The cost of repairing, replacing or restoring the services, as well as all other costs arising from any damage to services, shall be borne by, and will be recovered from the Contractor.
- 22.4 Authority granted by the Contract Supervisor and the presence of an authorised representative of the network operator in terms hereof, shall not relieve the Contractor of his duty to comply with this specification.
- 23.0 ACCESS, RIGHTS-OF-WAY AND CAMPSITES**
- 23.1 Where entry onto the network operator's property is restricted, permission to enter will be given only for the purpose of carrying out the Works and will be subject to the terms and conditions laid down by the network operator.
- 23.2 The Contractor shall arrange for campsites, workplaces and access thereto as well as for any right-of-

way over private property to the site of the Works, and for access within the boundaries of the network operator's property. The owners of private property to be traversed shall be approached and treated with tact and courtesy by the Contractor, who shall, if necessary, obtain a letter of introduction to such property owners from the Contract Supervisor.

The Contractor shall be responsible for the closing of all gates on roads and tracks used by him or his employees. Except with the prior approval of the Contract Supervisor and the owner or occupier of any private land to be traversed, the Contractor shall not cut, lower, damage, remove or otherwise interfere with any fence or gate which is either on the network operator's property or on private property and which restricts access to the Works. Where such approval has been given, the Contractor shall prevent entry of animals or unauthorised persons onto the network operator's or private property, and shall make the fences safe against trespass at the close of each day's work.

23.3 The Contractor shall take all reasonable steps to confine the movement of vehicles and plant to the approved right-of-way to minimise damage to property, crops and natural vegetation.

23.4 When access is no longer required, and before completion of the Works, the Contractor shall repair, restore or replace any fence or gate damaged during execution of the Works to the satisfaction of the Contract Supervisor and shall furnish the Contract Supervisor with a certificate signed by the owner and occupier of land over which he has gained access to a campsite, workplace and the Works, certifying that the owner and occupier have no claim against the Contractor or the network operator arising from the Contractor's use of the land. Should the Contractor be unable to obtain the required certificate, he shall report the circumstances to the Contract Supervisor.

24.0 SUPERVISION

24.1 The Contract Supervisor will provide overall technical superintendence of the Works, and may direct the Contractor in terms of the provisions of the Contract or in respect of any measures which the Contract Supervisor may require for the operations of the network operator, the safety of trains, property and workmen of the network operator, and for the safety of other property and persons. The Contractor shall carry out the directions of the Contract Supervisor. The superintendence exercised by the Contract Supervisor, including any agreement, approval, refusal or withdrawal of any approval given, shall not relieve the Contractor of any of his duties and liabilities under the Contract, and shall not imply any assumption by the network operator or by the Contract Supervisor of the legal and other responsibilities of the Contractor in carrying out the Works.

24.2 The Contract Supervisor may delegate to any deputy or other person, any of his duties or functions under the Contract. On receiving notice in writing of such delegation, the Contractor shall recognise and obey the deputy or person to whom any such duties or functions have been delegated as if he were the Contract Supervisor.

24.3 The Contractor shall exercise supervision over the Works at all times when work is performed or shall be represented by an agent having full power and authority to act on behalf of the Contractor. Such agent shall be competent and responsible, and have adequate experience in carrying out work of a similar nature to the Works, and shall exercise personal supervision on behalf of the Contractor. The Contract Supervisor shall be notified in writing of such appointment which will be subject to his approval.

24.4 The Contractor or his duly authorised agent shall be available on the site at all times while the Works are in progress to receive the orders and directions of the Contract Supervisor.

25.0 HOUSING OF EMPLOYEES

25.1 The Contractor shall, where necessary, make his own arrangements for suitable housing of his employees. Where temporary housing is permitted by the Contract Supervisor on any part of the site, the Contractor shall provide suitable sanitation, lighting and potable water supplies in terms of the requirements of the local authority or the current network operator's specification; Minimum Communal Health Requirements in Areas outside the Jurisdiction of a Local Authority - E.4B, as applicable.

