

Specification No. : ICF/ELEC/122
No. of Pages : 6

Specification for
Electrically Operated Wind Screen Wiper System
for EMU / DEMU Driver cabin.

Issued By
Integral Coach Factory, Chennai - 38

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1 SCOPE

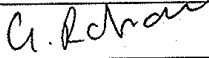
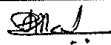

- 1.1 This specification covers the Design, Manufacture, Tests, Supply and after sales service of *Electrically Operated Wind Screen Wiper System for EMU / DEMU Driver cabin* operating on 110 Volt dc power supply.
- 1.2 The *Wind Screen Wiper System* is provided in the Driver's cabin of Electrical Multiple unit (EMU) or in Diesel Electric Multiple Unit (DMU).
- 1.3 The 110 Volt, dc power supply of sufficient rating shall be provided by the coach manufacturer for this purpose in both Electrical Multiple Unit operating on Traction supply of 25 kV, ac 50Hz, single phase supply and Diesel Electric Multiple Unit, operating on Traction supply derived from the Diesel Alternator set.

2. SERVICE CONDITIONS

- 2.1 The Wiper System shall be sturdy to withstand the following service conditions:

- 2.1.1. Maximum ambient temperature : 55°C.
- 2.1.2. Minimum ambient temperature : -4°C
- 2.1.3. Humidity : Upto 100%
- 2.1.4. Atmosphere : Very dusty atmosphere with dust of composite brake block shoe and fog.
- 2.1.5. Rainfall : Very heavy and continuous (heaviest in 24 hrs is 370mm), Max. Wind velocity 145kmph.
- 2.1.6. Altitude : sea level to 1000 Metres.
- 2.1.7. Maximum Train speed : 130Kmph
- 2.1.8. Vibration : The equipment, system and their mounting arrangement shall be designed to withstand satisfactorily the vibration and shocks encountered in service as specified below:-
- (a) Maximum vertical acceleration : 3.0 g
- (b) Maximum lateral acceleration : 3.0 g
- (c) Maximum longitudinal acceleration : 5.0 g
(‘g’ being the value of acceleration due to gravity)

In each of the three directions viz. Vertical, longitudinal and transverse sustained sinusoidal vibration in the frequency range. from 1 to 50 Hz having amplitude given by the following equations

		
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$a = 25/f$ - for value of 'f' from 1- 10 Hz and

$a = 250/f^2$ for value of from 10 - 50Hz.

3. STANDARDS

The Wiper System shall meet the requirements of RDSO Specification. C-K 306 (latest)

The Wiper Motor shall meet the requirement of the specification IS:7827 (Part-2).

RDSO/ELRS/SPEC/SI /0015-Reliability of Electronics used in Rolling Stock application.

4. POWER SUPPLY

- 4.1 The Wiper System and other related equipment shall be operable from 110V dc source only and the necessary power pack arrangement including DC-DC converter (If any) shall be built in the equipment. The input 110V dc variation is between 90 to 140 dc with ripples up to 15%. The unit shall be provided with the protection so as to withstand 200V dc and also reverse polarity.

5. SCOPE OF SUPPLY

- 5.1 The scope supply is as follows:

- a. Electric motor assembly with suitable integrated drive mechanism suitable for mounting on panel inside the driving cab with spindle protruding out of the panel for mounting the detachable wiper arm along with blade – suitable for Left hand wind screen -1 no., suitable for Right hand wind screen – 1 no.
- b. The Control Electrical Rotary Switch (3 position: slow wipe, fast wipe, parking) suitable for mounting on the Driver's desk – 2 nos.
- c. Windscreen wiper assembly consisting of wiper arm and blade, Wiper Blade shall be suitable for curved and flat windscreens and Wiper Arm (Main Arm & Support or Auxiliary Arm) shall be of pantograph type - 2 sets.
- d. Necessary power pack arrangement including DC-DC converter (If any).
- e. Necessary pre-wired interconnection cables to RDSO specn. ELRS/SPEC/ELC/0019 (Latest) or equivalent PTFE cables of suitable length with suitable multi pin connectors required for interconnection between wiper system and it's controls located inside the driver's cab. (Length of cable can be confirmed from ICF).

