SPECIFICATION FOR FIRE EXTINGUISHING SYSTEM TO BE USED ON WAG-9 (Co-Co)/ WAP-5(Bo-Bo) 3-PHASE A.C. ELECTRIC LOCOMOTIVE FOR INDIAN RAILWAYS.

SPECIFICATION No. CLW/MS/3/108 ALT.9
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ISSUED BY:
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ALTERATION RECORD SHEET

ALT. No.	DATE	DESCRIPTION	REASON	SIGNATURE
1	19.03.2002	PARA 7.7 ADDED	AS DECIDED BY COMPETENT AUTHORITY VIDE LETT. NO.C – D&D/ TOT/111 DT. 18.02.2002	S/d- 19.03.2002
2	30.05.2002	CLAUSE 10 ADDED	TO EASE ASSY. AND FITMENT VIDE L/No. C – D&D/ TOT/165 DT. 18.04.2001	S/d- 30.05.2002
3	21.11.2002	SL. No. 13 MODIFIED DRG. NO. 1209-00-340-109 TO BE FOLLOWED BY ALT.2	TO AVOID CONFUSION	S/d- 21.11.2002
4	14.01.2004	ALT.3 AGAINST DRG. NO. 1209-00-340-109 AND ALT. NO.4 AGAINST SPEC. ARE ADDED.	TO UPDATE SPEC.	S/d- 14.01.2004
5	12.02.2008	NEW DRG. NO. FOR WAP-5 ADDED IN THIS SPEC. AND PARA 10 (ii) ADDED.	NEW DRG. NO. FOR WAP-5 INCORPORATED	S/d- 12.02.2008
6	09.02.2011	NEW DRG. 1209-00-240-109 ALT.5 GENERATED INSTEAD DRG. NO. 1209-00-340-109 ALT.4 CHART OF PIPE SIZE AND QTY/LOCO DELETED. CHART INTRODUCE AT DRG.	ADDITION OF NEW PIPE FITTING INCREASING QTY/LOCO OF FITTINGS FOR PROPER FITMENT ACCORDING LAYOUT OF PIPE LINE FOR EXTINGUISING SYSTEM AND REQUISTION OF CLW ASSY. SHOP-16.	S/d- 11.02.2011
7	25.07.2018	ALTERED LENGTHS OF ST. ST. TUBES FOR WAP-5 LOCO ADDED AT PARA 10 (i) & DELETED PARA 10 (ii). REVISED PARA 4.7.6 &7.	CONVENIENCE OF WORK, PROPER FITMENT & EASY ACCESS AS TO VARIOUS JOINTS AS REQUIRED BY ASSY. SHOP.	S/d- 27.07.2018
8	As signed	ALT NO. IS ADDED TO DRG. NO. 1210-02.340-076 AT CLASUE 2.1 & 4.20. CLAUSE NO. 4.7.1, 4.9, 4.10, 4.14, 4.18, 5.1, 6.1, 6.3, 7.1, 7.4, 7.5, 7.6 & 10 ARE MODIFIED.	SPECIFICATION HAS BEEN ALTERED IN ACCORDANCE WITH LATEST INDIAN STANDARD AND DRAWING.	S/d- 07.05.2024
9	–	ALT. NO. OF DRG. NO.1209-00.240-109 IS CHANGED. CLAUSE NO. 4.5, 4.7.1, 4.7.3, 4.7.7 4.9, 4.11, 4.18, 6.1, 6.3, 7.1 & 7.7(II) ARE MODIFIED..	SPECIFICATION HAS BEEN ALTERED IN ACCORDANCE WITH LATEST INDIAN STANDARD AND COMMENTS OF VENDORS.	

Specification have been digitized and all alterations have been incorporated

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TECHNICAL SPECIFICATION OF FIRE EXTINGUISHING SYSTEM TO BE USED ON WAG-9 (Co-Co) / WAP-5 (Bo-Bo) 3-PHASE A.C. ELECTRIC LOCOMOTIVE FOR INDIAN RAILWAYS.

1. SCOPE:

This specification covers the minimum requirement of design, manufacturing, supply and installation conditions of Fire extinguishing system to be used on WAG-9 (Co-Co) / WAP-5(Bo-Bo) 3-phase A.C. electric locomotive for Indian Railways.

2. SCOPE OF SUPPLY :

2.1. One set of whole system of Fire extinguishing CO_2 gas of 22.5kg capacity, to be supplied per loco as per attached Drg. No. – 1209-00.240-109 ALT-9 or latest meant for WAG-9 class of loco. Qty per set will be equal to the quantity per loco as indicated against each item & Drg. No. -1210- 02.340-076 ALT.1 or latest for WAP-5 loco.

