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भारत सरकार  
रेल मंत्रालय  
GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS

**PARTICULAR SPECIFICATION  
FOR  
SELF-PROPELLED DIESEL- ELECTRIC  
JET DEFLECTOR CRANE CAR  
(BG)**

**Spec. No. MP – 0.08.00.46 (Rev – 0.00)**  
**विशिष्ट संख्या चा०श० – 0.08.00.46 (संशोधित 0.00 )**

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**PARTICULAR SPECIFICATION FOR SELF-PROPELLED DIESEL ELECTRIC JET  
DEFLECTOR CAR (B.G)**

**1. SCOPE**

- 1.1 This specification covers the particular requirements of design, construction, supply and commissioning into service of Self-propelled Diesel Electric Jet Deflector crane Car (BG).
- 1.2 It shall be a self-propelled single car unit with one driving cab at one end of the car and a crane mounted on the other end for lifting two Jet deflectors one at a time placed on the car. For operation of crane, independent diesel hydrostatic power unit shall be used.
- 1.3 M/s. Tractor India Limited, 517, Barrackpore Trunk Road, Calcutta shall provide the complete crane TIL make N205/50 model with its mounting, controls for operation of crane, lifting accessories, driving power equipment consisting of diesel engine, hydrostatic pump & motor and associated controls.
- 1.4 The particulars of crane and driving equipment as decided during the meeting between DR/DRDO, M/s. TIL and RDSO is placed at Annexure- II.
- 1.5 The car shall be used to carry two numbers Jet Deflectors. ICF shall provide rails to BG dimension for carry and movement of Jet deflector mounted on trolley. The suitable stops shall be provided at each end of the rails to prevent falling jet-deflector trolley from rail to floor of under-frame and also removable type stops shall be provided in between jet-deflectors to prevent hitting of the same. The dimension of the jet deflectors is given in Annexure-II.
- 1.6 ICF shall provide suitable clamping arrangements for clamping the Jet deflectors in Location firmly when stationary and also during movement of the crane car.
- 1.7 The Jet deflectors shall be brought manually within the working radius of the crane.
- 1.8 The vehicle shall be capable to operate as a single unit at a maximum operating speed of 80 km/h and shall be able to haul the trailing load of 400 tonnes at a speed of 40 km/h on level tangent track. The vehicle shall be hauled at a maximum speed of 80 Km/h in train formation.
- 1.9 The general layout of the crane and associated power equipments and controls shall be in accordance with RDSO Drawing No. **RDSO SK. NO. CR -834.**
- 1.10 This specification consists of two parts as follows:  
  
Part I : Coach Structure and Design  
Part II : Traction Equipment

## Part-I

### Coach Structure and Design

#### 1.0 SCOPE

- 1.1 The layout of jet deflector crane car shall be in accordance with drawing No.**RDSO SK. NO. CR-834**. The car shall be used for carrying two jet deflectors. A crane shall be mounted on the floor of the car at non-driving end side for loading and unloading of the jet deflectors one at a time. The jet deflectors have provision of trolley for movement on track. A light rail has also to be mounted on the floor for the placement of jet deflectors as shown in the layout drawing. The jet deflectors should be fully secured with underframe with proper holding mechanism to avoid the rolling and tilting of the jet deflectors during the running condition
- 1.2 This specification read with **IRS Specification No. R-35-75** for coaching stock is intended to include everything requisite to the construction of these coaches, notwithstanding that everything required may not be mentioned herein.

#### 2.0 KEY DRAWINGS AND STANDARD DRAWINGS

- 2.1 A list of key drawings and standard drawings applicable for construction of these cars is given in **Annexure-I**.

#### 3.0 LEADING PARTICULARS

- 3.1 The leading particulars of Jet Deflector Crane Car shall be as follows: -

(i)	Gauge	1676 mm
(ii)	Length over body	21262 mm
(iii)	Overall width of body	3245 mm
(iv)	Overall height of the car from rail level to center of roof	3886 mm
(v)	Height of side buffers from rail level under tare condition	1105 mm
(vi)	Side buffer centers	1956 mm
(vii)	Height of floor from rail level	1275 mm

(viii)	Distance between bogie centers	14783 mm
(ix)	Rigid wheel base of bogies	2896 mm
(x)	Wheel diameter on tread (New)	952 mm
(xi)	Wheel diameter on tread (fully worn-out)	877 mm
(xii)	Max. operating speed	80 km/h
(xiii)	Max. axle load (Assessed)	18 t

#### 4.0 **MOVING DIMENSIONS & MAX. CURVE**

4.1 The moving gauge shall be to SOD, 1929. The coaches shall be capable of negotiating curves of 175 m radius.

#### 5.0 **BOGIE**

##### 5.1 **Motor bogie**

5.2 The bogie shall be generally to **ICF Drg. No. DMU/DPC-0-0-001**.

5.3

5.3.1 The technical requirements for manufacture and inspection of bogie frame and bogie bolster for jet deflector crane car shall be as per **RDSO Specification No. C-9202**.

#### 6.0 **STRUCTURAL DESIGN**

##### 6.1 **Shell/covered structure**

6.1.1 The cross section of the covered Driving end of the curve of the car shall be of shell type design and conform to **Sketch No. 92132**. The main structural members of the Driving end ecovered portion shall be either of rolled steel sections or of pressed steel plates and sheets conforming to approved specifications assembled and welded together in suitably designed jigs.

6.1.2 The car shall be tested for leakage through roof and body sides and ends at the works of the manufacturer. To carry out this test, the manufacturer shall provide a test rig to the satisfaction of the inspecting authority.

## 6.2 Doors

6.2.1 The doors provided shall meet the following requirements:

- (i) The car shall have doors in accordance to **Sketch No.SK.CR-834**.
- (ii) Body side doors shall be provided with internal safety latches at top and bottom and with a provision of staples for pad locking from outside.
- (iii) The doors shall also be provided with carriage door locks suitable for locking/unlocking with standard square key both from inside and outside.
- (iv) Door hand holds should not project outside the coach profile to facilitate mechanical washing.

