

**QM-C-7.1/AB0001/M-(ERW)**  
**Inspection Plan (Check Sheet)**

**Item** : Pipes for Air Brake System for freight & coaching stock.

**Specn.:** 04-ABR-02

**Amd.:** 08 of Sept 2016.

**Drng. No. & Alt. No.:** WD-83062-S-06, Alt. 4, WD-83062-S-07 Alt. 6, WD94056-S-1, Alt. Nil

For all type of Freight & Coaching stock.

1. For Freight stock fitted with Conventional brake system:

Seamless pipe as per IS-1239 (Part-I) heavy grade or ASTM-A-106 Gr A for Brake/Feed pipe 32NB and for Flanges and fittings IS 2062-2006 E250A or IS: 6911-1992 X 04 Cr 19 Ni 9304 SI or ASTM A351/A351M-03 Gr CF8 J92600 or ASTM A182/A182M/12A

For branch pipe-20NB, stainless steel ASTM-A312 schedule 40S Gr. TP (ERW) and for Flange and fittings to IS: 6911-1992 X 04 Cr. 19 Ni 9304 SI or ASTM A351/A351M-03 Gr CF8 J92600 or ASTM A182/A182M/12A

2. For Freight Stock fitment with BMBS:

For Brake pipe, Feed Pipe and Branch pipe Stainless steel to ASTM-A312 schedule 40S Gr. T304 (ERW) & for Flange and fittings, Stainless steel to IS: 6911-1992 X 04 Cr 19 Ni 9304 SI or ASTM A351/A351M-03 Gr CF8 J92600 or ASTM A182/A182M/12A

3. For Passenger stock fitment with BMBS:

For Brake pipe, Feed pipe and Branch pipe, Stainless steel to ASTM-A312 schedule 40S Gr. T304 (ERW) & for flange and fittings, stainless steel to IS: 6911-1992 X 04 Cr 19 Ni 9304 SI or ASTM A351/A351M-03 Gr CF8 J92600 or ASTM A182/A182M/12A.

1	Name of Manufacturer	
2	Date of offer	
3	Date (Period) of Inspection	
4	RDSO File No.	
5	Drawing & Alt. No.	
6	P. O. No.	
7	Total Quantity ordered	
8	Quantity earlier passed	
9	Quantity now offered	
10	Consignee	
11	D.P.	

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A) Vendor should produce Mill Test Certificate of pipe at the time of inspection, shall be consisting of following tests as per IS 1239, Part-I Heavy Grade / ASTM A-106 Gr. A / ASTM A312 40S Gr. TP 304 (ERW)

S.No	Test Details	Specification	Specified Parameters	Value of MTC	Remarks
1	Grain Size	IS 1239 Pt.I, H	NA		OK / Not OK
		ASTM A-106Gr.A	NA		
		ASTM A 312	No. 7 or Coarser for TP-304		
2	Chemical Composition	IS 1239 Pt.I, H (In Ladle Analysis)	C - 0.20 max Mn - 1.30 max S - 0.04 max P - 0.04 max		OK / Not OK
		ASTM A-106 Gr.A	C - 0.25 max Mn - 0.27 - 0.93 S - 0.035 max P - 0.035 max Si - 0.1 min Cr - 0.4 max Cu - 0.40 max Mo - 0.15 max Ni - 0.40 max V - 0.08 max		
		ASTM A 312	C - 0.08 max Mn - 2.00 max S - 0.030 max P - 0.045 max Si - 1.00 max Cr - 18.0 - 20.0 Ni - 8.0 - 11.0		
3	Tensile Requirement	IS 1239 Pt.I, H	YS -NA UTS - 320 Mpa % E - 12 min		OK / Not OK
		ASTM A-106 Gr.A	YS - 205 MPa UTS - 330 Mpa % E - 20 min		
		ASTM A 312	YS - 205 MPa UTS - 515 Mpa % E - 35 min		
4	Flattening Test	IS 1239, Part-I Heavy Grade / ASTM A-106 Gr. A / ASTM A312 40S Gr. TP 304 (ERW)			OK / