ANNEXURE F

SPOORNET

A DIVISION OF TRANSNET LIMITED

ENGINEERING

SPECIFICATION CCE 1/18

SPECIFICATION FOR THE MANUFACTURING OF FISHPLATES (SPOORNET DESIGN)

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SPOORNET

SPECIFICATION CCE

SPECIFICATION FOR THE PROCUREMENT OF FISHPLATES

1 : SCOPE

1.1 This specification covers the supply of fishplates for uninsulated railway rails.

2: DEFINITIONS

2.1 "Principal Engineer" means the Principal Engineer of Spoornet, Railway Engineering, Track Technology or any other officer of Spoornet lawfully acting on their behalf.

2.2 "Batch" shall be considered primarily as a group of fishplates produced from an uninterrupted manufacturing process.

3: MANUFACTURING PROCESS

3.1 Manufacturer shall furnish the Inspector with a document giving the full layout of the manufacturing process, the material utilized and the test results pertaining to the proposed product acceptance of any which product will only be allowed once a written approved from the Principle Engineer has been attained. The requirements as set out below will be met.

3.1.1. The batch number.
3.1.2. Complete analysis of such batch.
3.1.3. The qualities and types of fishplates included in each batch.
3.1.4. Physical properties.

4: GENERAL DESIGN

4.1 The unit geometry must be according to size of the rail.

5: GENERAL FINISH OF FISHPLATES

5.1 The fishplates shall be manufactured within the permissible tolerances specified under section 6.

5.2 All fishplates shall be sound and free from detrimental defects, air holes or other flaws that could be introduced by the manufacturing process.

5.3 The fishplates shall be properly cleaned and dressed. The height or depth of any surface defect shall not exceed 0.5 mm.

5.4 Proper attention shall be given to the removal of any sharp edges.

6: PERMISSIBLE TOLERANCES

6.1 Each fishplate shall make a true bearing on the studgauge and no tolerance in the angle of the fishing surfaces shall be permitted.

6.2 The depth over fishing surface shall be correct within a tolerance of plus 0.8 mm minus 0 (zero), and this dimension shall be checked by the extent of the entry of each fishplate in the studgauge.

6.3 The top fishing surface at the centre of the enlarged fishplates shall be higher than the top fishing surface at the end, subject to a tolerance of plus or minus 0.2 mm.

6.4 Deviation from the straight on the top fishing surface of parallel fishplates when measured lengthwise by means of straightedge, shall not exceed 0.4 mm, but no hollow in the top fishing surface shall be permitted.

6.5 Deviation from the straight on the bottom fishing surface of parallel and enlarged fishplates when measured lengthwise with a straightedge, shall not exceed 0.4 mm but no hump on the bottom fishing surface shall be permitted.

6.6 The holes for the fishbolts shall be correct to size within a tolerance of plus 1mm minus 0 (zero). The position of the holes in relation to each other and in relation to the fishing surfaces shall not vary from their correct position by more than the amount required to enable every fishplate to fit the studgauge (see clause 6.3) easily.

6.7 After being cut to size the thickness of the angle portion of 100% fishplates shall be correct to $\pm$ 1 mm.

6.8 The length of the fishplates shall be correct to within the limits of plus or minus 3 mm and the thickness of any part shall not vary from the normal dimension by more than 1 mm.

6.9 Notwithstanding these dimensional tolerances, the fishplates shall not vary by more than 2% above or below the nominal weight of the pervious produced fishplates.

7: PRODUCT IDENTIFICATION

7.1 The letters SPOORNET, year of manufacture, batch No and manufacturer's identification mark shall be marked on the fishplate in clear stamped lettering and positioned.

8: PRODUCT REQUIREMENTS

Basic oxygen steel or electric arc furnace steel that has been vacuum degassed and continuously cast shall be used for the manufacture of fishplate shall conforms to the following requirements:

8.1 HYDROGEN AND OXYGEN CONTENTS

8.1.1 The hydrogen content of the steel should be less than or equal to 5 ppm.

8.1.2 The total oxygen content of steel should be less than 30 ppm.

8.2 CLEANLINESS

8.2.1 The cleanliness of the steel as measured according to ASTM A 380 (01.03) will be less than or equal to level 2.

8.2 DECABURIZATION

8.2.1 Decarburization surface layer should be less than 0.5 mm.

8.3 MICROSTRUCTURE

8.3.1 The microstructure of the fishplates shall contain no bainite or untempered martensite.

8.4 TENSILE PROPERTIES

8.4.1 The tensile tests shall be carried out according to ASTM E 8-89 (03.01). The position of the tensile test piece shall be as shown in figure 1. The following requirements shall be met:

Tensile strength	:	550 MPa (min)
Yield stress (0,5% proof stress)	:	280 MPa (min)

Elongation	16% min.

