

# **NATIONAL HIGH POWER TEST LABORATORY PVT LTD**

## **TECHNICAL SPECIFICATIONS**

### **Heavy Duty Industrial Trailer (350MT capacity) for supply at NHPTL-Bina, M.P, India**

#### **1.0 GENERAL**

M/s NHPTL Bina, M.P., India is a Laboratory with Short-circuit test capability for testing EHV Transformers upto 765kV voltage levels. For the said testing the Transformers with ~350MT weight are unloaded and loaded using ENERPAC Make Hydraulic Gantry.

We intent to procure Heavy Duty Industrial Trailer for placing the Transformer on it the same and moving from the Hydraulic Gantry to the Test bed for Short-circuit testing. The distance to be travelled is around 250m. The Trailer is desired to be pulled with a puller of M/s TLD Make (Model-TMX -250-18). The Heavy-Duty Industrial Trailer with safe working load (SWL) of 350MT, is required to be supplied to NHPTL, Bina site for use in short circuit testing of power transformer weighing upto 350MT.

#### **2.0 SCOPE OF WORK:**

- 2.1 This scope of work broadly covers the Design, Engineering, Manufacturing, Fabrication complete in all respect, pre-dispatch inspection & factory testing, transit insurance, transportation, supply including with spares & special tools and tackles at NHPTL Bina site, including required assembly/installation, testing, demonstration, training, and commissioning at site of the 350 MT (SWL) Heavy-Duty Industrial Trailer.
- 2.2 The trailer designed for carrying continuous load of 350MT without any appreciable dimensional deformation /deflection/ elongation of the supplied trailer. The safety margin as per applicable standard shall be used in the design for the trailer intended to be supplied and such design margin used by the bidder in the offered design shall be indicated with the breakdown load of the trailer during the engineering stage drawing approval from NHPTL.
- 2.3 The towing drawbar eye of the pulling arrangement of the trailer shall be designed to match generally with position of the available pulling pin of the M/s TLD make (Model-TMX -250-18) puller to avert eccentric loading.
- 2.4 The 3-Ph, 500 MVA 400kV rated Transformer tank unit size is envisaged to be a maximum of 11.2M X 5.3M (length X width). Accordingly, the top plate of the trailer should be optimally designed so that the Trailer top plate dimension should be 12M X 5M (length X width) to accommodate the transformers on the test bed which has length and width of 15M X 6M. Further, 100mm X 100mm un-painted GI flats of at least 10mm thickness for proper current conduction shall be provided on the Trailer top steel plate at 10 locations and in the metal portions of wheels at two places each for potential equalizing during the period of testing (A typical sketch for the locations of 100mm X 100mm flats is enclosed).
- 2.5 Heavy Duty Industrial Trailer for placing the Transformer on the same and moving from the Hydraulic Gantry to the Test bed for Short-circuit testing. The distance to be traveled is around 250m. This equipment is used regularly without any deformation /defects. The trailer shall be designed for trouble free movement and after sales service shall be provided by the supplier at least 15 years.

- 2.6 The bidder shall submit detail drawings and design calculations for approval of Engineer-In charge before commencement of manufacturing activities. The same shall be submitted within 30days of acceptance of award by the successful bidder.
- 2.7 All the materials required to be procured for manufacturing shall be as per relevant National/International applicable Standards and from reputed suppliers for such materials. The details of sourcing the major and critical materials including solid rubber tyres shall be intimated during the engineering drawing submission.
- 2.8 One complete set of special Tools & Tackles required for the trailer site maintenance including other tools like set of spanners, wrenches, grease guns, etc. and/or any other item required for trailer maintenance shall be supplied with trailer. The cost of the same may be included in the ex-price of the trailer.
- 2.9 The supplier shall specify the list of recommended spares with the corresponding unit ex-works price of the items intended for use for the long-term operation of the Trailer i.e., 15 years.
- 2.10 One set of complete solid tyre (with rims) assembly for one-to-one replacement of the complete set of tyre assembly shall be included in the list of mandatory spares.
- 2.11 Drawings, Operation/Instruction manuals, Service Manuals/Parts Manual in hard as well as soft copy. The procedure for replacement of tyre assembly and other spares at site shall be included in the service manual.