25.2 Fouling the area inside or outside the network operator's boundaries shall be prevented. The Contractor will be called upon by the Contract Supervisor to dispose of any foul or waste matter generated by the Contractor.

26.0 OPTICAL FIBRE CABLE ROUTES

26.1 The Contractor shall not handle, impact, move or deviate any optical fibre cable without prior approval.

26.2 Works that in any way affect the optical fibre cable requires prior approval from the Contract Supervisor

who will determine the work method and procedures to be followed.

PART B - SPECIFICATION FOR WORK NEAR HIGH-VOLTAGE ELECTRICAL EQUIPMENT

27.0 GENERAL

- 27.1 This specification is based on the contents of Transnet's publication ELECTRICAL SAFETY INSTRUCTIONS, as amended, a copy of which will be made available on loan to the Contractor for the duration of the contract.

These instructions apply to all work near "live" high-voltage equipment maintained and/or operated by the network operator, and the onus rests on the Contractor to ensure that he obtains a copy.

- 27.2 This specification must be read in conjunction with and not in lieu of the Electrical Safety Instructions.
- 27.3 The Contractor's attention is drawn in particular to the contents of Part I, Sections 1 and 2 of the Electrical Safety Instructions.
- 27.4 The Electrical Safety Instructions cover the minimum safety precautions which must be taken to ensure safe working on or near high-voltage electrical equipment, and must be observed at all times. Should additional safety measures be considered necessary because of peculiar local conditions, these may be ordered by and at the discretion of the Electrical Officer (Contracts).
- 27.5 The Contractor shall obtain the approval of the Electrical Officer (Contracts) before any work is done which causes or could cause any portion of a person's body or the tools he is using or any equipment he is handling, to come within 3 metres of any "live" high-voltage equipment.
- 27.6 The Contractor shall regard all high-voltage equipment as "live" unless a work permit is in force.
- 27.7 Safety precautions taken or barriers erected shall comply with the requirements of the Electrical Officer (Contracts), and shall be approved by him before the work to be protected is undertaken by the Contractor. The Contractor shall unless otherwise agreed, bear the cost of the provision of the barriers and other safety precautions required, including the attendance of the network operator's staff where this is necessary.
- 27.8 No barrier shall be removed unless authorised by the Electrical Officer (Contracts).

28.0 WORK ON BUILDINGS OR FIXED STRUCTURES

- 28.1 Before any work is carried out or measurements are taken on any part of a building, fixed structure or earthworks of any kind above ground level situated within 3 metres of "live" high-voltage equipment, the Electrical Officer (Contracts) shall be consulted to ascertain the conditions under which the work may be carried out.
- 28.2 No barrier erected to comply with the requirements of the Electrical Officer (Contracts) shall be used as temporary staging or shuttering for any part of the Works.
- 28.3 The shuttering for bridge piers, abutments, retaining walls or parapets adjacent to or over any track may be permitted to serve as a barrier, provided that it extends at least 2,5 metres above any working level in the case of piers, abutments and retaining walls and 1,5 metres above any working level in the case of parapets.

29.0 WORK DONE ON OR OUTSIDE OF ROLLING STOCK, INCLUDING LOADING OR UNLOADING

- 29.1 No person may stand, climb or work, whilst on any platform, surface or foothold:
- 29.1.1 higher than the normal unrestricted access way, namely -
 - 29.1.1.1 external walkways on diesel, steam and electric locomotives, steam heat vans, etc. and
 - 29.1.1.2 walkways between coaches and locomotives.
 - 29.1.2 of restricted access ways in terms of the Electrical Safety Instructions namely -
 - 29.1.2.1 the floor level of open wagons
 - 29.1.2.2 external walkways or decks of road-rail vehicles, on-track maintenance machines and material trains.
 - 29.1.3 Unauthorised staff working on these platforms must be directly supervised by duly authorised persons in terms of clause 607.1.3 of the Electrical Safety Instructions. These persons must attend the relevant electrical safety module training. A letter of training must then be issued by an accredited training authority. A Category C Certificate of Authority must be obtained from the

local depot examining officer.

- 29.2 When in the above positions no person may raise his hands or any equipment he is handling above his head.
- 29.3 In cases where the Contractor operates his own rail mounted equipment, he shall arrange for the walkways on this plant to be inspected by the Electrical Officer (Contracts) and approved, before commencement of work.
- 29.4 The handling of long lengths of material such as metal pipes, reinforcing bars, etc should be avoided, but if essential they shall be handled as nearly as possible in a horizontal position below head height.
- 29.5 The Responsible Representative shall warn all persons under his control of the danger of being near "live" high-voltage equipment, and shall ensure that the warning is fully understood.
- 29.6 Where the conditions in clauses 30.1 to 30.4 cannot be observed the Electrical Officer (Contracts), shall be notified. He will arrange for suitable Safety measures to be taken. The Electrical Officer (Contracts), may in his discretion and in appropriate circumstances, arrange for a suitable employee of the Contractor to be specially trained by the network operator and at the Contractor's cost, as an Authorised Person to work closer than 3 metres from "live" overhead conductors and under such conditions as may be imposed by the senior responsible electrical engineer of the network operator.

30.0 USE OF EQUIPMENT

30.1 Measuring Tapes and Devices

- 30.1.1 Measuring tapes may be used near "live" high-voltage equipment provided that no part of any tape or a person's body comes within 3 metres of the "live" equipment.
- 30.1.2 In windy conditions the distance shall be increased to ensure that if the tape should fall it will not be blown nearer than 3 metres from the "live" high-voltage equipment.
- 30.1.3 Special measuring devices longer than 2 metres such as survey sticks and rods may be used if these are of non-conducting material and approved by the responsible Electrical Engineer of the network operator, but these devices must not be used within 3 metres of "live" high-voltage equipment in rainy or wet conditions.
- 30.1.4 The assistance of the Electrical Officer (Contracts) shall be requested when measurements within the limits defined in clauses 31.1.1 to 31.1.3 are required.
- 30.1.5 The restrictions described in 31.1.1 to 31.1.3 do not apply on a bridge deck between permanent parapets nor in other situations where a barrier effectively prevents contact with the "live" high-voltage equipment.

30.2 Portable Ladders

- 30.2.1 Any type of portable ladder longer than 2 metres may only be used near "live" high-voltage equipment under the direct supervision of the Responsible Representative. He shall ensure that the ladder is always used in such a manner that the distance from the base of the ladder to any "live" high-voltage equipment is greater than the fully extended length of the ladder plus 3 metres. Where these conditions cannot be observed, the Electrical Officer (Contracts) shall be advised, and he will arrange for suitable safety measures to be taken.

31.0 CARRYING AND HANDLING MATERIAL AND EQUIPMENT

- 31.1 Pipes, scaffolding, iron sheets, reinforcing bars and other material which exceeds 2 metres in length shall be carried completely below head height near "live" high-voltage equipment. For maximum safety such material should be carried by two or more persons so as to maintain it as nearly as possible in a horizontal position. The utmost care must be taken to ensure that no part of the material comes within 3 metres of any "live" high-voltage equipment.
- 31.2 Long lengths of wire or cable shall never be run out in conditions where a part of a wire or cable can come within 3 metres of any "live" high-voltage equipment unless the Electrical Officer (Contracts) has been advised and has approved appropriate safety precautions.
- 31.3 The presence of overhead power lines shall always be taken account of especially when communications lines or cables or aerial cables, stay wires, etc. are being erected above ground level.

32.0 PRECAUTIONS TO BE TAKEN WHEN ERECTING OR REMOVING POLES, ANTENNAE, TREES ETC.

- 32.1 A pole may be handled for the purpose of erection or removal near high-voltage equipment under the following conditions:

(i) If the distance between the point at which the pole is to be erected or removed and the nearest "live" high-voltage equipment is more than the length of the pole plus 3 metres, the work shall be supervised by the Responsible Representative.

