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भारत सरकार  
भारतीय रेलवे  
**Government of India**  
**Indian Railways**

**TECHNICAL SPECIFICATION FOR TRACK RELAYING EQUIPMENT  
(PORTAL CRANE)**

(Specification No: TM/HM/TLE/401 Rev. 03 of 2021)

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Signature			
<b>Name &amp; Designation</b>	(Ravi Kumar) (Muslim Ahmad) SSRE/TM ARE/TM <b>Prepared By</b>	(Om Prakash) (S.K.Singh) DTM-III ED/TM <b>Checked By</b>	(S. C. Srivastava) PED/TMM <b>Approved By</b>

Issued By:

Track Machine & Monitoring Directorate  
Research Designs and Standards Organization  
Manak Nagar, Lucknow-226011

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 1 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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## TECHNICAL SPECIFICATIONS OF THE TRACK RELAYING EQUIPMENT (PORTAL CRANE)

**(Specification No. TM/HM/TLE/401 Rev. 03 of 2021)**

### **1.0 GENERAL:**

- 1.1 These specification has been framed for a robust and sturdy equipment which shall be in the form of a portal crane intended for working by moving on auxiliary track and shall be used for unloading of concrete sleepers, released track panel and rails from the wagons, loading of prefabricated track panels on wagon at base depot and replacing the old track panels by prefabricated track panels at work site. Generally, these works shall be performed by a set of two equipment i.e. two portal cranes working together.
- 1.2 The specification has been drafted to reflect the performance and quality requirement of the equipment in a neutral manner without bias to any specific manufacturer/supplier. Suppliers/bidders are requested to carefully study the specification and assure that their equipment fully comply with these specifications. Thereafter, if a supplier/bidder feels that his equipment can substantially fulfill the performance and quality requirements but does not fully satisfy a particular specification, the same shall be mentioned in the statement of deviation from the specifications, giving the details how the functional requirements are going to be met with.
- 1.3 The bidder shall specify the make/model offered and furnish a detailed technical description of the same. System/sub-systems of the working mechanism of the equipment as per clause 3.0 in particular and all the items of the specification in general shall be described in detail in the "Technical Description", along with the sketches to show the manner in which the requirements of the specifications are accomplished by the equipment (model) offered.
- 1.4 Photographs of the type of equipment in working mode and technical literature shall be enclosed with the offer. These shall also show close-ups of various working assemblies/systems of the equipment. The tenderer shall also furnish a compact disc (computer enabled) or DVD or USB showing the working of equipment in real time under field conditions. Tenderer shall also submit the names of countries & Railways where the offered equipments/machines are working and where their working at site can be visited by Indian Railway officials.
- 1.5 The bidder shall be entirely responsible for the execution of the contract strictly in accordance with the terms and conditions of the specification not withstanding any approval, which RDSO or the inspecting officer may have given:
- Of the detailed drawings prepared by the bidder.
  - Of his sub- bidders for materials, components & sub-assemblies.
  - Of other parts of the work involved in the contract.
  - Of the tests carried out by the bidder/sub- bidder or RDSO or the inspecting officer.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 2 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

## 2.0 DESIGN, DIMENSIONAL AND OPERATING REQUIREMENTS:

- 2.1 The diesel-powered equipment shall be robust, of latest design, reliable and suitable for working on Indian Railways. The design and dimensions of the equipment and components shall be to metric standards and shall comply with provision of Indian Railways Schedule of Dimensions–1676 mm gauge (BG), revised, 2004 with the latest corrigendum and up to date correction slips issued. Quality assurance during manufacturing of the machine shall conform to ISO-9001. The welding standard followed for manufacturing of equipment/machine shall conform to ISO: 3834, EN: 15085 or any other equivalent standard for welding railway vehicles and components. The manufacturer shall specify the standard followed and certify that it meets the welding standard mentioned above. The equipment shall be suitable for relaying of B.G track (Gauge 1676 mm) on straight, transition and curved tracks (up to 10 degree).
- 2.2 The equipment shall be capable of lifting of track panels including lifting of released service rails up-to 12-ton weight. The arrangement shall be such that excessive sag or deflection does not take place for the panels under lifted positions. For this purpose, it is desirable to have to grip the panel at sufficient locations.
- 2.3 It shall be capable of negotiating curves up-to 10°curvature (175 m radius), super elevation up-to 185 mm and gradients up-to 1 in 33 (3%)without any instability. Also, it shall be capable of getting self-unloaded and loaded on the flat wagons in severe curves. For the safe working and above operations, the parameters of auxiliary track shall be as under.
- Centre of Auxiliary track shall be same as that of main line track.
  - Gauge shall be 3400mm ± 20mm.
  - Auxiliary track shall be 0 mm to max 50 mm above the rail level of main line track.
  - Support under auxiliary track rail shall be in the form of CST-9 plates or wooden blocks or other similar arrangement placed at 1.5 to 2.0 m distance.
- 2.4 It shall be capable of continuous operation during the varying atmospheric and climatic conditions occurring throughout the year in India. The range of climatic conditions is as follows.
- |                          |  |
|--------------------------|--|
| Ambient Temperature      | : -5 <sup>0</sup> - to 55 <sup>0</sup> C |
| Altitude                 | : Up to 1750 m above mean sea level      |
| Relative Humidity        | : up to 100%                             |
| Maximum rail temperature | : 70 <sup>0</sup> C                      |
- All the system components on the equipment/machine, which are vulnerable to moisture ingress and adversely affected during rains, should be covered by roof or suitable arrangement so that the machine is able to work continuously even during rains.
- 2.5 The design life of equipment/machine shall be minimum 20 years.
- 2.6 The profile of the equipment/machine longitudinally and in cross section when loaded on flat wagon shall be within the Indian Railways Schedule of Dimensions–1676 mm gauge (BG), revised, 2004 with the latest corrigendum and up to date correction slips issued. The standard features of the flat wagon are enclosed as Annexure-VII & the sketch of loaded wagon is attached as Annexure- VIII. The minimum and maximum moving

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 3 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

dimensions are enclosed in Annexure-I. The tenderer shall submit the sketches of the equipment/machine both in plan and elevation and shall give calculations to prove that the equipment does not cause infringement while working on a 10<sup>o</sup> curve at any cross-section.

