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SPECIFICATION FOR
COMPLETE PIPE LAYOUT OF UNDER FRAME, MACHINE ROOM
3-PHASE ELECTRIC LOCOMOTIVE VIZ WAG-9/WAG-9H, WAP-7 AND WAG-9HC,
WAG-9 TWIN

SPECIFICATION NO. :- CLW/MS/3/153 Alt.5

ISSUE DATE :-22.07.2007

ISSUED BY:-

Dy. Chief Electrical Engineer/D/Conv.
Chittaranjan Locomotive Works,
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1. SCOPE :-

- a) The work includes the work of pipe layout of 3-phase locos. This work includes the piping work of under frame, machine room and cab floor pipe lay out for pneumatic brake system in WAG-9/WAG-9H, WAP-7 and WAG-9HC₄ class of locomotive. Normal working pressure 10kg/cm², operating air pressure may be as high as 11.5 kg/cm². *WAG-9 Twin*
- b) Loco Brake Equipment Frame Interface (Header bar), for Shell piping (i) SS pipe fittings (ii) Brass pipe fittings (iii) Steel pipe fittings (iv) Copper pipe fittings, All line valves, Filters and cocks will be supplied to the contractor from CLW. The fitment of these equipments and pneumatic connection is in the scope of the contract.
- c) Pipe, Reservoir and Tank Bracket assembly, clips and clamps and polypropylene components shall be procured by the contractor from approved suppliers of CLW and the same shall be fitted on the locomotive.

2. CLIMATIC & ENVIRONMENTAL CONDITIONS OF LOCOMOTIVES:-

a) Max atmosphere temperature	Under sun 70 deg. C In shade 50 deg. C.
b) Humidity	100% saturation during rainy season.
c) Rain fall	Very heavy in certain areas.
d) Atmosphere during hot weather	Extremely dusty.
e) Coastal area	Locomotive & equipment is designed to work in coastal areas in humid and salt laden atmosphere.
f) Vibration	Vibration as specified in the corresponding IEC publication unless otherwise prescribed.

3. STANDARDS:-

- 1) ASTM A269, SS Gr 304 Stainless Steel tubes
- 2) GR. 316 TO ASTM A276, for Ferrule
- 3) ASTM A108 Gr II for steel pipe fittings
- 4) ASTM A105 Gr I for steel pipe fittings
- 5) IS: 191 (DPA/DHP Grade) for Cu tubes material
- 6) IS: 2501-1995, Cu tube manufacturing process
- 7) IS: 5493, Cu tube manufacturing process
- 8) ISO: 7/1, Tapered Thread for pipe and fittings
- 9) ISO: 228/1, Parallel Thread for pipe and fittings
- 10) IS: 5986 Fe 410, for Clamps
- 11) IS:2062 Gr C, Steel fittings material
- 12) IS: 1364 P8.8 Hardware
- 13) IS: 320 Gr II Brass pipe fittings

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4. **GENERAL AND TECHNICAL DATA:-**

- i) The details of circuits/Loops as per various pipe sizes shall be done as per schematic drg. no. SCHB 1684.
- ii) For the latest applicable drawing the contractor will be required to refer to C&D book for Pneumatic items (Doc. No. ELDD/3634), which has comprehensive listing of all the components required for manufacturing with the applicable drawing/spec. In this book whenever CLW drg. is available the same to be followed and ABB drg. no. to be ignored in such cases.

5. **LIST OF MATERIAL TO BE PROCURED FROM CLW'S APPROVED SOURCES FOR THE PURPOSE OF THIS WORK SHALL CONFORM TO THE FOLLOWING:-**

Sl. No.	Description
1	Stainless steel pipe (seamless, annealed) for Pneumatic Brake system as per annexure 1 of CLW's specn. no. CLW/MS/3/029
2	Copper tube for Pn. Brake system as per annexure-1 of CLW's specn. no. CLW/MS/3/030
3	Copper pipe fittings for Pn. Brake system as per scope of supply of CLW's specn. no. CLW/MS/3/067
4	Clamps as per latest version of CLW's specn. no. CLW/MS/3/059
5	Plug as per latest version of CLW's specn. no. CLW/MS/3/064
6	Polypropelene components as per latest version of CLW's specn. no. CLW/MS/3/065
7	Saddle light stauff as per latest version of CLW's drg. no. 1209-18.406-053
8	U- Bolt as per latest version of CLW's drg. no. 1209-02.429-055,056, 017
9	Sockets as per latest version of CLW's drg. no. 1209-18.406-075, 215

Some additional petty item may be required for completion of the job, the same to be arranged by the firm on their own.