(ii) If the distance described in (i) is less than the length of the pole plus 3 metres, the Electrical Officer (Contracts) shall be consulted to arrange for an Authorised Person to supervise the work and to ensure that the pole is earthed where possible. The pole shall be kept in contact with the point of erection, and adequate precautions shall be taken to prevent contact with "live" high-voltage equipment.

32.2 The cost of supervision by an Authorised Person and the provision of earthing shall, unless otherwise agreed, be borne by the Contractor.

32.3 The provisions of clauses 33.1 and 33.2 shall also apply to the erection or removal of columns, antennae, trees, posts, etc.

33.0 USE OF WATER

33.1 No water shall be used in the form of a jet if it can make contact with any "live" high-voltage equipment or with any person working on such equipment.

34.0 USE OF CONSTRUCTION PLANT

34.1 "Construction plant" entails all types of plant including cranes, piling frames, boring machines, excavators, draglines, dewatering equipment and road vehicles with or without lifting equipment.

34.2 When work is being undertaken in such a position that it is possible for construction plant or its load to come within 3 metres of "live" high-voltage equipment, the Electrical Officer (Contracts) shall be consulted. He will arrange for an Authorised Person to supervise the work and to ensure that the plant is adequately earthed. The Electrical Officer (Contracts) will decide whether further safety measures are necessary.

34.3 The cost of any supervision by an Authorised Person and the provision of earthing shall, unless otherwise agreed, be borne by the Contractor.

34.4 When loads are handled by cranes, non-metallic rope hand lines shall be used, affixed to such loads so as to prevent their swinging and coming within 3 metres of "live" high-voltage equipment.

34.5 Clauses 35.1 to 35.4 shall apply *mutatis mutandis* to the use of maintenance machines of any nature.

35.0 WORK PERFORMED UNDER DEAD CONDITIONS UNDER COVER OF A WORK PERMIT

35.1 If the Responsible Representative finds that the work cannot be done in safety with the high-voltage electrical equipment "live", he shall consult the Electrical Officer (Contracts) who will decide on the action to be taken.

35.2 If a work permit is issued the Responsible Representative shall-

(i) before commencement of work ensure that the limits within which work may be carried out have been explained to him by the Authorised Person who issued the permit to him, and that he fully understands these limits.

(ii) sign portion C of the permit before commencement of work;

(iii) explain to all persons under his control the limits within which work may be carried out, and ensure that they fully understand these limits;

(iv) care for the safety of all persons under his control whilst work is in progress; and

(v) withdraw all personnel under his control from the equipment on completion of the work before he signs portion D of the work permit.

36.0 TRACTION RETURN CIRCUITS IN RAILS

36.1 DANGEROUS CONDITIONS CAN BE CREATED BY REMOVING OR SEVERING ANY BOND.

36.2 Broken rails with an air gap between the ends, and joints at which fishplates are removed under "broken bond" conditions, are potentially lethal. The rails on either side of an air gap between rail ends on electrified lines shall not be touched simultaneously until rendered safe by the network operator personnel.

36.3 The Contractor shall not break any permanent bonds between rails or between rails and any structure. He shall give the Contract Supervisor at least 7 days written notice when removal of such bonds is necessary.

36.4 No work on the track which involves interference with the traction return rail circuit either by cutting or removing the rails, or by removal of bonds shall be done unless the Electrical Officer (Contracts) is consulted. He will take such precautions as may be necessary to ensure continuity of the return circuit before permitting the work to be commenced.

37.0 HIGH-VOLTAGE ELECTRICAL EQUIPMENT NOT MAINTAINED AND/OR OPERATED BY THE NETWORK OPERATOR

Where the work is undertaken on or near high-voltage electrical equipment which is not maintained and/or operated by the network operator, the Occupational Health and Safety Act No. 85 of 1993, and Regulations and Instructions, or the Mines Health and Safety Act (Act 29 of 1996), shall apply.