5. TECHNICAL REQUIREMENTS :-

Electrical Wiper motor

		
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The Electrical Wiper Motor shall meet the requirement of the specification **IS:7827** (Part-2) Latest.

Motor Rating:-**(a) Option 1 :-**

- Rated voltage : 110 volt DC
- Nominal current : 0.4 / 0.7 Amps (wet screen)
- Nominal power output : 28 / 48 Watts
- Degree of protection : IP-54 or higher
- Enclosure : Totally enclosed
- Continuous torque : 9 / 6.5 Nm (min)
- Finish : Polyester power coated (Black colour)

(b) Option 2 :-

- Rated voltage : 24 / 27 volt DC
- DC-DC converter : 110 V to 24/27 V DC
- Nominal current : 2.5 A / 3.5 A (wet screen)
- Degree of protection : IP – 54 or higher
- Enclosure : Totally enclosed
- Continuous torque : 28 Nm, at output gear.
- Finish : Polyester power coated (Black colour)

The overall dimension of the DC-DC Converter shall not exceed 210(L) x125(W) x110(H) for option 2 above.

Wiper motor shall have two speeds operation viz. low speed and high speed.

The motor assembly shall have integrated Radio interference suppression circuit using LC filters class of immunization according to CISPR 25.

The motor assembly shall have in built thermal protector to avoid over heating under adverse conditions.

Wind Screen wiper Assly. & Blade

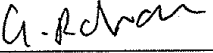
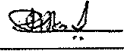
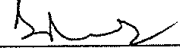
5.2.1 The wind screen wiper assembly and blade assembly shall confirm to RDSO Specification no: **C-K 306** (latest)

The nominal operating speed at low speed operation shall be 40 wipes per minute

The nominal operating speed at high speed operation shall be 55 wipes per minute

The system shall be designed to meet high level of durability. The motor and linkage shall be suitable for minimum 1.5 million cycles and the wiper blade shall have minimum 0.5 million or 6 months operational life as per SAE J 903 C standards.

The system shall have integrated wiper motor and links.

		
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The system shall be capable of producing Pantograph wipe pattern as per Indian Railway requirement to drawing no. ICF / STD 3-5-042 (latest)

The system shall have automatic parking facility and always stop the wiper in the agreed park position.

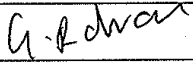
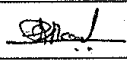
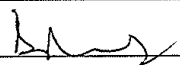
The wiper blade arm assembly shall be suitable for operating at minimum 60 cycles per minute.

6 CONSTRUCTIONAL REQUIREMENT

- 6.1.1 The Wiper system shall be constructed with strength and shall be robust design to meet the service conditions encountered in the Rolling Stock application.
- 6.2 The construction shall also cater for safe handling, transportation and rough usage without any damage.
- 6.3 All the parts that may cause injury or accident to the person operating shall be guarded with safe arrangement.
- 6.4 All parts that require periodic attention or maintenance shall be easily accessible when the unit is installed as per the requirement.
- 6.5 All hardware used shall be nickel plated and cadmium passivated and shall be with metric threads.
- 6.6 There shall be earthing terminals for connection of earth to coach body both on motor and DC-DC converter units
- 6.7 The units shall be supplied with fixing arrangement with fixing holes provided on the units and not in the enclosures or on steel sheets.
- 6.8 The supplier shall furnish the following details of all the items :-
 (i) Mounting dimension in mm with hardware size.
 (ii) Overall dimension in mm
 (iii) Weight in kgs
- 6.9 The dimensions and mounting arrangement of the each equipment mentioned in this specification are tentative and shall be finalized mutually between purchaser and supplier. The dimensional drawings with all details including the weight of the equipment shall be submitted for ICF approval before effecting supply. Bulk manufacture shall commence only on approval of the prototype by ICF.

