

NORTHERN RAILWAY

THERMIT PORTION PLANT
CHARBAGH LUCKNOW

SPECIFICATION NO. SPEC/TPP-CAP-2022

**SPECIFICATION FOR COMPRESSED AIR
PETROL SYSTEM**


AXEN/TPP

Dy. CE.TM/NR/HQ


CMS/TPP


SSE/TPP


25/01/22.
Dy. CE/TPP/NR/LKO

SPECIFICATION FOR COMPRESSED AIR PETROL SYSTEM

1. **Scope-** This specification covers the requirement of compressed air petrol system which is being used to pre heat rail ends to temperature of $600 \pm 20^{\circ}\text{C}$ with in a prescribed time as tabulated below:

S.N.	Rail Section	Grade/UTS	Gap	Time(Minutes : Seconds)
1	52 Kg.	90 UTS	$25 \pm 1 \text{ mm}$	5.00
2	60 Kg	90 UTS	$25 \pm 1 \text{ mm}$	5.15
3	60 Kg	R-260	$25 \pm 1 \text{ mm}$	5.15

2. **Description-** Complete system should be single compact unit having overall dimensions $(125 \pm 5 \text{ cm}) \text{ L} \times (65 \pm 5 \text{ cm}) \text{ W} \times (125 \pm 5 \text{ cm}) \text{ H}$. This unit should consist of petrol start and petrol run engine coupled with air compressor by V-belt. A petrol tank of 10 liters capacity for preheating of rail end. The whole system should be mounted on M.S. trolley having caster wheels so that it can be moved on top table of rail. It should be handy having weight not more than $(95 \pm 5) \text{ Kg}$ so that it can be off track easily. It should be easy to use, operate, maintain and shall be portable in nature.

3. Technical Requirements-

3.1-Engine- This shall be of rated capacity more than or equals to 4.1kW (5.5HP) at 3,600rpm (Honda-GX-200 or similar), air cooled, 4-stroke, petrol start and petrol run engine. Technical specification of engine is as under-

S.N.	Technical Features	Values
1	Type	4-stroke, overhead valve, single-cylinder, horizontal shaft
2	Bore and stroke	68x54 mm
3	Displacement	196 cm ³
4	Compression ratio	8.5:1
5	Net Power	4.1kW (5.5HP) at 3600 RPM
6	Continuous rated power	3.7kW (5.0 HP) at 3600 RPM
7	Maximum Net Torque	12.4 Nm at 2,500rpm
8	Ignition System	Transistorised magneto ignition
9	Starting System	Recoil (Electric Starter Optional)
10	Cooling System	Forced-Air
11	PTO Shaft Rotation	Counter-clockwise (from P.T.O. side)
12	Fuel Consumption at Rated Power	1.7 L/h at 3,600rpm
13	Lubrication System	Splash
14	Recommended Oil	10W/30 API SG
15	Recommended Fuel	Unleaded
16	Oil Capacity	0.6L
17	Fuel Tank Capacity	3.1L


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3.2 -Compressor- This shall be of air cooled type capable to deliver compressed air pressure of 0-1.0 kg/cm² (0-15 PSI). Compressor should be of type roots blower compressor single stage. It will be driven by engine and coupled by twin V-belt.

3.3 -Air Delivery Hose- It should be pneumatic type capable to withstand minimum pressure 100 PSI. Length of hose pipe should be at least 4.5 meter with internal diameter of 25.4 mm and outer diameter 35mm. Both ends should have suitable jubilee clips for proper clamping.

3.4 -Petrol delivery hose- It shall be made up of PVC, having internal diameter 10 mm and outer diameter 15 mm length of pipe should be 4.0 meters. Ends must be provided with clips which suit it.

3.5 -Petrol tank for pre heating- It should be of 10 liters capacity in cylindrical shape, made up of M S sheet, wall thickness of 3 mm and able to bear required pressure of 100±10 PSI.

3.6 -Burner- Design of burner should confirm to the heating requirement of A.T. weld manual 2012 (should be referred the latest version) for fusion welding of rails by the alumino thermic process. Clamping height (37±2 mm) as well as distance of burner must be adjustable to achieve maximum temperature (600±20⁰c) from the system in time as mentioned in the table of para 1. It should be capable to maintain compressed air pressure 0.2 Kg/cm² to 0.3 Kg/cm² as per para 4.9.2 of A.T. weld manual 2012.

3.7 -Relief Valve- There should be manual release valve to adjust the compressed air pressure of range 0.2 Kg/cm² to 0.3 Kg/cm².

3.8 -Pressure Gauge- It should be mounted on compressor chamber to measure the pressure. It should be dual reading range (Kg/cm² & PSI). Air pressure gauge capacity 0-15 PSI or 0-1 Kg/cm² is essentially required. Pressure gauge should be of glycerin filled damping quality so that pressure showing needle may not be vibrate during operation.

3.9 -Safety Valve- Spring loaded brass made safety valve mounted on petrol tank of size 10 cm length X 3.5 cm diameter able to withstand pressure of 5 kg/cm² to be provided.

3.10 -Safety Guard- It should be provided to cover up the twin V belt area which is made up of metal mesh, wire diameter of 4 mm.

3.11 -Trolley- Metallic trolley of size height 300 mm width 260 mm length 660 mm made up of commercial steel with arrangements. The trolley should be movable on rail as well as on road too. It should also be handy and having total weight not more than (95±5) Kg. so that it can be lifted by two men from track easily.

3.12 -Manufacturers Identification- Manufacturers should mark firm's identification, month and year of manufacturing on machines. It should be embossed on aluminum plate and fixed on suitable location.


