



**SPECIFICATION No.: CLW/MS/03/157**

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## SPECIFICATION

for

# DRIVER SEAT ASSEMBLY WITH MECHANICAL SUSPENSION FOR 3-PHASE ELECTRIC LOCOMOTIVE

**ISSUED BY:**

ELECTRIC LOCO DESIGN OFFICE

## CHITTARANJAN LOCOMOTIVE WORKS

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## 1. FOREWORD

A constantly alert and vigilant crew is crucial for safe running of trains. Optimum seat ergonomics crucially improves working conditions and helps to preserve crew health, thereby, ensuring alertness and cognizance of the crew.

To achieve optimum seat ergonomics for anthropometric variation across India must be considered. Reach, visibility, comfortable sitting position and sitting posture of crew varies with the variation in anthropometric dimension which in turn varies with the racial and geographical changes over the country. Hence, a single fixed dimension for driver seat and its sub-assemblies cannot be suitable for all crews. Necessary adjustments are required for each crew. The specification considers these aspects in detail.

Optimum seat ergonomics ensures reach of all the locomotive controls and driver interface to crew without any stress. Each user has different requirements for comfortable sitting. Various adjustments in driver seat provide user specific optimization in terms of reach, visibility and sitting posture, thus, providing a comfortable working condition to crew. It contributes to enhancement in crew alertness level, reduction in drowsiness and ensuring visibility of signals to crew, thereby, improving overall safety in operation of locomotive.

## 2. SCOPE OF SUPPLY

Four numbers of assembled driver seats per locomotive are to be supplied along with mounting arrangement and necessary hardware.

## 3. CLIMATIC AND ENVIRONMENTAL CONDITIONS

### a) Maximum Atmospheric Temperature:

Under Sun : 75° C  
In Shed : 55° C

### b) Humidity:

100% saturation during rainy season.

### c) Reference site condition:

Ambient Temp : 47°C (Max) & -5°C (Min)  
Humidity : 60%

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Altitude : 160 m above sea level

d) Rainfall:

Very heavy in certain areas. The locomotive will be designed to permit its running at 10 Km/Hr. in flood water level of 102 mm above rail level.

e) Atmosphere during hot weather:

Extremely dusty and desert terrain in certain areas.

f) Coastal areas:

Locomotives and equipment shall be designed to work in coastal areas in humid and salt laden atmosphere.

g) Vibration:

The equipment, sub system and their mounting arrangement will be designed to withstand vibration and shocks encountered in service as specified in corresponding IEC publication unless otherwise prescribed.

#### 4. STANDARDS:

4.1. Latest version of specification shall be applicable unless otherwise specified.

4.2. Certification/Performance Standards referenced

1.	ISO 9001:2015 (or latest version)	Quality management systems
2.	IRIS	International Railway Industry Standard
3.	UIC 651	Layout of Driver's Cabs in Locomotives, Railcars, Multiple-Unit Trains and Driving Trailers
4.	UIC 612	Driver Machines Interfaces for EMU/DMU, Locomotives and Driving Coaches - Functional and System Requirements Associated with Harmonised Driver Machine Interfaces
5.	EN 45545-2	Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behavior of materials and components
6.	DIN 5566	Railway vehicles - Driver cabs
7.	IEC 61373	Railway applications - Rolling stock equipment - Shock and vibration tests
8.	EN 15085-2	Railway applications. Welding of railway vehicles and

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		components. Quality requirements and certification of welding manufacturer
9.	TSI LOC & PAS	

## 5. GENERAL & TECHNICAL REQUIREMENTS:

5.1. Two nos. of driver seat are installed in each cab. Pedestal for mounting driver seat and associated accessories are to be supplied along with the assembly.

5.2. The driver seat shall be mechanically/pneumatically suspended and shall have following features:

SN	Features	
1.	Height adjustment (mm)	80 (min 4 steps)
2.	Suspension travel (mm)	100
3.	Fore/aft adjustment (mm)	210
4.	Adjustable backrest	10° to 70°
5.	Tilt adjustment	-3° to +5°
6.	Seat rotation with roller catch release	-120° to +120°
7.	Mechanical weight adjustment	50 to 130 kg
8.	Adjustable seat cushion depth (mm)	60 (min 4 steps)
9.	High-comfort folding armrests	60x320mm
10.	Attachable headrest	--
11.	Mechanical lumbar support	--

5.3. The backrest cover of the driver seat shall be made of stainless steel conforming to ASTM A240 Grade 316. It shall be possible to completely fold the driver seat back rest when not in use as to provide maximum working space during the maintenance. The back rest should be designed to withstand at least 100 kg of load.

5.4. Driver seat shall have in built provision of automatically securing (not locking) the position for the individual crew.

5.5. Control for each adjustment should be different to prevent confusion when adjusting the seat. The control to the adjustments shall be marked with a special colour & label/gesture to have visualisation and shall be placed where one intuitively expected to find them.