6. **INSPECTIONS AND ACCEPTANCE:-**

The entire pipe layout/equipment/materials mentioned must be tested individually as per Annexure B by the manufacturer. However, U/F pipe layout is to be treated as single unit and machine room and cab pipeline should be treated as another unit. Testing of the units should be done in assembled condition. All the pipes and pipe joints should be leak proof.

7. **TESTING:-**

Each unit should be offered for inspection at the work premises after completing the U/F pipe layout/MR pipe layout and cab pipe layout. These are to be witnessed by the authorized representative of the purchaser and cost of the same will be borne by the manufacturers/bidder. The pipe layout offered for inspection shall have the capability to withstand the following test.

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(i) **Visual/Dimensional checking:-**

Pipe layout shall be as per Schematic pipe layout and drgs indicated in Annexure A&B. Overall finish, workmanship shall be of the highest quality. Dimensional checking will be carried out by properly calibrated measuring/checking instruments.

(ii) **Pneumatic pressure test:-**

The assembly consisting U/F pipe layout, M/R pipe layout and cab floor pipe layout including pipe and joints are to be tested at a pressure of 11.5 kg./cm² (pneumatic pressure) and to be held at that pressure for 15 minutes. No leakage is permitted.

(iii) Material procured from CLW's approved sources shall be pre-inspected by CLW's inspection wing. The cost of inspection shall be borne by CLW.

(iv) The stage inspection will be generally as per annexure-B. From CLW, representative of Dy.CEE/D & Dy.CME/ELA will carry out joint inspection for prototype unit. For other units the same shall be routine inspected as per PO conditions. The work shall be strictly as per CLW spec./drg. However, in case clarification or deviation is required, the same shall be got approved by CLW prior to fitment.

8. PRECAUTIONS FOR THE STORAGE OF PIPES AND FITTINGS:-

- i) All the pipe/equipment/assemblies shall be stored in a covered area and will have proper anticorrosive treatment wherever required.
- ii) The mouth of pipe layout open to air shall be properly plugged/capped and ensure prevention from dust particle /ingredient /moist particle to enter into.

9. MARKING & PAINTING OF FINISHED PIPING WORK:-

For complete piping work, the name of the contractor and month/year of manufacture shall be marked in the manner jointly decided between CLW and the firm.

10. GUARANTEE/DEFECT LIABILITY:-

The supplier is required to guarantee that the pipe layout/equipment work satisfactory for a period of two (2) years after commissioning of loco. Any equipment/part which fails during the guarantee period shall be replaced free of cost by the manufacturers.

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ANNEXURE-'A'

(List of relevant specification and drawings)

SL. NO.	DESCRIPTION	SPECIFICATION/ DRG. NO.
1	Stainless steel pipe fittings	CLW/MS/3/053
2	Stainless steel tube	CLW/MS/3/029
3	Copper tube	CLW/MS/3/030
4	Clamps	CLW/MS/3/059
5	Plug	CLW/MS/3/064
6	P.P. Components	CLW/MS/3/065
7	Brass pipe fitting	CLW/TS/99/CF/5
8	Copper pipe fitting	CLW/MS/3/067
9	Steel pipe fittings	CLW/MS/3/068
10	Schematic diagram of Metcafe Air brake system E-70	SCHB1684
11	Pneumatic equipment layout Under frame	1B071-00058
12	Pn. Equipment layout section	1B071-00059
13	Pn. Equipment BOM	1B071-00060
14	Location of drill holes on U/F for pipe layout Cab-1 end	1209-02.129-021
15	Location of drilled holes on U/F for pipe layout central	1209-02.129-022
16	Location of drilled holes on U/F for pipe layout Cab-2 end	1209-02.129-023
17	Piping arrangement U/F for exhaust pipe from emergency exhaust valve	1209-07.329-035
18	Modified pipe layout valve	1209-07.229-024
19	Piping arrangement M/c room	1B071-00054
20	Piping arrangement view B M/c room	1B071-00061
21	Piping arrangement view C&D M/c room	1B071-00062
22	M/c room BOM	1B071-00064
23	Manifold piping arrangement M/c room	1B071-00063
24	Header bar	AB759-OV93
25	Pn. Piping converters & filter cubicles	1B071- 00066
26	Piping arrangement Cab	1B081-00414
27	Pneumatic line for drainage of 450 ltr. Air Reservoir.	1209-07.332-035
28	Pneumatic line for horn and park brake gauge	1209-08.032-030
29	C&D book (Pneumatic Items)	ELDD/3634
30	Piping arrangement Servomotor and DJ Line with flexible hose (HRPT Control Unit) & Quick coupler pipe line	1B071-00054, 1B071-00023, 3EHP-130203, 1209-07.250-002 Alt. 6
31	Angle cock assly. & Hose fitment with Elephant bracket (Dummy Coupling)	1B061-00160 Rev. 10
32	Pneumatic Panel & Aux. Compressor mounting and pneumatic pipe connection	1A071-00018
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ANNEXURE-B

