



No. SV.EMU.RAS

Dated :10 .04.2008

The General Manager (Engineering),

- i. Western Railway, Churchgate, Mumbai-400020
- ii. Central Railway, CSTM, Mumbai - 400 001

Sub:- Final Speed Certificate for operation of BG ICF AC-DC EMU Motor and Trailer coaches fitted with M/s Siemens IGBT based Electrics and 150/180KN air suspension at the Secondary Stage at a speed of 100 kmph on track maintained to standards other than C&M-I Vol-I.

1. The traction power system of Mumbai suburban area is being converted from 1500 DC to 25 KV AC system for meeting the growing and urgent demands of suburban passengers. This, inter-alia, requires EMUs capable of having both AC and DC systems during the transition phase of conversion. With this objective in view, ICF has manufactured dual voltage AC/DC EMUs fitted with Siemens IGBT based 3 phase Electrics. These EMUs have been provided with air suspension in the secondary stage. Trailer and driving trailer coaches have also been provided with air springs in the secondary stage in ICF make HCC bogie. Moreover, Zonal Railways have reported the problem of non-lifting of motor coaches with the existing design of air springs at a pressure of 6 Kg/cm². In order to overcome this problem, RDSO has evolved the design of air springs of 150kN/180 KN capacity. The maximum axle load of the motor coach is 20.32 t and trailer/driving trailer coaches is 17.64t. Other features are same as in existing AC/DC EMU and also DC EMU stock.
2. Detailed oscillation trials were conducted upto a maximum speed of 110 kmph in empty and loaded condition over CST-Karjat suburban section of Central Railway. Results of these tests as contained in report no. RDSO/2008/TGMT-848/F/Rev.0/Dt.14.03.2008 for 180kN capacity and report no. RDSO/2008/TGMT-851/F Rev.0 Dt.24.03.2008 for 150kN air suspension indicate acceptable riding behaviour of test coach in empty and loaded condition upto a maximum speed of 110 kmph.
3. Based on the above, it is certified that AC-DC EMU Motor and Trailer coaches fitted with 180 kN and 150 kN air suspension are fit for operation upto maximum speed of 100 kmph over track laid to standards other than those specified in C&M-I, Vol.I, of Indian Railways subject to conditions given below.

3.1 Track

- 3.1.1 The track shall be to a minimum standard of 52 kg rails on sleepers to M+7 density and minimum depth of ballast cushion below sleepers of 250 mm which may consist of at least 100 mm clean and the rest in caked condition, on compacted and stable formation.

- 3.1.2 For track maintained to lower standard than that mentioned above, the Chief Engineer shall decide the lower maximum permissible speed on the basis of maintenance condition. In this connection, Railway Board's letter No. 65/WDO/SR/26 dated 19/20-10-1966 may be seen. When the Chief Engineer considers that the road bed is not compacted or there is improper drainage, he may suitably restrict the maximum permissible speed depending upon the local conditions.
- 3.1.3 The maximum permissible speed on curves to be decided on the basis of existing provision of the Indian Railway Permanent Way Manual, second reprint 2004 and should not be more than 90 kmph.

3.2 Bridges

- 3.2.1 The clearance refers to bridges with standard design of girders, slabs, pipe culverts, piers and abutments etc. issued by RDSO for BGML, RBG and MBG-1987 standard loadings. However, the bearings of span 78.8m (effective) designed for BGML standard loading as per RDSO's drawing no.BA-11154 should be strengthened by providing two additional anchor bolts.
- 3.2.2 Superstructures & bearings of non-standard spans including Arches and sub-structures of all bridges are to be examined under the directions of the Chief Bridge engineer concern and certified safe by him in terms of current IRS Bridge Rules, Steel Bridge Code, Concrete Bridge Code, Arch Bridge Code, Bridge Sub-Structures and Foundation Code etc. read with upto date correction slips.
- 3.2.3 Zonal Railways to certify the adequacy of existing bridges for permitting rolling stocks based on physical condition of bridges by keeping them under observations considered necessary the Chief Bridge Engineer of Railway.
- 3.2.4 Location of bridges on which speed restrictions are imposed shall be notified by the Railways and incorporated in the working time table.
- 3.2.5 The clearance is subject to the following parameters of AC-DC EMU Unit :-
- | | | |
|-------|---|-----------------------|
| (i) | Maximum permissible axle load DTC/TC/HTC | =20.32t |
| (ii) | Maximum permissible axle load MC | =20.32t |
| (iii) | Maximum tractive effort (MC) at rated voltage and train resistance with 0% gradient | =13.76t |
| (iv) | Maximum friction braking force at rail level (MC) | =5.116t |
| (v) | Maximum friction braking force at rail level (DTC/TC/HTC) | =3.82t |
| (vi) | Maximum friction+ regenerative braking force at rail level (MC) | =18.61t |
| (vii) | Maximum C.G. height from rail level | =not exceeding 1830mm |