2.7 It shall be capable of working and travelling in electrified sections with power block. On Indian Railways, 25 KV or 2x25 KV AC power supply is used for traction through an overhead wire at 5500 mm above rail level. The height of overhead wire is restricted to 4800 mm on bridges and in tunnels.

2.8 While working on single line/multiple lines sections, it shall not infringe the adjoining track and shall be possible to permit trains at full speed on that track. Minimum spacing of track is 4265 mm centre to centre.

2.9 The equipment shall be of a modular design to enable quick replacement of damaged or defective parts/assemblies.

### 3.0 WORKING MECHANISM

3.1 The maximum height of track panels which includes rails, sleepers and fittings will be 388 mm for normal PSC sleeper and 413 mm for wider PSC sleeper. The details of sleepers are given in Annexure-II.

3.2 The equipment shall be capable of relaying/lifting of any track structure with 60 kg/m, 52 kg/m or 90 Lbs/yards rails. The dimensional sketches of rails are shown in Annexure III, IV, and V.

3.3 The equipment shall be provided with all accurate arrangement to lay new panels in accordance with the alignment of old track. There shall be positive indication to operator about accurate alignment being maintained while laying the track panel.

3.4 Proper and robust safety guards shall be provided for the safety of equipment's operator.

3.5 The system of relaying shall consist of following activities:

(i) Arrival of the relaying train-consisting of machine BFR, empty BFRs and BFRs loaded with pre-fabricated panels (using service rails, new sleepers with complete fittings) and unloading of portal crane from BFR on auxiliary track. The portal shall be capable to be unloaded on its own.

(ii) Lifting and transportation of the old track (cut into 13 m length panels generally and loading the same on empty BFRs.

(iii) Lifting of prefabricated panels (new) from BFRs and transporting them to laying site and to lay the panel at the original alignment of the track.

(iv) After completion of laying work, the portal cranes shall be able to be uploaded on their own on the BFR.

3.6 Set of two portal cranes shall be capable of relaying at least 200 m track per effective hour of working. The arrangement shall be such that old track is brought back on wagons along with the relaying equipment after the completion of work in the block section. The new panels of wider and normal concrete sleepers shall be carried in three

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 4 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

and four layers respectively on flat bottom wagons in train formation from the base depot.

- 3.7 The equipment shall be capable of lifting one panel of 60kg Rails with 13 m length on 21 wider concrete sleepers and at least two nos. released rails of 60 kg at one time. The gripping hooks for the panels shall be hydraulically operated and extended up to such length to avoid/minimize the sag in the panels at the end while in lifted condition. The up & down movement of both cylinders shall be synchronized while lifting and lowering of panel.
- 3.8 Sleeper handling/pick up unit shall be adequately designed to grip and pick up at least 10 for normal sleeper and 9 wider sleepers at a time from flat bottom wagon, placed in layers on battens of 50 mm thickness.
- 3.9 The equipment shall be so designed that it can do lifting/lowering of bridge simultaneously with forward/backward movement at safe speed on the auxiliary track.
- 3.10 The design shall be such that the equipment is stable and can travel on its own power on the auxiliary track along with the panel in suspended position at reasonable speed, for achieving the minimum stipulated progress as mentioned in clause 3.6.
- 3.11 The equipment shall be capable of self re-railing in the case of derailment, if happened. Procedure of re-railing of derailed equipment, its limitations, if any shall be well documented and the same shall be practically demonstrated during the inspection/commissioning tests.
- 3.12 The equipment shall have sufficient safe guard to ensure that the bridge of the equipment does not come down suddenly due to failure of hydraulic/mechanical circuits of the lifting system. There shall be self locking arrangement of bridge against such failure to safe guard staff working around.
- 3.13 Suitable mechanism for lifting/lowering of released/new rail panel and loading/unloading of the equipment on its own on flat wagon, shall be designed in such a way that breakage of any chain/rope (for example) shall not cause sudden subsequent failure of other chain/ropes and the equipment remain in loadable condition with emergency system.
- 3.14 Track laying equipment shall be adequately designed to avoid its tilting/overturning in case of snapping of chain/rope, provided for lifting/lowering of bridge. The fail-safe arrangement provided for the purpose shall be automatically activated to stop sudden failure of the system and subsequent infringement to moving schedule of dimensions.
- 3.15 The equipment shall be equipped with an independent robust and reliable emergency backup system which can be used for operation of bridge lifting, lowering and loading of equipment on flat wagon.
- 3.16 The panel lifting/lowering mechanism, for example chains/ropes arrangements, technical specification, maintenance and service instructions, etc shall be supplied along with machine manual.
- 3.17 The arrangement in equipment for holding the fabricated panel shall be such that the alignment and spacing of sleepers are not disturbed during its transit and laying.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 5 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

- 3.18 All major assemblies shall be easily accessible and maintainable.
- 3.19 The equipment shall be capable of carrying the new as well as released panels/sleepers safely over a height up to four layers of new panels of 60kg track, fitted with normal PSC sleeper and over a height up to three layers of new panels fitted on wider PSC sleepers loaded on BG flat bottom wagons on newly laid track except in tunnel. In tunnel, it shall move with one panel over three layers of panels of normal PSC and two layers of panels of wider PSC panel loaded on BG flat bottom wagons. The minimum clearance of lowest portion of bridge of portal above rail level shall be 3400 mm at full height condition of equipment. The height of loaded panels (with normal 60 Kg/wider PSC Sleepers) over flat bottom wagon is shown in Annexure-VIII.
- 3.20 One portable Diesel operated D.C. welding generator (with the provision of auxiliary output of minimum 2.5 KW, 230 V AC for lighting) of reputed make (preferably made in India) with a minimum 5 KVA capacity of welding up to 5 mm (diameter) electrode at 60% duty cycle shall be supplied. Sufficient length of cable or lead shall be provided with a set of two equipments for day to day repairing of equipment and its wearing parts. The diesel tank capacity shall be not less than 10 liters.
- 3.21 The height of the operator's seat shall be hydraulically adjustable so that the operator can easily view the position of gripping hooks during gripping the panels at top most layer on the BFR.
- 3.22 The machine shall be provided with an industrial quality heavy duty portable computer (Laptop-tough book) for keeping record of overall aspects of working, spares management and reporting. The software shall be window based. The hardware shall be sturdy for operation under conditions of shock, vibrations, dust, electromagnetic influence from outside and interruption of power supply. The detailed specifications of the laptop are enclosed as Annexure-IX.