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- 5.6. Seat and back of driver seat shall be covered with porous material allowing for normal body perspiration. Seat cushion, fabric and non-metallic part of the driver seat assembly should be made of fire resistant materials and conform to EN 45545-2. Cushions shall be contoured ergonomically on the sides to provide side support.
- 5.7. The armrests shall also be upholstered out of PU-foam. The armrests inclination shall be adjustable and armrest shall be foldable.
- 5.8. Suspension of the driver seat shall be covered with PVC-bellow.
- 5.9. Swivel movement shall be supported by a bearing to ensure smooth and easier movement.
- 5.10. The driver seat shall conform to UIC-612 and UIC-651 standards. The compliance with respect to standards shall be confirmed during the design stage and validated during the prototype testing. Necessary documents/certifications shall be provided by the firm for the same. In addition, the driver seat shall conform to ergonomic requirement as per TSI Loc & Pas.
- 5.11. Driver seat shall also conform to safety requirement as per UIC 651, UIC 612, DIN 5566 and EN 45545-2.
- 5.12. All visual metal parts must be powder-painted in black RAL9005. Salt spray test in accordance with DIN 50021 shall be applicable for the painted parts.

## 6. INSPECTION AND ACCEPTANCE:

- 6.1. The manufacturer/bidder shall offer one loco-set (4 nos.) of driver seat assembly for prototype inspection.
- 6.2. One no. of offered driver seat assembly shall undergo type testing and other 3 unit shall undergo routine testing at their works premises.
- 6.3. All tests shall be witnessed by an authorized representative of the CLW and the cost of the testing shall be borne by manufacturer/bidder.
- 6.4. The manufacturer shall submit the test protocol to CLW for approval before offering prototype unit for inspection. The prototype test, routine test and acceptance test shall be carried out as per approved test protocol.

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**6.5. PROTOTYPE TEST:**

- 6.5.1. **Visual/Dimensional checks:** The driver seat assembly shall be checked for overall finish, workmanship and dimensions; Dimensional checking will be carried out by properly calibrated measuring/checking instruments.
- 6.5.2. Conformity with the standard as specified in this specification shall be verified during the prototype testing. All tests shall be performed as per relevant standard and approved test protocol.
- 6.5.3. **Static Test:** Driver seat shall undergo static test as per DIN 5566.
- 6.5.4. **Strength Test for Seat Frame:** The seat frame shall be able resist 1000N force with a maximum deflection of 5mm on each point.
- 6.5.5. **Shock and Vibration:** The driver seat shall be able to withstand shock and vibration as per IEC 61373 category 1 class A.
- 6.5.6. **Endurance Test for Height Adjustment:** Driver seat height adjustment shall be autonomous. It shall go under endurance test of min 30,000 cycles with a load of 80kg during way down.
- 6.5.7. **Endurance Test for Other Adjustment:** Various adjustments of the Driver seat shall also undergo endurance test of min 10,000.
- 6.5.8. Type test shall be carried in following cases:
- (i) First time supply to IR
  - (ii) Failure or variations established during type or routine test
  - (iii) Consistency type test within 5 years of the last type test to reestablish performance parameters
- 6.6. **FIELD TRIAL:** Prototype set shall undergo field trial for 6 months.
- 6.7. **ROUTINE TEST:** Routine test shall be performed by manufacturer on each assembly as per approved test protocol. Record of the same is to be maintained and furnished as per demand of the purchaser.
- 6.8. **ACCEPTANCE TEST:** 10% of the quantity of each batch shall undergo acceptance test as per approved test protocol. The acceptance test shall be witnessed by authorized representative of the purchaser.

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- 6.9. Railway reserves the right to perform any tests at any time to establish specific performance parameter.

## 7. DOCUMENTATION:

- 7.1. Along with tender offer, tender shall submit:
- Clause wise comments on the specification.
  - Detailed Dimensional Drawings
  - Material Specification
  - Technical Data sheet
  - Operational manual
  - Maintenance manual
  - Past experience with supporting papers (if any).
  - Quality Assurance program.
  - Machinery and plant for such job.
  - Testing facilities available
- 7.2. Successful tenderers shall submit list of items supplied, certified copies of material and test certificates, technical datasheet and guarantee certificate along with the supply.

## 8. QUALITY ASSURANCE:

- 8.1. **System Certification:** Firm to have obtained system certification against ISO 9001:2015 (or latest version).
- 8.2. Any other certification obtained by the firm may also be submitted during the tender.

## 9. MARKING:

- 9.1. Each assembly shall have clear readable marking as follows:
- a. Name and model number of product
  - b. Manufacturer's name/trade mark
  - c. Date of manufacturing
  - d. CLW PO number and date
  - e. Batch number/code for traceability of raw material


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- 9.2. Sub-components of the driver seat shall also have clear readable marking for part name, part no. and manufacturer's name/trade mark.
- 9.3. Various adjustment controls shall also be marked accordingly for user. A brief sheet shall be attached/engraved at the back side of the backrest explaining various adjustments.

#### 10. PACKING:

The driver desk shall be properly packed to avoid damage during transit and storage.

FINAL DRAFT

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