

7. INSPECTION AND ACCEPTANCE :-

7.1 General :-

The manufacturer shall submit one prototype sample set (consisting of all items quantity wise as indicated in Annexure-I) for the purpose of inspection and conducting type testing at their works premises. These are to be witnessed by an authorized representative of the Purchaser and the cost of the same will be borne by manufacturer/bidder.

7.2 The test specimens being offered for prototype inspection shall have capability of withstanding the following tests:

a) Visual/Dimensional checks:-

Fittings will be checked for overall finish, workmanship and dimensions; Dimensional checking will be carried out by properly calibrated measuring/checking instruments.

b) Inspection before/during/after test:-

After assembly of tube fittings along with tube it forms a test specimen. After each dis-assembly of the test specimen, assembly coupling, the component and the tubing shall be examined for:

- Damage of 'o' ring if any
- Formation of fatigue crack at thread roots
- Damage of ferrule
- Damage of sealing face
- Damage or cracking of tube

c) Pneumatic Proof Test:-

Test-assembly consisting of male connector, union, union tee, elbow & cap to 6 to 8 inch tube length for each size of fitting in Annexure-I. Tube as per CLW Spec MS/3/029 of desirable OD (total 4 assemblies) tightened 1-1/4 turn past snug. Pressurize each test-assembly initially to 7 kg/cm² and hold for 5 minutes. Observe any leakage. Then gradually increase the pressure to 40 kg/cm² (Pneumatic Pressure). Hold at that pressure for 10 minutes. If no leak is found, the fittings are to be disassembled and shall be inspected as per Clause 7.2(b).

d) Hydrostatic Proof Test:-

After the completion of Pneumatic re-assemble the test specimen as stated in 7.2 (c) and pressurize each test-assembly for hydro test initially to 7 kg/cm² for 5 minutes. If no leakage is observed, increase the pressure to 200 kg/cm² and hold at that pressure for 15 minutes. If no leak is found, the fittings are to be disassembled and shall be inspected as per Clause 7.2(b).

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e) Vibration Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Vibration test to be conducted as per Section-S8 of ASTM F1387-99 standard.
- (iii) After the test, dis-assemble the test-assembly and the fittings are to be inspected as per Clause 7.2(b).
- (iv) On completion of test, re-assemble the test-assembly and the test-assembly must successfully pass the Pneumatic Proof Test as per clause 7.2(c) and the Hydrostatic Proof Test as per clause 7.2(d).

f) Pressure Impulse cum Vibration Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Each test-assembly shall be subjected to vibration frequency of 60 Hz, with amplitude of 5 mm, simultaneously pressure cycling up to 100 kg/cm² at 35+5 impulse/minute with suitable hydraulic fluid.
- (iii) Pressure impulse shall be run for 500000 cycles (minimum) and vibration for minimum of 10 x 10⁶ cycles.
- (iv) Test-assembly is monitored for leakage during the test.
- (v) After the test, dis-assemble the test-assembly and the fittings are to be inspected as per Clause 7.2(b).
- (vi) On completion of test, re-assemble the test-assembly and the test-assembly must successfully pass the Pneumatic Proof Test as per clause 7.2(c) and the Hydrostatic Proof Test as per clause 7.2(d).

g) Vacuum Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Vacuum test shall be conducted at 750 milli bars with a test volume of 1 litre of water capacity. The deterioration of vacuum shall not exceed 20 milli bars over a period of 20 minutes.
- (iii) After the test, dis-assemble the test-assembly and the fittings are to be inspected as per Clause 7.2(b).
- (iv) On completion of test, re-assemble the test-assembly and the test-assembly must successfully pass the Pneumatic Proof Test as per clause 7.2(c) and the Hydrostatic Proof Test as per clause 7.2(d).

h) Repeated Assembly Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Repeated Assembly test to be conducted as per Annex-A9 of ASTM F1387- 99 Standard.
- (iii) After the test, dis-assemble the test-assembly and the fittings are to be inspected as per Clause 7.2(b).
- (iv) On completion of test, re-assemble the test-assembly and the test-assembly must successfully pass the Pneumatic Proof Test as per clause 7.2(c) and the Hydrostatic Proof Test as per clause 7.2(d).

