



सत्यमेव जयते

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No.EL/3.1.39/1

Date: 02.09.2014

Chief Electrical Engineer

- 1- Central Railway, Mumbai CST - 400001
- 2- Northern Railway, Baroda House, New Delhi - 110001
- 3- Eastern Railway, Fairlie Palace, Kolkata- 700001
- 4- Southern Railway, Park , Chennai -600003
- 5- South Central Railway, Rail Nilayam, Secunderabad -500071
- 6- Western Railway, Church Gate, Mumbai - 400020
- 7- South Eastern Railway, Garden Reach, Kolkata - 700043
- 8- East Central Railway, Hazipur, Bihar - 844101
- 9- West Central Railway, Jabalpur - 482001
- 10- South East Central Railway, Bilaspur- 495004
- 11- East Coast Railway, Bhubneshwar- 751016
- 12- North Central Railway, Subedarganj, Allahabad- 211033

Technical Circular No: RDSO/2014/EL/TC/0128 (Rev '0') -2014

Sub: Haulage capacity of Conventional Electric locomotives under dry/wet weather condition on different gradients & speed.

The haulage capacity detail of three phase electric locomotives is available in respective Technical Circular No: RDSO/2013/EL/TC/0114 (Rev '1') -2013 issued by RDSO.

Railways are regularly raising queries for the haulage capacity of Conventional Electric locomotives under dry/wet weather condition on different gradients & speed. Accordingly, haulage capacity detail of conventional electric locomotives have been calculated & is sent herewith vide Technical Circular No: RDSO/2014/EL/TC/0128 (Rev '0') -2014 for reference & record. The haulage capacity has been determined with 20% reduced adhesion of dry condition & 2.5⁰ curve.

Railways may encounter even lesser adhesion than 20% which will lead to reduced haulage capacity & Railways shall haul the locomotive accordingly to avoid wheel slip/stalling.

Railways are requested to conduct field trials to verify the simulated haulage capacity of locomotives at various speed/gradients and RDSO shall be apprised of the outcome of the trials.

(A.K.Rastogi)

for Director General/Elec.

Encl: Annexure - I to X

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Encl: Annexure - I to X

(A.K.Rastogi)

for Director General/Elec.

ANNEXURE-I

SPEED (kmph)	Haulage capacity (in tonnes) for WAG7 Locomotive (3 step weak field) with dry condition & tangent track GR : 1 / 4.06 (16 : 65) TM : HS15250A Loco Wt. : 123 T						
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50	
Start	Up to 5400	Up to 5400	Up to 4739	Up to 3978	3002	1700	
10					2733	1357	
20				3942	2698	1347	
30			3865	2660	1336		
40			3781	2618	1324		
50			4098	3219	2239	1133	
60			3298	2601	1815	915	
70			4025	2177	1720	1197	590
80			2706	1485	1173	812	386
90			3614	1826	1011	797	546
100	2293	1201	666	521	348	138	

ANNEXURE-II

SPEED (kmph)	Haulage capacity (in tonnes) for WAG7 Locomotive (3 step weak field) with 20% reduced adhesion & 2.5 degree curve GR : 1 / 4.06 (16 : 65) TM : HS15250A Loco Wt. : 123 T								
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50			
Start	Up to 5400	Up to 4870	Up to 3372	Up to 2872	Up to 2207	Up to 1275			
10									
20									
30									
40								1270	
50						2849	2048	1076	
60				4806	2844	2305	1660	869	
70				3149	1880	1524	1094	559	
80				3665	2134	1283	1039	740	364
90				2439	1449	873	704	495	228
100	1587	957	572	457	313	127			

ANNEXURE-III

SPEED (kmph)	Haulage capacity (in tonnes) for WAP4 Locomotive (4 step weak field) with dry condition & tangent track GR : 1 / 2.52 (23 : 58) TM : HS15250A Loco Wt. : 114 T						
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50	
Start	Up to 1650	Up to 1650	Up to 1650	Up to 1650	1650	1160	
10					1604	782	
20					1567	772	
30					1529	761	
40					1490	750	
50					1449	737	
60					1403	721	
70					1365	709	
80					1198	625	
90					1404	1023	534
100			1439	1187	869	453	
110			1230	1020	750	390	
120			1573	1035	862	636	329
130			1609	1103	731	608	446
140	1158	807	538	446	324	150	

