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भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226011
Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226011



No. EL/3.1.35/4

Date: 20-01-2004

The General Manager (Engg.),

1. Central Railway, Chhatrapati Shivaji Terminus, Mumbai-400001.
2. Eastern Railway, Fairlie Place, Kolkata-700001.
3. Northern Railway, Baroda House, New Delhi-110001.
4. Southern Railway, Park Town, Chennai-600003.
5. South Central Railway, Rail Nilayam, Secunderabad-500071.
6. South Eastern Railway, Garden Reach, Kolkata-700043.
7. Western Railway, Churchgate, Mumbai-400020.
8. East Coast Railway, Chandrashekharpur, Bhubaneshwar-751016.
9. North Central Railway, Hasting Road, Allahabad-211001.
10. East Central Railway, Hajipur-844101.
11. South Western Railway, Hubli-580023.
12. West Central Railway, Jabalpur-482001.
13. South East Central Railway, Bilaspur-495004.

Sub: Final Speed Certificate for maximum permissible speed of WAP-7 class of electric locomotive on track maintained to other than C&M-1 vol.-I standard.

WAP-7 class of locomotives with Co-Co bogies have been manufactured by CLW adopting the basic design of WAG-9 class of locomotives imported from M/s. Bombardier Transportation, Switzerland (earlier Adtranz, Switzerland). The design of WAP-7 locomotive is exactly the same as that of WAG-9 locomotive except that the gear ratio of the latter has been changed from 5.133 to 3.6 to achieve a high speed locomotive of former type. The outline of the WAP-7 locomotive is as per drawing no. SKEL-4490. The axle load of the locomotive is $20.5 \pm 2\%$ t. This locomotive has already been cleared to haul passenger trains upto a maximum speed of 100 km/h on track maintained to main line vide RDSO's Speed Certificate No. EL/3.1.35/4 dt 18/25-06-2002.

- 1.1 Detailed oscillation trials of WAP7 locomotive have subsequently been done upto 115 km/h test speed on Maksi – Ujjain section (UP line) of Western Railway. The results as contained in Report No. MT-453 (December, 2003) indicate satisfactory riding and stability of the locomotive up to maximum test speed of 115 km/h and on curves up to the maximum test speed of 100 km/h based on considerations of maximum cant deficiency of 100 mm.
- 2.0 Based on the above, it is certified that operation of single WAP-7 class of locomotives may be permitted for hauling passenger trains up to a maximum speed of 105 km/h on track maintained to other than C&M-1 vol.-I standard, subject to the following conditions.
 - 2.1 **Track:**
 - 2.1.1 The track shall be to a minimum standard of 52 kg rails on sleepers to M+7 density and depth of ballast cushion below sleepers of 250 mm, which may consist of at least 100 mm clean and the rest in caked up condition, on compacted and stable formation.

2.1.2 For track of lower standard than that mentioned above, the Chief Engineer concerned shall decide the lower maximum permissible speed. In this connection, Railway Board's letter no. 65/WDO/SR/26 dt 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 on the local conditions.

2.1.3 The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual-1986.

2.2 **Bridges:**

2.2.1 The clearance in regard to bridges refers to standard design of girders, slabs, pipe culverts, pier and abutments etc. issued by RDSO for BGML, RBG & MBG-1987 standard loadings.

2.2.2 All other designs of superstructures and sub-structures are to be examined under the direction of the Chief Engineer concerned 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.

2.2.3 This clearance is subject to the following parameters of WAP-7 locomotive:

Maximum Axle Load	-	20.5 ± 2% t
Maximum Tractive Effort	-	32.9 t/loco
Maximum Braking Force at rail level	-	18.6 t/loco

2.3 **Signalling:**

2.3.1 Signalling shall be provided as per the standards of interlocking.

2.3.2 Provision of GR, SR, SEM & all extant instructions issued from time to time shall be complied with.

2.3.3 It is necessary to provide means/arrangements to put back the home signal and last stop signal to its "ON" position immediately after the passage of the train.

2.3.4 Where signalling system has been upgraded the catenary current shall be limited to 800/1000 Amp for single line and double/multi line sections respectively. Where the signalling system has not so far been upgraded the catenary current shall be limited to 300/600 amp for single line and double/multi line sections respectively. CSTE and CEE should ensure the above provisions in signalling and catenary current respectively.

2.3.5 For speed beyond 100 km/h and upto 105 km/h, following works may be executed on programmed basis wherever existing installations do not have the following, in view of Railway Board's letter No. 2001/SIG/M/9 dt. 27.09.2002.

(i) MACLS with Distant, Home, Starter and Advance starter signals in each direction. At stations in automatic signalling territory, a semi-automatic/manual Home signal and semi-automatic/manual starter signal in each direction. Wherever required more than one distant signal may be provided.

(ii) Electrical operation of points and means for locking both switches. Means for lock detection and independent switch detection by the respective signals.

