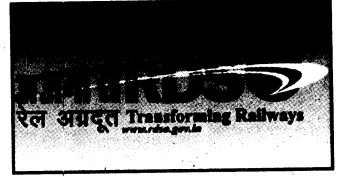




भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011
EPBX (0522) 2451200
Fax (0522) 2458500

Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
DID (0522) 2450115
DID (0522) 2465310



No.SD.WAG9.11

Dated: 03.07.2014

महाप्रबन्धक (इंजीनियरिंग)

1. मध्य रेलवे, छत्रपति शिवाजी टर्मिनस, मुम्बई- 400 001
2. पूर्व रेलवे, फेयरलीप्लेस, कोलकाता- 700 001
3. उत्तर रेलवे, बडौदा हाऊस, नईदिल्ली- 1100 01
4. पूर्वोत्तर रेलवे, गोरखपुर- 27 3001
5. पूर्वोत्तर फ्रन्टियर रेलवे, मालीगाँव गुवाहाटी- 781 011
6. दक्षिण रेलवे, एनेक्सी, पार्कटाऊन, चेन्नई- 600 003
7. दक्षिण मध्य रेलवे, रेलनिलायम, सिकन्दराबाद- 500 071
8. दक्षिण पूर्व रेलवे, गार्डनरीच, कोलकाता- 700 043
9. पश्चिम रेलवे, चर्चगेट, मुम्बई- 400020
10. उत्तर मध्य रेलवे, इलाहाबाद- 211 001
11. उत्तर पश्चिम रेलवे, जयपुर- 302 006
12. पूर्व मध्य रेलवे, हाजीपुर- 844 101
13. पूर्व कोस्ट रेलवे, रेलवे कॉम्प्लेक्स, भुवनेश्वर- 751 023
14. दक्षिण पश्चिम रेलवे, हुबली- 580 023
15. पश्चिम मध्य रेलवे, जबलपुर- 482 001
16. दक्षिण पूर्व मध्य रेलवे, बिलासपुर- 495 004
17. मैनेजिंग डायरेक्टर, कोंकण रेलवे कार्पोरेशन लिमिटेड, बेलापुर, नवी मुम्बई - 400614

Sub: Final speed certificate for operation of WAG9H class of locomotives upto a maximum speed of 100 km/h on track maintained to other than C&M-I, Vol.-I standard.

- 1.0 WAG9 class of locomotives with Co-Co bogies are imported locomotives from M/s. ABB, Switzerland. Outline of the locomotive is as per drawing No. SKEL-4357. The axle load of the locomotive is $20.5 \pm 2\%$ t. WAG9 locomotive has been permitted to run upto a maximum speed of 100 kmph vide this office speed certificate of even no. dated 25.10.2005 on the basis of satisfactory test results contained in RDSO's report no. MT-81. In order to achieve starting tractive effort of 50.97t, the axle load of this locomotive was increased to $22.0 \pm 2\%$ t and the loco had been named as WAG9H. The salient features of the WAG9H locomotive are as under:
 - 1.1 The general arrangement of WAG9H locomotive is as per RDSO Drg. No. SKEL-4547.
 - 1.2 The locomotive has Co-Co bogie arrangement as per ABB Drg. No. IB011-00065, TM suspension arrangement as per ABB Drg. No. IB011-00194 and axle box assembly ABB Drg. No. IB011-00176(with blank cover), ABB Drg. No. IB011-00178(with Hasler Transmitter), ABB Drg. No. IB011-00184(with earth contact).
 - 1.3 The wheel profile of locomotive is as per CLW Drawing No. 1209-01.111-003.