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i) Temperature Cycling Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Then each test-assembly shall be subjected to 3 temperature cycles each of approximately 3 hours duration.
- (iii) In temperature cycle, temperature should increase to 100° C in 45 +15 minutes and held for 60 minutes .Then the temperature should reduce to ambient form 100° C in 45+15 minutes.
- (iv) After the test, dis-assemble the test-assembly and the fittings are to be inspected as per Clause 7.2(b).
- (v) On completion of test, re-assemble the test-assembly and the test-assembly must successfully pass the Pneumatic Proof Test as per clause 7.2(c) and the Hydrostatic Proof Test as per clause 7.2(d).

j) Tensile Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Tensile test to be conducted as per Annex-A7 of ASTM F1387-99 standard.

k) Hydrostatic Burst Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Hydrostatic burst test to be conducted as per Annex-A8 of ASTM F1387-99 standard.

l) Flexure Fatigue Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Flexure Fatigue Test to be conducted as per Annex-A6 of ASTM F1387-99 standard.
- (iii) After the test, dis-assemble the test-assembly and the fittings are to be inspected as per Clause 7.2(b).
- (iv) On completion of test, re-assemble the test-assembly and the test-assembly must successfully pass the Pneumatic Proof Test as per clause 7.2(c) and the Hydrostatic Proof Test as per clause 7.2(d).

m) Neutral Salt Spray Test:-

- (i) Test to be conducted on test-assembly under gone test under clause 7.2(c) and 7.2(d).
- (ii) Each size of back ferrule to be randomly selected for salt spray test as per IS: 9844 standard for 96 hrs.
- (iii) The ferrule shall not have any corrosion up to 96 hours.

n) Salt Mist Test:-

- (i) This test to be conducted on one no. of each type of fitting mentioned in Annexure-I.
- (ii) Each size of back ferrule to be randomly selected for salt spray test as per IEC 60068 -2-52 standard for 96 hrs.
- (iii) The ferrule shall not have any corrosion up to 96 hours.

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- (iv) After the test, dis-assemble the test-assembly and the fittings are to be inspected as per Clause 7.2(b).
- (v) On completion of test, re-assemble the test-assembly and the test-assembly must successfully pass the Pneumatic Proof Test as per clause 7.2(c) and the Hydrostatic Proof Test as per clause 7.2(d).

o) Intra-Granular Corrosion Test:-

- (i) This test to be conducted only on the back ferrule.
- (ii) Each size of back ferrule to be randomly selected from the offered material for Intra-granular Corrosion Test as per ASTM A262 Practice-E.
- (iii) On completion of test, the ferrule shall not show any Intra-granular Corrosion.

p) Interchangeability/Intermixability Test:-

Manufacturer/bidder must certify that components of fitting are interchangeable with other CLW approved sources of the same item.

7.3 Manufacturer/bidder must have in-house test facilities for carrying out the tests indicated Clause 7.2 (a), (b), (c), (d), (g), (i), (j) and (k). For remaining tests, the manufacturer/bidder may perform tests through a Government approved test laboratory in presence of authorized representative of the purchaser. Expenditures towards these will be borne by the manufacturer/bidder.

7.4 ROUTINE TEST /INSPECTION:

- a) Routine test will be carried out in presence of authorized representative of the purchaser at manufacturer's premises as per approved routine test program submitted by the manufacturer. Tests mentioned at Clause 7.2 (a), (b), (c), (d), (g), & (h) are compulsory for routine test, whereas rest of the tests are at discretion of the purchaser.
- b) The tenderer shall indicate the sample size including minimum size for routine inspection of each lot and the acceptance criteria for acceptance by the purchaser.

7.5 Type test shall be repeated in following cases:-

- (i) First time supply to IR.
- (ii) Failure or variations established during type or routine test.
- (iii) Consistency type test within 5 years of the last type test to re-establish performance parameters.