### **3.0 FEATURES:**

- 3.1 **Steering:** Proper double turntable steering with required special steel plate systems along with suitably placed greasing points etc. to be ensured. Steering lock limiter, sturdy drawbar with safety device should be provided according to International Standards/Regulations to prevent accidents from falling down / mis-alignment.
- 3.2 **Frame:** The designed frame structure should be with sturdy steel sections and platform cover plate with chamfered deflector edges. The multiple main beams should be with suitable number of cross beam sections. There should not be any abnormal deformities due to loading on the trailer. All corners of the trailer structure should be rounded to avoid damage to adjacent objects. Suitable number of Forklift pockets and collapsible twist locks shall also be provided in the trailer.
- 3.3 **Wheels:** Heavy –duty wheels with break-proof design, these tyres operate on sites where any kind of liquid tends to spill on the floor. Suitable solid rubber elastic tyres with required reinforcement / hydraulically pressed onto the wheel body. The hubs should be equipped with suitable double precision heavy load roller bearings according to applicable national/international standards (i.e., DIN 625, respectively DIN 720, or equivalent standard). Removable wheel stoppers shall be provided for all the wheels to avert any movement during placement of the trailer during testing. Towing hooks and lifting eyes should be provided for convenience in transport.
- 3.4 **Finish:** All steel surfaces are to be shot-blasted to be quality standards, primed, and top-coated with suitable thickness to achieve weatherproof coating, typical thickness between 100 – 120 µm. The color scheme shall be indicated during the drawing engineering approval.

- 3.5 **Running gear:** Required number of axels made of suitable steel sections to ensure that the load is uniformly distributed on all axels and wheels.

#### **4.0 SERVICES**

##### **The SCOPE OF SERVICES includes:**

- 4.1 Transportation of entire equipment under the scope of supplier from manufacturer's works to NHPTL, Bina, Dist-Sagar (M.P) site and unloading at the site.
- 4.2 Assembly, Installation, start-up, testing, and commissioning of the as per required tender specification to the satisfaction of the NHPTL and handing over of the fully operational equipment to NHPTL at Bina Laboratory. During assembly/installation, testing, and commissioning of the equipment, the supplier shall bring or use his own tools and tackles.
- 4.3 Demonstration, Training of operation & routine monitoring and maintenance and safety aspects for the supplied supplier to site personnel/Engineer and operators at NHPTL Bina for efficient handling of the equipment, prices of the same may be included in the ex-works price of the equipment and no separate payment shall be provided in this regard whatsoever.
- 4.4 The Officer in charge or his nominee shall inspect the trailer under manufacturing at the supplier works / premises. The Engineer In charge or his authorized representatives shall also carry out pre-dispatch inspection. The trailer shall be dispatched only after receipt of dispatch clearance from Engineer In charge. All arrangements for test conduction and trailer operational during pre-dispatch inspection and site shall be made by the supplier. All expenses for the deputation of NHPTL representatives for pre-dispatch inspection shall be borne by NHPTL.
- 4.5 Three sets of Operation and maintenance manuals in the English language shall be provided along with a soft copy.
- 4.6 Spare parts list in the English language.
- 4.7 **Typical Pre-dispatch acceptance test:**
- 4.7.1 The bidder shall submit the pre-dispatch acceptance test plan with procedures and data sheet which shall typically include the following any addition to other tests required to be conducted as per relevant standards and best industry practices.
- 4.7.2 All test reports of material/ sub-assemblies procured for the manufacturing of trailer shall be submitted during the pre-inspection for review.
- 4.7.3 The trailer shall be subject to a 350MT load for testing at supplier works before dispatch. The load test shall be conducted in the presence of authorized representative of NHPTL. The movement of the trailer shall be also verified for any dimensional variation which shall be built in by the bidder for the pre-dispatch testing at manufacturer works.
- 4.7.4 The trailer movement test shall be demonstrated in both loaded and unloaded conditions for a sufficient distance to validate proper operation of the trailer in presence in the presence of the authorized representative of NHPTL.
- 4.7.5 The original copy of the pre dispatch inspection including the load test report shall be submitted to NHPTL for issuance of dispatch clearance.
- 4.8 All other terms & conditions shall be as per the Bidding document.

## 5.0 CODES AND STANDARDS

- 5.1 The design and construction of the complete system shall comply with the latest applicable Indian/International Standards/Codes & practices.
- 5.2 It is not the intent to specify herein all the details of design & construction. However, the trailer shall conform to high standards of design, quality engineering & workmanship in all respects and shall be capable of performing the required duties.
- 5.3 The trailer shall be designed to work at the temperature prevailing at the NHPTL site in the range of operating temperature from 0°C to 60°C and with uninterrupted services for continuous operation. The operation of the trailer should be unaffected by rain. The trailer shall comply with Relative Humidity standards also.