(iii) Means for directly holding the closed switch rail to corresponding stock rail and preventing the points from being unlocked during the passage of the train (clamp lock).

- (iv) The interlocking between signals and points shall be by electrical or electronic means (PI/RR/SSI). Track circuiting of complete station yard from first stop signal to last stop signal.
- (v) Means for verifying complete arrival of trains by suitable means (axle counter / track circuit block proving).

2.4 **Traction Installation:**

- 2.4.1 The OHE shall have swiveling type of cantilever assembly having the tension in the conductors regulated automatically. The contact wire shall have a presag of 50/100 mm for a span of 72 meter and proportionately less for smaller spans.
- 2.4.2 At 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 km/h. At all other locations where porcelain section insulators are installed, the speed shall be limited to 80 km/h.
- 2.4.3 The current collection beyond 100 km/h shall be made through one number pantograph fit for high speed operation.
- 2.4.4 In addition to above, 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 any particular section.

2.5 **General:**

- 2.5.1 All the permanent and temporary speed restrictions in force and those that may be imposed from time to time due to track, bridges, curves, signalling and interlocking etc. shall be observed.
 - 2.5.2 The pantograph of WAP7 locomotives in locked down condition and the surge arrestors infringe the Maximum Moving Dimensions of 1929 over non-electrified sections. After removing pantograph pan assembly and two surge arrestors, the profile will infringe the Maximum Moving Dimensions of 1929 but will be within 'X' class loco profile. For movement of the loco in non-electrified territory, pantograph pan assembly and two surge arrestors shall be removed and the movement of the loco shall be cleared by the Railway concerned as per the extant rules applicable. In non-electrified sections where Maximum Moving Dimensions of existing 'X' class locos are not permissible, the movement shall be in accordance with the instructions issued by the Railway Board and other additional instructions issued by the Zonal Railways for the movement of ODCs. Railway Board have condoned the infringements of WAP-7 locomotive vide their letter no. 2000/CEDO/SR/2 dt 17-2-2000.
- 3.0 This speed certificate supersedes the earlier issued maximum permissible speed certificate of even number dated 18/25-06-2002.

DA: i) Rly Board's letter no. 2000/CEDO/SR/2 dt 17-2-2000.
ii) Drg No. SKEL-4490.



(S. K. Sinha)

Executive Director Standards (Motive Power)

Copy to:

- a) Secretary (Elect./Engg.(G)). Railway Board, Rail Bhawan, New Delhi-110001.
- b) The General Manager (Elect.)
 1. Central Railway, Chhatrapati Shivaji Terminus, Mumbai-400001.
 2. Eastern Railway, Fairlie Place, Kolkata-700001.
 3. Northern Railway, Baroda House, New Delhi-110001.
 4. Southern Railway, Park Town, Chennai-600003.
 5. South Central Railway, Rail Nilayam, Secunderabad-500071.
 6. South Eastern Railway, Garden Reach, Kolkata-700043.
 7. Western Railway, Churchgate, Mumbai-400020.
 8. East Coast Railway, Chandrashekharpur, Bhubaneswar-751016
 9. North Central Railway, Hasting Road, Allahabad-211001.
 10. East Central Railway, Hajipur-844101.
 11. South Western Railway, Hubli-580023.
 12. West Central Railway, Jabalpur – 482001.
 13. South East Central Railway, Bilaspur – 495004.
- c) General Manager (Elect.), Chittaranjan Locomotive Works, Chittaranjan-713331.

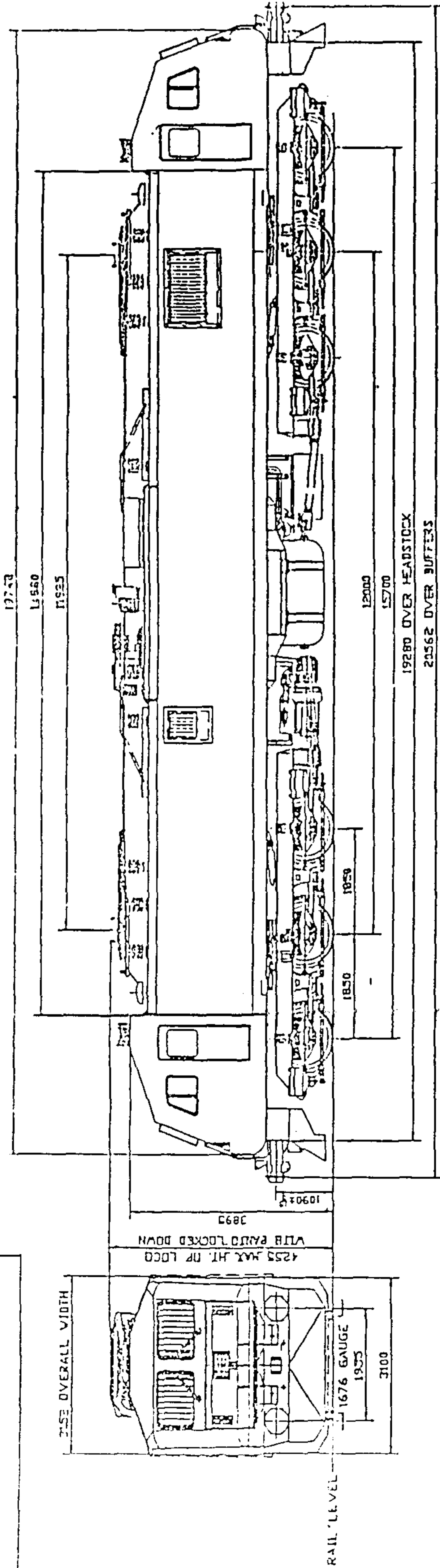
DA: i) Rly Board's letter no. 2000/CEDO/SR/2 dt 17-2-2000.
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(S. K. Sinha)