Such equipment includes:-

- (i) Eskom and municipal equipment;
- (ii) The Contractor's own power supplies; and
- (iii) Electrical equipment being installed but not yet taken over from the Contractor.

END

Mandatory Agreement

OCCUPATIONAL HEALTH AND SAFETY ACT 85 of 1993 (AS AMENDED)

AGREEMENT WITH MANDATORY

In terms of Section 37(1) & (2)

WRITTEN AGREEMENT ENTERED INTO AND BETWEEN

Transnet SOC Ltd

(Hereinafter referred to as the Employer)

AND

(Hereinafter referred to as Mandatory (Principal Contractor))

Compensation Fund Number :

Project Name :

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28. HEADING

PREAMBLE

WHEREAS section 37(1) & (2) of the Occupational Health and Safety Act No 85 of 1993 ("the Act") requires that parties have an agreement in writing to ensure compliance by a mandatory in line with the provisions of the Act.

AND WHEREAS Transnet SOC Ltd requires the services of the Contractors to execute certain projects within its workshops.

AND WHEREAS TRANSNET SOC LTD can be better served by Contractors who have the infrastructure, specialist employees and expertise to execute such projects at the highest level of efficiency on short notice.

NOW THEREFORE the parties agree as follows;

1. DEFINITIONS

For the purpose of this agreement, unless the context indicates otherwise, the following definitions are set out for the terms indicated:

- 1.1 **"Act"** means the Occupational Health and Safety Act No 85 of 1993;
- 1.2 **"Agreement"** means this Mandatory agreement;
- 1.3 **"Contractor "** means the Mandatory;
- 1.4 **"COID Act"** means the Compensation for Occupational Injuries and Diseases Act No 130 of 1993.
- 1.5 **"Effective Date"** means the date of signature of this Agreement by the last party signing hereto;
- 1.6 **"Employer"** refers to TRANSNET SOC LTD;
- 1.7 **"Mandatory"** means an agent, Contractor or sub-contractor for work, but without derogating from the status in his own right as an employer or user;
- 1.8 **"Parties"** means TRANSNET SOC LTD and the Contractor, and **"Party"** shall mean either one of them, as the context indicates;
- 1.9 **"Principal Contract"** means the appointed contractor whereby such contractor has to provide goods and or services to TRANSNET SOC LTD.
- 1.10 **"Regulations"** means regulations promulgated in terms of the relevant legislation.
- 1.11 **"Section"** means the relevant section of the Occupational Health and Safety Act No 85 of 1993
- 1.12 **"Services"** means the services to be provided by the Contractor to TRANSNET SOC LTD.
- 1.13 **"TRANSNET SOC LTD"** means Transnet Group and all its operating divisions and Specialist units with (Registration No. **1990/000900/06**), a public company incorporated in accordance with the company laws of the Republic of South Africa;

2. INTERPRETATION

- 2.1 Clause headings in this Agreement are included for ease of reference only and do not form part of this Agreement for the purposes of interpretation or for any other purpose. No provision shall be construed against or interpreted to the disadvantage of either Party hereto by reason of such Party having or being deemed to have structured or drafted such provision.
- 2.2 Any term, word or phrase used in this Agreement, other than those defined under the clause heading "Definitions" shall be given its plain English meaning, and those terms, words, acronyms, and phrases used in this Agreement will be interpreted in accordance with the generally accepted meanings accorded thereto.
- 2.3 A reference to the singular incorporates a reference to the plural and vice versa.
- 2.4 A reference to natural persons incorporates a reference to legal persons and vice versa.
- 2.5 A reference to a particular gender incorporates a reference to the other gender.

3. REPORTING

- 3.1 The Mandatary and/or his designated person appointed in terms of Section 16(2) of the Occupational Health and Safety Act 85 of 1993 ("the OHS Act") shall report to the Risk Manager and/or a Project Manager and/or a representative designated by the Employer prior to commencing the work at the premises of the Employer.