#### **4.0 POWER UNIT/DIESEL ENGINE**

- 4.1 The equipment/machine shall be powered with diesel engine of indigenous make with proven record of service in tropical countries with wide service network in India. Robust construction and low maintenance cost are of particular importance. Adequate allowance shall be made for de-rating of diesel engine under the most adverse climatic conditions mentioned in clause 2.4. The manufacturer of the engine shall have acquired quality assurance certifications of ISO-9001. The supplier shall furnish the information regarding make and model of the engine proposed to be used and details of agency which will provide after sales service support and availability of spares in India.
- 4.2 The details of diesel engine and its controls to assess its conformity with the engines already operating on track machines on Indian Railways. If the machine design incorporates an engine not already operating with the purchaser, the model of the engine is liable for change as per the technical requirements and the maintenance logistics with the purchaser after technical negotiations with the supplier during tendering stage. Nothing extra shall be payable on this account.
- 4.3 High speed diesel oil to Indian standard specification shall be normally used. A minimum fuel capacity sufficient for continuous operation for 8 hours shall be desirable. Oil tank will be provided with sight glass type gauge for maximum and minimum oil level indication.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 6 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

- 4.4 The engine starting shall normally be of push/pull start type button /ignition key start system.
- 4.5 The engine parameter monitoring gauges like temperature, rpm with engine running hours, lubricating oil pressure & lubricating oil temperature etc. shall be direct reading digital output type mounted on the engine backed up by electrical/mechanical gauges at operator's seat showing the absolute readings along with safe limits suitably colored. There shall be audio-visual warning (safety mechanism) to the operators. In case of any of the parameters for engine temperature, lubricant oil temperature & pressure exceed the safe limit, the engine will be shut down automatically.
- 4.6 It shall be possible to remove the engine with ease, and with minimum dismantling of surrounding equipment. Normal access to the engine must be maintained at all times regardless of whether the machine is working or not.
- 4.7 Exposed sections of the exhaust system must be protected to prevent any accidental burn due to physical contact. All hot surfaces must be supported well, cleared of any combustible materials carried nearby.
- 4.8 Since the engine is to work outdoor under extreme dusty conditions, the air intake system shall be designed suitably so as not to allow dust through air intake system. There shall also be easy access for daily cleaning and routine maintenance.
- 4.9 Suitable and rugged mechanism shall be provided to start the prime mover at minimum/no load and gradual loading after the start of the prime mover.
- 4.10 The engine shall be mounted on suitable anti vibration mounting pads.
- 4.11 Engine shall automatically be shut down in the following situations.
- Low engine oil pressure
  - High engine temperature
- Each of the above must have both visual and audible indication.
- 4.12 A water separator/filter is to be fitted in the suction line of the engine fuel system. This unit shall be of the condition indicating type.
- 4.13 All gauges fitted, shall be self illuminating type.
- 4.14 In order to adhere to pollution control norms, the diesel engine shall be electronically controlled emissionized engine with minimum compliance of tier 2 /BS-II stage/the emission regulation standards set by Indian regulatory bodies.

## 5.0 OIL RESERVOIRES

- 5.1 To fill the oil tanks, an adequately rated, pump with a rated performance shall be supplied.
- 5.2 All tanks shall be suitably marked with capacity, fluid type, filling point and drain point.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 7 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

5.3 Tanks are to be fitted with at least two sight glasses one at the bottom and one at the top of the tank.

## 6.0 HYDRAULIC SYSTEM

6.1 All the hydraulic components, i.e. pumps, motors, valves, hoses, seals and filters, etc., shall be from established manufacturers.

6.2 Details of the hose, its specification, pressure rating and layout details shall be supplied by the suppliers at the time of delivery of equipment.

6.3 Oil cooling system provided on the equipment shall be very efficient so as to ensure continuous working of the machine for 8 hours during the hottest part of the day.

6.4 Supplier shall note that the equipment shall be working under extreme dusty conditions and the cooling mechanism shall be maintainable under these conditions.

6.5 Flexible hydraulic hoses or seamless metallic pipe as suitable shall be provided.

6.6 All hoses shall be fitted with straight hydraulically swaged or crimped coupling only.

6.7 The end fittings (male/female) for all pipes/hoses shall be staggered in position/keep fittings end parallel at adequate distance so that access to group can be attained with ease.

6.8 All suction lines and main return lines shall be protected by filters of adequate micron rating.

6.9 All filters shall be fitted with indicators such that the indicator "triggered" well before the filter is clogged.

## 7.0 PNEUMATIC SYSTEM

7.1 If equipment is going to be provided with pneumatic system also, the components used shall be procured from established manufacturer and the pneumatic circuit shall be provided with air dryer for the smooth working of pneumatic components. Part number and the dimensional drawings of the spares shall also be provided with the equipment.

## 8.0 BRAKES

8.1 While working, adequate provision shall be made for hydraulic/pneumatic brakes.

## 9.0 HORNS

9.1 The equipment shall be provided with dual tone (low & high tone) electric or pneumatic horns facing outwards at both the ends of the equipment/machine at suitable locations for use during travelling and to warn the workmen of any impending danger. The horns shall be distinctly audible from a distance of at least 400 m from the equipment/machine. The horns shall be operated by means of push button from working seat. One additional switch shall also be provided on other side for operation by person assisting the operator.



ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 8 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

- 9.2 Pneumatically/electrically operated hooters capable of producing intensity of sound between 105-110 dB at a distance of 5 m (when measured in still air in a closed room) and variation in intensity of sound of not more than 5 dB shall be provided. Additionally, switches for such hooter shall be provided outside on the equipment/machine frame so that it can be operated by staff present at work site near the machine. The hooter shall also be operated by remote switch at a distance of at least 300 m from the hooter.