### 5.1 TYPICAL APPLICABLE STANDARDS:

S.No.	Description	Applicable Standard
1	Solid tyres	<b>ISO 10499-1:2019:</b> Industrial tyres and rims-Rubber solid tyres (metric series) for pneumatic tyre rims.
2	Steel to be used manufacture the trailer	<b>IS 2062: 2011:</b> Hot rolled medium and high tensile structural steel-specification <b>BS EN 10025.2004:</b> Hot rolled products of structural steels. <b>ASTM A36 : 2008:</b> Standard specification for carbon structural steel
3	Roller bearings	<b>DIN 625:</b> Rolling bearings; double row radial contact ball bearings <b>DIN 720:</b> Rolling Bearings - Tapered roller bearings <b>IS 4398:1994:</b> Carbon-Chromium Steel for the manufacture of Balls, Rollers and bearing races. <b>IS 6455 : 2020:</b> Single Row Deep Groove Ball Bearings-Specification <b>IS 2898:2019:</b> Rolling bearings-Balls. <b>IS 3823:2014:</b> Rolling bearings-Static load ratings <b>IS 3824:2014:</b> Rolling bearings-Dynamic load ratings and rating life
4	Paint	<b>IS 5:</b> Colours for ready mixed paints and enamels (RAL 5010, Gentian Blue)
5	Shot Blasting	<b>ISO 11124 :</b> Preparation of steel substrates before application of paints and related products — Specifications for metallic blast-cleaning.

### 6.0 APPLICABLE TESTS & PROCEDURE FOR TRAILER:

1. **Dimensional checks:** Dimensional inspection is a manufacturing process used to measure the physical dimensions of a part or product to make sure that it conforms to specified tolerances outlined and allow to make sure that every part meets exact design specifications, as well as maintain consistency and adherence to GTP. The quality, reliability, and compliance are ensured through the inspection of part dimensions.
2. **Dye penetrant inspection (DPI) or Liquid penetrant inspection (LPI):** Vendor may arrange DPI or LPI inspection, to inspect the surfaces of non-porous assets made out of metals and it's useful for detecting flaws in welds and castings.
3. **Dry film thickness (DFT) test for paint:** A dry film thickness test is the go-to measure for verifying the correct application of protective coatings and finishes after it has dried on a cured surface.
4. **Load Test on Trailer:**
  - a) **Static Load Test:** Applying a load of 350MT for the duration of 24Hrs. to the trailer without any movement & LVDT's reading will be recorded to check for structural weaknesses or deformations. The Trailer deflection at different locations will be measured by means of LVDT's of suitable

quantity having least count of 0.01mm. The acceptable limit of deflection will be furnished during detailed engineering.

<b>LOAD TEST MEASUREMENTS:</b>			
	<b>Pre-loaded</b>	<b>Loaded</b>	<b>Post-loaded</b>
Front			
Centre			
Rear			

- b) Dynamic Load Test: After completion of static load test the Trailer will be moved to approx. 250m with 350MT load and the measurement of draw bar forces are desirable. Post dynamic load test the trailer will be physically inspected at different locations for the cracks, deformations etc which may impact the desired operation of the trailer.

## 6.0 TYPICAL FUNCTIONAL DATA

<b>Sr. No.</b>	<b>Parameters</b>	<b>Description</b>
01	Capacity	350Metric Ton (Safe working load)
02	Platform size	12M X 5M (length X width)
03	Platform height	Height from surface should be optimally designed for lower center of gravity to extent possible. Typically, between 800mm to 1200mm.
04	Platform cover	15 mm steel plate or higher as required.
05	Coupling height	As per the puller model available at NHPTL i.e., M/s TLD make (Model-TMX -250-18).
06	Steering	Turntable steering at the front and rear
07	Tyres	Suitable size of Solid Rubber Tyres installed as Twin Tyres on suitable no of oscillating axles with reinforcement and wheel stoppers shall be provided.
08	Finish	All steel surfaces should be completely shot blasted as per associated specification welding. Surface Cleanliness SA2.5 in accordance with ISO 8501-1. 2-component paint system (or similar), Rustproof, Primer paint thickness (DFT) 50 - 60 µm, Top coat paint thickness (DFT) 50 - 60 µm & total paint thickness (DFT) 100 – 120 µm.
09	HSN Code for trailer	87164000
10	Drawbar	2no.s, i.e., one at each end
11	Drawbar length	Foldable/detachable so that they do not overhang beyond our test bed which is 15M long

**7.0 WARRANTY/GUARANTEE:** The warranty/Guarantee period shall be as per the Bidding document.