4. WARRANTY OF COMPLIANCE

- 4.1 In terms of this Agreement the Mandatary warrants that he agrees to any of the arrangements and procedures as prescribed by the Employer and as provided for in terms of Section 37(2) of the OHS Act for the purposes of compliance with the OHS Act.
- 4.2 The Mandatary further warrants that he and/or his employees undertake to maintain such compliance with the OHS Act. Without derogating from the generality of the above, nor from the provisions of the said Agreement, the Mandatary shall ensure that the clauses as hereunder described are at all times adhered to by himself and his employees.
- 4.3 The Mandatary hereby undertakes to ensure that the health and safety of any other person on the premises is not endangered by the conduct of his activities and that of his employees.

5. APPOINTMENTS AND TRAINING

- 5.1 The Mandatary shall appoint competent persons as per Section 16(2) of the OHS Act. Any such appointed person shall be trained on any occupational health and safety matter and the OHS Act provisions pertinent to the work is to be performed under his responsibility. Copies of any appointments made by the Mandatary shall immediately be provided to the Employer.
- 5.2 The Mandatary shall further ensure that all his employees are trained on the health and safety aspects relating to the work to be done on the premises of the Employer and that they understand the hazards associated with such work being carried out on the premises. Without derogating from the foregoing, the Mandatary shall, in particular, ensure that all his users or operators of any materials, machinery or equipment are properly trained in the use of such materials, machinery or equipment.
- 5.3 Notwithstanding the provisions of the above, the Mandatary shall ensure that he, his appointed responsible persons and his employees are at all times familiar with the provisions of the OHS Act, and that they comply with the provisions of the Act.

6. SUPERVISION, DISCIPLINE AND REPORTING

- 6.1 The Mandatary shall ensure that all work performed on the Employer's a premise is done under strict supervision and that no unsafe or unhealthy work practices are permitted. Discipline regarding health and safety matters shall be strictly enforced against any of his employees regarding non-compliance by such employee with any health and safety matters.
- 6.2 The Mandatary shall further ensure that his employees report to him all unsafe or unhealthy work situations immediately after they become aware of such conditions and that he in turn immediately reports these to the Employer and/or his representative.

7. ACCESS TO THE OHS ACT

- 7.1 The Mandatary shall ensure that he has an updated copy of the OHS Act on site at all times and that this is accessible to his appointed responsible persons and employees, save that the parties may make arrangements for the Mandatary and his appointed responsible persons and employees to have access to the Employer's updated copy/copies of the Act.

8. COOPERATION

- 8.1 The Mandatary and/or his responsible persons and employees shall provide full co-operation and information if and when the Employer or his representative inquires into any occupational health and safety issues concerning the Mandatary. It is hereby recorded that the Employer and his representative shall at all times be entitled to make such inquiry.
- 8.2 Without derogating from the generality of the above, the Mandatary and his responsible persons shall make available to the Employer and his representative, on request, all and/or any checklists and inspection registers required to be kept by him in respect of any of his materials, machinery or equipment.

9. WORK PROCEDURES

- 9.1 The Mandatary shall, after having established the dangers associated with the work performed, develop and implement mitigation measures to minimize or eliminate such dangers for the purpose of ensuring a healthy and safe working environment. The Mandatary shall then ensure that his responsible persons and employees are familiar with such mitigation measures.
- 9.2 The Mandatary shall implement any other safe work practices as prescribed by the Employer and shall ensure that his responsible persons and employees are made conversant with such other safe work practices as prescribed by the Employer and that his responsible persons and employees adhere to such safe work practices.
- 9.3 The Mandatary shall ensure that work for which any permit is required by the Employer is not performed by his employees prior to the Employer obtaining such permit from the Mandatary.

10. HEALTH AND SAFETY MEETINGS

- 10.1 If required in terms of the OHS Act, the Mandatary shall establish his own health and safety committee(s) and ensure that his employees, being the committee members, provide health and safety representatives to attend the Employer's health and safety committee meetings.