### 6.2.2 Driver's Compartment

6.2.2.1 Single leaf inward opening hinged doors shall be provided in driver's compartment and shall provide a clear opening of 533 mm minimum and shall fold back against the partition of the compartment. The doors may be of light alloy pressings or castings or of steel pressings of robust design provided with handles both on the inside and outside working a slam type lock. A grab handle shall also be provided on the outside of each door.

6.2.2.2 Each door shall be provided with two downward opening shutters, the inner one being of glass and the outer one of metal louvers, similar in design of shutters provided in passenger compartments. Both shutters shall be capable of being locked in the closed position.

6.2.2.3 Continuous hand rails of drawn bar 1524 mm long extending upwards from a point approximately 70 mm above floor level shall be provided on both sides of each doorway, the position of hand rails being adjusted to permit mounting into the driver's compartments from ballast level, and of operating the door lock, without discomfort.

### 6.2.3 Engine Room and Auxiliary Engine Room

6.2.3.1 A removable hatched type door or sliding door shall be provided on each side of Engine Room for Jet Deflector Crane Car. The door shall be watertight and shall bleed with each profile. The removable hatched type doors shall be secured by bolts so that they can be opened only by the railway staff from the interior of the Engine Room.

6.2.3.2 A single hinged swing door leading from the driver's compartment for staff use shall be provided. It shall be located on the partition to suit the arrangement of

Engine Room secured by a slam type lock, which can be opened by railway staff from the driver's cab.

## 6.3 WINDOWS

### 6.3.1 Driver's Compartments

6.3.1.1 Two fixed look-out glasses of uniform size shall be provided in the end wall of driver's compartment and these shall be of glazed with clear, colourless, safety glass 6.3 mm thick.

6.3.1.2 Fixed sun-visors of approved design shall be provided outside the glazed windows, and a pneumatic type wind- screen wiper as per Clause 17.0 with a long handle for manual operation shall be provided on each of the two lookout windows.

6.3.1.3 Window shall be provided in body side doors in accordance with Clauses 6.3.1.1 to 6.3.1.4.

### 6.3.2 Lifting Pads

The body shall lend itself to repeated lifting by overhead cranes or jacks without damage to the body. Suitable lifting brackets or pads shall be provided for Jet Deflector Crane Car at suitable points and marked in a readily distinguishable manner on the coach body.

## 7.0 FLOORING

The floor of driver's cab shall consist of aluminium-chequered plates as per **Schedule of Requirements C-8217** (issued by RDSO) laid on epoxy painted corrugated steel floor sheets. The following procedures may be adopted for fixing the chequered aluminium plates.

7.1 The corrugated steel floor sheets shall be epoxy painted comprising of:

- (a) Epoxy zinc phosphate primer (Minimum dry film thickness 60 microns)
- (b) Epoxy Micaceous iron oxide (Minimum dry film thickness 200 microns)
- (c) Polyurethane/epoxy chemical resistant paint (Minimum dry film thickness 200 microns)

This system requires metal surface to be either grit blasted or phosphated, which should be ensured. Untreated surface will vitiate the protection.

- 7.2 8 mm thick compreg board to **RDSO Specification No. STR C-9407, Type-II** may be used as padding below the aluminium-flooring sheet.
- 7.3 Drain holes at each doorway shall be provided.
- 7.4 The openings in the flooring for the passage of pipes and cables through the floor shall be so constructed as to prevent any seepage of the oil and in addition give effective protection against the spread of fumes originating beneath the body.
- 7.5 The floor shall be blended at the junction with the interior body lining by a fillet corner moulding on light metal alloy material resistant to corrosion and made impervious to seepage of water. The floor shall also be provided with an adequate number of grilled outlets of 25 mm diameter under the seats and at points where water is likely to accumulate, fitted with drain pipes to prevent water from spreading on the underside of the coach structure or dripping on to the running gear. The design and construction of the flooring system shall permit access to all parts of the structure from the underside for spraying.
- 7.6 The floor of the Engine Rooms and open area shall consist of galvanized chequered steel plates of approved quality laid directly on the steel supports secured to the corrugated steel floor sheets. The steel chequered plates shall be directly secured to the steel support frame. No timber/any inflammable material shall be used for flooring of Engine Room and open area.

## 8.1 **Ceiling Material**

- 8.1.1 The ceiling of Engine Rooms shall be of 1 mm thick Mild Steel Sheet.

## 8.2 **Paneling**

- 8.2.1 The interior paneling in the driver's cab shall consist of 3 mm thick resin bonded thermo-setting laminated plastic sheets of approved shades. The laminated plastic sheets shall conform to RDSO Schedule of Technical Requirements for decorative Thermosetting Synthetic Resin Bonded Laminated Sheets **No. C-8623**.
- 8.2.2 Sidewall, partitions of Engine Rooms shall be 1 mm thick M.S. Sheets.

## 8.2 **Driver's Seats**

Two seats shall be provided in driver's compartment, one for the driver behind the controls, and the other for the guard behind the other glazed window. The driver's seat shall be of the folding and swiveling type to permit the driver to manipulate the controls either while sitting or standing. The seat frame or swiveling arrangement shall be of robust design, easy to operate and hold in any desired position

## 9 FOOT STEPS

### 9.1 Crane attention

9.1.1 Foot- steps shall be provided near crane area as shown in **Sketch No.SK.CR-834.**

### 9.2 Driver's Compartment

9.2.1 Steel step iron shall be provided below the entrance to driver's compartment and shall be so located as to provide a convenient foothold without infringement of maximum moving dimensions.

### 9.2 Draw gear arrangement

Draw gear arrangement to **RDSO Drg. No. SK-99003** shall be fitted on both and of the car.

