

ISO 9001-2015	Doc. No.: TM/SM/20	Revision- 02	Date Effective From:30/06/2022
Document Title: <b>Specification of Portable D.C. Welding Generator.</b>			



## Specification of Portable D.C. Welding Generator

(No. TM/SM/20 dt. 19.11.1992)

Second Revision, 2022

Track Machines & Monitoring Directorate

**RESEARCH DESIGNS AND STANDARDS ORGANISATION**  
Manak Nagar, Lucknow-226011

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## 1.0 SCOPE:

- 1.1 This standard lays down the requirements, test and service conditions for DC arc generators with drooping characteristics for manual single operator metal arc welding specially for reconditioning of points and crossings of Railway track in-situ conditions.
- 1.2 Preference to Make in India: Compliance of the instruction contained in Public Procurement (Preference to Make in India) order -2017 “Make in India” and latest guidelines issued in this regard shall be ensured.

## 2.0 REFERENCES:

Following IS codes and notifications have been referred to in this specification. Updated copies of the same shall be available in the works of the manufacturer/Suppliers.

- i) IS: 2635-1997 (Reaffirmed 2017) –DC Electric welding generators specification (third Revision).
  - ii) Notification G.S.R. 281(E) & G.S.R. 535(E) or any other instruction issued by Ministry of Environment, Forest & Climate Change related to Emission standards and noise limits.
- 2.1 Terminology used in this specification is same as mentioned in IS: 2635-1997 (Reaffirmed 2017).

## 3.0 MATERIALS, PROCESSING, WORKMANSHIP and FINISH:

- 3.1 Frame of the Portable D.C. Welding Generator shall be made of high quality seamless steel or equivalent material to resist shock and vibration during operation and handling.
- 3.2 Insulating materials: The insulating materials used in Portable D.C. Welding Generator shall be non-hygroscopic and conform to IS: 1271.
- 3.3 All materials used in the manufacture shall generally conform to relevant Indian Standards wherever applicable.
- 3.4 All parts shall be manufactured to a high standard of workmanship and finish.

## 4.0 REQUIREMENTS

- 4.1 Rated Open Circuit Voltage: The open circuit voltage of Portable D.C. Welding Generator shall not exceed 100V.
- 4.2 Rated Current: The rated current for maximum continuous hand welding shall not be less than 200 Ampere at 60% duty cycle. The total duration of each cycle shall be 5 minutes comprising a period of 3 minutes of welding load followed by period of 2 minutes of no load operation.
- 4.3 Range of welding current (Minimum & Maximum):
  - 4.3.1 The current range shall be in the range of 60-200 Ampere.

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- 4.3.2 The maximum hand welding current shall not exceed 270 Ampere.
- 4.4 Class of Insulation: 'F'.
- 4.5 **Polarity Change over Switch:** Portable D.C. Welding Generator shall be fitted with a polarity change over switch to facilitate welding with reverse polarity unless otherwise agreed mutually by purchaser and supplier/manufacturer.
- 4.6 **Internal Combustion Engine for Driving Portable D.C. Welding Generator:** The Portable D.C. Welding Generator shall be driven by a compatible internal combustion Petrol / Diesel / Natural Gas (NG) / Liquid Petroleum Gas (LPG) / Petrol and Natural Gas (NG) / Diesel and Natural Gas (NG) / Petrol and Liquid Petroleum Gas (LPG) / Diesel and Liquid Petroleum Gas (LPG) / Petrol and Kerosene engine.
- 4.7 The Portable D.C. Welding Generator shall be in conformity with IS: 2635-1997 (Reaffirmed 2017) however, purchaser may accept the Portable D.C. Welding generator conforming to BS: 638 part 2:1979 at his discretion.
- 4.8 Limits of temperatures and temperature rise shall be as per of IS 2635-1997 (Reaffirmed 2017).
- 4.9 Ampere Meter: Portable D.C. Welding Generator shall be fitted with an ampere meter properly damped to indicate the welding current.
- 4.10 Current Regulator: The Portable D.C. Welding Generator shall be fitted with a current regulating device to set the welding current as required by operator. The current regulating device shall be duly calibrated and marked with graduation to show amount of current drawal.
- 4.11 Cooling: Natural or forced air cooling shall be used.
- 4.12 **Enclosures:** The enclosure shall be of type designation IP 42 of IS 4691-1985 (Reaffirmed 2004).
- 4.13 Auxiliary Output: The Portable D.C. Welding Generator set shall be fitted with a change over switch to give auxiliary output as mentioned below. Welding shall be carried out while drawing auxiliary output:
- i) Voltage: 220-240 V AC
  - ii) Output: 2500 Watts at 50/60 Hz
- 4.14 Portable D.C. Welding Generator shall be adequately guarded by robust pipe frame and mounted on wheels for easy portability and should have additional mono wheel to enable movement on the rail track.
- 4.15 There shall be an arrangement to protect the Portable D.C. Welding Generator from direct rain.
- 4.16 Weight: The maximum weight of Portable D.C. Welding Generator unit (excluding transportation arrangement) shall not exceed 150 kg.