11. COMPENSATION REGISTRATION

- 11.1 The Mandatary shall ensure that he has a valid proof of registration with the Compensation Commissioner, as required in terms of **COID Act**, and that all payments owing to the Commissioner are discharged. The Mandatary shall further ensure that the cover remain in force while any such employee is present on the premises.

12. MEDICAL EXAMINATIONS

- 12.1 The Mandatary shall ensure that all his employees undergo routine medical examinations and that they are medically fit for the purposes of the work they are to perform.

13. INCIDENT REPORTING AND INVESTIGATION

- 13.1 All incidents referred to in Section 24 of the OHS Act shall be reported by the Mandatary to the Department of Labour and to the Employer. The Employer shall further be provided with copies of any written documentation relating to any incident.
- 13.2 The Employer retains an interest in the reporting of any incident as described above as well as in any formal investigation and/or inquiry conducted in terms of section 32 of the OHS-Act into such incident.

14. SUBCONTRACTORS

- 14.1 The Mandatary shall notify the Employer of any subcontractor he may wish to perform work on his behalf on the Employer's premises. It is hereby recorded that all the terms and provisions contained in this clause shall be equally binding upon the subcontractor prior to the subcontractor commencing with the work. Without derogating from the generality of this paragraph:
- 14.1.1 The Mandatary shall ensure that training as discussed under appointments and training, is provided prior to the subcontractor commencing work on the Employer's premises.
- 14.1.2 The Mandatary shall ensure that work performed by the subcontractor is done under his strict supervision, discipline and reporting.
- 14.1.3 The Mandatary shall inform the Employer of any health and safety hazards and/or issue that the subcontractor may have brought to his attention.
- 14.1.4 The Mandatary shall inform the Employer of any difficulty encountered regarding compliance by the subcontractor with any health and safety instruction, procedure and/or legal provision applicable to the work the subcontractor performs on the Employer's premises.

15. SECURITY AND ACCESS

- 15.1 The Mandatary and his employees shall enter and leave the premises only through the main gate(s) and/or checkpoint(s) designated by the Employer. The Mandatary shall ensure that employees observe the security rules of the Employer at all times and shall not permit any person who is not directly associated with the work from entering the premises.
- 15.2 The Mandatary and his employees shall not enter any area of the premises that is not directly associated with their work.
- 15.3 The Mandatary shall ensure that all materials, machinery or equipment brought by him onto the premises are recorded at the main gate(s) and/or checkpoint(s). Failure to do this may result in a refusal by the Employer to allow the materials, machinery or equipment to be removed from the Employer's premises.

16. FIRE PRECAUTIONS AND FACILITIES

- 16.1 The Mandatary shall ensure that an adequate supply of fire-protection and first-aid facilities are provided for the work to be performed on the Employer's premises, save that the Parties may mutually make arrangements for the provision of such facilities.

- 16.2 The Mandatary shall further ensure that all his employees are familiar with fire precautions at the premises, which includes fire-alarm signals and emergency exits, and that such precautions are adhered to.

17. ABLUTION FACILITIES

- 17.1 The Mandatary shall ensure that an adequate supply of ablution facilities are provided for his employees performing work on the Employer's premises, save that the parties may mutually make arrangements for the provision of such facilities.

18. HYGIENE AND CLEANLINESS

- 18.1 The Mandatary shall ensure that the work site and surround area is at all times maintained to the reasonably practicable level of hygiene and cleanliness. In this regard, no loose materials shall be left lying about unnecessarily and the work site shall be cleared of waste material regularly and on completion of the work.

19. NO NUISANCE

- 19.1 The Mandatary shall ensure that neither he nor his employees undertake any activity that may cause environmental impairment or constitute any form of nuisance to the Employer and/or his surroundings.
- 19.2 The Mandatary shall ensure that no hindrance, hazard, annoyance or inconvenience is inflicted on the Employer, another Mandatary or any tenants. Where such situations are unavoidable, the Mandatary shall give prior notice to the Employer.