Executive Director Standards (Motive Power)

SKEL - 4490



- 1 . TYPE OF SERVICE : PASSENGER
- 2 . SUPPLY SYSTEM : 25 KV, 50Hz ac
- 3 . CLASS OF LOCO : WAP 7
- 4 . TRACK GAUGE : 1676mm BROAD GAUGE
- 5 . AXLE ARRANGEMENT : Co-Co
- 6 . BRAKE SYSTEM : Air, Regenerative & Parking brake
- 7 . TOTAL WEIGHT : 123.0±1%t
- 8 . AXLE LOAD : 20.5±2%t
- 9 . UNSPRUNG MASS PER AXLE : 3.984t
- 10 . WHEEL DIAMETER : 1092mm (new), 1016mm (full worn)
- 11 . LENGTH OF LOCO OVER BUFFERS : 20562mm
- 12 . LENGTH OF LOCO OVER HEADSTOCK: 19280mm
- 13 . BOGIE CENTER DISTANCE : 12000mm
- 14 . LOCO WHEEL BASE : 15700mm
- 15 . EDGE WHEEL BASE : 1850mm + 1850mm
- 16 . OVERALL WIDTH OF BODY : 3152mm
- 17 . LENGTH OF CAB : 2434mm
- 18 . PANTO LOCKED DOWN HEIGHT : 4255mm

- 19 . TRACTION MOTOR TYPE : 6FRA 6068
- 20 . TRACTION MOTOR MOUNTING : Axle hung nose suspended
- 21 . GEAR RATIO : 3.6 (72:20)
- 22 . CONT. RATED POWER : 4500kW (6122hp)
- 23 . STARTING TRACTIVE EFFORT : 322.6 kN (32.9t)
- 24 . CONT. RATED TRACTIVE EFFORT : 228 kN (23.2t)
- 25 . MAX. REGEN BRAKING EFFORT : 181 kN (18.6t)
- 26 . MAX. SERVICE SPEED : 110 km/h
- 27 . CONTROL CIRCUIT VOLTAGE : 110Vdc (NOMINAL)
- 28 . DRIVE SYSTEM : 3 Phase Drive With GTO Thyristors and Microprocessor Based Control System
- 29 . MULTIPLE UNIT OPERATION : Max. 2 Locos

REF : _____ SCALE - 1 : 75 APPROVED : *[Signature]*

LOCO OUTLINE DRAWING FOR
25KV ac LOCOMOTIVE CLASS WAP7

RDSO, ELECT. DTE. SKEL - 4490



Millennium Year

No. 2000/CEDD/SR/2

भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय MINISTRY OF RAILWAYS
(रेलवे बोर्ड RAILWAY BOARD)

रेल भवन, नई दिल्ली-110001, दिनांक

Rail Bhavan, New Delhi-110001, dated 17.2.2000

The Director General/Track,
RDSO,
Manak Nagar,
Lucknow-226001.

Sub: Condonation of infringement of WAP-7 Class of Electric Locomotive.

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With reference to your application No. CT/DEL/WAG-9/ dt. 16.11.99, sent through the Chief Commissioner of Railway Safety, Lucknow, the sanction of Ministry of Railways is hereby communicated for condonation of infringement to item 9(b) Chapter IV (c) and profile of maximum moving dimensions of 1929 as shown in diagram 1A and others of BG schedule of dimensions 1973 (reprint) involved in the design of WAP-7 class electric locomotive as shown in Annexure - I and drawings accompanying your application referred to above.

The sanction is subject to removal of pantograph pan assembly and two surge arresters when moving in Non-Electrified section.

(V.K. Bahmani)
Exec. Dir. Civil Engg. (GT)
Railway Board.

No. 2000/CEDD/SR/2

New Delhi,

Dated 17.2.2000

Copy forwarded for information to the Chief Commissioner of Railway Safety, 16-A, Ashok Marg, Lucknow, w.r.t. his endorsement No. Q.17011/8/99-RS dt. 2-12-1999.

(V.K. Bahmani)
for Secretary, Rly. Bd.