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GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

STR No. TI/STR/039 (Rev.0)

Schedule of Technical Requirements
for
Approval of Vendor for Manufacture & Supply
of
Continuous Cast Silver Bearing Copper (CCSBC) Wire Rods

[Specification no. TI/SPC/OHE/CW(Cu-Ag)/0130 with latest Amendments]

ISSUED BY,
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Prepared by SSE/CW	Checked By DTI-II	Approved by DTI/OHE-D

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1.0 SCOPE

This Schedule of Technical Requirements (STR) is to assess manufacturing capability of the Vendor for new Registration /Approval in RDSO to manufacture and supply of Continuous Cast Silver Bearing (CCSBC) Copper Wire Rods of size 19.1 to 26.5 mm diameter to RDSO approved Vendors of Silver Bearing Grooved Copper Contact wire.

This STR shall be read in conjunction with RDSO Specification No. TI/SPC/OHE/CW(Cu-Ag)/0130 with latest amendments.

2.0 GENERAL INFRASTRUCTURE, MANUFACTURING FACILITIES AND TESTING FACILITIES

The manufacturer should have adequate covered area and free space for storage and transportation of Raw Material and finished CCSBC Wire Rod awaiting dispatch. Manufacturer should have the system to ensure that the final product conforms to the relevant clauses for CCSBC Wire Rod in the Specification No. TI/SPC/OHE/CW(Cu-Ag)/0130 with latest amendments.

2.1 The relations with the workers should be harmonious and regular employee training programs should be scheduled by the management for regular up-gradation of the knowledge and skills of the employees.

2.2 MANUFACTURING FACILITIES

Following machinery and plant of adequate capacity should be essentially available with the prospective manufacturer: -

2.2.1 PRODUCTION STAGE

- (i) Raw material : Electrolytic grade Copper cathodes conforming to the requirement of LME Grade `A' copper as listed in the London Metal Exchange. Facility for alloying silver with `A' grade copper cathode and manufacturing of continuous cast silver bearing copper rod to suitable diameter shall be available with the firm.
- (ii) Facility for verifying chemistry of Raw Material
- (iii) Main melting furnace adequate capacity.
- (iv) Optical thermal device for continuously monitoring of cast bar.
- (v) High pressure casting water
- (vi) Rolling mill, crop shear, casting machine, pinch rolls and coiler.
- (vii) Ultrasonic flaw detector.
- (viii) Digital Weigh Bridge of adequate capacity with programmable logic controller (PLC).
- (ix) Pneumatic operated cutting /straightening machines to cut and straightening coil end.
- (x) Lathe, shaping machine and grinding machines.
- (xi) Coiler weight setting (generally operable from 1.0 to 4.0 tons per coil)
- (xii) Electronic oven with digital temperature controller.
- (xiii) Various types of digital balances capable of determining 1/100th of a milligram.

2.3 TESTING FACILITIES

The firm should essentially have the following testing and measuring instruments/ equipment. These instruments, wherever applicable, should be calibrated from NABL/NABCB or a similar reputed international/national agency. Each instrument should have a valid calibration certificate.

SN	Equipment	Range/accuracy/remarks
1	Spectrometer for determining the copper and other trace elements of raw material.	Suitable for determining all the trace element specified in TI/SPC/OHE/CW(Cu-Ag)/0130 with latest Amendment
2	Electrolytic analyzer for chemi	Suitable for the purpose.

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	composition of copper	
2	Oxygen analyzer	Suitable for the purpose
3	Electronic oven with digital temperature controller preferably with temperature recorder and time	Suitable temperature range
4	Digital balance	Suitable capacity/range
5	Universal tensile testing machine	Suitable capacity range/ accuracy
6	Kelvin double bridge	Suitable range /accuracy
7	Hardness tester	BHN/Rockwell scale machine with suitable range /accuracy
8	Polishing machine	Suitable finish
9	Metallurgical Microscope	Suitable magnification
10	Compression Test Machine	Suitable capacity
11	Digital micrometer	Suitable accuracy and range
12	Digital Vernier Caliper	Suitable accuracy and range
13	Stop watch	Suitable accuracy
14	Measuring Tape (Steel)	Suitable accuracy

3.0 QUALITY CONTROL REQUIREMENTS

- 3.1 The firm should have ISO-9000 certification for the product broadly for which approval is being sought
- 3.2 The quality manual of the firm should clearly indicate the control over manufacturing and testing of the said product at various stages of production and testing.
- 3.3 System of easy traceability of the product from the stage of raw material to finished product should exist.
- 3.4 The firm should have quality assurance plan (QAP) indicating the checks to be carried out at Raw Material stage, in process stage and testing and inspection stage.
- 3.5 Details about type test, quantum of checks and record of all the parameters checked should be kept systematically in respective record books.
- 3.6 The approval of QAP mentioned in para 3.4 above is to be obtained by the firm from RDSO.
- 3.7 It should be ensured that system of documentation in respect of rejection at the customer end and warranty replacement exists.
- 3.8 It should be ensured that in case of failures reporting from purchaser a system of reporting recording, visit to the site, and collection of failed samples, proper analysis and corrective action taken in order to arrest failures.
- 3.9 It should be ensured that properly calibrated instruments are used and calibration is done within time through authorized agencies.
- 3.10 It should be ensured that suitable tag for identification having details mentioned in para 3.13 shall be provided on each coil.
- 3.11 It should be ensured that employees engaged in the manufacture/ testing of the said product are technically competent enough and are headed by qualified engineer.
- 3.12 It should be ensured that manufacturer maintain adequate firefighting equipment for employees safety and takes measures for keeping pollution under control.
- 3.13 Packing of the material shall be supplied in coils strapped with loops or as required by the purchaser. The suitable tags shall have the following information.
 - (i) Name and trade mark of manufacturer,
 - (ii) Size of CCC wire rod and weight of coil,
 - (iii) Lot number
 - (iv) Date of manufacture
 - (v) Purchase order number and name of consignee;
 - (vi) Date of inspection and inspecting authority;
 - (vii) Any other information required by the purchaser.

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