20. INTOXICATION NOT ALLOWED

- 20.1 No intoxicating substance of any form shall be allowed on site. Any person suspected of being intoxicated shall not be allowed on the site. Any person required to take medication shall notify the relevant responsible person thereof, as well as the potential side effects of the medication.

21. PERSONAL PROTECTIVE EQUIPMENT

- 21.1 The Mandatary shall ensure that his responsible persons and employees are provided with adequate personal protective equipment (PPE) for the work they may perform and in accordance with the requirements of General Safety Regulation 2 (1) of the OHS Act. The Mandatary shall further ensure that his responsible persons and employees wear the PPE issued to them at all material times.

22. PLANT, MACHINERY AND EQUIPMENT

- 22.1 The Mandatary shall ensure that all the plant, machinery, equipment and/or vehicles he may wish to utilize on the Employer's premises is/are at all times of sound order and fit for the purpose for which it/they is/are attended to, and that it/they complies/comply with the requirements of Section 10 of the OHS Act.
- 22.2 In accordance with the provisions of Section 10(4) of the OHS Act, the Mandatary hereby assumes the liability for taking the necessary steps to ensure that any article or substance that it erects or installs at the premises, or manufactures, sells or supplies to or for the Employer, complies with all the prescribed requirements and will be safe and without risks in terms of health and safety when properly used.

23. NO USAGE OF THE EMPLOYER'S EQUIPMENT

- 23.1 The Mandatary hereby acknowledges that his employees are not permitted to use any materials, machinery or equipment of the Employer unless the prior written consent of the Employer has been obtained, in which case the Mandatary shall ensure that only those persons authorized to make use of such materials, machinery or equipment, have access thereto.

24. TRANSPORT

- 24.1 The Mandatary shall ensure that all road vehicles used on the premises are in a roadworthy condition and are licensed and insured. The Mandatary shall ensure that all drivers shall have relevant and valid driving licenses and the Mandatary shall ensure that no vehicle/s shall carry passengers unless it is specifically designed to do and that all drivers shall adhere to the speed limits and road signs on the premises at all times.
- 24.2 In the event that any hazardous substances are to be transported on the premises, the Mandatary shall ensure that the requirements of the Hazardous Substances Act 15 of 1973 are complied with fully all times.

25. CLARIFICATION

- 25.1 In the event that the Mandatary requires clarification of any of the terms or provisions of this Agreement, he should take the necessary steps to contact the Risk Manager of the Employer to obtain such clarification.

26. DURATION OF AGREEMENT

- 26.1 This Agreement shall remain in force for the duration of the work to be performed by the Mandatary and/or while any of the Mandatary's employees are present on the Employer's premises.

27. NON COMPLIANCE WITH THE AGREEMENT

- 27.1 If the Mandatary fails to comply with any provisions of this Agreement, the Employer shall be entitled to give the mandatory 7 (seven) days written notice to remedy such non-compliance and if the Mandatary fails to comply with such notice, then the Employer shall forthwith be entitled but not obliged, without prejudice to any other rights or remedies which the mandatory may have in law,
- 271.1 to suspend the main Agreement; or
- 27.1.2 To claim immediate performance and/or payment of such obligations.
- 27.2 Should mandatory continue to breach the contract on three occasions, then the Employer is authorised to suspend the main contract without complying with the condition stated in the clause above.

28. HEADINGS

The headings as contained in this Agreement are for reference purposes only and shall not be construed as having any interpretative value in them or as giving any indication as to the meaning of the contents of the paragraphs contained in this Agreement.

Thus done and signed

at _____ on the _____ day of _____ 201__

For and on behalf of the Employer

Witnesses:

1. _____

2. _____

at _____ on the _____ day of _____ 201__

for and on behalf of the Mandatary

Witnesses:

3. _____

4. _____