7.6 Railway reserves the right to perform any of above tests at any time to establish specific performance parameter.

8. DOCUMENTATION :-

8.1 Along with tender offer :-

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- a) The tenderer shall submit dimensioned manufacturing drawing indicating manufacturing tolerances, part drawings of individual items and sub-assemblies, part listing of Assembly/Sub Assembly, Material Specification. Technical Data /Calculation in duplicate for purchaser's examination/checking, scrutiny and authentication.
- b) Any deviation from Specified values shall be spelled out clearly by the tenderer.
- c) The Tenderer shall submit all in-house facilities available for both type test and routine test. They should also clearly mention the tests to be carried out at Government approved test laboratory.
- d) The tenderer shall submit proof of supply of double ferrule compression type fittings for three years to Indian or Global railways.

8.2 Along with supply :-

Successful tenderers shall submit along with supply the required copies of list of items supplied, certified copies of material and test certificates from Government approved test laboratory and guarantee certificate for the supplied items.

9. QUALITY ASSURANCE:-

- 9.1 **System Certification:** Firm to have obtained system certification against ISO 9001:2015 (or latest version).
- 9.2 Any other certification obtained by the firm may also be submitted during the tender.

10. MARKING :




Each assembly, sub-assembly/component shall have clear readable laser etched/engraved marking, particularly body and back nuts. Marking shall be as follows:

- a) Manufacturer's name/trade mark
- b) Part no. and size (in mm/inch)
- c) Traceability of raw material

NB: Both front ferrule and back ferrule of size 1" & above shall have manufacturers name/trade mark engraved/punched on them at suitable location.


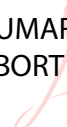

11. PACKING :

All pipe fittings shall be properly packed to avoid damage during transit and storage.

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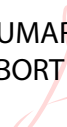

ANNEXURE-I

SL. NO.	DRAWING NO.	ALT. NO.	DESCRIPTION	REMARKS
1	1209-18.406-010 SL.-1	2	MALE ELBOW 10 MM TUBE X 3/8" ISO TAPER	
2	1209-18.406-012 SL.-1	4	STRAIGHT COUPLING Ø10 TUBE (TYPE P-GV)	
3	1209-18.406-013 SL.-2	4	BULKHEAD COUPLING Ø10 TUBE	
4	1209-18.406-013 SL.-3	4	BULKHEAD COUPLING Ø15 TUBE	
5	1209-18.406-014 SL.-1	4	EQUAL TEE Ø10 (TYPE P-TV)	
6	1209-18.406-014 SL.-3	4	EQUAL TEE Ø22 (TYPE P-TV)	
7	1209-18.406-016 SL.-2	4	EQUAL ELBOW Ø10 (TYPE P-WV)	
8	1209-18.406-016 SL.-4	4	EQUAL ELBOW Ø22 (TYPE P-WV)	
9	1209-18.406-020 SL.-1	2	REDUCING UNION TEE Ø22/15/22	
10	1209-18.406-020 SL.-2	2	REDUCING UNION TEE Ø22/15/15	
11	1209-18.406-020 SL.-3	2	REDUCING UNION TEE Ø22/22/15	
12	1209-18.406-022 SL.-1	2	REDUCER FITTING 1" TUBE X 1 ½" PIPE	
13	1209-18.306-024 SL.-1	2	1" TUBE X 1" FEMALE ELBOW SPL	
14	1209-18.406-036 SL.-2	7	10 mm TUBE X 3/8" BSPT MALE ELBOW	
15	1209-18.406-036 SL.-8	7	10 mm TUBE X ½" BSPT MALE ELBOW	
16	1209-18.406-036 SL.-12	7	½" TUBE X 3/8" BSPT MALE ELBOW	
17	1209-18.406-036 SL.-3	7	½" TUBE X ½" BSPT MALE ELBOW	
18	1209-18.406-036 SL.-7	7	1" TUBE X ¾" BSPT MALE ELBOW	
19	1209-18.406-036 SL.-4	7	1" TUBE X 1" BSPT MALE ELBOW	
20	1209-18.406-036 SL.-5	7	1½" TUBE X 1¼" BSPT MALE ELBOW	
21	1209-18.406-036 SL.-6	7	1½" X 1½" BSPT MALE ELBOW	
22	1209-18.306-026 SL.-1	3	MALE CONNECTOR 10 MM TUBE X ¼" ISO TAPER	
23	1209-18.306-026 SL.-2	3	½" TUBE X ½" BSPT MALE CONNECTOR	
24	1209-18.306-026 SL.-3	3	1" TUBE X 1" BSPT MALE CONNECTOR	
25	1209-18.306-026 SL.-5	3	1½" TUBE X 1¼" BSPT MALE CONNECTOR	
26	1209-18.306-027 SL.-1	3	ELBOW UNION 1" SPL	
27	1209-18.306-028 SL.-1	3	UNION 10 MM SPL	
28	1209-18.306-028 SL.-2	3	UNION ½" SPL	
29	1209-18.306-028 SL.-3	3	UNION 1" SPL	
30	1209-18.306-028 SL.-4	3	UNION 1½" SPL	
31	1209-18.306-029 SL.-1	3	UNION TEE 10 MM	
32	1209-18.306-029 SL.-2	3	UNION TEE 1"	
33	1209-18.306-029 SL.-3	3	UNION TEE 1½"	