## 10.0 FIRE PREVENTION

- 10.1 Each equipment shall be supplied with suitable number of fire extinguishers. The chemicals used for extinguishing fire by such fire extinguishers shall not chemically react with electronic equipment/components, PCBs, cables etc.
- 10.2 For prevention of fire in the machine suitable materials shall be used for construction of interiors as well as exteriors of the cabin and for machine components. Proper design layout, protective devices and prevention measures for outbreak of fire shall be ensured. For fire prevention "Code of Practice for Prevention of Fires on DMUs" conforming to document no. CMI-K 402(Rev-1) with latest amendments shall be suitably followed as guidelines.

## 11.0 CONTROLS

- 11.1 All the controls provided for operations of the equipment shall be within the reach of operator's seat. Controls shall be so located that they can be easily maintained .i.e. all junction boxes and main panel shall be water proof and shall have adequate space for accessibility during maintenance and testing of a particular section.

## 12.0 LIGHTING ARRANGEMENTS

- 12.1 The lighting arrangement shall be such that the equipment can be illuminated at its every corner and section along with the illumination of working area at least 50 m on both sides of equipment and 10 m across the track for work in night, if required.

## 13.0 ELECTRIC EQUIPMENT

- 13.1 Equipment shall be provided with flasher lights on suitable location at the top.
- 13.2 All cable conduit and electrical installation shall be protected against climatic condition, oil, heat and other outer agents.
- 13.3 The electric equipment provided shall conform to relevant standard specifications and shall be suitable for Indian climatic conditions.
- 13.4 For starting the engine, heavy duty storage batteries of reputed make & of suitable capacity shall be provided.
- 13.5 An easily accessible and adequately ventilated housing for battery shall be fitted.
- 13.6 The fuse and circuit breaker provided for protection of the circuits shall ensure that electrical failure of one section does not affect the control of any other section.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 9 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	--------------	----------------------------	-------------------------------

13.7 All electrical wiring in the machine shall be done with e-beam cables conforming to RDSO's Specification No ELRS/SPEC/ELC/0019 Rev.-3 dated 28.02.2017 with latest amendment.

13.8 All metallic parts of the entire machine including bogies, superstructure along with electrical equipments shall be integrated electrically through wheels to rail and as per standard practice for rolling stock to ensure proper earthing of the machine.

#### **14.0 ULTRASONIC TESTING OF MAJOR PARTS**

14.1 The supplier shall, ensure detailed ultrasonic testing of structural members, wheels and shafts etc, provided on the equipment during the manufacturing stage.

14.2 The firm shall provide detailed technical drawings and specifications of wheels and shafts etc used in the equipment/machine along with detailed code of procedure for ultrasonic testing shafts of all types and test report of wheel shall be submitted along with other documents. The above details shall be provided in four sets with each machine.

14.3 The supplier shall also enclose a certificate/report of USFD/NDT testing of these items.

14.4 The supplier shall also enclose frequency of USFD/NDT testing of various parts.

#### **15.0 TOOLS AND INSTRUCTION/PARTS MANUAL**

15.1 Each set of two equipments/machines shall be supplied with two sets of tools for carrying out all field repairs, maintenance and overhauling of track laying equipment in workshop and in the field.

15.2 If pneumatic tools are proposed to be provided, the details of torques required for various nuts and bolts used at different place of equipment shall be mentioned. The take off points shall also be provided at sufficient locations for the functioning of pneumatic tools.

15.3 While offering the equipment for first inspection, the supplier shall submit one copy of complete technical literature in English language including operation, service, field maintenance manual/instructions and workshop manuals for overhauling of the assemblies and machine. Complete electrical, electronic, hydraulic and pneumatic circuit diagram, trouble shooting charts, component drawings/descriptions and other relevant technical details for keeping as reference documents for the inspecting officer.

15.4 The part catalogue shall include supplier's number as well as the internationally used part number, wherever applicable. Component specification shall be supplied in four copies with a set of two equipments. OEM details who have actually manufactured/supplied the spares for the equipment shall be given.

15.5 The manufacture and construction assembly drawing, material specification of sub components and all the mechanical components used in various system of the equipment shall be provided in four copies with each set of two equipments purely for the purpose of maintaining the equipment.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 10 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	---------------	----------------------------	-------------------------------

- 15.6 Detailed operating manual, maintenance and service manual, user manual and workshop manuals shall be specifically prepared in English language and four copies of each of the same shall be supplied with a set of two equipment.
- 15.7 In additions, the supplier shall provide dimensional drawings with material description of items like rubber seals, washers, springs, bushes, metallic pins etc. Main features such as type, rpm & discharge etc of items like hydraulic pumps, motors and such other bought out components/assemblies shall be furnished by the tenderer. These shall be specially prepared in English language and four copies of these shall be supplied with a set of two equipment.
- 15.8 In addition to clause 15.3, 15.4, 15.5 and 15.6 one set of all the manuals, diagrams and technical literature shall also be provided for Principal/IRTMTTC, Allahabad, one set for Chief Workshop Manager (Track Machines) CPOH Workshop, PO. Dhoomanganj, Prayagraj -211011, one set for Chief Workshop Manager (Track Machines) CPOH Workshop, South Central Railway, Rayanapadu, Vijaywada, Dist.-Krishna, Andhra Pradesh-521241, one set for Chief Workshop Manager (Track Machines) CPOH Workshop, Eastern Railway, Bhutbagan Railway Colony, Kanchrapara, P.S: Bizpur, P.O.: Kanchrapara, West Bengal-743145, one set for Chief Engineer. C.P.O.H, Western Railway, Divisional Office, Near Chamunda Mata Mandir, Naroda Road, P.O. - SaijpurBodha, Ahmedabad-382345, one set for ED/TMM, RDSO, Lucknow, one set for DTK (MC)/Railway Board and one set for Director General/IRICEN/Pune along with supply of first machine of similar group. In case, there is any subsequent amendment in above documents based on field performance, the amendment/amended documents shall also be sent to above mentioned authorities.

## 16.0 SPARE PARTS

- 16.1 The expected life of the components shall be advised along with their condemning limits.
- 16.2 The tenderer shall quote the list of mandatory spare parts for the operation and maintenance of the equipment for a period of two years along with description, part number, quantity, cost, whether imported or indigenous. The list of spare parts required shall be supplied with tender document indicating description, part number and quantity.
- 16.3 The supplier shall be responsible for the subsequent availability of spare parts to ensure trouble free operation and maintenance during life of equipment (i.e. 20 years). It is preferred that the spares shall be stored in India and will be available at short notice say maximum within a month.
- 16.4 The relevant technical details of indigenous, imported items/assemblies shall be supplied while offering the equipment for inspection.
- 16.5 List of critical fast wearing spares shall be separately attached with the tender offer with part number and frequency of replacement.