## 10 Screw coupling

Screw coupling to **RDSO Drg. No. SK-79067** shall be fitted on both ends of the car with provision of shackle holding hooks.

## 11 SIDE BUFFERS

12.1 Provision shall be made for fitment of side buffers 635 mm long on the head stocks on both ends of jet deflector crane car.

## 12 BRAKE SYSTEM

13.1 The jet deflector crane car shall be fitted with graduated release twin pipe air brakes. The brake system shall be of UIC approved type and shall meet all UIC requirements. It shall have the following distinct positions: -

- (i) Isolation position
- (ii) Release and running positions
- (iii) First notch position
- (iv) Full application position
- (v) Emergency position

The driver's brake valve shall be self-lapping application as well as in release.

13.2 The emergency braking distance (EBD) for fully loaded unit from maximum speed of 80 km/h shall not be more than 800 m.



- 13.3 Jet deflector crane car shall be provided with the following additional brake requirements:
- i) Dead man's device in driving cab.
  - ii) An emergency brake valve in driving cab on extreme right hand side.
  - iii) Stand-by brakes, in case of failure of distributor valve or any component in the main brake system.
- 13.4 Application of any type of brake provided on the jet deflector crane car shall result in simultaneous cutting of the power to the driving axles.
- 13.5 The brake rigging arrangements shall be light and as simple as possible with minimum number of levers and fulcrum points permitting easy access to brake blocks and other wearing parts. With clasp brakes, brake block to RDSO SK-80029.
- 13.6 Brake system shall be provided with automatic slack adjuster built into the brake cylinder.
- 13.7 Adequate safety straps/ropes shall be provided below the moving components of the brake rigging and other components to prevent falling on the track in the event of failure of any component.
- 13.8 The pneumatic pipes shall be given suitable anti-rust treatment for protection against corrosion. Stainless steel pipes may be provided.

**13.9 Parking brakes:**

Parking brake arrangement on jet deflector car shall be similar to BG DEMU stock (700 hp). The brake block pressure exerted by brake blocks shall be adequate to hold the car loaded, stationary on 1/100 gradient.

**13 WARNING HORN**

- 14.1 Two pneumatic horns shall be mounted in front of driver's compartment and these shall be operated by two robust foot operated valves located on either side of driver's control desk.

**14 WIND SCREEN WIPER**

- 15.1 The glazed windows in front of the driving position in driver's compartment shall be fitted with pneumatic type wind screen-wipers, which shall permit Manual operation of the wiper blade from inside the compartment, in the event of power failure.

16. CATTLE GUARD

16.1 Cattle guard shall be provided at driver's cab end of the car.

17.0 ROOF VENTILATION

17.1 Roof ventilation to ICF Drg.No. WLRRM4-7-3-402 alt. Shall be provided in Driver's cabin.

18.0 INSULATION

18.1 The inside roof of the driver's cabin shall be provided with suitable mineral /glass wool thermal insulation.

18.2 The partition wall of engine room shall be insulated to eliminate transmission of heat and noise of the engine to the driver's compartment.

19.0 EXTERIOR COLOUR SCHEME:

19.1 This shall be as per the requirement of defence vehicle.

20.0 EXTERNAL FITTINGS

20.1 Continuous water woggles shall be provided on either side of covered portion.

20.2 Rain water-gutters of suitable design shall be provided. Drainpipe in cab shall be provided in such a way that free draining of water is possible.

20.3 A fuel tank of 1200 l capacity shall be provided below the under frame.

21.0 Interior colour scheme of driver's compartment shall be similar to one used in 700 hp DEMU.

22.0 FIRE PREVENTION MEASURES

22.1 It shall be as per standard code of practice for prevention of fire.

23.0 ANTI CORROSION TREATMENT

23.1 Anti corrosion treatment shall be as per RDSO Specification No. 72- B – 06.

## 24.0 CAR LIGHTING AND VENTILATION

- 24.1 Suitable light, fan and ventilation arrangement shall be made in the driver's cabin and engine room. Necessary light arrangement shall also be provided in crane operating area.
- 24.2 The power supplyd for lighting and fan operation shall be provided by auxiliary generator provided with the power equipment.
- 24.3 **Wiring:** The code of practice for wiring as per EL/TL/48 shall generally be followed.
- 24.4 **Fans:** Fixed type fans of 400 mm sweep conforming to IS:6680-1972 shall be provided. The fans shall have its own control switch. The base of fan shall be insulated from coach body and the coach wiring shall be terminated to 2-way connectors supplied with the fan and fixed on the ceiling.
- 24.5 **Light:** Fluorescent fitting shall be provided for lighting the driver's cabin and engine rooms.
- 24.6 One electrical socket on either side of the car shall be provided to facilitate the use of portable inspection lamp for under carriage inspection and maintenance.
- 24.7 **Test Certificates:** Electrical test shall be carried out in accordance with EL/TL/48. One copy of test certificate duly signed by inspecting officer shall be made available to the user Railway.
- 24.8 **Marking:** Location of junction box shall be stenciled as below:  
“ **Junction box provided here**”

## 29. Test and Trials

### 29.1 Test on Mechanical Parts

29.1.1 Squeeze test: The jet deflector car shall be subjected to squeeze test with the following loading conditions:

- a) Vertical loads as shown in drawing No. SK.CR-834.
- b) Horizontal squeeze load of 102 t applied at the center line of each buffer.
- c) Combination of loads in (a) & (b) above.

### 29.1.2 Test on brake equipment

### 29.1.3 Test on parking brake equipment

**30.0 WEIGHTMENT**

30.1 The weight of Jet deflector car shall be taken using load cells.

**31.0 RUNNING TEST**

31.1 The following tests shall be conducted on prototype to assess the speed potential and brake capability:

- i) Oscillation trial to assess ride characteristics and acceleration characteristic up to max. speed of 90 km/h. under gross load condition.
- ii) Braking distance trial under gross load condition up to a max. speed of 90 km/h .