Testing Scheme of Component Pipe Lines of WAG-9/WAG-9H/WAP-7/WAG-9HC Loco

WAG-9 TWIN

- 1) Line BC-1 to both cab.
- 2) Line BC-2 to both cab.
- 3) Line W to both cab.
- 4) Line O to direct brake controller of cab-1.
- 5) Line Y to direct brake controller cab-2.
- 6) Line FP to gauge both cab.
- 7) Line C from Header Bar to back of cab-1 upto U/F.
- 8) Line D from Header Bar to back of cab-2 upto U/F.
- 9) Line E from Header Bar to back of cab-1 upto U/F.
- 10) Line F from manifold to back of cab-2 upto U/F.
- 11) Line T from Header Bar to cab-1 up to un-loader + Auto D/V.
- 12) Line X from Header Bar to U/F both end cock 1 inch MR Equaliser pipe.
- 13) Line V from Header Bar to D/CH Valve both bogie.
- 14) Line L from Header Bar to U/F D.B. pipe in both cabs.
- 15) Line B from Header bar to U/F both cab end angle cock.
- 16) Line W from Header bar to U/F connecting M/R.
- 17) Line W from 1½" T x ½" T to both cab & Pr. Switch 35,36,37.
- 18) Line BC-1 M/C room to U/F cab-1&2 + P/S.
- 19) Line BC-2 M/C room to U/F cab-1&2 + P/S.
- 20) Line M from Header Bar to Flow meter Gauge in Both Cab.
- 21) Line U from Header Bar to Reservoir 1 Isolating Cock 94.
- 22) Line J from Header Bar to Aux. Reservoir 51.
- 23) Line K from Header Bar to BP Line.
- 24) Line H from Header Bar to Direct Brake Controller in both Cabs.
- 25) Line A from Header Bar to Auto Brake Line Double Check Valve.
- 26) Line N from Header Bar to Park Brake Line.
- 27) Line AA from Header Bar to under frame both end 1.25" Angle Cock.
- 28) Assistant Driver Emergency Line BP in Both Cabs.
- 29) 3/8" BP Gauge Line in Both Cab.
- 30) Line S from Header Bar to Panto-1.
- 31) Line R from Header Bar to Panto-2.
- 32) Line Q up to VCB.
- 33) Line CC from Header Bar to Filter Cubical.
- 34) Pneumatic testing of Panel Base and connected pneumatic pipes.
- 35) Leakage test of both end connected angle cock and hose.

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Details of Alterations

Alt. No.	Date	Description	Signature	Remarks
3	06.04.17	In sheet no. F/33/2 clause 1b & 1c modified. In sheet no. F/33/3 clause 5 modified. Sheet no. F/33/7 to F/33/8 for annexure- B revised and Sheet no. F/33/9 to F/33/10 deleted. Sheet no. F/33/11 for Alt. added.	Sd./- 06.04.17	As per approval of CEE/CLW on this office note no. ELDD dated: 01.04.17
4	08.08.17	WAG-9HC loco added in Sheet no. F/33/1 to F/33/11.	Sd./- 08.08.17	As per approval of CEE/D&D/CLW on this office note no. ELDD/3610 dated:05.08.17
5	31.08.18	In Sheet F/33/2 in Clause 1b copper pipe fittings included and in Clause 1c copper pipe fittings deleted.	Sd./- 31.08.18	As per approval of PCEE/CLW on this office note no. ELDD/3610 dated 31.08.18

Specification have been digitized and all alterations have been incorporated.

6		WAG-9 TWIN LOCO ADDED. IN ANNEXURE-A, SL. NO. 30, 31, 32 ADDED & IN ANNEXURE-B, SL. NO. 34, 35 ADDED.		
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