भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
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संख्या. No. RDSO-TI0LKO(OHE)/44/2020-O/o PED/TI/RDSO-Part(1) दिनांक/Date: As signed

1. Central Railway., 2nd floor, Electrical Branch, Parcel Office Bldg. Mumbai - 400 001.
2. Eastern Railway, Fairlie Place, Kolkata-700 001
3. East Central Railway, Hajipur (Bihar).844101
4. East Coast Railway, B-Rental Colony, Chandrashekharpur, Bhubaneshwar (Orissa)-751 023
5. Northern Railway, Baroda House, New Delhi - 110 001
6. North Central Railway, Block-A, Subedarganj, Allahabad 211 033.
7. North Eastern Railway, Gorakhpur (UP).220 055
8. Northeast Frontier Railway, Maligaon, Guwahati - 781011.
9. North Western Railway, Jaipur (Raj.) – 302017.
10. Southern Railway, Park Town, Chennai - 600 003 (TN)
11. South Central Railway, Rail Nilayam, Secunderabad – 500 371
12. South Eastern Railway, Garden Reach, Kolkata-700 043.
13. South East Central Railway, Bilaspur (Chhattisgarh).4950 04
14. South Western Railway, DRM's Office, Hubli (Karnataka)
15. Western Railway, Churchgate Stn. Bldg, Mumbai - 400 020.
16. West Central Railway, Jabalpur-482 001 (M.P)
17. Metro Railway, Kolkata, Metro Bhavan, 33/1, J L Nehru Road, Kolkata-700031.
18. Konkan Railway Corporation Limited, Belapur Bhavan, Plot No 6, Sector 11, CBD Belapur, Navi Mumbai – 400614.

विषय/Sub: Revised Specification for Tensile Load Testing Machine for 25 kV Porcelain & Composite Insulators before Installation

The subject Specification No. TI/SPC/OHE/INSTEST/0090 (02/2009), Rev-0 with A&C Slip 1&2 for Tensile Load Testing Machine for 25 kV Porcelain & Composite Insulators before Installation has been revised. The copy of revised Specification No. TI/SPC/OHE/INSTEST/0091 is attached herewith for your kind information and necessary action please.

यह सक्षम प्राधिकारी के अनुमोदन से जारी किया जाता है।

संलग्नक: Revised Specification No. TI/SPC/OHE/INSTEST/0091

27.08.2024

(गिर्राज किशोर/Girraj Kishore)
संयुक्त निदेशक/कं.सं-1/ Joint Director/TI-1
For Director General (TI)/कृते महानिदेशक (कर्षण संस्थापन)

सत्यमेव जयते

भारत सरकार **GOVERNMENT OF INDIA**
रेल मंत्रालय **MINISTRY OF RAILWAYS**

सं.टीआई/एसपीसी/ओएचई/इनसटेस्ट/0091

No. TI/SPC/OHE/INSTEST/0091
(अगस्त, **2024/August, 2024**)

25 केवी पोर्सिलेन और कम्पोजिट इंसुलेटर के स्थापना से पहले टेस्टिंग लिए टेन्साइल लोड टेस्टिंग मशीन के लिए विनिर्देश/विशिष्टि

SPECIFICATION FOR TENSILE LOAD TESTING MACHINE FOR 25 KV PORCELAIN & COMPOSITE INSULATORS BEFORE INSTALLATION

		हस्ताक्षर/Signature
अनुमोदित Approved by	प्रधान कार्यकारी निदेशक (कर्षण संस्थापन) Principal Executive Director (TI)	23/8/24
अनुशंसित Recommended by	कार्यकारी निदेशक (कर्षण संस्थापन) Executive Director (TI)	23/8/24

जारीकर्ता/ISSUED BY:

कर्षण संस्थापन निदेशालय
TRACTION INSTALLATION DIRECTORATE,
अनुसन्धान अभिकल्प एवं मानक संगठन
RESEARCH DESIGNS & STANDARDS ORGANISATION,
मानक नगर लखनऊ-226011
MANAKNAGAR, LUCKNOW-226011

Amendment History:

Amendment Number	Amendment/Revision	Total pages including drawings	Date of Issue	Reasons for Amendment/Revision
First issue	TI/OHE/INSTEST/0090 (02/2009), Rev-0	5	19.02.2009	--
Rev-01	TI/OHE/INSTES/0091	8	August, 2024	• Make in India policy incorporated. • "Director General/TI (DG/TI), RDSO, Lucknow" deleted as the item has been decontrolled. • Tenderer replaced with "manufacturer". • Clauses have been rearranged and renumbered. • Climatic conditions Altitude, Atmosphere during hot weather, Coastal area & Vibration have been added in clause 4.0. • List of Governing specifications referred in the Final Draft specification has been added as new clause 3.0 as per standard procedure of RDSO. • Technical Details has been added as new clause 5.0. • IS: 1828 (Pt-1) for accuracy of Machine has been added and new test "Calibration of the Machine and Accuracy Test" in Type test & routine test has been added. • IS: 3098 for Hydraulic Oil has been added in clause 8.0. • "Packaging", "Design and Drawings" & "ISO Certification" as new clauses 16.0, 19.0 & 21.0 have been added.