**PART II**

**TRACTION EQUIPMENT**

1.0 Broad Gauge, Self-propelled diesel-electric Jet Deflector car with nominal axle load of 20 t and fitted with a 700 hp fuel efficient diesel engine and AC/DC transmission, complete in all respects, shall be assembled, inter alia, with:-

- One Cummins' KCL 1710 L fuel efficient diesel engine capable of producing 700 hp under standard conditions along with GAC actuator (to be supplied by the engine manufacturer) and excitation control & speed governing system LCC of CIL.
- One BHEL Make traction alternator model TA 7005 AZ or CGL make C1002TA .
- One BHEL or CGL make three phase bridge type rectifier .
- Four BHEL Make 4601 BZ model or CGL make TM 2141 A model traction motors.
- One Kerala Electrics make Auxiliary alternator of 18.5 KW, with voltage regulator.
- One complete set of BHEL or CGL make propulsion control equipment.

**2.0 OPERATING REQUIREMENTS (half worn wheels)**

Maximum operating speed: as single Unit	100 km/h
With 400 t trailing load	60 km/h
Gear ratio	20:91
Motor Grouping	4P FF
Minimum continuous speed	Less than 30 kmph
Maximum tractive effort at start	Around 12 T
Continuous rating tractive effort	Around 5 T
Installed power(standard)	Approx. 700 hp
Power input to traction (site)	610 hp
Speed Vs TE characteristics	As per Figure-1

**PERFORMANCE CHARACTERISTICS  
700 HP BG DIESEL ELECTRIC JET DEFLECTOR CAR**

One Traction Alternator type : TA 7005 AZ  
 One Traction Motor type : TM 4601 BZ  
 Gear Ratio : 20 :91, Wheel dia : 915 mm (HW)

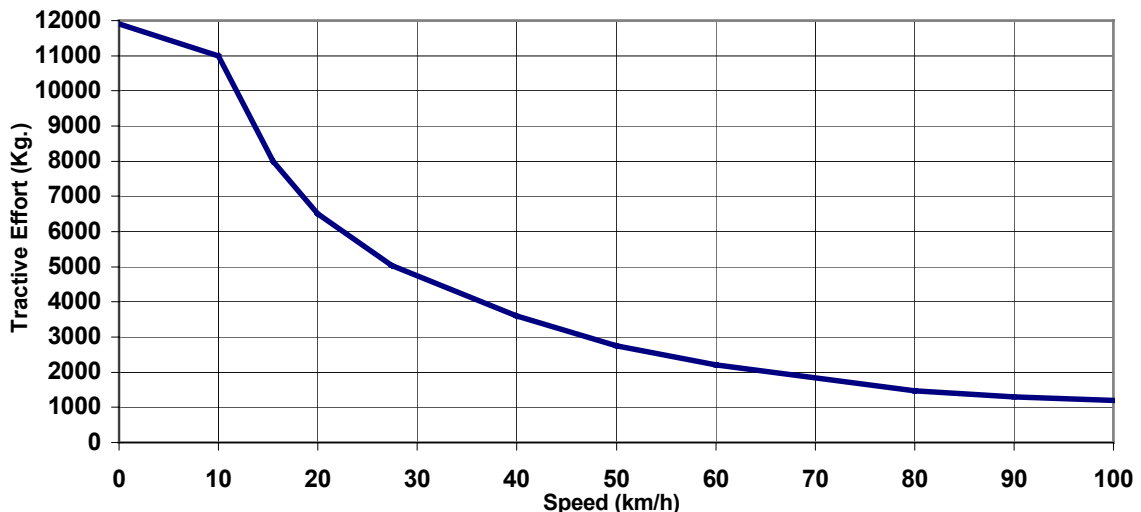


Fig 1

### 3.0 CLIMATIC CONDITIONS

The Jet Deflector Car power equipment shall be in continuous operation under the following atmospheric and climatic conditions :-

Ambient temperature	45 deg.C (occasional peak value of 50 deg.C)
Altitude	Sea level to 600 m
Humidity	40% - 100%
Maximum temperature	55 deg.C

### 4.0 TRAILING LOAD

The car shall be capable to haul a trailing load of approximate 400t at an operating speed of 60 km/h on a level tangent track. The details of formation of trailing load shall be as per clause 1.3 of Scope.

### 5.0 DIESEL ENGINE AND ITS COOLING SYSTEM

The Power car shall be powered by Cummins' KCL 1710 L fuel efficient diesel engine capable of producing approx. 700 hp at 1800 rpm under standard conditions. The engine shall be adjusted to deliver 610 hp to the alternator under site conditions.

Side mounted radiator and fan assembly, with panels for the proposed KCL 1710 Power-packs, similar to the unit in existing 700 hp BG DEMU shall be provided. For ventilation of engine room, fan of adequate capacity, similar to the one used on existing DEMU, shall be provided. Fixed displacement hydraulic pump shall be provided for both radiator and ventilation system. The Hydraulic circuit with supporting calculation shall be submitted by the tenderer for assessment of adequacy of the offered system.

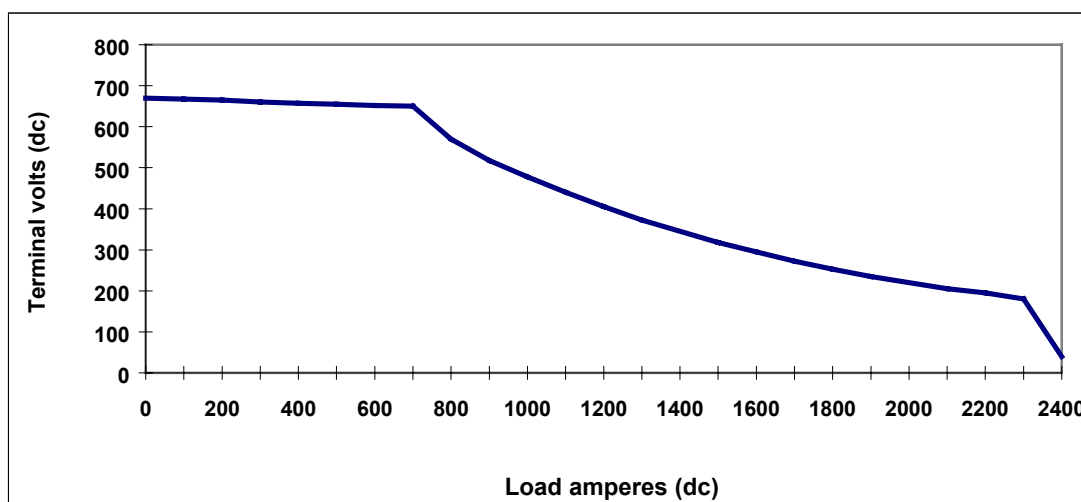
### 6.0 TRANSMISSION

Transmission of power from the engine shall be done by means of a directly coupled self ventilated BHEL make TA 7005 AZ model traction alternator, with BHEL make separately-mounted rectifier, driving 4 axle hung nose suspended BHEL model 4601 BZ traction motors or CGL make C1002 TA model traction alternator, with CGL make separately-mounted rectifier, driving 4 axle hung nose suspended CGL make TM 2141 A traction motors, similar to the equipment used in 700 HP DEMU. A 18.5 KW Kerala Electrical auxiliary alternator shall be provided. BHEL or CGL make propulsion control equipment shall be provided.

All electrical machines and control equipment shall generally conform to relevant IEC Publications and shall be type and routine tested as per RDSO approved test programme. Type testing of equipment shall be carried out by RDSO unless specifically waived by RDSO in case of proven equipment. The temperature rise limits given in the IEC Publication shall be reduced suitably to work out the applicable limits for alternator, traction motor and other machines to account for higher ambient temperatures in India.

## 7.0 TRACTION ALTERNATOR

Make and Type	BHEL model TA 7005 AZ or CGL C1002TA
No. per car	One
Low voltage rating (DC)	Application rating to be based on the system
High voltage rating (DC)	-do-
Temperature rise limit	T1a-70 deg.C. for stator & T1f-70 deg.C. for field where T1a and T1f are the established temperature indices for armature and field insulation respectively.
Insulation	Class H
Ventilation	Self-ventilated
Excitation	CIL make LCC capable of working with GAC actuator and suitable for control of BHEL alternator TA 7005/ CGL alternator TA 1002
Alternator Characteristics	As per Figure-2



V-I characteristics of alternator 7005 AZ  
Figure-2

## 8.0 TRACTION MOTOR

Make and Type	BHEL make 4601 AZ or CGL make TM2141A
No. per car	Four
Insulation – Armature & field	Class H
Ventilation	Self-ventilated

## 9.0 TRACTION RECTIFIER

Make & Type	BHEL or CGL make.
Number per car	One cubicle per Power car
Short time duty rating (DC)	3000 amps
Continuous rating (DC)	1800 amps, 530 V
Ventilation	Self-ventilated
Type of device	BHD R62-32
No. of bridges per cubicle	3
Device arrangement per bridge	1X1X6

## 10.0 AUXILIARY GENERATOR/EXCITER

The auxiliary generator provided shall be suitable for catering to the lighting and fan requirement of five coaches, including one DTC.

Make & Type	Kerala Electricals or equivalent.
Number per DPC	One
Continuous rating	18.5 KW
Insulation - Armature & field	Class H
Drive	Belt-driven-drive taken from main alternator end
Ventilation	Self-ventilated

## 11.0 CONTROLS AND GAUGES

Adequate control equipment including gauges, instruments and cab safety devices shall be provided for safe and satisfactory operation of the. The controls shall be so arranged in the cab that it will be within easy reach of the driver from all driving positions. All gauges shall be of proven and reliable design. Graduations of all gauges shall be in metric units. Following gauges shall be provided in the cab :-

- Diesel engine lube oil pressure gauge.
- Cooling water temperature gauge (Electronic).
- Fuel oil pressure gauge.
- Boost pressure gauge.
- Traction motor load Ammeter.
- Air brake gauges
- Battery charge and discharge ammeter.
- Water level indicator (Electronic)
- Speedometer

The following audio-visual signals or reference panel lights shall be provided in the cab:

- Low lubricating oil pressure.
- Radiator water temperature too high.
- Engine shut-down
- Battery discharge indication.
- Aux. Gen. failure indication.
- Low idle rpm indication.
- Power ground.
- Cranking contactor welding indication
- Traction control supply ON
- Engine trip
- Rectifier fuse failure
- Rectifier cooling fan failure
- Motor overload failure
- Motor earth fault
- Drive function released
- Common annunciation
- Train parting indication
- Multiple operation status



The following safety devices, inter alia, shall be provided :

- Water temperature too high - Transmission cut-off and engine returned to idle.
- Low water in radiator - Power to transmission cut-off and engine shut down.
- Low lube oil pressure - Power to transmission cut-off and engine shut down.
- Engine speed too high (Over speed trip) - Power to transmission cut-off and engine shut down

Adequate protection of an approved design shall be provided against electrical overloads and grounding.

The following minimum operating controls for multiple unit operation of all Power cars from any cab of Power or Driving trailing unit shall be provided :-

- Notch control
- Brakes
- Forward and reverse movement control
- Sanding

The car shall be provided with speed indicating and recording system of approved make and shall conform to RDSO Specification No. MP.0.3700-01.5.