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## 5.0 SERVICE CONDITION

5.1 This standard applies to Portable D.C. welding generator set operating under following normal service conditions:

- i) Ambient temperature : Not exceeding 40<sup>0</sup> C
- ii) Altitude : Not exceeding 1000 meters.

5.2 The unfavourable conditions like unusual corrosive fumes, steam or excessive humidity, excessive oil vapour, explosive gases, abnormal vibration or shock, excessive dust, usual sea coast or shipboard conditions etc. may be brought to the manufacturer/supplier attention.

## 6.0 TESTS

### 6.1 Acceptance Tests:

Acceptance tests and their sequence shall be as follows:

- a) Insulation Resistance test
- b) No load test
- c) Load test
- d) Temperature rise test.
- e) Commutation test.
- f) Short Circuit test
- g) High voltage test
- h) Insulation resistance test (Repeated)

6.2 Acceptance Test shall be carried out on each of Portable D.C. Welding Generator.

6.3 Acceptance test shall be carried out in accordance with type tests and Routine tests mentioned in IS 2635-1997 (Reaffirmed 2017) (Specification for DC Electric Welding Generators).

6.4 Manufacturer/Supplier shall comply with the notification G.S.R.281 (E) & G.S.R.535(E) or any other instruction related to emission standards and noise limits of Ministry of Environment, Forest & Climate change, whichever applicable, and shall submit valid certificates issued by institutions recognized by them in this regard at the time of Prototype test and also at the time of Acceptance test.

## 7.0 INSPECTION:

The inspection of the Portable D.C. Welding Generator during procurement shall be carried out by the purchaser zonal railways or any representative /agency authorised by CTE of the zonal railways. The cost of inspection and testing shall be borne by the manufacturer/supplier. Minimum level of inspecting official shall be SSE.

7.1 Compliance of specification shall be verified at the time of Inspection.

## 8.0 TRAINING:

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Adequate training for operation and maintenance of Portable D.C. Welding Generator shall be imparted at consignee's end or at manufacturer/supplier's premises as mutually agreed between the manufacturer/supplier and the purchaser at the rate of two operators per Portable D.C. Welding during supply. This training shall be treated as part of commissioning.

## 9.0 WARRANTY AND AMC:

- 9.1 Any part of the Portable D.C. Welding Generator failing or proving unsatisfactory in service due to defective design, material or workmanship within 12 months from the date of commissioning shall be replaced by the supplier/manufacturer at his own expenses. If any design modification is made in any part of the equipment offered, the period of 12 months would commence from the date of such modification.
- 9.2 During procurement, the purchaser may go for post-warranty AMC with the manufacturer/supplier for a pre-determined period as decided by the purchaser. This shall be incorporated in the tender document as a condition of contract.

## 10.0 SERVICE FACILITY AND SPARE PARTS(INCLUDING TOOLS):

- 10.1 The supplier/manufacturer shall provide service of competent service engineers free of cost during commissioning and warranty period. The service engineer shall guide the operating and maintenance staff during commissioning and warranty period of the Portable D.C. Welding Generator for proper operation and handling.
- 10.2 The manufacturers/supplier shall have good service network throughout the purchaser's country for quick and easy access to the users. A prompt response to the call of the customers is expected in case of any problem experienced in field.
- 10.3 Each Portable D.C. Welding Generator shall be supplied with a complete set of tool kit.
- 10.4 The manufacturer/supplier shall be responsible for subsequent availability of the spare parts to ensure trouble free service.

## 11.0 DOCUMENTATION:

- 11.1 Copies of the maker's certificate guaranteeing the performance of the Portable D.C. Welding Generator should be supplied in duplicate along with the delivery of each Portable D.C. Welding Generator.
- 11.2 In order to facilitate subsequent maintenance in service, the manufacturer/ supplier shall supply two sets of schematic diagrams. These shall exhibit clearly the details of the various components.
- 11.3 Frequency of various maintenance operations like servicing, overhauling etc. shall be indicated by the supplier.

## 12.0 MARKING AND PACKAGING:

- 12.1 The welding generator shall be legibly and indelibly marked with the following:
- Manufacturer name, country and trade mark.

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- ii) Year of supply & machine serial no.
- iii) Number of Indian Standard (Ref: IS 2635)
- iv) Range of welding current (Min. & Max.)
- v) Maximum continuous hand welding current.
- vi) Maximum open circuit voltage.
- vii) Rate speed.
- viii) Insulation class.
- ix) Maximum input power required for prime mover in KW.
- x) Auxiliary output.

12.2 The Portable D.C. Welding generator shall be packed in wooden/suitable carton after covering with good quality plastic sheets as per best trade practice to avoid any damage during transshipment.

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