



सत्यमेव जयते

भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय MINISTRY OF RAILWAYS

सं. टीआई/एसटीआर/032 (पुनरीक्षण-1)
STR No. TI/STR/032 (Rev.1)
(जनवरी, 2022 / January, 2022)

ब्रॉड गेज (1676 मिमी) पर संचालन हेतु ओएचई कार्यों में उपयोग के लिए स्व-चालित 8-व्हीलर डीजल इलेक्ट्रिक निरीक्षण एवं रखरखाव ओएचई कार (8-डबल्यूडीईटीसी, अंडर स्लंग टाइप) तथा स्व-चालित मशीनीकृत मशीन वाहन (डीजल इलेक्ट्रिक/डीजल हाइड्रोलिक ट्रांसमिशन) के लिए तकनीकी आवश्यकता की अनुसूची (एसटीआर).

Schedule of Technical Requirement (STR) for the **self-propelled 8-Wheeler Diesel Electric Inspection & Maintenance OHE Car under slung type (8W-DETC)** and Self-propelled Mechanized Machine Vehicles with Diesel Electric/Diesel Hydraulic (under slung) Transmission for operation on Broad Gauge (1676 mm) for use on OHE works.

		हस्ताक्षर/Signature
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SCHEDULE OF TECHNICAL REQUIREMENT (STR) FOR THE SELF
PROPELLED 8W-DETC AND MECHANISED MACHINE VEHICLES

STR No. TI/STR/032

Amendment History:

Amendment Number	Amendment/Revision	Total pages including Annexures	Date of Issue	Reason for Amendment/Revision
0	TI/STR/032	09	06.06.2012	First issue
1	TI/STR/032 (Rev.1)	12	----01.2022	<p>Second Issue.</p> <p>STR reviewed as per directive of Railway Board.</p> <p>STR reviewed and Title of STR is modified for self-propelled Mechanized vehicles and 8W-DETC.</p> <p>Change in Para No. 1.1, 1.2, 1.3, 1.4 (New para for 'Make in India' policy), 2.1, 2.2, 2.5, 2.6, 3.0 (QAP), 4.1, 4.2 (deleted), 5.1, 5.2(deleted), 6.1, 6.2, 6.5, 7.2, 7.4. (and renumbering of para No. 4 to 7.4).</p> <p>In Annexure-I (for M&P), quantity of level track changed from 01 No. to 02 Nos.</p> <p>In Annexure-II (Testing facilities) modified for outsourcing of some facilities. Motorised Meggers are replaced by 'Digital Insulation Resistance Tester' and some new para are added for 'Sound level meter', 'High Voltage Tester', 'Infrared Temperature indicator', 'Digital Lux meter', 'Water Load Box Test set up' and 'Bogie Load Testing facility', based on requirement of 8WDETC Specification.</p> <p>In Annexure-III (Jigs & fixture), heading of table modified.</p>

Note: This STR supersedes the STR No. TI/STR/030 Rev'0' (August, 2011).

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SCHEDULE OF TECHNICAL REQUIREMENT (STR) FOR THE SELF-PROPELLED 8-WHEELER DIESEL ELECTRIC INSPECTION & MAINTENANCE OHE CAR UNDER SLUNG TYPE (8W-DETC) AND SELF PROPELLED MECHANISED MACHINE VEHICLES WITH DIESEL ELECTRIC/DIESEL HYDRAULIC (UNDER SLUNG) TRANSMISSION FOR OPERATION ON BROAD GAUGE (1676 MM) FOR USE ON OHE WORKS

1. SCOPE

- 1.1 ~~The Self-Propelled Mechanised Machine Vehicles with Electric/Diesel hydraulic type are used for erection of new OHE, digging foundations, Erection of Mast and 8-Wheeler Inspection & Maintenance OHE car (8W DETC) for periodical inspection, patrolling and maintenance of traction overhead equipment (OHE) also to attend OHE break down, restoration etc. It is also required to erect small lengths of catenary and contact wire by way of repairs of damaged OHE.~~

This Schedule of Technical Requirement (STR) supersedes the STR No. TI/STR/030 Rev'0' (August, 2011), as the requirement of STR No. TI/STR/030 Rev'0'(August, 2011) has been merged into this STR.