ANNEXURE-IV

SPEED (kmph)	Haulage capacity (in tonnes) for WAP4 Locomotive (4 step weak field) with 20% reduced adhesion & 2.5 degree curve GR : 1 / 2.52 (23 : 58) TM : HS15250A Loco Wt. : 114 T							
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50		
Start	Up to 1650	Up to 1650	Up to 1650	Up to 1650	1514	863		
10					1460	741		
20					1429	732		
30					1396	722		
40					1364	712		
50					1328	700		
60					1288	685		
70					1256	675		
80				1488	1104	594		
90				1514	1265	943	507	
100				1277	1072	801	430	
110				1614	1095	922	692	370
120				1345	925	781	587	311
130				1313	948	653	551	411
140	955	696	480	403	297	140		

ANNEXURE-V

SPEED (kmph)	Haulage capacity (in tonnes) for WAG5(TAO) Locomotive (3 step weak field) with dry condition & tangent track						
	GR : 1 / 4.13 (15 : 62)		TM : TAO-659		Loco Wt. : 118.8 T		
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50	
Start	Up to 5400	Up to 5400	3588	3008	2264	1271	
10			3446	2644	1789	870	
20			3367	2596	1765	863	
30			3281	2543	1739	855	
40			3190	2486	1710	847	
50			3063	2401	1661	828	
60		4620	2445	1923	1334	659	
70		3493	1884	1486	1031	502	
80		5123	2469	1352	1067	737	347
90		3479	1757	973	767	525	235
100	2337	1227	683	536	360	147	
105	633	473	330	277	202	85	

ANNEXURE-VI

SPEED (kmph)	Haulage capacity (in tonnes) for WAG5(TAO) Locomotive (3 step weak field) with 20% reduced adhesion & 2.5 degree curve GR : 1 / 4.13 (15 : 62) TM : TAO-659 Loco Wt. : 118.8 T					
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50
Start	Up to 5210	Up to 3687	Up to 2545	Up to 2164	1657	947
10					1626	824
20					1607	818
30					1585	811
40					1560	803
50				2121	1517	785
60				3575	2105	1701
70	4813	2730	1625	1316	941	475
80	3346	1946	1167	944	671	327
90	2347	1395	840	677	476	219
100	1620	979	588	471	325	135
105	544	417	297	251	184	78

ANNEXURE-VII

SPEED (kmph)	Haulage capacity (in tonnes) for WAG5(H) Locomotive (3 step weak field) with dry condition & tangent track GR : 1 / 3.55 (18 : 64) TM : HS15250A Loco Wt. : 126 T					
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50
Start	Up to 5400	Up to 5400	4046	3393	2556	1439
10			3508	2691	1819	882
20			3428	2642	1795	875
30			3340	2588	1768	867
40			3248	2530	1739	858
50			2946	2306	1593	788
60		4472	2361	1855	1283	629
70		3567	1922	1515	1050	509
80	5169	2488	1360	1072	738	344

ANNEXURE-VIII

SPEED (kmph)	Haulage capacity (in tonnes) for WAG5(H) Locomotive (3 step weak field) with 20% reduced adhesion & 2.5 degree curve GR : 1 / 3.55 (18 : 64) TM : HS15250A Loco Wt. : 126 T						
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50	
Start	Up to 5400	Up to 4158	Up to 2873	2444	1873	1074	
10				2356	1653	835	
20				2318	1633	829	
30			2847	2276	1611	822	
40			2778	2230	1586	814	
50			2528	2037	1454	747	
60			3458	2031	1640	1171	595
70			4917	2787	1657	1341	957
80	3374	1960	1173	947	671	324	

ANNEXURE-IX

SPEED (kmph)	Haulage capacity (in tonnes) for WAG5(TAO) Locomotive (3 step weak field) with dry condition & tangent track					
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50
Start	Up to 5400	Up to 5400	3799	3186	2400	1350
10			3793	2913	1975	966
20			3707	2861	1949	959
30			3613	2803	1921	951
40			3514	2741	1889	941
50		5285	2732	2139	1476	729
60		3149	1649	1289	883	418
70		4602	2074	1098	856	579
80	2815	1330	705	545	360	142
90	1873	920	486	372	238	77
100	1305	661	346	261	159	35

ANNEXURE-X

SPEED (kmph)	Haulage capacity (in tonnes) for WAG5(TAO) Locomotive (3 step weak field) with 20% reduced adhesion & 2.5 degree curve GR : 1 / 4.53 (17 : 77) TM : TAO-659 Loco Wt. : 118.8 T					
	Grade LEVEL	Grade 1/500	Grade 1/200	Grade 1/150	Grade 1/100	Grade 1/50
Start	Up to 5400	Up to 3904	Up to 2697	Up to 2294	Up to 1759	1008
10						916
20						910
30					1751	902
40			1724	893		
50			2344	1888	1347	691
60	4438	2429	1415	1136	803	394
70	2876	1611	940	752	525	242
80	1821	1037	601	476	323	131
90	1247	719	412	322	211	69
100	889	518	291	223	138	29