2.2. Maintenance procedure and inspection schedule required to maintain the extinguishing system in good working order, to be supplied along with fire extinguishing system.

3. GENERAL

3.1. The Fire extinguishing system with pipe, intended to operate manually, is installed in the loco withits entire length of side wall (both side) in the machine compartment, having 22.5kgs capacity CO_2 gas cylinders installed outside of the machine compartment i.e. in cup-board to operate from driver's cabin more effectively instead of rushing inside the compartment. to extinguish the fireinvolving carbonaceous solids, flammable and combustible liquids, oil, cables, rubber, energized electrical equipments etc. This specn. based on RDSO's Letter no. EL/3.1.35/2 dt. 15.10.98.

4. TECHNICAL REQUIREMNT:

4.1. The carbon di-oxide gas of fire extingushing system shall be capable to extinguish the fires involving carbonaceous solids, wood, cloth, cables, paper, rubber, plastics, flammable and combustible liquids, oil, energized equipments etc.

4.2. Shall be suitable for an installation in dynamic vehicle under continuous vibration and shocks and impact load up to 5 cm/s^2.

4.3. In order to gain access to awkward location, the gas discharge jet shall be designed in such a manner to extinguish the fire effectively.

4.4. The extinguisher shall be provided with a safety device in the actuating mechanism to prevent accidental operation.

4.5. The length of seamless stainless steel pipe N. Bore 1/4" with socket joint to be such to cover entire length of loco sidewall LHS and RHS with discharge jet at four places, as indicated in the drawing, which extinguish the fire effectively.

4.6. The extinguish act shall be electrically non-conductive and designed to operate in the normal vertical position.

4.7. Each fire extinguishing cylinder shall be provided with two nos. of pressure gauges with graduated marks and indicator.

4.7.1. Two nos. of carbon di-oxide gas cylinder each capacity 22.5 Kg. conforming to ~~IS:16018~~ IS:7285-2 or later standard and shall be approved by Petroleum and Explosive Safety Organization (PESO) as per Gas Cylinder Rules 2016 or latest standard with charged weight aprox. 70 Kg.

4.7.2. Four nos. of diffusers with nozzles.

4.7.3. Seamless stainless steel pipe nom. Bore ~~6.4mm~~ 1/4" & O/D 10mm to ASTM-A 269 Gr.304.

4.7.4. Wheel cock - 2 Nos.

4.7.5. Isolating cock - 2 Nos.

4.7.6. Discharge flexible hose - 2 Nos. 1.0 meters each lg. with horn.

4.7.7. Pipe clamp 30 Nos. with St. St. HEX. Hd. Screw M6x12 of ~~Gr. ISO 4017 A4-70~~ IS 1364 (Part 2)

4.8. Pressure developed in a correctly charged extinguisher during operation at a temp. of 65ºC shall be capable to discharge the gas continuously for the specified period.

4.9. The body of the cylinder shall be of seamless steel conforming to IS: 7285-2 or later standard and shall be approved by Petroleum and Explosive Safety Organization (PESO) as per Gas Cylinder Rules 2016 or latest standard. The external surface of cylinder shall be treated to resist atmospheric corrosion.

4.10. Discharge time shall be 20 seconds minimum and 60 seconds maximum.

4.11. Proper sealing arrangement shall be provided on wheel cock in order to avoid inadvertent operation. Valve must be adequately protected during transport to prevent damage or accidental operation. Suitable protective covers or guards shall be used to cover the valve. These protective measures should ensure that the valve remain intact and functional upon delivery.

4.12. Fire extinguishing system is intended to be operated manually by the drivers.

4.13. The pipe lines shall be interconnected at one end to other take care of the situation when one carbon di-oxide fire extinguisher becomes defective/in-operational due to some problem.

4.14. Liquified carbon di-oxide gas used for extinguisher shall conform to IS:15222 filled with filling 0.667 with tolerance ±0.017. The quantity shall be determined by weighing.

4.15. There shall be no leakage of carbon di-oxide from valve or fittings during or before use of extinguisher.

4.16. Operational method and inspection schedule shall be written on the body in Hindi & English.

4.17. Period for refilling/checking should be clearly mentioned on the body.

4.18. The material used for body, internal discharge diffuser, discharge hose, wheel cock & isolating cock shall ~~conform to IS: 16018~~ be as per the drawing.

4.19. It should also designed to withstand without rupture of a pressure of not less than 4 times the equilibrium pressure when operated at 65ºC temperature with outlet blocked.