- 1.4 The loco has E-70 air brake system which consists of SAB WABCO brake system or CCB brake system of M/s Knorr as per CLW specification No. CLW/MS/3/001(Alt.11).
- 1.5 Brake gear arrangement of loco is as per CLW specification No. CLW/MS/3/007(Alt.1) and brake gear details as per ABB Drg. No.IB011-00248.
- 1.6 The axle load of locomotive is $22.0 \pm 2\%$ t.
- 1.7 Coupler and buffer assembly is as per ABB Drg. No.IB021-00464.
- 1.8 Cow catcher assembly is as per CLW specification No. CLW/MS/3/107(Alt.5).
- 1.9 Traction control circuit is as per ABB documents no. 3EHP 281148, sheet no.08, A to F.
- 1.10 Power circuit of locomotive is as per ABB documents no. 3EHP 281141, sheet no. 01Z.
- 1.11 Two crew members are required for operation of WAG9H locomotive.
- 1.12 VCD has been provided in the locomotive which is a part of brake system as per para 1.4 mentioned above.
- 1.13 Microprocessor based speedometer recorder cum indicator (Memotel) has been provided as per RDSO spec.no. ELRS/SPEC/SPM/002 (REV.2) June 2004.
- 1.14 Automatic flasher light has been provided as per RDSO Spec.no. ELRS/SPEC/LFL/0017 (Rev-1) Sept 2004.
- 1.15 The WAG9H locomotive has the provision of Tractive Effort Limiting Switch as per ABB document No. 3EHP 541681, Page 22.
- 1.16 Haulage capacity for WAG9H locomotive is as per Annexure-IV of RDSO Technical Circular no. RDSO/2013/EL/TC/0114(Rev '1') dated 10.10.2013.
- 1.17 The bogies are fitted with 6FRA6068 type Axle-hung, Nose suspended Traction motors. All the axles are power-driven.
- 2.0 In order to establish the speed potential of WAG9H locomotive on track maintained to other than C&M-1 Vol-I standard, detailed oscillation trials were conducted on WAG9H locomotive and the results contained in RDSO's Report No. RDSO/2014/TG/MT-1302/F/Rev.0 dated 16.01.2014 Amendment- Nil, indicate that the test locomotive has exhibited satisfactory riding and stability characteristics upto the maximum test speed of 110 km/h, under conditions of testing with new wheel profile and worn condition (with max. root wear of 6 mm) on the tangent track, station yard and 2.08° curved track, between Kalyan (KYN) and Karjat (KJT) section of Mumbai division in Central Railway.
- 3.0 Based on the satisfactory trial results, it is certified that single/double headed WAG9H class of locomotives may be permitted to run up to a maximum speed of 100 km/h on track maintained to other than C&M-1, Vol.-I standard, subject to the following conditions:

3.1 **Track:**

- 3.1.1 The track shall be to a minimum standard of 60kg rails on sleeper to M+7 density and depth of ballast cushion below sleepers of 300mm, which may consist of at least 150mm clean ballast and the rest in caked up condition on compacted and stable formation. However, on track to a minimum standard of 52kg rails on sleeper to M+7 density and depth of ballast cushion below sleepers of 250mm, which may consist of at least 100mm clean ballast and the rest in caked up condition on compacted and stable formation, the speed up to 75kmph can be permitted.
- 3.1.2 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 upon the local conditions.
- 3.1.3 The maximum permissible speed on curves shall be decided on the basis of the existing provisions of the Indian Railways Permanent Way Manual-Revised 2004.
- 3.1.4 The welds shall be protected by provision of Joggled fish plates as per provision of para 6.4 and para 8.14 of USFD Manual and para 6.3 of AT welding manual and policy instructions of Railway Board. Joggled fish plating of rail should also be ensured as per para 251 of IRPWM- 2004 regarding maintenance of rail joints.
- 3.1.5 Zonal Railway may ensure further detailed examination of track as deemed fit based on age cum condition basis, overdue renewal and condition of formation etc. as per provisions of Chapter-III of IRPWM- 2004 regarding permanent way renewals.

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 & MBG-1987 standard loadings. However, the bearings of span 76.2 m (clear) 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 and bearings of non-standard spans including Arches and sub-structures of all bridges are to be examined under the direction of the Chief Bridge Engineer concerned and certified safe with respect to current Indian Railway Standard Codes with up to-date correction slips.
- 3.2.3 This clearance is subjected to the following Parameters of WAG9H Locomotives:

A. For running of single WAG9H Locomotives:

- | | |
|---|----------------|
| (i) Maximum Axle load | = 22.0 t ± 2 % |
| (ii) Maximum Tractive Effort | = 50.97 t |
| (iii) Maximum Braking Force at rail level | = 26.5 t |

B. For running of coupled WAG9H Locomotives:

- | | |
|--|--------------------|
| (i) Maximum Axle load | = 22.0 t ± 2 % |
| (ii) Maximum limiting Tractive Effort on BGML spans of 13.1m, 25.6m, 31.9m, 47.3m, 63.0m, 78.8m, and RBG Span of 47.3m (effective) | = 30.0 t per loco |
| (iii) Maximum Braking Force at rail level | = 26.5 t per loco. |