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3.13-Working Instructions- Two hard copies of instruction manual containing safety precaution, operation and important repair periodically to be supplied.

4. Workmanship and Finish-

4.1 All the metal surfaces shall be properly finished. Rough and sharp edges shall be removed.

4.2 All the working parts and the parts subject to wear shall be accurately machined to many tolerances as will ensure the fitting of spares with minimum of adjustment.

5. Inspection & Testing-

5.1 Inspection of the equipment shall be carried out by the purchaser/ CTE or his authorize representative at various stages of manufacture. The manufacturer shall provide all testing facilities including transportation that are required by the inspection officials for proper inspection of the equipment. In case these facilities are not available at manufacturer's premise he would be required to get them arranged in nearby technical institution or test house approved by purchaser.

5.2 The equipment shall be subjected to following tests before passing/ approving by inspection officers. The sequence of conducting these tests and their frequency shall be as given below:

5.2.1 Visual and dimensional test:

The equipment shall be free from defects such as crack, blow holes etc. The equipment shall be checked dimensionally as per drawing of manufacturer approved by purchaser/RDSO/Railway Board.

5.2.2 Performance test:

All the machines offered shall undergo visual and dimensional inspection. Two machines shall be selected randomly which pass the visual dimensional examination for the performance test. The pre heating of rails for five joints shall be executed by both the machines individually in the premises of TPP/LKO.

5.3 Before offering the equipment for inspection and testing, manufacturer shall satisfy himself regarding performance of his equipment and shall give a certificate specially mentioning that he has checked and tested each equipment. Manufacturer's certificate will be issued for all the purchasing machines separately.

5.4 Inspection certificate shall be issued only after complete testing. Inspection certificate will be issued for all the purchasing machines separately.


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6. Tools :

Each machine shall be supplied with a complete kit of tools required by the operator in emergency and for normal working of the machine. There should also be tools manual including the list of tools with their images and purpose/operation.

7. Spares:

7.1 The manufacturer shall be responsible for the subsequent availability of spares to ensure trouble free service life of the machine.

7.2 The spare parts required time to time, should be detailed in a list indicating description, part number, source of procurement and expected life.

8. Protection & Packing:

All exposed surface shall be painted with yellow paint of standard quality to protect it from rusting and other weathering effects. The equipment shall be supplied packed in suitable wooden crates according to the best trade practices to safely transport by rail/road and reach the consignee in safe and satisfactory manner. All the working parts shall be oiled before being assembled.

9. Marking:

The machine shall be legibly and indelibly marked with following details-

- i) Name/ Trade mark of manufacturer
- ii) Serial No of equipment
- iii) Month and year of manufacturing

10. Handling and transportation arrangement:

The machine shall have mono rail double flanged wheels arrangements (two axles) at the bottom and a handle of convenient height (preferably adjustable height) to enable it to be pushed over the rails by one person assisted by another to take it to the work site. Nylon wheels should also be attached either side to be moved on cess/ plain surface as required. The diameter and thickness of the nylon wheels shall be such that they do not infringe check rails or the ballast adjoining the rail heads.

11. Information to be supplied by manufacture with consignment:

The following information shall be supplied by the manufacturer to the purchase/consignee along with the machine.

11.1 Manuals:- Detailed operating manual, safety precautions to be taken, maintenance and service manuals shall be supplied in three copies along with each machine.

11.2 Maker's Test Certificate:-

11.2.1 Copies of the maker's test certificate guaranteeing the performance of the machine should be supplied in duplicate along with delivery of each machine.


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11.2.2 Copies of the inspection certificate of the machine should be supplied in duplicate along with delivery of each machine.

11.2.3 Copies of the engine manufacturer's certificate guaranteeing the performance of the engine of the machine shall be supplied along with maker's certificate mentioned in para 11.2.1. The guarantee of the engine should be in favour of consignee.

11.2.4 Copies of the compressor manufacturer's certificate guaranteeing the performance of the compressor of the machine shall be supplied along with maker's certificate mentioned in para 11.2.1. The guarantee of the engine should be in favour of consignee.

11.3 Drawings:- The manufacturer shall supply detailed drawings exhibiting clearly the materials and dimensions so that the user can have a clear understanding of the machines.

11.4 List of tools with sketch shall supply for easy identification and use.

12. Guarantee:

12.1 Any part of the machine failing or provide unsatisfactory in service due to defective design, material or workmanship within 12 months from the date of supply shall be replaced by the supplier at his own expenses. Further should any design modification be made in any part of the equipment offered, the period of 12 months would commence from the date of modified part is commissioned in service.

12.2 The engine & compressor both shall also be guaranteed for period of 12 months individually from the date of supply of machine. This guarantee shall be from the engine & compressor manufacturer in favour of consignee for using the engine & compressor with compressed air petrol system otherwise machine manufacturer/ supplier shall get a letter released from the engine & compressor manufacture to its service centre mentioning that guarantee of the engine in favour of machine manufacturer should be treated as a guarantee in favour of consignee and therefore local service centre render all the services as provided to direct purchaser.

13. Training:

Adequate training of operation and maintenance of the machine shall be imparted to railway operators by the manufacturer at railway premises for two days at a date & place fixed in consultation with purchaser. The manufacturer/ supplier shall inform the all consignee (if there is more than one consignee) about the date & place of training fixed in consultation with purchaser.

14. Demonstration & Commissioning:

The manufacturer/supplier shall commission and demonstrate one machine to the consignee/purchaser at a date & place fixed in consultation with purchaser. The manufacturer/ supplier shall inform the all consignee (if there is more than one consignee) about the date & place of commissioning fixed in consultation with purchaser. The demonstration & commissioning shall be only for one machine for the entire supply.

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