



A Division of Transnet SOC Limited

## TECHNOLOGY MANAGEMENT

### SPECIFICATION

## CALIBRATION OF TEST AND MEASURING INSTRUMENTS

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Transnet Engineering

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**DOCUMENT HISTORY**

Specification originally created by:	<b>P.C Bredenhand</b>	Document revised from specification with document number:	BBC6030 version 2

**AMENDMENT HISTORY**

1.0	The scope Includes suppliers of components to TE
6.4	Clause 6.4.1 and 6.4.2 added

## 1.0 SCOPE

This document specifies minimum requirements for the calibration process, repair, certification and supply of test and measuring instrument by SANAS accredited Calibration and legal metrology Laboratories, applicable to Transnet Freight Rail and Transnet Engineering. Suppliers of components must comply with the requirements of this specification.

This is to ensure that the outsourced calibration and verification of test/measuring instrument is traceable to National Standards and complies with the requirements of legal metrology.

## LEGAL REQUIREMENTS

In addition to the requirements of the referenced specifications and standards, the mandatory requirements of The Occupational Health and Safety Act and Regulations (Act No 85 of 1993) referred to as OHSA shall be adhered to.

## PRECEDENCE

In the event of any conflict between the various submitted relevant documents, the order of precedence shall be, and in consultation with Transnet Freight Rail (Technology Management):

- a. Legal and safety requirements.
- b. This Specification.

## TECHNICAL DEVIATIONS

No technical deviations from this specification or any other document forming part of the purchase submission shall be permitted unless approved in writing by Transnet Freight Rail (Technology Management).

## 2.0 NORMATIVE REFERENCES

Unless otherwise specified all standards/references referred to shall comply with the current edition of the relevant publication. The following publications are referred to in this specification:

- |     |                               |  |
|-----|-------------------------------|--|
| [1] | SANS 17025: 2005 ed2          | General requirements for the competence of testing and calibration laboratories  |
| [2] | BBG 4543: 2016                | Calibration of Rolling Stock/Infrastructure Measuring Instruments and Legal Metrology requirements   |
| [3] | JCGM 200:2012                 | International vocabulary of basic and general terms in metrology   |
| [4] | Act 85: 1993                  | Occupational Health and Safety Act.  |
| [5] | Legal Metrology Act 9 of 2014 | To provide for the administration and maintenance of legal metrology technical regulations in order to promote fair trade and to protect public health and safety and the environment; and to provide for matters connected therewith. |

## 3.0 ABBREVIATIONS AND TERMINOLOGY

Abbreviations used in this specification are listed below

ISO:	International Standards Organization
SANAS:	South African National Accreditation System
VIT:	Very Important Technology

Terminologies used in this specification are listed below

Measuring instrument	A device, transducer, instrument or system to be used to make measurements alone or in conjunction with supplementary devices. This includes but is not limited to electronic, mechanical or comparative (go/no-go) gauges [JCGM 200].
Test instrument	A device that creates signals and captures responses from electronic/electrical devices [JCGM 200].

## 4.0 BACKGROUND

Diverse measuring instruments and measuring systems are used by Transnet to conduct its business. Examples of reasons why measurements are necessary include amongst others, (i) ensure safety limits are conformed to (Railway safety, safety of employees and safety of public) (ii) ensure conformance to quality standards or quantify deviation from the quality standard and (iii) proof of safety in terms of Occupational Health and Safety Act, Act 85: 1993 and (iv) compliance to Legal Metrology Act 9 of 2014.

It is very important to note that the Measuring Units and National Standards Act as amended in 1998, stipulates that for the purpose of measurement for any legal purpose, a measuring standard which is not a national measuring standard, must be traceable to one or more national measuring standards through unbroken chain of comparisons. Therefore, unless measuring instrument is accurate and calibrated in a manner whereby the measurements are traceable to national standards, risks that are unacceptable will be introduced into the business process.

Legal Metrology Act 9 of 2014 states that all measuring instruments, including those used by the State for a prescribed purpose, are subject to initial verification and subsequent verification in accordance with the relevant legal metrology technical regulations, unless the measuring instrument is exempted by regulation from initial verification or subsequent verification.

This specification will also ensure that the Suppliers, Transnet Engineering and Transnet Freight Rail depots conform to the requirements of the Legal Metrology Act 9 of 2014 and Transnet Calibration Policy document BBG4543.

## 5.0 METHOD OF TENDERING

- 5.1 Calibration and legal metrology Laboratories shall indicate clause-by-clause compliance with the requirements of this specification. This shall take the form of a separate document listing all the requirements clause-by-clause indicating the individual statement of compliance or non-compliance.
- 5.2 The Supplier/Service provider shall motivate a statement of non-compliance.
- 5.3 Suppliers/Service providers must quote per individual measuring instrument item as listed in APPENDIX 1: LIST OF MEASURING INSTRUMENTS TO BE CALIBRATED.
- 5.4 All the above mentioned requirements do not replace Transnet's tender rules and regulations.
- 5.5 Specifically designated measuring instruments may be used as a working standard to calibrate other measuring instruments, provided it has a valid calibration certificate from a SANAS accredited laboratory and if the accuracy of the working standard is at least two times better than that of the measuring instrument to be calibrated.
- 5.6 Failure to comply with the above clauses may preclude a Supplier/Service provider from consideration.