## 17.0 OPTIONAL EQUIPMENTS

- 17.1 Supplier shall quote for optional equipment separately for each item giving the advantages/functions of such optional equipment.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 11 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	---------------	----------------------------	-------------------------------

## 18.0 OPERATIONAL BASE IN INDIA

- 18.1 The supplier, before offering the equipment for inspection, shall establish a permanent operational base in India for providing necessary technical support in terms of the spares and maintenance and shall also provide assistance and logistics support concerning problem within and beyond the warranty period.

## 19.0 TRANSPORT OF EQUIPMENT

- 19.1 Arrangement for transporting the equipment at train speed of not less than 50 kmph shall be possible in standard flat wagons in use on Indian Railways. All necessary arrangements shall be provided to avoid over-turning, tilting etc. during travel in loaded condition or while working in traffic block. The supplier shall give details of this arrangement.

## 20.0 ACCEPTANCE TEST

- 20.1 In addition to verification of the various provisions in the specifications covered earlier, the following tests shall be carried out at the time of acceptance and commissioning of the equipment.
- 20.1.1 Dimensional check of loading gauge, i.e. maximum moving dimensions, clearance wherever applicable.
- 20.1.2 Actual output and performance quality tests. These tests shall consist of the following.
- Lifting of fully assembled 13 m length panel with 21 concrete sleepers up to a height as indicated in clause 3.19 without infringing overhead wire in electrified section as mentioned in clause 2.7.
  - The working speed of the portal crane will be assessed on the first equipment in base depot or supplier's works. The time taken in lifting 13 m concrete sleeper panel from the Flat Bottom wagon, carrying it to about 100 m distance, laying in position, lifting the old panel next to newly laid panel and placing it on empty Flat Bottom wagon at 100 m distance shall be not more than 5 minutes.
- 20.2 While inspecting the equipment and sub-assemblies, components of equipment, etc. before their dispatch from the supplier's premises, the nominated inspecting official of the Indian Railways, shall verify the conformity of the all such items with respect to Indian Railway's individual accepted specification. The conformity/non-conformity with respect to each item shall be jointly recorded, before the issue of the "Inspection certificate and approval for dispatch of the equipment, sub-assemblies and components of equipment, etc. as per Annexure-VI enclosed.
- 20.3 The general conditions of the test shall be more or less as mentioned below. These tests shall be conducted on first machine.
- The crew of the equipment shall be either trained personnel of Indian Railways or the staff of the supplier.
  - Dry weather, ambient temperature between  $-5^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ .

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 12 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
--------------	-----------------------------	---------------	----------------------------	-------------------------------

- Plain track and curved up to 10° curvature.
- Gradient up to 3%.
- Rail sleeper in serviceable condition and properly fastened.
- Concrete / wooden / metal sleeper.
- Fish plated/LWR track.
- One set of equipment (Two Portals) shall be able to do track panel renewal of at least 200 m per effective hour of working. Stoppage of work not attributed to equipment shall be discounted.

20.4 The total time taken by the two operations of setting up and winding up the equipment together shall not exceed 10 minutes.

**21.0** Should any modification, for meeting the functional requirement or for preventing frequent break down of equipment/its unit be found necessary as a result of the tests or during field operation of equipment within the warranty period, the same shall be carried out by the supplier at his own expense.

## **22.0 MARKING & COLOUR OF MACHINE:**

22.1 The machine body shall be painted in golden yellow colour of Indian Standard Colour code of 356 conforming to IS:5. The exterior painting shall be polyurethane binder based conform to RDSO Specification No. M&C/PCN/100/2013 (Specification for epoxy cum polyurethane painting system—two packs for the exterior painting of railway coaches, diesel and electric locomotives and other industrial applications) or conforming to ISO 12944.

22.2 Following shall be written in black on the machine at appropriate location in English & Hindi as per direction of Indian Railways official

- (i) Indian Railways logo of suitable height in different machine units at prominent locations.
- (ii) "INDIAN RAILWAYS" is to be written in bold and in black colour of appropriate size for clear visibility at prominent location on different units of machine.
- (iii) Manufacturers name and machine model and manufacturing year shall be written in black colour and in letter of size less than the size in which Indian Railways is written and at suitable locations.

## **23.0 TRAINING AND SERVICE ENGINEERS:**

23.1 The contractor shall provide at his own expense the services of competent engineers during the warrantee period for warrantee related issues. The service engineers shall be available for the commissioning of the machine for regular service, and for training to the operating, repairing and maintenance staffs of the machine. E-Learning courses module shall be arranged for imparting training to railway operators. In addition, the service engineer shall provide hands on training to railway staff in calibration, operation, repairing and maintenance of the machine in field to make them fully conversant with the machine. The service engineers shall also advise the Railways on appropriate maintenance, testing, operating, repair and staff training facilities that are necessary for the efficient performance of the machines.

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 13 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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- 23.2 During the warrantee period of the machine, the supplier must ensure trouble free availability of the machine in good working condition for at least 90 % of the time and accordingly they must ensure availability of spares & services of competent service engineers at prompt disposal of user railways.

