

SPOORNET

(INFRASTRUCTURE)(ELECTRICAL)

<p>THIS ISSUE CANCELS SPECIFICATION NO: CEE.0241.98</p>

SPECIFICATION FOR HARD DRAWN, GROOVED, COPPER CONTACT WIRE, FOR ELECTRICAL TRACTION PURPOSES.

This specification covers the manufacture, testing and supply of hard drawn, grooved, copper contact wire.

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1.0 SCOPE

This specification covers the manufacture, testing and supply of hard drawn, grooved, copper contact wire.

2.0 REFERENCES

2.1 The following specifications and drawings are referred to herein :

2.1.1 British Standards Specification :

BS 23 : Copper and Copper-Cadmium Trolley and Contact Wire for Electric Traction.

2.1.2 Spoornet Drawing:

CEE-TW-433 : Steel Drum for Contact Wire.

3.0 APPENDICES

The following appendices form an integral part of this specification:

3.1 Appendix 1: Schedule of Requirements.

3.2 Appendix 2: Test Results of 107mm² Grooved Contact Wire.

This appendix specifies the form in which the test results for 107mm² grooved copper will be presented in order to check compliance.

3.3 Appendix 3: Test Results of 161mm² Grooved Contact Wire.

This appendix specifies the form in which the test results for 161mm² grooved copper will be presented in order to check compliance.

3.4 Appendix 4: Special Marking for Identification Purposes.

(A) specifies the form for the chemical composition of the brass insertion
(B) specifies the nature of the imprinting

4.0 MATERIAL

4.1 The wire shall be made from high conductivity copper complying with specification BS 23.
Complies/Does not comply

4.2 The wire shall comply with all the properties detailed in Appendix 2 and 3 hereof.
Complies/Does not comply

5.0 MARKING

5.1 A marking groove as specified by specification BS 23 clause 7 is required. The groove will also comply with the following requirement.

5.1.1 A brass strip of cross sectional area not greater than 1% and not smaller than 0,5% of total wire area will be embedded into the groove in such a way that the removal of the brass is not possible by hand.
Complies/Does not comply

5.2 The wire shall have imprinted on the top of the wire the words SPOORNET and the Spoornet logo, as indicated in Appendix 4(B).
Complies/Does not comply

6.0 SIZE AND LENGTH

6.1 The wire shall have a cross sectional area of 161mm² or 107mm² and shall have dimensions in accordance with specification BS 23.

Complies/Does not comply

6.2 The wire shall be supplied in continuous lengths as specified in Appendix 1, Schedule of Requirements, plus 2m minus 0 (zero).

Complies/Does not comply

7.0 DRUMS AND WINDING

7.1 Each drum shall be manufactured in accordance with SpoorNet's drawing No. CEE-TW-433 and shall have the wire tightly and evenly wound thereon.

Complies/Does not comply

7.2 The inner end of each length shall be marked at a distance of 30m from that end in such a manner as to give an observer, 6m away from the drum, an indication of the approaching end of the length when the wire is being reeled off at the rate of 60m per minute.

Complies/Does not comply

7.3 The wire shall be wound on the drum with the vertical axis of the wire at right angles to the axis of the drum and in such a manner that the contact surface of the wire shall be to the bottom when the wire is unreel of the top of the drum. The wire shall be wound in uniform layers with turns tightly together and free from kinks and crossovers.

Complies/Does not comply

7.4 Both ends of the wire must be securely fixed to the drum flange.

Complies/Does not comply

8.0 MARKING OF DRUMS

8.1 Each drum shall have, clearly marked on the outer surface of one flange, the following information:

- The manufacturer's name
- The size of the wire
- The total length of the wire contained thereon
- The gross mass
- The net mass
- SpoorNet's stores order number
- A suitable sequence number for identification purposes

Complies/Does not comply

8.2 Arrows indicating the direction of unwinding, must appear clearly marked on both flanges of the drum.

Complies/Does not comply

9.0 INFORMATION

Tenderers shall submit with their tenders the following information:

- Maximum resistance of the wire to be supplied, (Ω/km at 20°C)
- Minimum tensile strength of the wire to be supplied (kN)
- Actual number and full details of the type of joints in each length of wire to be supplied
- Chemical composition of brass used in embedded strip

Complies/Does not comply

10.0 TESTS

- 10.1 A sample length of wire from the end of each drum shall be cut off for test purposes. When relevant, one sample length in five, shall include a joint. All samples shall be tested to ensure compliance with clauses 4.2, 5.1.1 and 6.1 hereof. Whenever samples cut off in terms of the above includes a joint, the exact location of this joint shall be clearly and positively marked by means of non destructive chemical etching. This is required to ensure that the wire at the joints can be tested for compliance with the requirements of clause 4.2.
- 10.1.1 After removal of a sample length of wire from a drum, the actual length of wire remaining thereon, shall not be less than that called for in clause 6.2.
Complies/Does not comply
- 10.2 Since creep of the contact wire has to be taken into account during erection stages and afterwards during normal maintenance, tenderers must give figures indicating the initial and final creep rate that can be expected. The tensile stress for these creep rates should also be indicated.
Complies/Does not comply
- 10.3 Tests to confirm the compliance of the wire with the technical properties laid down in clause 4.2, shall be carried out on the sample lengths by the manufacturer as detailed in specification BS 23.
Complies/Does not comply
- 10.4 Spoornet reserves the right to witness all tests.
- 10.5 Copies of test certificates giving details of all tests results are to be handed, immediately after the tests, to Spoornet, to confirm that the wire and drums meet the electrical and mechanical properties required by this specification.
- 10.5.1 The test certificates to be supplied to Spoornet shall be as shown in Appendix 2 and 3.

APPENDIX 1

SCHEDULE OF REQUIREMENTS

APPENDIX 2

TEST RESULTS OF 107mm² GROOVED CONTACT WIRE

Customer's Name: _____

Customers Order No.: _____

Drum No.	Nominal Mass per km (kg)	Area (mm ²)	Resistance per km @ 20°C	Tensile strength (Mpa)	Elongation on 200 mm (%)	Hardness (Brinell or Rockwell)	Twists in 250 mm	Reverse Bends	Notes
	951 ±3%	107	0.1695 max	36 min	3.0 min	96 HB 1/10 or 54 HRB min	5 min	5 min	

Signed: Quality Inspector: _____ Date: _____

Testing Authority: _____ Date: _____

APPENDIX 3

TEST RESULTS OF 161mm² GROOVED CONTACT WIRE

Customer's Name: _____

Customers Order No.: _____

Drum No.	Nominal Mass per km (kg)	Area (mm ²)	Resistance per km @ 20°C	Tensile strength (Mpa)	Elongation on 200 mm (%)	Hardness (Brinell or Rockwell)	Twists in 250 mm	Reverse Bends	Notes
	1430 ±3%	161	0.1125 max	32.5 min	3.0 min	96 HB 1/10 or 54 HRB min	5 min	5 min	

Signed: Quality Inspector: _____ Date: _____

Testing Authority: _____ Date: _____

APPENDIX 4A

SPECIAL MARKING FOR IDENTIFICATION PURPOSES

(A)

Customer's Name: _____

Customer's Order No.: _____

Drum No.: _____

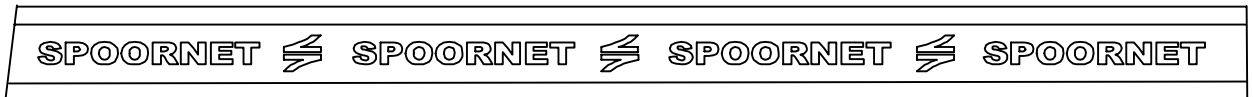
Date: _____

Chemical Break-up of contaminant insert

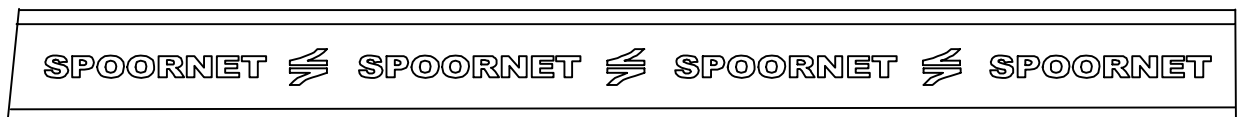
Cu	
Sn	
Pb	
Fe	
Al	
Mn	
Ni	
Sb	
As	
Pb	
Si	
Cd	
Zn	
Impurity	

SPECIAL MARKING FOR IDENTIFICATION PURPOSES

(B)



107mm square contact wire



161mm square contact wire

In both cases (107 and 161 contact wire) the height of the text must be 3.5mm \pm 0.5 and the height of the logo 7mm \pm 0.5.