

STR No. TI/STR/032 Rev."1"



सत्यमेव जयते

GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS

SCHEDULE OF TECHNICAL REQUIREMENT (STR) ~~TO~~  
~~MANUFACTURE FOR~~ THE SELF PROPELLED MECHENISED  
MACHINE VEHICLES (Self-Propelled Multi-Purpose Utility Vehicle,  
~~Road-Rail Heavy Vehicle~~, Self-Propelled Auger,  
Self-Propelled Wiring Train, Mast Erection Machine Vehicle, & ~~Self-~~  
~~propelled 8-Wheeler Diesel Electric Inspection & Maintenance OHE Car~~  
~~Under Slung Type - 8W DETC~~) WITH DIESEL ELECTRIC/DIESEL  
HYDRAULIC (UNDER SLUNG) TRANSMISSION FOR OPERATION ON  
BROAD GAUGE (1676 MM) FOR USE ON OHE WORKS

(----- 2020)

APPROVED BY	SIGNATURE
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Issued by

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Manak Nagar, Lucknow-226011

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SCHEDULE OF TECHNICAL REQUIREMENT (STR) ~~TO MANUFACTURE FOR~~  
THE SELF PROPELLED MECHENISED MACHINE VEHICLES & 8W DETC

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0	NA	09	First issue
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SCHEDULE OF TECHNICAL REQUIREMENT (STR) ~~TO MANUFACTURE~~ FOR THE SELF PROPELLED MECHENISED MACHINE VEHICLES (Self-Propelled Multi-Purpose Utility Vehicle, ~~Road-Rail Heavy Vehicle~~, Self-Propelled Auger, Self-Propelled Wiring Train, Mast Erection Machine Vehicle, & ~~Self-propelled 8-Wheeler Diesel Electric Inspection & Maintenance OHE Car Under Slung Type - 8W DETC~~) WITH DIESEL ELECTRIC/DIESEL HYDRAULIC (UNDER SLUNG) TRANSMISSION FOR OPERATION ON BROAD GAUGE (1676mm) FOR USE ON OHE WORKS

## 1.0 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.

1.2 The Schedule of Technical Requirement (STR) mentioned hereunder is issued to serve as a guide to manufacturers (called the "firm" hereafter) of Self-Propelled Mechanised Machine Vehicles and ~~8W DETC~~ for OHE works should be read in conjunction with the following Specifications and with latest National & International standards.

- i) ~~TI/SPC/OHE/SPMUV/0092 (01/2017)~~ or latest
- ii) ~~TI/SPC/OHE/WIRING/0091~~ or latest
- iii) ~~TI/SPC/OHE/RRV/0090(05/2009)~~
- iv) ~~TI/SPC/OHE/MEMV/0090(03/2009)~~ or latest
- v) ~~TI/SPC/OHE/AUGER/0090(02/2009)~~ or latest
- vi) ~~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 Mechanised 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 Government of India shall be applicable.

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## 2. GENERAL REQUIREMENTS

- 2.1 The firm should have currently valid ~~ISO-9000~~ **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 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 equipments 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 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.

### 3.0 QUALITY ASSURANCE PLAN (QAP)

The firm shall prepare a Quality Assurance Plan (QAP) **as per RDSO's ISO standard format**, for all items for which approval is sought and submit the same as part of compliance of this STR. The QAP shall be a comprehensive document covering the following aspects:

- i) **Organisation Chart.**
- ii) Details of Quality Control Organisation of the firm along with key personnel engaged in the QC function.
- iii) Quality Assurance Process of incoming materials used for

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the subject items.

- iv) Process Flow Chart indicating process of manufacture for an individual product or for a family of products if the process is same.
- v) Quality Assurance System - Inspection & Testing Plan including the stage inspection.
- vi) Calibration scheme and status of calibration of equipments 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.

#### 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.

#### 5.0 INCOMING MATERIAL

- 5.1 A complete Bill of Material indicating all input material items required for manufacturing of the Mechanised Machine Vehicle and 8WDETC, governing specification and their sources of supplies as approved by the firm in accordance with stipulation in ~~ISO-9001-(2008)~~ ISO-9001-(2015) should be furnished.
- 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.

#### 6.0 PROCESS OF MANUFACTURE

- 6.1 Complete Process Flow Chart covering all steps of 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.
- 6.2 The following details of machines used for all the steps of machining and welding operations should be included:

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- Make and model of the machine
  - Accuracy
  - Details of machining operations
- 6.3 Machining process should be such that all critical dimensions are final machined on CNC machining centers, preferably in a single setting.
- 6.4 Details of Jigs and fixtures to be used during manufacture should be furnished along with the manufacturing process wherever used.
- 6.5 List of typical 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.

7.0 QUALITY ASSURANCE PROCESS-INSPECTION & TESTING PLAN

- 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.
- 7.2 The following details of measuring instruments/equipments/jigs /fixtures used for all the steps of measurement operations should be included:
- Make and model of the measuring equipment
  - Accuracy
  - Quantity to be measured and acceptable value range.
- 7.3 Stage inspection detailing inspection procedure, inspection parameters, and method of testing/test procedure should be available and furnished.
- 7.4 The list of Testing and Measuring instruments are furnished in **Annexure-II & III** respectively for general guidance only. 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.

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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 15tonnes	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)	<del>01</del> 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 equipments should be done at least once in a year unless stated otherwise.
- Following testing facilities should be available with the firm; ~~alternatively can be outsourced from NABL accredited Laboratories.~~

S.N.	Description of testing	Capacity	Quantity
1.	Motorised Meggars	500V	01
2.	Meggar	500V	01
3.	Motorised Meggars	1000V	01
4.	Meggar	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.	<del>Impact Testing Machine.</del> 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.	<del>Tensile Testing Machine.</del> 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)	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)	300KW or more	01

\*Testing facility mentioned at S.N. 5, 12, 16, 17, & 18 above, may be outsourced from NABL accredited Laboratories.

PHYSICAL LABORATORY:

1. ~~Universal Testing Machine of 40 tonne capacity with graphical recording facilities for conducting tensile tests.~~
2. ~~Direct reading Hardness Tester of capacity 95-500 BHN.~~
3. ~~Impact Testing Machine (Charpy V Notch) of 0-300 Joules capacity for conducting impact test with facilities for notch cutting & undertaking this test at sub-zero temperatures as per the specified standard.~~
4. ~~Shadowgraph facilities for assuring correct notch profile and dimension for impact test specimen.~~

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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:

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 Endwall
7.	Fixture for Bogie/Underframe Fabrication
8.	Fixtures for sub-assembly of components
9.	Fixture for cambering under frame & subsequent welding with sidewall.

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