- 3.2.4 With CC train load, track on bridges and approaches on BGML spans 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m, 19.4m, 25.6m, 31.9m (all effective), RBG spans of 1.0m, 1.5m, 2.0m, 2.5m, 3.0m,

3.7m, 4.3m, 5.3m, 6.9m, 19.4m (all effective), and MBG 1987 spans 1.0m, 1.5m, 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m (all effective) shall be strengthened or modified in such a way so as to allow for dispersion of longitudinal force as per clause 2.8.3.2 of IRS Bridge Rules. In case, where dispersion cannot be allowed as per clause 2.8.3.2 such as due to provision of SEJ in bridge etc., the bridge super-structure including bearings and sub-structure shall be checked for the longitudinal force without dispersion and certified safe by the Principal Chief Engineer concerned.

3.2.5 For double headed operation (with limit of TE to 30 t / loco):-

3.2.5.1 Locomotives in which tractive effort limiting device along with recording features are available, following restrictions are applicable:

3.2.5.2 Track on bridges and approaches of BGML spans 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m, 10.0m, 13.1m, 19.4m, 25.6m, 31.9m, 47.3m, 63.0m and 78.8m, RBG spans 1.0m, 1.5m, 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m, 6.9m, 10.0m, 13.1m, 19.4m, 25.6m, 31.9m and 47.3m and MBG span of 1.0m, 1.5m, 2.0m, 2.5m, 3.0m, 3.7m, 4.3m, 5.3m, 13.1m and 47.3m (all effective) shall be strengthened or modified in such a way so as to allow for dispersion of longitudinal force as per clause 2.8.3.2 of IRS Bridge Rules. In cases, where dispersion cannot be allowed as per clause 2.8.3.2 such as due to provision of SEJ in bridges etc., the bridge superstructure including bearings and sub-structure shall be checked for longitudinal force without dispersion and certified safe by the Chief Bridge Engineer concerned.

3.2.5.3 The maximum tractive effort of the double headed (WAG9H) locomotives shall be limited to 60t (i.e. by operation of switch provided on the driver's desk in WAG9H locomotives for limiting tractive effort to 30t for each locomotive) while running over the bridges of BGML span 13.1m, 25.6m, 31.9m, 47.3m, 63.0m, 78.8m and RBG span of 47.3m (effective).

3.2.5.4 Bridges with BGML loading span 13.1m, 25.6m, 31.9m, 47.3m, 63.0m, 78.8m and RBG span of 47.3m (effective) should be kept under close watch during operation of double headed WAG9H locomotives for its conditions monitoring by Zonal Railways.

3.2.5.5 In order to limit the tractive effort of multiple unit WAG9H locomotives to 30t each over bridge of BGML span 13.1m, 25.6m, 31.9m, 47.3m, 63.0m, 78.8m and RBG span of 47.3m (effective), (60t for double headed WAG9H), the driver shall operate the tractive effort limiting switch provided on the locomotives while approaching the bridges. This instruction along with detail of BGML span of 13.1m, 25.6m, 31.9m, 47.3m, 63.0m, 78.8m and RBG span of 47.3m (effective) should be indicated in the working timetable of the Zonal Railway.

3.2.5.6 For BGML 13.1m, 25.6m, 31.9m, 47.3m, 63.0m, 78.8m and RBG span of 47.3m (effective), if train gets stuck upon the bridges and requires tractive effort of more than 30t each in WAG9H locomotive (it means that the requirement of tractive effort is more than 60t in MU operation), the driver should ask for assisting engine for banking the train in rear. These instructions should be incorporated in the working timetable so that all operating staff is aware of the instructions.

3.2.5.7 Double headed operation of only those WAG9H locomotives will be permitted which are equipped with tractive effort limiting switch (ZTEL) which is provided on PANEL-A of driver's desk, tractive effort indication meter and mechanism for recording of operation of TE limiting switch and shall be in fully working order. In case any of these features is not working, the locomotive in multiple unit will not be permitted to operate over the bridge of BGML span of 13.1m, 25.6m, 31.9m, 47.3m, 63.0m, 78.8m and RBG span of 47.3m (effective).

3.2.5.8 The sub-structures of bridges shall be kept under close observation, particularly in the following cases:-

- (i) Bridges located in such section where the train may be applying brakes or may be starting such as approaches to stations, heavily graded sections etc.
- (ii) Bridges with signs of distress.