INDEX

SPECIFICATION FOR TENSILE LOAD TESTING MACHINE FOR 25 kV COMPOSITE AND PORCELAIN INSULATORS

1.0 SCOPE: - This specification covers the requirements of machine for tensile load testing of porcelain & composite insulators.

2.0 The "Make In India" Policy of Government of India shall be applicable.

3.0 GOVERNING SPECIFICATIONS:

SN	Specification No.	Description
(i)	IS 1828 (Part -1):2022 or latest	Metallic materials-Calibration and Verification of Static Uniaxial Testing Machines - Part 1 Tension/Compression Testing Machines-Calibration and Verification of the Force-Measuring System
(ii)	ASTM E4 – 21 or latest	Standard Practices for Force Calibration and Verification of Testing Machines.
(iii)	IS 3098: 1983 (Reaffirmed 2019) or latest	Specification for Oil, Hydraulic, Mineral Oil Type
(iv)	IS 2062: 2011 (REAFFIRMED 2021) or latest	Hot Rolled Medium And High Tensile Structural Steel — Specification
(v)	SS 304	Stainless Steel
(vi)	IS 513 (Part 1 & 2):2016 (Reaffirmed 2021) or latest	Cold Reduced Carbon Steel Sheet and Strip
(vii)	EN 8	Carbon Steel
(viii)	EN 19	Alloy Steel

4.0 CLIMATIC CONDITIONS

The machine shall be in continuous operation under the following atmospheric and climatic conditions:

Ambient Temperature	-10°C to55°C
Maximum temperature under sun	70°C
Altitude	2000 m above mean sea level
Maximum Relative Humidity	100%.
Atmosphere during hot	Extremely dusty and desert terrain in certain areas. The dust concentration in air may reach as high as of 1.6 mg/m³. In many iron ore and coalmine areas, the dust concentration is very high

weather	affecting the filter and air ventilation system.
Coastal Area	Machine shall be designed to work in coastal areas in humid and salt laden atmosphere with maximum pH value of 8.5, sulphate of 7 mg per liter, max. concentration of chlorine 6 mg per liter and maximum conductivity of 130 micro Siemens/cm.
Vibration	The equipment, sub-system and their mounting arrangement shall be designed to satisfactorily withstand the vibration and shocks encountered during operation and service.

5.0 TECHNICAL DETAILS

Materials	:	Materials used in the construction shall be robust (Appropriate grade of Steel/Mild Steel/Carbon Steel/Stainless Steel/EN8 as applicability in Construction of Tensile Testing Machine). Necessary provision against corrosion shall be provided in the Machine.
Full Load Capacity (Safe Working Load)	:	10 Tonne
Measuring Range	:	0-20 Tonne
Load Measuring accuracy	:	± 1% of measured load as per IS:1828 (Part-1)
Rate of application of Tensile load	:	300kgf (max.) per second
Operational Test withstand capability	:	1.25 times of full load capacity (with the fixture of insulator testing without permanent deformation of any component part)
Proof Load withstand capability	:	2 times of full load capacity (Proof Load shall be applied for at least five minutes. There shall be no permanent deformation of any component of the machine after removal of the Proof Load)
Calibration	:	Shall be traceable to National/International Standards

6.0 OPERATIONAL CHARACTERISTICS/FEATURES OF THE TENSILE TESTING MACHINE

6.1 The operation of machine shall be smooth and jerk free.

6.2 Machine shall be mounted on castor wheel with suitable locking arrangement.

6.3 Machine shall be capable of testing the insulators up to 700mm length excluding the adopter/attachment required for fitment of insulators.

6.4 The Machine shall be stable in all operational positions (unloaded, loaded and to stand on its own) without any foundation.

6.5 Minimum possible time to fix the insulators in the machine shall be within 10 minutes.

6.6 A wire mesh of mild steel material shall be fixed around the machine to restrict the insulator pieces inside the mesh in case of breakage of insulator thereby preventing any injury to the operator during testing. Wire mesh shall be having at least 8-10 mm holes/gap so that it shall not restrict the visibility of the test specimen during testing.

6.7 The Machine shall be equipped with necessary control equipment, gauges and safety devices for safe and satisfactory operation of the machine.

6.8 Two sets of appropriate grade of Steel/stainless steel/Carbon Steel/EN8 adopters /grips/fixtures for each type of insulator shall also be provided for testing of different types of insulators, as per requirement of the purchaser/user Railway or its authorized representative. If Carbon Steel/EN8 material of adopters /grips/fixture is used it should be properly heat treated and electro galvanized.

One calibrated Dynamometer of range upto 20 Tonne is also to be supplied by manufacturer with calibration Certificate issued by NABL accredited laboratory or any other Government laboratory to check calibration of Tensile Testing Machine."