## 12.0 CABLES & OTHER ELECTRICAL FITTINGS

Power & control cables of standard metric sizes shall be provided as per RDSO Specification No. SPEC/E-14/01(Part II)-REV-II:1993 (Table 1). Terminal ends for control cables and wire shall conform to RDSO Specification No.MP- 0.5200.04. The Power car shall be equipped at both ends with standard headlights to RDSO specification no. EL/TL/41. Aspect lights, cab lights/ conduits etc. shall be of type available indigenously. The Power car shall be provided with flasher lights to RDSO Spec. No. SPEC/E-14/6/02-A of Aug '87 with Amendment dt. 4-4-90.

## 13.0 COMPRESSOR

One belt-driven air compressor type TRC 1000 B of ELGI make or equivalent, similar to the one used on the existing 700 HP BG DEMUs, shall be provided.

## 14.0 PIPING

All pipe joints will be as per ICF standard practice. Schematic piping to suit the engine shall be to the relevant ICF drawings. Flexible pipes shall be provided at the locations prone to vibrations.

## 15.0 LUBRICATION

Grease nipples shall conform to IS specification No. 4009. All the grease nipples & adapters, where used, shall be tack welded to prevent them from unscrewing and falling off in service.

## 16.0 FIRE EXTINGUISHER

Three Halon 1211 type fire extinguishers shall be provided, one in the engine compartment and the others in the cabs.

## **PART III**

### **Crane and Jet Deflector Unit**

#### **1. General**

- 1.1 The self-propelled Jet Deflector Car shall be provided with one crane for lifting and placing the Jet Deflector at work site.
- 1.2 There will be a provision to place two nos. Jet deflector on the car.
- 1.3 Crane shall be operated by an independent diesel-hydrostatic power equipment mounted on the car
- 1.4 The location of crane and the Jet Deflector shall be as per the layout drawing No. SK.CR-0000.
- 1.5 The provision shall be made for mounting running rails of adequate length on the floor of car for keeping the jet deflector for easy movement.
- 1.6 The trolley for mounting/placing of jet deflector shall be provided.

#### **2. Crane**

- 2.1 The car shall be fitted with TIL make N205/50 model crane.
- 2.2 The crane without props will be required to lift 6.1T + rope sling weight at an outreach of 3.135 m from head stock from non-engine end for 360° slewing.
- 2.3 In train running order with jib fastened on to the car floor, the crane shall be within the dimensions shown on Drg. No. CSL 3039, when standing centrally on a level tangent track. The whole crane shall be kept within the clearances (including extras) allowed over the moving dimensions when the crane is negotiating the maximum specified curve and 1 in 8.5 turn out.
- 2.4 The crane shall be within Indian Railways schedule of dimensions – 1676mm gauge 1939 – Reprinted 1973 when mounted on the car.
- 2.5 The maximum height of crane from car floor should not be more than 2569mm in stowed condition.
- 2.6 The crane should also be capable of meeting the lifting requirement as detailed in clause 2.2 when car is standing on a super-elevated track with a maximum super-elevation of 140mm.
- 2.7 Adequate margin of stability should be provided for safe working of crane to meet the duty requirement of crane as detailed in clause 2.2 for level as well as super-elevated track.
- 2.8 Approximate weight of the crane with mounting is 5 tonnes.

#### **3. Wire rope, Wire rope sheave, Drum, Hook and Brake**

- 3.1 The wire rope fitted on the crane for hoisting shall be of standard 6x37 (18/12/6/1 F(c) construction to IS Specification No. 2266. The breaking strength of the ropes shall not be less than six times the maximum static load on the rope.

- 3.2 Sheave used will be of cast steel or rolled steel welded construction of ample diameter for the rope. The radius of the sheave groove will be just large enough to provide clearance for the rope without pinching, the pitch diameter of the sheave being more than 18 times of the nominal outside diameter of the rope. The sheave will be provided with anti friction bearing.
- 3.3 The drum will be of alloy cast iron/cast steel or rolled steel welded construction. The hoisting drum will be constructed to accommodate length of rope for the range of lift.
- 3.4 The crane shall be provided with a hook of 7 tonnes capacity supported on thrust ball bearing to allow free swivel even under loaded hook.
- 3.5 The hook shall be made of steel and shall be of forged construction to IS: 5749 and 3815 respectively. Cutting of hooks from slabs shall not be permitted.
- 3.6 Suitable brake arrangement for crane operational motion shall be provided.

#### 4 Lubrication

- 4.1 Provision shall be made for the lubrication of bearings and all wearing surfaces with either grease or oil.