#### 24.0 WARRANTY

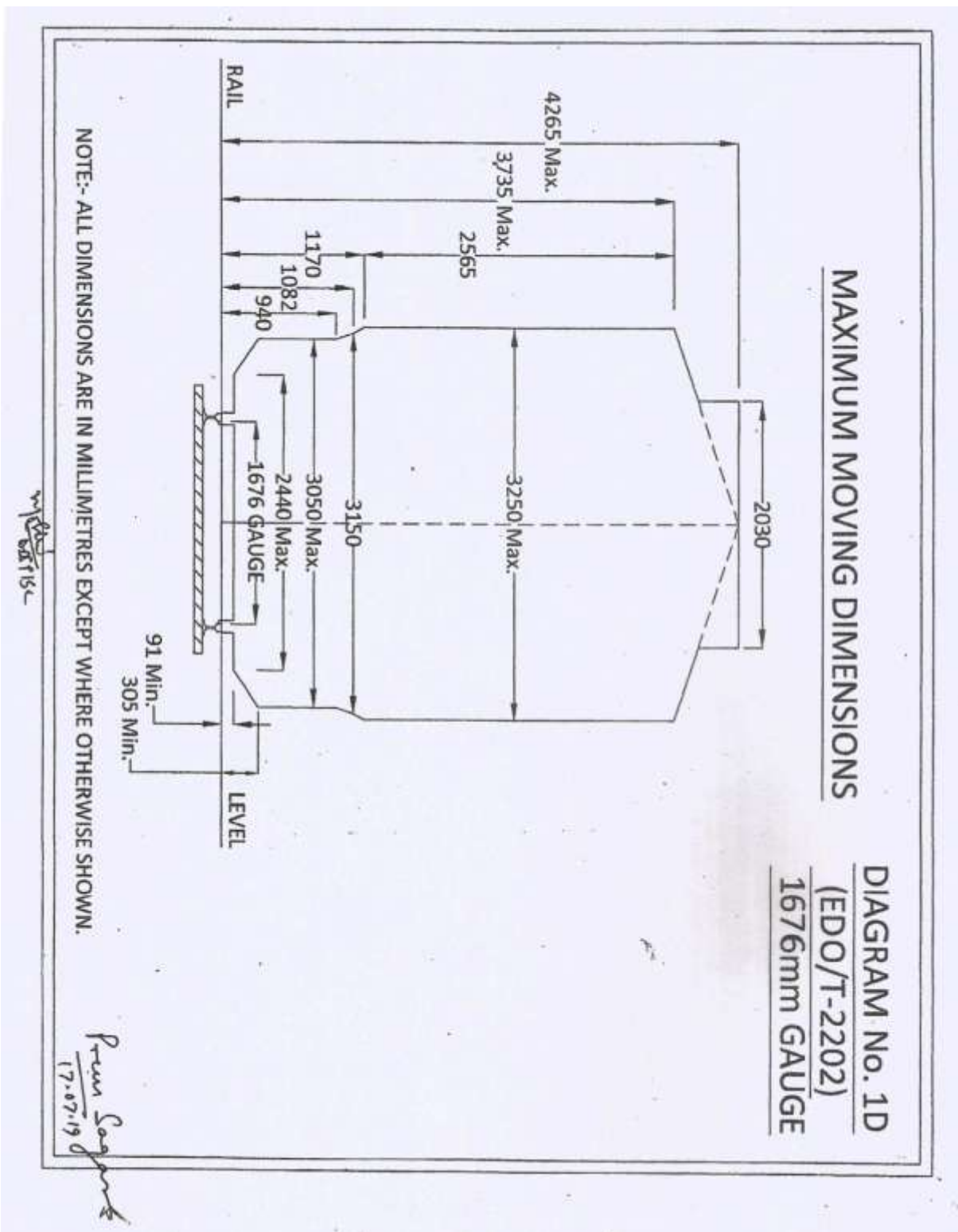
- 24.1 The machine shall be warranted for 1200 effective working hours or 18 months from date of commissioning and proving test of machine or 24 months from date of delivery at ultimate destination in India whichever shall be earlier. Effective working hours for this purpose will be traffic block time during which machine is deployed for laying work.

Should any design modification be made in any part of the machine offered, the warranty period of 18 months would commence from the date of commissioning and proving test of the machine for the purpose of that part and those parts which may get damaged due to defects in the new replaced part. The cost of such modification shall be borne by the supplier.

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ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 14 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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Annexure-I



ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 15 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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## Annexure-II

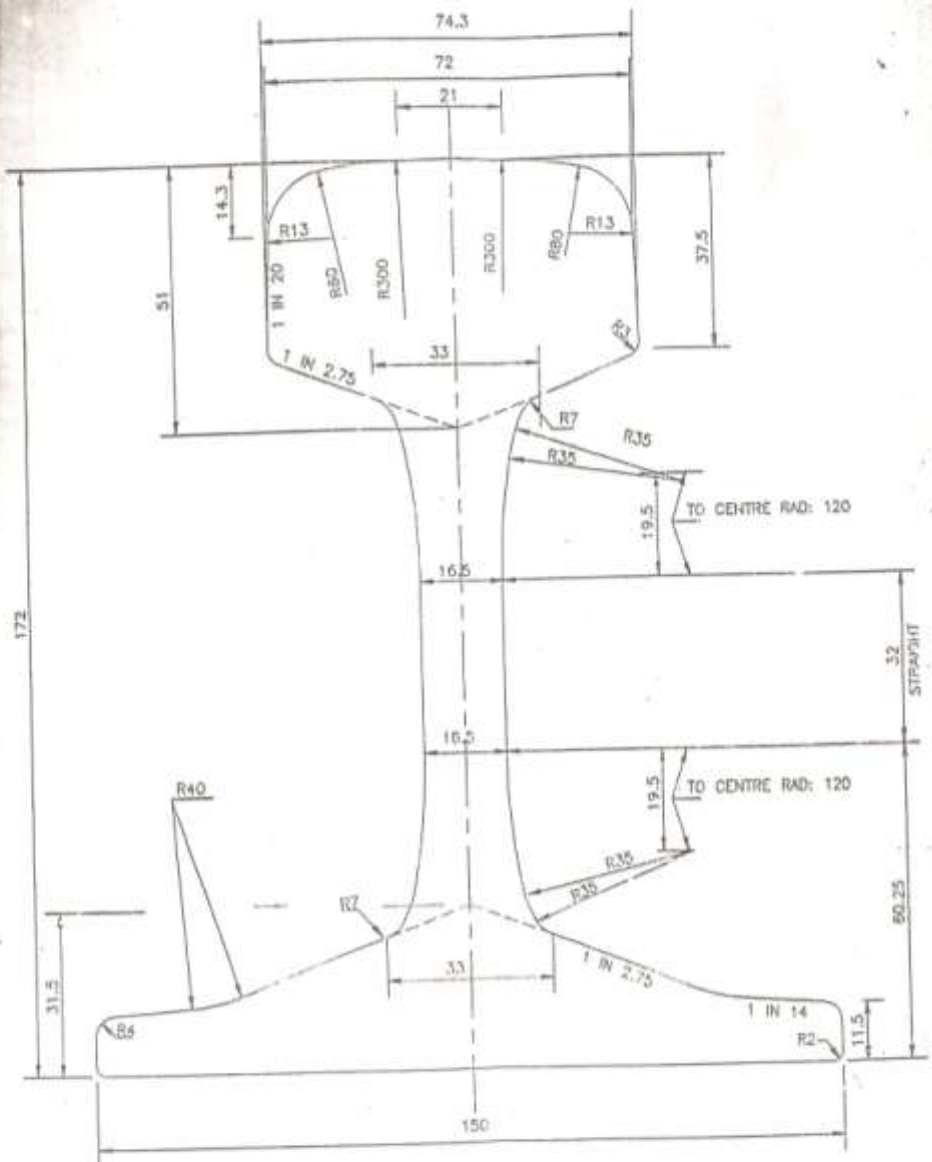
**Details of rails and sleepers used for different Track structures**