8.5 IMPACT STRENGTH

8.5.1 Charpy impact tests are to be carried out according to ASTM E 23-88 (03.01). A minimum value of 18 joules at 20 ^{0}c is required for acceptance. The position of the charpy test piece shall be as shown in figure 1.

8.6 CHEMICAL ANALYSIS

8.6.1 The chemical composition of the fishplates will be determined by spectrometric analysis.

9: QUALITY CONTROL TESTING AND CERTIFICATION

9.1 The manufacturer shall furnish to the Principle Engineer a certificate including the results of all the tests required by section 8.

9.2 The testing frequency for all the tests will be one per 30 000 kg or fraction thereof for each type or size of the fishplates.

10: SUBMISSION OF SAMPLES

10.1 Qualifying tests before the awarding of a contact will be carried out according to the requirements of section 8. These tests should specify all the properties stated above.

10.2 Approval of the proposed design will be subjected to testing of the product to the requirements laid out in sections 3.and 6. These tests will be performed by the Principle Engineer of whom the manufacturer will carry the costs, unless another agreement has been made with Spoornet Material Logistics, where upon Material Logistics will carry the costs. The manufacturer will provide and deliver finished fishplates to the Principle Engineer for testing, free of charge.

11: CHECK ANALYSIS AND TESTS

11.1 The Inspector shall be a liberty to take any one finished fishplate selected by him from each batch and the results of any check test carried out on these samples conforms to the requirements of this specification.

11.2 Should any one of the testpieces first selected from the batch, not fulfil these specification requirements, all the fishplates from the batch shall be rejected.

12: TESTING AND INSPECTION

12.1 Inspection of the fishplate at the Manufacturer's works is required to be carried out in terms of Clause 25 of the General Conditions of Stores Contracts Form US. 7.

12.2 Every fishplate is required to conform to this specification.

Before the fishplates are submitted to the Inspector, the Manufacturer shall have them examined. He shall sort out and stack on one side all clamps that do not conform to the requirements of this specification.

12.3 The Inspector may refuse to inspect any lot of fishplates that have not been sorted in this manner. If the fishplates upon such refusal are not forthwith properly sorted, the lot may be rejected.

12.4 All testing and inspection specified herein shall be carried out entirely under the supervision of and in accordance with the instructions of the Inspector, who shall be at liberty to reject any clamps which do not comply with the provisions of this specification.

13: PROTECTIVE COATINGS

13.1 All fishplates shall be treated with an anti corrosion product approved by the Principle engineer.

14: PACKING

15.1 Fishplates shall be securely parked in pairs for 40 kg and 4 kg fishplates and in twin pairs for 30 kg. 57 kg and 48 kg heavy duty fishplates (100-140-100) may be packed singly. A metal label showing the contents and the order number shall be nailed to each box.

Fishplates of different sizes and / or types must not be mixed.

Principal Engineer's Office
JOHANNESBURG
Date:
Ref.:

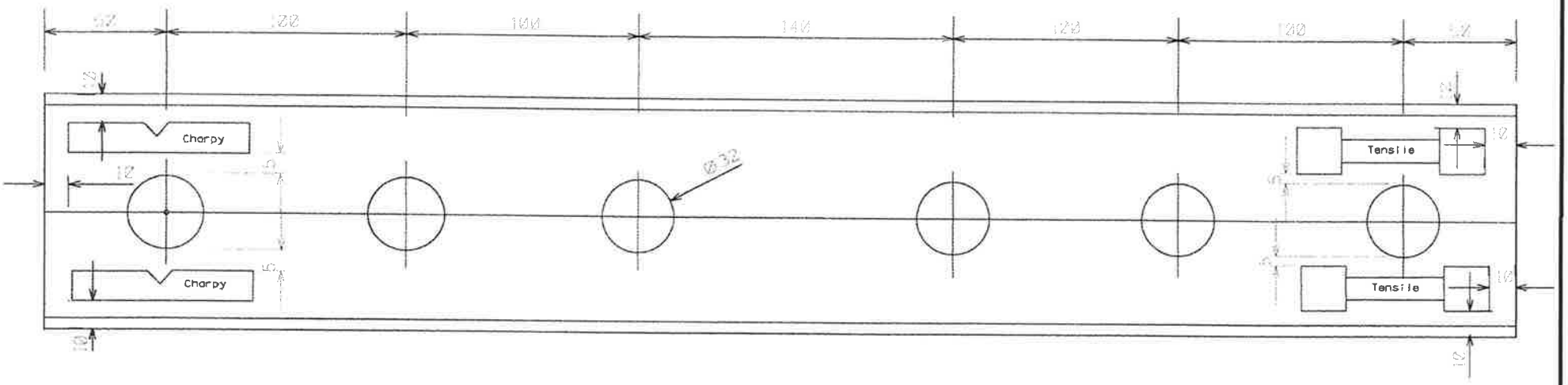

Figure 1

Schematic representative of a fishplate joint