6.9 There shall not be any leakage of the oil from the machine during the operation/otherwise.

6.10 Design of the Machine shall be such that one operator can fix the insulator & operate the tensile testing machine on its own by manually operating the hydraulic pump Reading on the display board or gauge shall be clearly visible to operator during operation.

6.11 The reading of load applied on insulator shall be available in Kgf or kN with a measuring accuracy not exceeding ±1% as per IS 1828 (Part -1):2022 or latest.

6.12 Machine shall be provided with 'Self Aligning Mechanism', such that the load applied on the Insulator gets automatically aligned in Vertical Straight Line during testing.

7.0 CAPACITY:

The minimum capacity of the machine shall be 10 Tonne. Digital type Measuring gauges shall have such range so as to indicate correct readings during Proof Loading Test and Operational Test specified in Clause 14.4 and Clause 14.5 respectively.

8.0 Hydraulic oil used in the Machine shall comply with "specification for Oil, Hydraulic, Mineral Oil Type IS: 3098-1983 (Reaffirmed 2019) or latest".

9.0 VIBRATION:

The machine shall withstand satisfactorily, the vibration and shocks normally encountered during insulator testing. Machine should be mounted on castor wheels with suitable braking mechanism.

10.0 MAJOR COMPONENTS:

Major components of the machine like Cylinder, pump, Load Cells/ hydraulic actuator and gauges used for operation of the machine shall be of reputed make & test certificates from OEM regarding their testing at NABL accredited laboratory or any other Government laboratory

11.0 TYPE TEST:

Following type tests shall be conducted on the offered design of tensile test machine, if not previously carried out.

i) Visual Examination.
ii) Verification of Dimensions.
iii) Measurement of the weight.
iv) Verification of Calibration and Accuracy Test
v) Proof loading.
vi) Operational test.

12.0 ACCEPTANCE TEST: All the tests mentioned in clause 11.0, shall constitute acceptance tests.

13.0 ROUTINE TESTS:- The following tests shall be carried out by the manufacturer on each machine and record maintained and produced during type tests/ acceptance tests by purchaser/user Railway or its authorized representative:

i) Visual Examination.
ii) Verification of Dimensions.
iii) Measurement of the weight.
iv) Verification of Calibration and Accuracy Test

14.0 TESTING PROCEDURE:

14.1 Visual Examination: The component / parts of the machine shall be visually examined for any manufacturing defect, deformation of parts, misalignment, rusting, pitting / corrosion, sharp edge etc. No such defects which may be harmful to safe /satisfactory operation of machine shall be accepted.

14.2 Measurement of Dimensions: The major and other critical dimensions of the machine shall confirm to the drawings/design approved by Purchaser /user Railway or its authorized representative. Tolerance shall be as approved in the drawing.

14.3 Measurement of weight: The weight of the machine shall be measured and shall bewithin the limits specified in the drawings/design approved by Purchaser or its representative. Tolerance shall be as approved in the drawing.

14.4 Proof Loading: The tensile load testing machine shall be tested prior to operational test with load of 20,000 Kgf, which it shall withstand for at least five minutes without permanent deformation of any component of the machine.

14.5 Operational Test: - After proof loading, the machine shall be made to test 1.25 times i.e. 12500 kgf load with the fixture of insulator testing for at least 5 minutes, which shall ensure that every part of the fixture & machine comes under load. During the test there shall be no permanent deformation of any component part.

14.6 Verification of Calibration and Accuracy Test: Valid calibration certificate shall be checked.

15.0 INSPECTION & TESTING:

The machine shall be inspected and tested by purchaser /User Railway or its authorised representative at the manufacturer's work. Manufacturer shall demonstrate functioning of the machine on the sample test specimen along with associated fittings during the inspection.

16.0 PACKAGING:

16.1 The Machines shall be properly packed duly assembled in strong wooden boxes so as to avoid damage during transit.

16.2 The following details shall be permanently and legibly marked on a suitable part or name plate provided on each Machines giving the following information:

a) Manufacturer's name and trade mark,
b) Safe working load,
c) Accuracy
d) Month and year of manufacture

17.0 INSTALLATION& COMMISSIONING:

The machine shall be installed & commissioned by contractor. Manufacturer shall also arrange to impart training to purchaser/user's staff for operation, maintenance and troubleshooting of machine after installation.

18.0 MAINTENANCE& OPERATIONAL MANUALS:

Two copies of operational and maintenance manual including troubleshooting guidelines shall be supplied.

19.0 DESIGN AND DRAWINGS:

Manufacture of the Tensile Load Testing Machine shall submit the Design & Drawings of the Tensile Load Testing Machine to the purchaser/User Railway or its authorised representative for approval.

20.0 WARRANTY:

Warranty shall be as per Indian Railways Standard (IRS) Conditions of Contract.

21.0 ISO CERTIFICATION:

Manufacturer of the Tensile Load Testing Machine should have ISO 9001:2015 Certification covering the product in ISO scope for manufacturing and supply.