#### 5. Power equipment for Crane

##### 5.1 Diesel Engine

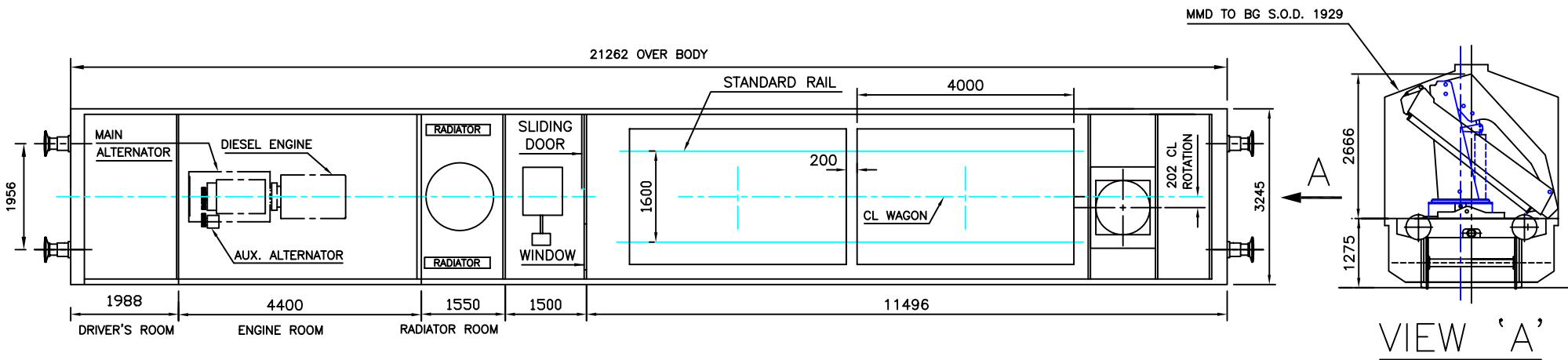
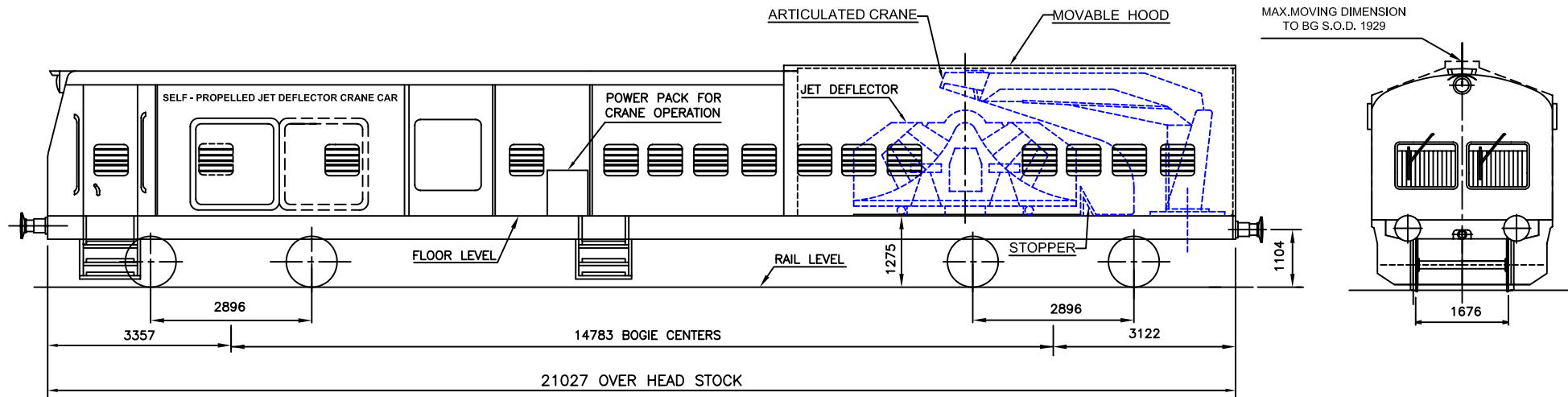
- 5.1.1 The Simpson make diesel engine model ----- developing -----hp @ ----- rpm shall be provided exclusively for crane operation.
- 5.1.2 The mounting space for engine has been shown in layout drawing No . SK.CR 0000.
- 5.1.3 The mounting of power pack shall not cause any in convenience to the persons involved in operation of crane and movement of jet deflector.
- 5.1.4 The engine driven radiator shall be so located that the heat is properly dissipated to atmosphere.
- 5.1.5 The engine exhaust layout shall be under floor/ over roof.
- 5.1.6 The engine shall work with HSD fuel to IS 1460: 1995.
- 5.1.7 The engine shall have its own independent fuel tank.

#### 6. Transmission system

- 6.1 The hydraulic transmission system shall consist of :
  - a) Hydrostatic variable displacement pump to model ----- and make ----- -- and directly driven by the diesel engine.
  - b) Hydrostatic motor to model ----- and make -----.
  - c) Pressure

### Technical Parameters of Jet Deflector car

S. No.	Parameters	Details
1.	Gauge	BG ,(1676 mm)
2.	Vehicle proposed	700 hp DEMU
3.	Maximum Self-propelled speed	80 km/h
4.	Hauling speed in train formation	80 km/h
5.	Details of power pack :	Same as 700 hp DEMU
6.	Brake system	Air Brake
7.	Pay load a) Jet deflector – 2 nos. b) Crane c) Power pack of crane d) No. of staff/crew (8) e) Miscellaneous	2x 6100 = 12200 4600 400 500 100 ----- 17800kg -----
8.	Trailing load details. a) No. of Coaches (4) b) No. of wagons. (4) c) Total trailing load.	LCC+PSC+SSC+SLR TCT+HTC+TCT+HTC (400 t ) approx.
9.	Dimension of Jet Deflector	4mx 2.5m x 1.5m
10.	Mounting of Jet Deflector	On 4-Wheels BG
11.	Type of coach coupling required	Screw coupling
12.	Crane Type	Series N 205/50 with winch crane or Equivalent
13.	Duty of Crane	To lift 6.8 T at 4m
14.	Base of Crane (L X B)	1.4m X 2.4 m
15.	Rotation of crane	390 deg. non- continuous
16.	Maximum height in stowage condition.	2591mm
17.	Auxiliary Diesel engine for Crane operation	Under scope of supply of Crane supplier
18.	Drive for different motion of Crane	Hydrostatic