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34	1209-18.306-031 SL.-1	3	UNION TEE SPECIAL 1½"	
35	1209-18.306-031 SL.-2	3	UNION TEE SPECIAL 1½"	
36	1209-18.306-031 SL.-3	3	UNION TEE SPECIAL 1½"	
37	1209-18.306-031 SL.-4	3	UNION TEE SPECIAL 1½"	
38	1209-18.306-031 SL.-5	3	UNION TEE SPECIAL 1"	
39	1209-18.406-035 SL.-1	2	MALE ELBOW Ø10 MM TUBE X ¼" NPT	
40	1209-18.406-036 SL.-11	4	MALE ELBOW Ø22 MM TUBE X ¾" ISO TAPER	
41	1209-18.406-039 SL.-1	3	MALE CONNECTOR Ø10 MM TUBE X ¼" ISO TAPER	
42	1209-18.306-026 SL.-4	3	MALE CONNECTOR 1" TUBE X 1" ISO TAPER	
43	1209-18.406-037 SL.-1	1	THREADED TEE 1¼" FTT	
44	1209-18.406-037 SL.-2	1	BSP THREADED TEE 1½" (F) X 1½" (F) X 1½" (F)	
45	1209-18.406-176	-	¾" BSPP X BSPP THD. REDUCING BUSH (M/F)	
46	1209-18.406-218 SL.-1	-	REDUCING UNION TEE 1½" X 1" X 1½"	
47	1209-18.406-167 Ref.1	1	UNION ELBOW 1½" TUBE X 1½" TUBE	ONLY FOR WAP-7
48	1209-18.406-036 Ref.13	7	MALE ELBOW 10 OD TUBE ¼" BSPT	
49	1209-18.406-036 Ref.14	7	MALE ELBOW ½" TUBE ¼" BSPT	
50	1209-18.406-036 Ref.15	7	MALE ELBOW ½" TUBE ½" BSPT	
51	1209-18.306-026 Ref.7	6	MALE CONNECTOR 1½" TUBE X 1½" BSPT	
52	1209-18.306-026 Ref.8	6	MALE CONNECTOR 10 MM OD TUBE X M14	
53	1209-18.306-029 Ref.4	6	UNION TEE ½" TUBE X ½" TUBE X ½" TUBE	
54	1209-18.306-029 Ref.5	6	UNION TEE 1" TUBE X ½" TUBE X 1" TUBE	
55	1209-18.406-036 Ref.16	6	MALE ELBOW ¼" TUBE ¼" BSPT	
56	1209-18.406-220 SL. NO.-2	NIL	REDUCER (ADAPTER)	

Note: 38.1 Ø-4 nos., 25.4 Ø-3 nos., 22 Ø-2 nos. extra ferrules are to be supplied along with the set of SS- Pipe Fittings as spares.

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