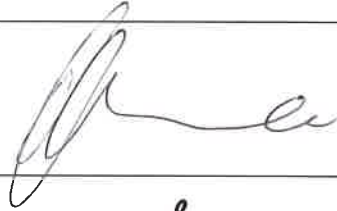





A division of Transnet SOC Limited

RAIL NETWORK - TECHNICAL

SPECIFICATION FOR SHORT TERM SUPPLY AND DELIVERY OF HARDFACING ELECTRODES FOR REPAIR WELDING 14% AUSTENITIC MANGANESE (HADFIELD STEEL) CROSSINGS

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1.0 INTRODUCTION

This document covers the technical requirements for short term supply and delivery of hard facing filler materials (electrodes) to Transnet Freight Rails.

2.0 RAILWAY AUTHORITY

Transnet Freight Rail (TFR) as the railway authority uses (SMAW) Shielded Metal Arc Welding also known as (MMAW) Manual Metal Arc welding for repair welding of 14% cast austenitic manganese monoblock and rail bound crossings frogs. These are manufactured from Hadfield steel

3.0 REFERENCED DOCUMENTS

- 3.1 BS EN 10204: 2004 Metallic products – Types of inspection documents
- 3.2 SANS 455: 2011 Covered electrodes for the manual arc welding of carbon and carbon manganese steels.
- 3.3 BS EN 15689:2009 Railway Applications –Track- Switches and Crossings- Crossing components made of cast austenitic manganese steel
- 3.4 SFA-5.1/SFA-5.1M, Carbon Steel Electrodes for Shielded Metal arc Welding
- 3.5 AWS A5.13-2000, Specification for Surfacing Electrodes for Shielded Metal Arc Welding
- 3.6 ISO 15614-7: 2008 (Overlay Welding) Specification and qualification of welding procedures for metallic materials - welding procedure test.

4.0 TERMS AND DEFINITIONS

4.1 Hard surfacing welding electrodes

These are welding electrodes used for repairing of worn out surfaces due to abrasion, metal to metal contact and high impact forces.

4.2 Shielded metal arc welding process (flux cored)

It's a semi-automated or automatic arc welding process which requires a continuously-fed consumable tubular electrode containing a flux and at a constant-voltage.

4.3 Manufacturer

An entity that wishes to be approved to supply welding electrodes to Transnet Freight Rail.

4.4 Monoblock crossings

These are high wear resistant cast crossings with approximately 14% Mn and has an austenitic microstructure.

4.5 **Rail bound crossings**

These are crossings manufactured using 14% Mn crossing insert (frog) bounded by flat bottom rails.

5.0 **GENERAL REQUIREMENTS**

5.1 **Crossing**

The material used for TFR crossings complies with the requirements of BS EN 15689:2009 Railway Applications –Track Switches and Crossings- Crossing components made of cast austenitic manganese steel (Hadfield steel),

5.2 **Manufacturing Requirements**

5.2.1 The hard surfacing welding electrodes may be manufactured or produced by any method that will produce material that meets the requirement of this specification.

6.0 **COMPLIANCE REQUIREMENTS**

6.1 **Technical compliance**

6.1.1 The following classifications or the nearest are applicable and it is mandatory that proof of compliance is submitted:

- AWS A5.13: 2000 (EFe-Mn-A)
- EN 14700:2005 (Efe9)
- DIN 8555 (E6-UM-55-GS)

6.1.2 An inspection certificate 3.1 (Type 3.1 certificate) as per EN 10204:2004 Metallic products – type of inspection document must be provided by the bidder to indicate proof of compliance to the classifications above.

6.1.3 The certificate shall consist of all the characteristics in the classification as per clause 3.1 of SANS 455: 2011 Covered electrodes for the manual arc welding of carbon and carbon manganese steels;

6.1.4 The bidder shall also provide the Hardness range for the filler material,

6.1.5 The mechanical properties of the deposited metal shall be in accordance to clause 5.1.1 of SANS 455: 2011, Covered electrodes for the manual arc welding of carbon and carbon manganese steels

6.1.6 The Methods of test shall be in accordance to Clause 8 of SANS 455: 2011, Covered electrodes for the manual arc welding of carbon and carbon manganese steels, except Radiography testing,

6.1.7 The intent of EN 10204 :2004 Type 3.2 certification (Inspection Certificate 3.2) shall be done at the discretion of the TFR technical representatives

6.2 Packaging and branding

- 6.2.1 The packaging boxes shall be tightly sealed to prevent any form of moisture from getting in contact with the hard surfacing electrodes and
- 6.2.2 The packaging and marking shall be in accordance to Clause 6 of SANS 455: 2011, Covered electrodes for the manual arc welding of carbon and carbon manganese steels
- 6.2.3 The dimensional requirements shall be in accordance to clause 4.1 and 4.2 of SANS 455: 2011, Covered electrodes for the manual arc welding of carbon and carbon manganese steels

7.0 GENERAL

- 7.1 This specification does not cover requirements for flux core wires.
- 7.2 The tests conducted to produce Type 3.1 Inspection certificate shall be done at an accredited laboratory or equivalent.
- 7.3 In a case where the bidder is not the manufacturer a Memorandum of Understanding (MOU)- shall be supplied.
- 7.4 The bidder shall submit a Type 3.2 Inspection certification from an independent laboratory or accredited facility which provides a statement of compliance to tests results in Type 3.1 certification as per EN 10204:2004
- 7.5 Bidder must provide evidence that filler materials or welding electrodes proposed are recommended for repair of cast austenitic manganese crossings/frogs by a turnout Original Equipment Manufacturer (OEM).
- 7.6 The bidder shall provide a Material Safety Data sheet (MSDS) alongside each delivery.
- 7.7 The bidder must supply proof of use of the product in a reputable railway company or a reference letter for the use of his product.