- 1.2 The Schedule of Technical Requirement (STR) mentioned hereunder is issued to serve as a guide to manufacturers (called the "firm" hereafter) regarding Machinery & Plant and Testing facility required to manufacture Self-propelled 8W-DETC and Self-Propelled Mechanized Machine Vehicles (Self-Propelled Multi-Purpose Utility Vehicle, Self-Propelled Auger, Self-Propelled Wiring Train, Mast Erection Machine Vehicle) for use on OHE works, and to assess the manufacturing capability of manufacturer, should be read in conjunction with the following Specifications ~~and~~ with latest ~~National & International standards Amendments~~.

- i) TI/SPC/OHE/SPMUV/0092 (01/2017) or latest
- ii) TI/SPC/OHE/WIRING/0091 or latest
- iii) TI/SPC/OHE/MEMV/0090(03/2009) or latest
- iv) TI/SPC/OHE/AUGER/0090(02/2009) or latest
- v) TI/SPC/OHE/8WDETC/0092(08/2015) or latest

- 1.3 The firm should satisfy themselves having complied with the requirements of the respective Specification of the vehicle and STR. The technical requirements are meant to serve as guidelines only and are not exhaustive. This is also meant for judging the capability of the firm to manufacture and supply above Mechanized Machine Vehicle and 8W DETC.

If the firm is not having any of the equipment or machinery; it may give reasons or alternate method to complete the job.

- 1.4 The "Make in India" policy of the Government of India shall be applicable.

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2. GENERAL REQUIREMENTS

- 2.1 The firm should possess valid ISO 9001 certificate for manufacture of same/similar item at his works address issued by the certifying body which is accredited by an accreditation body that is a part of the International Accreditation Forum (IAF) under the Multilateral Recognition Arrangement (MLA). ~~should have currently valid ISO-9001-2015 certification issued by an approved agency with the activity desired clearly mentioned in the scope of certification. The firm shall have a Quality Manual indicating the extent of control over production~~
- 2.2 The firm shall have a Quality Manual indicating the extent of control over production.
~~A system of regular submission of rejection details of material giving rejection rate, cause of rejection, corrective action taken etc. on quarterly basis should be followed by the firm.~~
- 2.3 The firm shall have a system of documentation in respect of rejection at customer end, warranty replacement and failure of item supplied by them during service.
- 2.4 The firm shall have a system of recording the plant, machinery and control equipment remaining out of service, nature of repairs done etc.
- 2.5 The testing and measuring equipment shall be duly calibrated and the validity of calibration should be current and shall be verified by physically checking the calibration certificate issued by the Calibration Agency from whom it was calibrated.
- 2.6 The firm shall have a system of easy traceability of the product from manufacturing stage to finished product stage. ~~Stamped identification marking with serial number of beam should be used for this purpose.~~
- 2.7 The firm should have a system of monitoring the supplied product complaints. The complaints made by the customer should be identifiable to the various manufacturing stages of the product and linking the complaint for the corrective and preventive action of the product.

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3. QUALITY ASSURANCE PLAN (QAP)

The firm should have Quality Assurance Plan (QAP) as per firm's ISO policy for the same/similar items being manufactured by the firm at declared factory location.

However, if a contract is awarded, firm shall prepare and submit a Quality Assurance Plan (QAP) ~~as per RDSO's ISO standard format as per RDSO/Purchaser's guidelines during the design approval stage, for all items the item for which approval is sought and submit the same as part of compliance of STR.~~ the contract is awarded for the declared factory location. The QAP shall be approved by RDSO/purchaser and shall be prepared as per details given in relevant contract specification. The QAP shall be a comprehensive document covering the following aspects:

- i) Organisation Chart.
- ii) Details of the Quality Control Organisation of the firm along with key personnel engaged in the QC function.
- iii) Process Flow Chart indicating the process of manufacture for ~~an individual product/sub-assembly or for a family of products if the process is the same.~~
- ~~iv) Quality Assurance process of incoming material used for subject items.~~
- v) Quality Assurance System including inspection & testing Plan including for the various stage inspections i.e. incoming, in process and final product inspection.
- vi) Calibration scheme and status of calibration of equipment used in the quality process.

~~Details of the above aspects are described in the following paragraphs. The QAP shall be approved by RDSO and shall form basis of approval process. For preparing the QAP, briefs of the above aspects are described in the following paragraphs.~~

3.1 ~~(4.0)~~ QUALITY CONTROL ORGANISATION

~~(4.1)~~ The complete organizational setup of the Quality control key personnel and officials along with their qualification and experience should be furnished.