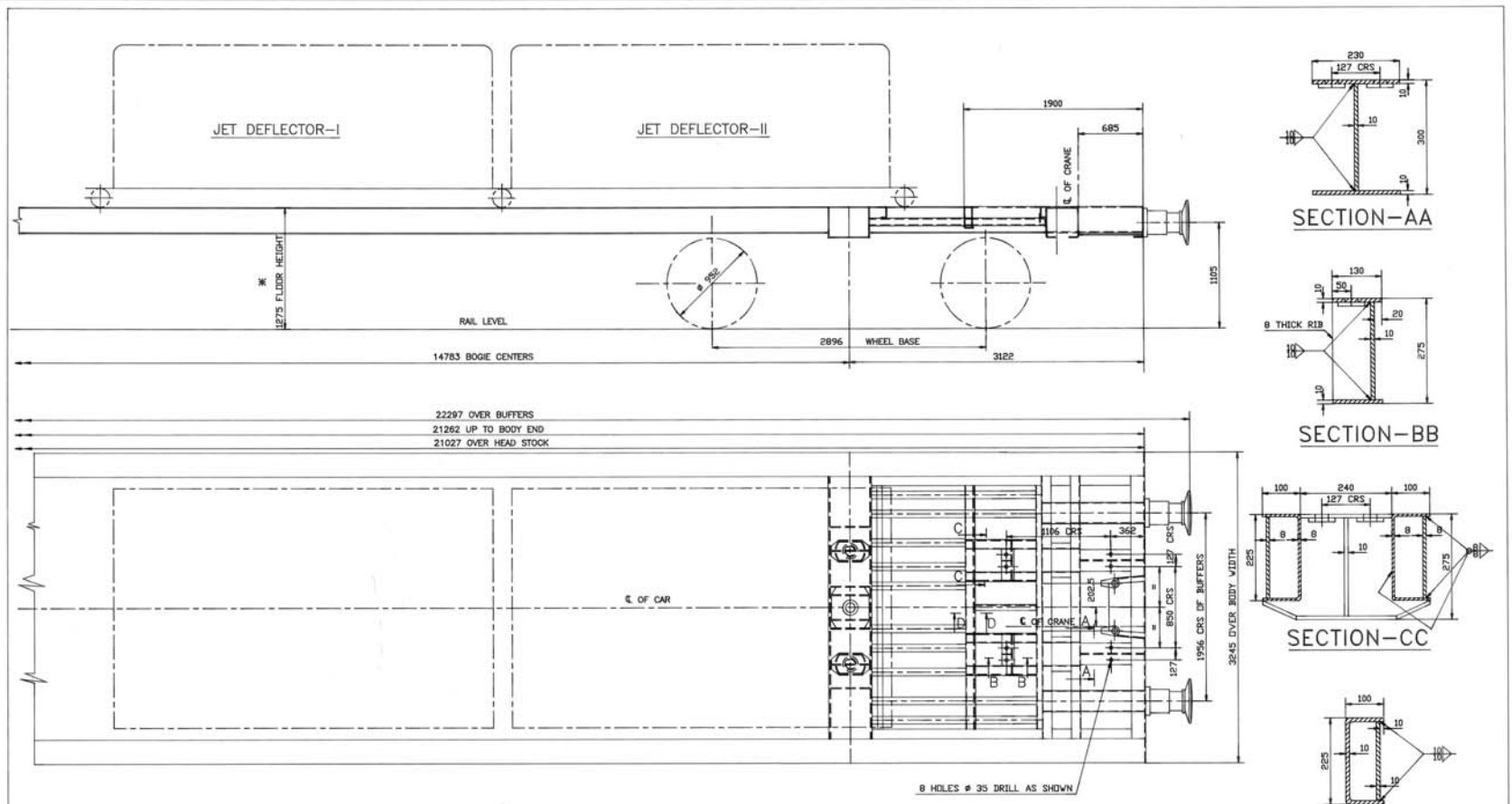


NOTE: - DRG NOT TO SCALE

REF NO	I R PART NO	DESCRIPTION	NO OFF	WT(kg) EACH	MATL	SPEC
APPLICABLE FOR		JET DEFLECTOR CRANE CAR				
SCALE		REF:				FIRST ISSUED
INDIAN RLYS RDSO (MP)		DRG. RDSO SK. NO. CR-834 NO.				SUPERSEDES SUPERSEDED BY

ALT	NO. OF PLACES	REF. NO.	DESCRIPTION	ALT. NOTE NO.	SIGN	DATE

D  
C  
APPD  
Dt 28.10.05



- NOTES :-**
1. UNDERFRAME IS SIMILAR TO ICF DRAWING NO. DMU/DPC-1-1-001.
  2. HEAD STOCK ARRANGEMENT OF NON ENGINE SIDE TO ICF DRAWING NO. DMU/DPC-1-2-001 TO BE MODIFIED AS PROPOSED FOR THE MOUNTING OF CRANE.
  3. BOGIE GENERAL ARRANGEMENT TO ICF DRAWING NO. DMU/DPC-0-0-001. SUSPENSION MAY BE MODIFIED TO SUIT THE LOADING PARTICULARS IF REQUIRED.
  4. SIDE BUFFER, DRAW GEAR AND SCREW COUPLING SHALL BE AS PER DRG. MENTIONED IN SPECIFICATION NO. MP-0.0800.46(Rev.0.00)
  5. SUITABLE RIBS AND MEMBERS SHOULD BE PROVIDED TO STRENGTHEN THE MOUNTING AND SUPPORTING MEMBERS WHERE EVER REQUIRED.
  6. SECTION OF THE MEMBERS SHOWN IN THIS KEY DRAWING ARE ONLY FOR THE GUIDENCE. MANUFACTURES CAN DESIGN ALTERNATE SECTIONS OF ADEQUATE STRENGTH TO SUIT THE MANUFACTURING FACILITIES AND LOCATION OF THE SITE.
  - \* 7. FLOOR HEIGHT AT CRANE MOUNTING AREA SHOULD BE KEPT AS LOW AS POSSIBLE TO AVOID THE INFRINGEMENT AT THE SLOPE OF THE ROOF IN M.M.D. OF S.O.D.-1929.
  8. WELDING SHOULD BE DONE IN WORKMAN LIKE MANNER AND SHOULD GIVE GOOD APPEARANCE.

FOR PROTOTYPE ONLY

ALTY		ITEM	AUTHY.	DESCRIPTION	CKD.	DATE	FLOPPY NO. MK-3	SUPERSEDED BY:-		JET DEFLECTOR CRANE CAR	
								ASSEMBLY DRAWINGS		SUPERSEDES:-	
								REFERENCE		SCALE P DATE	
								1. DMU/DPC-1-1-001		C	
								2. DMU/DPC-1-2-001		D MANOJ 10/01	
										T	
										J.S.EMU/12/01/01	
								B.G.		R.D.S.O.	
								(C)		GROUP	
										SKETCH - K1043	