4.20. Installation shall be as per drg. No. 1209-00.240-109 Alt.9 or latest for WAG-9 loco and Supplier shall confirm the system satisfactorily after installing in the loco (only on prototype) & installation shall be as per drg. No. 1210-02.340-076 ALT.1 or latest for WAP-5 loco.

5. PERFORMANCE REQUIREMENT :

5.1. The design and construction of fire extinguishing system shall be such that when operated at 27ºC, it shall expel carbon di-oxide gas in uniform of continuous discharge for minimum 20 seconds from the time of operating the valve.

5.2. Shall also conform the correct discharge rate and speed of jetting.

6. MANUFACTURE:

6.1. Body of extinguisher shall be a seamless cylinder manufactured to IS: 7285-2 or later standard and shall be approved by Petroleum and Explosive Safety Organization (PESO) as per Gas Cylinder Rules 2016 or latest standard. The external surface of the cylinder shall be treated or coated to resist atmospheric corrosion.

6.2. The actuating mechanism shall be made of non-ferrous metal or stainless steel of high strength and be so designed that necessary operation for extinguishing shall be simple and obvious.

6.3. Material used for manufacturing isolating cock, diffuser pipe, wheel cock etc. which are the constituents of supply, shall be ~~conformed~~ ~~the condition laid down in IS:16018~~ as per the drawing.

6.4. Each extinguisher shall be supplied with all the items shown in drawing with spanner.

7. INSPECTION & TESTING:

7.1. ~~Each extinguisher body shall be passed the hydraulic stretch and pressure test according to IS:7285, which shall not be less than 250Kg/cm^2.~~The cylinders shall be subjected to hydrostatic stretch test in accordance with IS: 5844 which shall not be less than 250Kg/cm^2. The test pressure applied to the cylinder shall be retained for a period of not less than 30 seconds. The permanent stretch suffered by the cylinder due to application of test pressure shall not exceed 10% of the total stretch suffered during the test.

7.2. Sealing device of actuating mechanism shall be checked.

7.3. Discharge test to be conducted by supplier to check the discharge time of liquefied gas, distance and residue during demonstration.

7.4. Authorized representative of respective inspection agenecy will inspect the material and mechanism at firm's premises. All the tests shall be conducted and borne by supplier. Being a safety item defective material if any shall not be accepted.

7.5. The Hose assembly with its coupling shall be tested to the minimum burst pressure of 1.5 times the pressure develpoed in the extinguisher at 55°C, the test being carried out at 27 ± 2°C and 1.25 times the pressure developed in the extinguisher at 55°C, the test being carried out at 55 ± 5°C as per clasue 8.11.3(b) of IS:16018.

7.6. Extinguisher showing loss of weight of gas exceeding (-) 5% shall be rejected.

7.7. **(i)** Prior to prototype inspection CLW'S representative will be deputed to seal the sample piece of the material specified for test in the government approved/ RDSO approved test lab. The lab test report should be produced at the time of prototype inspection.

(ii) Standard Fasteners of M/s. TVS, M/s. LPS and M/s UNBREAKO & M/s KUNDAN or from CLW/BLW approved vendors only shall be used in the assembly.

8. MARKING AND IDENTIFICATION :

Every extinguisher shall be marked with the following:

a) Instruction for operation and name of gas.

b) The capacity in Kilogram.

c) Name and Address of Manufacturer with Trade Mark.

d) The working pressure in Kg/cm^2 or mega Pascal.

e) The overall weight of the Extinguisher when full.

f) The Year and Month of Manufacture with IS Specification.

g) Period for refilling/checking.

9. PACKING & DELIVERY:

9.1. The fire extinguisher system shall be supplied complete in all respect as laid down in specification, properly protect from damage or deterioration and ready for successful operation.

9.2. For other details, terms & conditions refer bid document.

9.3. Supplier can contact C-D&D/CLW for any improvement prior to manufacture.

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11. Tubes, threaded at both ends should be supplied as per the following schedule:-

i. Ref. Drg. No- 1210-02.340-076 Alt.1 or latest for WAP-5 loco.

SL. No.	LENGTH IN mm	QUANTITY	TOTAL LENGTH (mm)
1.	2525	1	2525
2.	2600	1	2600
3.	3325	1	3325
4.	2470	1	2470
5.	2610	1	2610
6.	1840	1	1840
7.	1630	1	1630
8.	3400	1	3400
9.	150	2	300
10.	955	1	955
11.	1040	1	1040
12.	90	2	180
13.	450 (Bend at 20^0 at one end)	4	1800