~~(4.2) The Quality Control organization should be headed by a senior level official having adequate technical qualification who shall directly report to plant in-charge.~~

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3.2 ~~(5.0)~~ INCOMING MATERIAL

3.2.1 ~~(5.1)~~ A complete Bill of Material indicating all input material items required for manufacturing of the Mechanized Machine Vehicle/ 8WDETC as per governing specification and their sources of supplies as approved by the firm in accordance with stipulation in ~~ISO 9001 (2015)~~ their ISO Quality Policy should be furnished.

3.2.2 ~~(5.2)~~ ~~Test results of incoming raw material and Brought Out Items like Cranes etc. reference to Test Certificate issued by the supplier and the results of internal tests carried out by the firm for verification may be submitted as part of QAP.~~

3.3 ~~(6.0)~~ PROCESS OF MANUFACTURE

3.3.1 ~~(6.1)~~ ~~Complete Process Flow Chart covering all steps of the process of manufacture for an individual product (or for a family of products if the process is same) shall be clearly enlisted as a part of QAP.~~

Process flow chart indicating all the operations involved in manufacturing & testing of products from raw material to finished product inspection, including Consignee inspection/dispatch inspection should be furnished. Details of Sub-assemblies/components manufactured in-house and outsourced should also be furnished.

3.3.2 (6.2) The following details of machines (M&P/T&P) used for all the steps of machining and welding operations should be included in the following format:

- ~~o Make and model of the machine~~
- ~~o Accuracy~~
- ~~o Details of machining operations~~

Sl. No.	STR/ Spec. para no.	Requirement of M&P/T&P as per STR/Spec		Details of the M&P/T&P available with the firm					
		M&P/ T&P name	Range/ capacity of M&P/ T&P	Name of M&P/ T&P	Model	Make	Machine No.	Year of Built	Range/ capacity

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3.3.3 (6.3) Machining process should be such that all critical dimensions are final machined on CNC machining centers, preferably in a single setting.

3.3.4 (6.4) Details of Jigs and fixtures to be used during manufacture should be furnished along with the manufacturing process wherever used.

3.3.5 (6.5) List of typical **minimum** M & P required for manufacture is furnished in **Annexure-I**. The list is for general guidance only and **actual manufacturing operations shall be submitted and got approved by the firm from RDSO as a part of QAP** shall be available with the firm. Any deviation to this due to change in M&P due to the actual manufacturing process shall be indicated while submitting compliance of STR. However, the specific M&P used by the firm will also form part of QAP which shall be submitted and got approved by the firm.

3.4 (7.0) QUALITY ASSURANCE PROCESS-INSPECTION & TESTING PLAN

3.4.1 (7.1) Complete Inspection and testing Chart covering all steps of process of manufacture for an individual product including final inspection should be clearly enlisted as a part of QAP.

3.4.2 (7.2) The **following** details of measuring instruments/equipments/jigs/fixtures used for all the steps of measurement operations should be included **in the following format:**

- ~~o Make and model of the measuring equipment~~
- ~~o Accuracy~~
- ~~o Quantity to be measured and acceptable value range.~~

Sl. No.	STR/ Spec. para no.	Requirement of M&P/T&P as per STR/Spec.		Details of the M&P/T&P available with the firm					
		M&P/ T&P name	Range/ capacity of M&P/T &P	Name of M&P/ T&P	Mo del	Make	Mac hine No.	Year of Built	Range/ capacity

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3.4.3 (7.3) Stage inspection detailing inspection procedure, inspection parameters, and method of testing/test procedure should be available and furnished.

3.4.4 (7.4) The list of Testing and Measuring instruments ~~are~~ furnished in **Annexure-II & ~~III~~** and for Jigs & Fixtures furnished in **Annexure-III** respectively ~~are~~ for general guidance only and shall be available with the firm. Any deviation to this due to change in Testing and Measuring instruments and Jigs & fixtures due to the actual manufacturing process shall be indicated while submitting compliance of STR. However, the specific Testing & measuring instruments, gauges used by the firm will also form part of QAP which shall be submitted and got approved by the firm.