3.3 Signaling

- 3.3.1 Provisions of GR, SR, SEM & all extant instructions issued from time to time shall be complied with.

- 3.3.2 On the sections where EBD of more than 1 km is to be catered for, second distant signal or automatic signaling should be available failing which suitable speed restriction is to be imposed.
- 3.3.3 In the event of failure, if only one motor coach remains in operation, the rake shall be put out of service not later than completing its schedule run. Thereafter, the rake shall be brought to the shed in empty condition

3.4 Traction Installation

3.4.1 For 25kV ac traction area

3.4.1.1 The OHE shall have swiveling type of cantilever having the tension in the conductors regulated automatically with a presag of 50/100 mm. The presag is on the contact wire for a span of 72m, proportionately less for smaller spans.

3.4.1.2 In case of locations where porcelain section insulators are installed on main line and lie within first 1/10th and 1/3rd of the span immediately after the OHE structure and the runners are in the trailing direction, the maximum speed shall be 120 kmph. At all other locations where porcelain section insulators are installed, the speed shall be limited to 80 kmph.

3.4.1.3 In 25 kV a.c. traction area, the CEE of Railway shall have to ensure that the minimum height of contact wire as stipulated in provision of Chapter-V and V-A, Electric Traction "Schedule of Dimension of 1676 gauge (BG) revised 2004" is not violated and strictly followed to ensure its safe running.

3.4.1.4 In addition to the above, the Chief Electrical Engineer may impose any temporary speed restrictions on the basis of his personal knowledge and experience of the OHE and the conditions prevailing on the particular section.

3.4.2 For DC traction area

3.4.2.1 For DC OHE the condition of operation shall be specified by CEE of the concerned railway

3.5 Rolling Stock

3.5.1 Before initiating the operation the above stock, CEE of the concerned Railway will certify the track worthiness and safety of the rolling stocks. He will also ensure proper maintenance of the rolling stock.

3.6 General

3.6.1 All the permanent and temporary speed restrictions in force and those that may be imposed from time to time due to track, bridges, curves, signaling and interlocking etc. shall be observed.

3.6.2 The 3660 mm (12'wide) ICF AC/DC EMU motor and trailer coaches fitted with pneumatic suspension in the secondary stage have been manufactured exactly as per the existing dimensions and profile of the DC EMU motor and trailer coaches, which have been running in the Mumbai area for the past many years. The profile infringes clauses no.5, 10, 12, 14, 24, 25, 26 & 29 of Chapter IV(A) of IR Schedule of Dimensions (BG), Revised 2004. Railway Board vide their letter No. 2006/CEDO/SR/15 dt.01.03.2007 have condoned the above infringements.

- Encl.:**
- 1.ICF drg. no. ICF/MRVC/M-9-0-001
 - 2.ICF drg. no. ICF/MRVC/M₂-9-0-201
 - 3.ICF drg. no. ICF/MRVC/C-9-0-001
 - 4.ICF drg. no. ICF/MRVC/C₂-9-0-201
 - 5.ICF drg. no. ICF/MRVC/D-9-0-001
 - 6.ICF drg. no. ICF/MRVC/D₂-9-0-201
 - 7.ICF drg. no. ICF/MRVC/D/HC-9-0-001
 - 8.ICF drg. no. ICF/MRVC/D2/HC-9-0-201



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Executive Director Standards (Motive Power)

Copy:-

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2. **The General Manager (Mech. /Optg., /S&T)**
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