Sr. No	Rails			Sleepers				
	Rail Section	Weight (kg/m)	Height (mm)	Description	Length (mm)	Width (bottom) (mm)	Height (mm)	Weight (kg.) (approx.)
1.	60 kg 90 UTS	60.34	172	Wider Sleeper	2750	285	235	350
2.	52 kg 90 UTS	51.89	156	Concrete Sleeper	2750	250	210	300
3.	52 kg 72 UTS	51.89	156	CST-9	2680	257	106	79
4.	90 R	44.61	142.88					



ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 16 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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Annexure-III

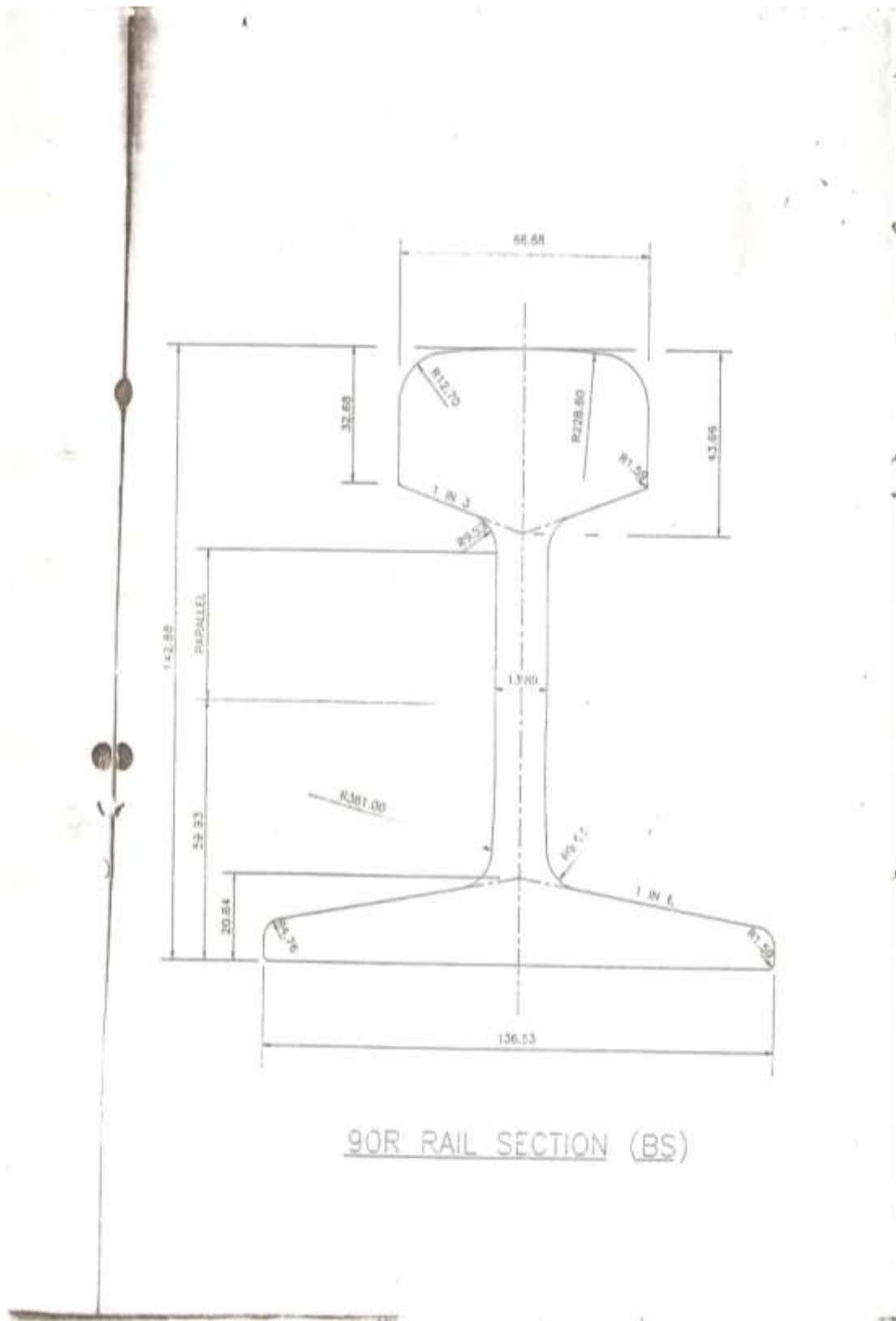


UIC 60Kg. F.F. RAIL SECTION



ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 18 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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Annexure-V



ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 19 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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## Annexure-VI

**INSPECTION CERTIFICATE**

**CERTIFICATE OF INSPECTION OF TRACK MACHINE ( ) BY INSPECTING  
OFFICIAL AND APPROVAL FOR DESPATCH OF MACHINE  
(STRIKE OUT WHICHEVER NOT APPLICABLE)**

This is to certify that I have inspected the machine (type)\_\_\_\_\_ bearing Sl. No.\_\_\_\_\_ from (date) \_\_\_\_\_ to \_\_\_\_\_ at (Place) \_\_\_\_\_ for its conformity/non-conformity with respect to the laid down Technical Specifications in contract Agreement No.\_\_\_\_\_ dated \_\_\_\_\_ between President of India through Director Track (Machines) and M/s. (Name of Supplier) \_\_\_\_\_

The detailed Inspection Note regarding its conformity/non-conformity to the laid specifications is to be enclosed along with this certificate. It is observed that (strike out whichever is not applicable):-

- The Machine conforms to all the laid down specifications.
- The machine conforms to all the laid down specifications except those at Sl.No.\_\_\_\_\_.
- The above deviations are minor/major affecting/not affecting the performance of the equipment in substantial way.