## 6.0 CALIBRATION REQUIREMENTS

### 6.1 CALIBRATION PROCESS

**Note 1:** *Only Calibration Laboratories that are SANAS accredited for the specific field of calibration required can calibrate measuring instruments according to the laboratory's schedule of accreditation.*

- 6.1.1 SANAS accredited Calibration Laboratories that are under temporary suspension may not perform calibration for Transnet.
- 6.1.2 Calibration Laboratories must ensure that no test/measuring instrument will be calibrated if the test/measuring instrument does not have a unique identification number.
- 6.1.3 Test/Measuring instruments shall be calibrated in accordance to the manufacturer's specification.
- 6.1.4 If the measuring instrument that was calibrated does not perform in accordance with manufacturer's specification, such measuring instruments must be labelled and reported to the Transnet in order to be repaired.
- 6.1.5 All measuring instruments shall be calibrated in full. Partial calibration of measuring instruments is not acceptable.
- 6.1.6 The calibration standard used to calibrate the measuring instrument must be at least two times more accurate than the unit under test.
- 6.1.7 All non-rechargeable batteries must be replaced before the measuring instrument is calibrated and sealed.
- 6.1.8 Transporting, handling and storage of the measuring instruments on site, as well as, when required, to and from site, must be done in such a way that it is ensured the measuring instruments stay calibrated.

**Note 2:** *If no SANAS accredited Calibration Laboratory in South Africa can perform the calibration under their accreditation then a non-SANAS accredited calibration laboratory is allowed if authorized by the Transnet Freight Rail, Metrology Technology Manager (VIT Metrology) located at the Railway Technology Development Centre facility in Koedoespoort. In this situation, the Depot Engineer/Engineering Manager must receive written authorisation from the VIT prior to calibration of measuring instrument.*

### 6.2 REPAIRS

- 6.2.1 If a measuring instrument, sent for calibration, is found to be defective, the quotations for repairs must be submitted and approved before repair work is done. Should the quotation be deemed excessive (due to market research), Transnet reserves the right to request quotations from other SANAS accredited laboratories.
- 6.2.2 Repaired measuring instruments shall be re-calibrated and must comply with clause 6.1 of this specification.
- 6.2.3 Measuring instruments shall be repaired by a competent person, as per Legal Metrology clause 9, 10.1 and 10.2. Records are to be kept according to SANS 17025 clause 5.5.5(h).

### 6.3 CERTIFICATION / LABELLING

- 6.3.1 All measuring instruments calibrated shall be supplied with a calibration certificate and sticker with SANAS emblem after completion.

6.3.2 In accordance with clause 5.10.2 of SANS 17025 and Transnet Calibration Policy Document (BBG4543), the calibration certificate must have the following minimum information:

- SANAS emblem.
- A title (e.g. Calibration or Verification Certificate or Test report etc.).
- Name and address of the calibration laboratory customer.
- Certificate number on each page.
- Serial and model number of the unit under test and reference standard.
- Calibration results with SI units of measurement.
- Condition under which the calibration was made.
- Uncertainty of measurement.
- Date of calibration and recommended date of re-calibration.
- Signature of the technical manager and the person who conducted the calibration.

6.3.3 In accordance with clause 5.5.8 of SANS 17025 and Transnet Calibration Policy Document (BBG4543), the calibration sticker must have the following minimum information:

- SANAS emblem.
- Certificate number.
- Name of the calibration laboratory.
- Serial number of the measuring instrument.
- Date of calibration and recommended date of re-calibration.

6.3.4 Calibration Laboratories must recommend a re-calibration date, on the calibration sticker, on the measuring instrument as well as on the calibration certificate.

**Note 3:** *Date of next calibration for each measuring instrument must be determined in consultation with the Depot, Transnet Calibration Policy Document (BBG4543) and as recommended by the Original Instruments Manufacturer.*

## **6.4 SUPPLIER**

6.4.1 All new instruments must be supplied with the calibration certificate/declaration of conformity.

6.4.2 Suppliers of components must comply with the requirements of this specification.

## **7.0 SAFETY**

7.1 A Calibration Laboratory that performs on site calibration falls under the jurisdiction of the Depot Manager with respect to the Occupational Health and Safety Act, Act 85: 1993.

7.2 The Calibration Laboratory employees must adhere to all the safety rules and regulations of the Transnet Depot whilst they perform on site calibration.

- 7.3 The Calibration Laboratory must ensure that their employees that perform the onsite calibration are briefed on the safety (dangers) at the Transnet Depot.
- 7.4 The Calibration Laboratory must report any unsafe measuring instrument, installation or practice with respect to measuring instruments to the Depot Engineer/Engineering Manager.

## **8.0 WARRANTY**

- 8.1 The calibration results on the calibration certificate must not be tampered with or altered after issuing of the calibration certificate.
- 8.2 Newly purchased measuring instruments must be guaranteed to be free of manufacturing and material defects.

## **9.0 DOCUMENTS**

- 9.1 The calibration laboratory/supplier must provide PDF-soft copies, and hard copies of the calibration certificates and stickers.
- 9.2 The supplier must provide operational manual, calibration certificate and stickers for newly purchased measuring instruments.

## **10.0 PACKAGING**

- 10.1 The calibration laboratory/supplier must provide a sturdy transport container to ensure that the measuring instrument is securely stored and transported.
- 10.2 The calibration certificates, stickers and operational manual must be delivered inside a sealed package.

**APPENDIX 1: LIST OF MEASURING INSTRUMENTS TO BE CALIBRATED**

(To be completed by Depot)

Page \_\_ of \_\_

**DEPOT NAME:** .....

**	Measuring instrument type (e.g. multi-meter; torque wrench)	Make and Model	Unique number	On/off site calibration
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
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25				

**\*\*Note 4:** Measuring instrument items on the list are sequentially numbered per page