FINAL DRAFT

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ANNEXURE-I**MACHINERY & PLANT**

S.N.	Description of Machine	Capacity	Quantity
1.	CNC Profile cutting machine/Plasma Cutting Machine/Laser Cutting Machine		01
2.	Edge preparation milling machine		01
3.	Shearing machines		01
4.	Hydraulic press	50 tonne	01
5.	Milling Machine		01
6.	Press brakes	100t-450t	01
7.	Welding Sets	300-450A	05
8.	Metal Inert Gas (MIG) welding equipments sets	400-600A	04
9.	Brake testing rig		01
10.	Induction heating/oil bath heating equipment		01
11.	Drilling and boring machines		01
12.	Engraving Machine		01
13.	Laser Cutting or plasma cutting Machine		01
14.	EOT Cranes/Movable Cranes	15 tonnes	02
15.	EOT Cranes or Synchronised lifting/shifting screw jacks	30 tonnes 15 tonnes	02 05
16.	Compressor with free air discharge	Suitable capacity	02
17.	Forklifts of capacity and Diesel or Battery driven tow truck	2-3t 1-3t	
18.	Facilities for carrying out Radiographic tests of welds or Out sourcing with a reputed agency for carrying out radiographic testing.		01
19.	Facilities for carrying out submerged arc welding		01
20.	Paint Booth/Painting facility		01
21.	Level Track (To be set up within 6 months after awarding of contract)	1676 mm gauge 100 meters length (min)	02
22.	Pit facility under track	25 meters	01
23.	Dust proof room for Cable Harnessing		01
24.	Angle Grinder for surface cleaning etc.		02

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ANNEXURE-II**TESTING FACILITIES:**

- Calibration of testing equipment should be done at least once in a year unless stated otherwise.
- Following testing facilities should be available with the firm.

S.N.	Description of testing Facility	Capacity	Quantity
1.	Motorised Meggars Digital Insulation Resistance Tester (IR Tester)	Test Voltage range upto 1000V (including 500V setting)	01 02
2.	Megger	500V	01
3.	Motorised Meggars	1000V	01
4.	Megger	1000V	01
5.	Testing facilities for Aux. Machines before mounting*		01
6.	Testing facilities for light running of traction motors with suspension unit		01
7.	Testing and charging facilities for batteries before mounting		01
8.	Fan & Electrical Fittings Test facility		01
9.	Facilities for checking MMD of the unit		01
10.	Harness Tester		01
11.	Digital Coating Thickness Meter		01
12.	Impact Testing Machine (Charpy V-Notch) for conducting impact test with facilities for notch cutting & undertaking this test at sub-zero temperatures as per the specified standard*	0-300 Joules	01
13.	Universal Testing Machine with graphical recording facilities for conducting tensile tests*	40 tonne	01
14.	Torque Meter		

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15.	Weighing Facility	100 tonnes	01
16.	Magnetic Particle Inspection (MPI) facilities for checking sub-surface flaws*		01
17.	Direct reading Hardness Tester*	95-500 BHN	01
18.	Shadowgraph facilities for assuring correct notch profile and dimension for impact test specimen*		01
19.	Sound level meter/Noise level meter		01
20.	High Voltage Tester (HV Tester)	Min. 3KV/ 5KV	01
21.	Infrared Temperature indicator		01
22.	Digital Lux meter		01
23.	Water Load Box Test set up (for Water Load test of Engine & Alternator set)	Min. 250 KW 300KW or more	01
24.	Bogie Load Testing facility	Min. 30 tonne	01

*Testing facility mentioned at S.N. -5, 12, 13, 16, 17 & 18 above, may be outsourced from any Government Lab/NABL accredited Laboratories.

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ANNEXURE-III

~~Jigs, Fixtures & Gauges as required should be available in sufficient quantity or be procured within 6 months of awarding of contract. Some of them are as below:~~

Required Jigs, Fixtures & Gauges (some of them are tabulated below) should be available in sufficient quantity for any rolling stock manufactured/being manufactured as compliance to this STR. However, for manufacturing intended rolling stock under scope of this STR, the required Jigs and fixtures shall be procured/made within 6 months of awarding of contract.

S.N.	Description of Jigs/Fixtures/Gauges
1.	Jigs for marking and drilling operations
2.	Fixtures to ensure fitting accuracy of under frame
3.	Fixture for Body Side Wall Assembly
4.	Fixture for Body Shell Assembly
5.	Fixture for Roof Assembly
6.	Fixture for End wall
7.	Fixture for Bogie/Under frame Fabrication
8.	Fixtures for sub-assembly of components
9.	Fixture for cambering under frame & subsequent welding with sidewall.

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