The following T and P/manuals/drawings are to be supplied along with the machine:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Based on the above, the Machine is certified/not certified to be conforming to the specifications.

The machine is approved/not approved for dispatch to \_\_\_\_\_ (Consignee) Indian Railway.

For M/s. \_\_\_\_\_  
\_\_\_\_\_

SIGNATURE AND DATE  
INSPECTING OFFICIAL  
(NAME AND DESIGNATION)  
For and on Behalf of President of India

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 20 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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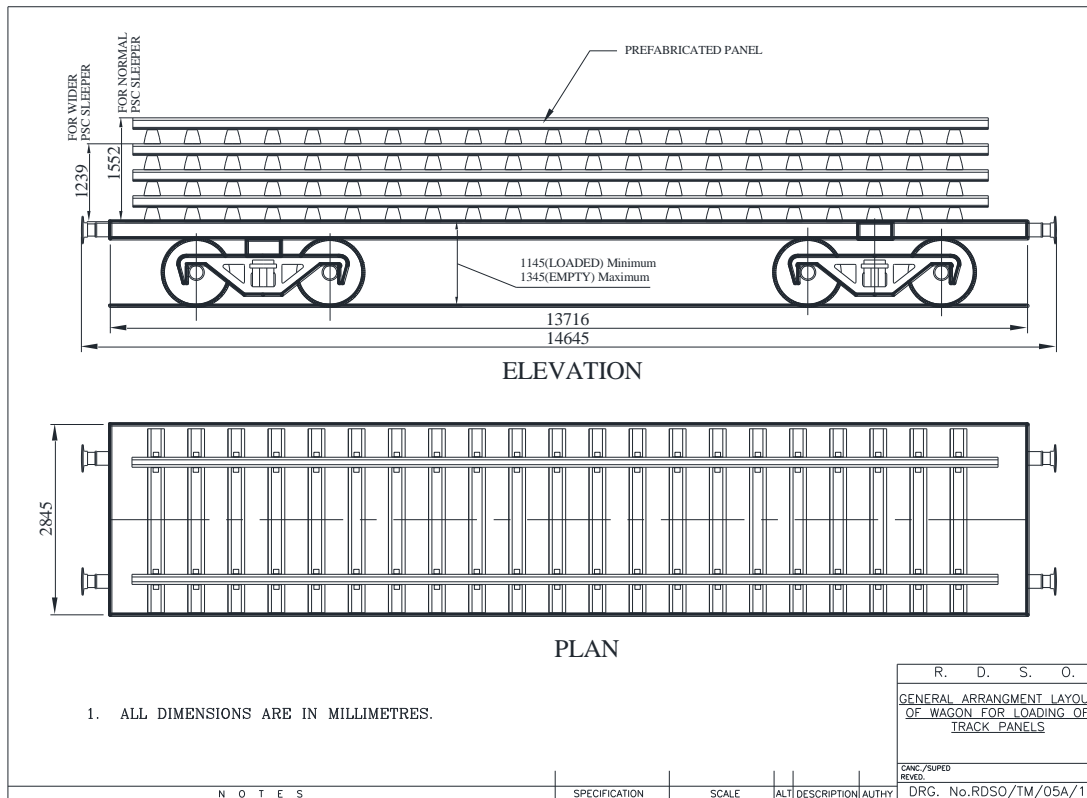
## Annexure-VII

## STANDARD FEATURES OF FLAT WAGON (BRHNEHS WAGON)

1.	Length over head stocks	13716 mm
2.	Length over couplers	14998 mm
3.	Length inside	13716 mm
4.	Width inside/Width overall	2845/3145 mm
5.	Bogie centers	9144 mm
6.	Journal length x dia.	RB144.5Ø mm
7.	Journal centers	2260 mm
8.	Wheel dia. on tread (New/Worn)	1000/906 mm
9.	Height of C.B.C. coupler from R.L.	1105 mm
10.	Maximum axle load	20.32 tonne
11.	Tare Weight	26.15 tonne
12.	Pay load	55.13 tonne
13.	Gross load (Pay+Tare)	81.28 tonne
14.	Ratio gross load/Tare	3.11
15.	Ratio (Pay load to tare)	2.11
16.	Track Loading density (tonne/meter)	5.419
17.	No. of wagons per train	41
18.	Brake System	Air brake
19.	Coupler	T.S.
20.	Bearing	R.B.
21.	Maximum Speed	(Loaded) 50 kmph (Empty) 65 kmph

ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 21 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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Annexure-VIII



ISO9001:2015	Ref: QO-D-8.1-2 Ver. 1.0	Page 22 of 22	Date of issue: -March-2022	TM/HM/TLE/401 Rev. 03 of 2021
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**Annexure-IX**

Specifications of Heavy duty Industrial Quality Water proof & shock proof  
Laptop (Tough book)

CPU	Intel Core i-5processor , speed 2.4GHz or higher version
Operating System	Windows 7 professional or higher version
RAM	2 GB or more and expandable up-to 8GB
Storage	Shock mounted flex connect hard drive with quick release 500 GB or More
Display	Minimum 13" high definition LED or better with sunlight readable display, anti reflective and anti glare treatment
Keyboard	LED Backlit 61 key QWERTY keyboard with integrated numeric pad. Touchpad with vertical scrolling support.
Wireless	Integrated Gobi 2000 mobile broadband or better, Bluetooth V 4.0 or better.
Durability features	Product shall be fully rugged, durable and meet the latest MIL standard. Moisture /water and dust resistant screen, Key board and touch pad.
Pre Loaded Softwares	Antivirus software for 18 months validity Microsoft office 2007 or latest complete bundle
Power supply	Long life Li-ion battery, minimum 5400 m AH
Warranty	5 -year warranty