7. INSPECTION

- 7.1 All materials and work covered in this specification shall be inspected by CEE/ QC & C / ICF Chennai or his authorized representative.

		
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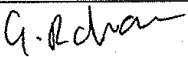
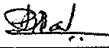

- 7.2 The equipment offered shall be tested as per this specification, in conjunction with latest IS: 7827 (Part-II) and RDSO Spec. C - K306 and ICF approved drawings of the firm.
- 7.3 The cost of the Inspection of the ordered equipment and the works shall be borne by the manufacturer.
- 7.4 The manufacturer shall inform CEE / QC & C / ICF, Chennai-38 well in advance for carrying out the Inspection of the ordered equipment.

8. TESTS :

- 8.1 Test shall constitute **Type test** and **Acceptance test**. The testing cost / charges applicable shall be borne by the manufacturer.
- 8.2 All the facilities for conducting the tests indicated shall be provided by the manufacturer at their works and on their own cost.
- 8.3 One complete unit from the ordered quantity, with all accessories, shall be type tested for Prototype Tests (clearance).
- 8.4 The following shall constitute the type tests and shall be done on the first unit for each purchase order unless otherwise stated and in every 50th Unit, if the ordered quantity is more than 50 numbers. The tests shall be conducted in the manufacturer's premises. All the facility for the conduction of the Tests shall be provided by the manufacturer at the manufacturing premises free of cost.
- 8.4.1 Tests for Wiper motor shall be conducted as per **clause 4 of IS: 7827 (Part-II)**.
- 8.4.2 Tests for Wind screen wiper arm and Blade assembly shall be conducted as per **clause 6.2 of RDSO spec. C – K 306**
- 8.4.3 The type tests shall be carried out at the works of the manufacturer by CEE QC & C / ICF or his authorized representative for conformity of the product with specification.

9 APPROVAL of DRAWINGS

- 9.1 The tenderer shall submit three sets of drawings showing technical details of the Wiper assembly, fixing arrangement dimensions, material specifications, list of parts for ICF approval.

		
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9.2 On approval of the drawing, the prototype unit, complete in all respects, shall be manufactured and offered for prototype test by ICF. Bulk manufacture shall commence only on approval of the prototype by ICF.

10. MARKINGS

10.1 Each Wiper unit shall be provided with a name plate carrying the following data, marked in a durable manner and located in a place such that it is visible and legible when the unit is installed. The Anodised aluminum name plate indicating:

Manufacturer's name,

Name of item, rating

Specification No.

Serial No. (first two digits year and next two digits month and three digits running serial number)

11. GUARANTEE:

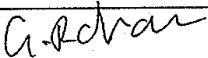
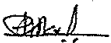

11.1 The Wiper unit complete (including wiper motor & power pack) shall be guaranteed against design and manufacturing defects for a period of 60 months from the date of supply or 48 months from the date of fitment whichever is earlier. The successful tenderer shall offer prompt free after sales service during the guarantee period at ICF as well as at any car sheds of Indian Railway where motor coaches fitted with Electrical wiping system are in service.

12. ELIGIBILITY CRITERIA

12.1 The bidder should have manufactured and supplied at least 1000 sets for passenger car applications with comparable features to any renowned automobile manufacturer or railway system and these equipment should have been in active and troubles free service for at least 5 years.

12.2 If a bidder has already made supply in India with collaboration of any reputed firm and their equipments are working satisfactorily for at least 5 years, they should produce documentary evidences of supply details made in India.

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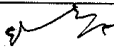

		
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Correction Slip No.01 to Specification ICF/ELEC/122 Rev.0

Clause No. 1.1 modified and shall be read as follows.

- 1.1 The specification covers the Design, Manufacture, Tests, Supply, Installation, Commissioning and after sales service of Electrically Operated Wind Screen Wiper System for EMU / DEMU Driver cabin operating on 110 Volt dc power supply.

		
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