(iii) Bridges with piers and abutments of strength lower than BGML/RBG. In general such bridges may be the bridges constructed prior to 1926.

3.2.6 Zonal Railways to certify adequacy of existing bridges for permitting rolling stock based on physical condition of bridges. Bridges shall be kept under observation as considered necessary by the Chief Bridge Engineer of the Railway.

3.2.7 Location of bridges on which speed restrictions are imposed shall be notified by the Railways and incorporated in the working time-table.

3.3 Signalling:

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

3.3.2 While running through a station, speed of train shall be restricted to the maximum permissible speed as per standard of interlocking provided at the station.

3.3.3 In the normal single phase 25 kV AC electrified section where electric locomotive is used, provisions given in para 22.6, 22.7, 22.8, 22.9 & 22.10 of SEM Pt. II regarding maximum permissible length of track circuits, signal feeding, maximum permissible length for operation of Point motor, use of block instruments and use of AFTC/axle counters for higher catenary currents limited to 800A on single track section and 1000A on double track section shall be ensured by the Railway.

3.3.4 The condonation regarding infringements in Schedule of dimensions shall be obtained in accordance with local conditions, before movement.

3.4 Traction Installation:

3.4.1 The 25 kV AC OHE shall have swiveling type Cantilever Assembly having tension in the conductors, regulated automatically with a presag. The presage of 50/100mm is on the Contact Wire for a maximum span of 72m, proportionately less for smaller spans.

3.4.2 In case of locations where 25 kV AC porcelain Section Insulators are installed on main line and lies within first 1/10th and 1/3rd of the span, immediately after the OHE Structure and the runners are in trailing direction, the maximum speed shall be 120kmph. At all other locations where 25 kV AC Porcelain Section Insulators are installed, the speed shall be limited to 80kmph.

3.4.3 In 25kV AC traction area, the CEE of the Railway shall have to ensure that the minimum height of contact wire and electrical clearances as stipulated in provisions of chapter-V and V-A, Electric Traction "Schedule of Dimension of 1676 mm gauge (BG) revised 2004" with latest Addendum & Corrigendum Slips are not violated and strictly followed to ensure its safe running.

3.4.4 In addition to above, the Chief Electrical Engineer of Concerned Railway may be imposed any temporary speed restriction on the basis of personal knowledge, experience of the Sectional OHE and the field conditions prevailing on the particular section.

3.5 Rolling Stock:

3.5.1 Periodic maintenance shall be done as per Maintenance and Repair Manual provided by ABB for WAG9 locomotive.

- 3.5.2 Brakes of locomotive shall be in proper order during operation.
- 3.5.3 Before initiating the operation, Electrical department of the Railway shall arrange to certify the track worthiness and safety of the rolling stocks based on the maintenance standards cited above.
- 3.5.4 The operation of Tractive Effort Limiting Switch shall be covered during route learning of the Loco Pilots/ Assistant Pilots/Loco Inspectors. Zonal Railway shall ensure route learning of the Loco Pilots/ Assistant Pilots/Loco Inspectors in reference to tractive effort limiting switch before the operation.
- 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 Manned level crossing gates shall be provided with telephonic communication with the nearest station as per extant instructions.
- 3.6.3 Concerned Railway shall arrange for providing fencing as per their requirement to prevent unauthorized pedestrian/cattle crossings.
- 3.6.4 The profile of WAG9H class of locomotive is same as that of WAG9 locomotives. The pantograph of WAG9H 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 moving of the loco in non-electrified territory, pantograph pan assembly and two surge arrestors 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 WAG9 locomotive vide their letter no. 95/CEDO/SR/37 dt 13-01-1996.
- 3.6.5 This speed certificate supersedes the earlier speed certificate no. EL/3.1.35/4 dated 08.09.2005 and amendment No. 1 dated 12.01.12 & amendment No. 2 dated 20.01.12.

- Encl: (i) RDSO Drg. No. SKEL-4547
(ii) ABB Drg. No. IB011-00065
(iii) ABB Drg. No. IB011-00194
(iv) ABB Drg. No. IB011-00176
(v) ABB Drg. No. IB011-00178
(vi) ABB Drg. No. IB011-00184
(vii) CLW Drawing No. 1209-01.111-003
(viii) CLW specification No. CLW/MS/3/001(Alt.11)
(ix) CLW specification No. CLW/MS/3/007(Alt.1)
(x) ABB Drg. No. IB011-00248
(xi) ABB Drg. No. IB021-00464
(xii) CLW specification No. CLW/MS/3/107(Alt.5)
(xiii) ABB documents no. 3EHP 281148, sheet no.08, A to F
(xiv) ABB documents no. 3EHP 281141, sheet no. 01Z
(xv) RDSO spec.no. ELRS/SPEC/SPM/002 (REV.2) June 2004
(xvi) RDSO Spec.no. ELRS/SPEC/LFL/0017 (Rev-1) Sept 2004

(xvii) ABB document No. 3EHP 541681, Page 22

(xviii) Annexure-IV of RDSO Technical Circular no. RDSO/2013/EL/TC/0114(Rev.1) dated 10.10.2013

03/07/14
(संजय कुमार)

कार्यकारी निदेशक मानक/चालन शक्ति

प्रतिलिपि:

1. सचिव (यांत्रिक/इंजीनियरिंग(जी.)/विद्युत), रेलवेबोर्ड, रेलभवन, नईदिल्ली- 110001
2. मुख्य रेल संरक्षा आयुक्त, अशोकमार्ग, लखनऊ-226001
3. महाप्रबन्धक (विद्युत/यांत्रिक/संचालन/संकेत एवं दूरसंचार)
 - i) मध्य रेलवे, छत्रपति शिवाजी टर्मिनस मुम्बई - 400 001
 - ii) पूर्व रेलवे, फेयरली प्लेस, कोलकाता - 700 001
 - iii) उत्तर रेलवे, बडौदा हाऊस, नई दिल्ली - 1100 01
 - iv) पूर्वोत्तर रेलवे, गोरखपुर - 27 3001
 - v) पूर्वोत्तर फ्रन्टियर रेलवे, मालीगॉव गुवाहाटी- 781 011
 - vi) दक्षिण रेलवे, एनेक्सी, पार्क टाऊन, चेन्नई - 600 003
 - vii) दक्षिण मध्य रेलवे, रेल निलायम, सिकन्दराबाद - 500 071
 - viii) दक्षिण पूर्व रेलवे, गार्डन रीच, कोलकाता - 700 043
 - ix) पश्चिम रेलवे, चर्च गेट, मुम्बई - 400020
 - x) उत्तर मध्य रेलवे, इलाहाबाद - 211 001
 - xi) उत्तर पश्चिम रेलवे, जयपुर - 302 006
 - xii) पूर्व मध्य रेलवे, हाजीपुर - 844 101
 - xiii) पूर्व कोस्ट रेलवे, रेलवे कॉम्प्लेक्स, भुवनेश्वर - 751 023
 - xiv) दक्षिण पश्चिम रेलवे, हुबली - 580 023
 - xv) पश्चिम मध्य रेलवे, जबलपुर - 482 001
 - xvi) दक्षिण पूर्व मध्य रेलवे, बिलासपुर - 495 004
4. महाप्रबन्धक/चितरंजन रेल इंजन कारखाना, चितरंजन-713 331

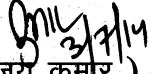
- Encl: (i) RDSO Drg. No. SKEL-4547
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(iv) ABB Drg. No. IB011-00176
(v) ABB Drg. No. IB011-00178
(vi) ABB Drg. No. IB011-00184
(vii) CLW Drawing No. 1209-01.111-003
(viii) CLW specification No. CLW/MS/3/001(Alt.11)
(ix) CLW specification No. CLW/MS/3/007(Alt.1)
(x) ABB Drg. No. IB011-00248
(xi) ABB Drg. No. IB021-00464
(xii) CLW specification No. CLW/MS/3/107(Alt.5)
(xiii) ABB documents no. 3EHP 281148, sheet no. 08, A to F
(xiv) ABB documents no. 3EHP 281141, sheet no. 01Z

(xv) RDSO spec.no. ELRS/SPEC/SPM/002 (REV.2) June 2004

(xvi) RDSO Spec.no. ELRS/SPEC/LFL/0017 (Rev-1) Sept 2004.

(xvii) ABB document No. 3EHP 541681, Page 22

(xviii) Annexure-IV of RDSO Technical Circular no. RDSO/2013/EL/TC/0114(Rev '1') dated 10.10.2013


(संजय कुमार)

कार्यकारी निदेशक मानक/चालन शक्ति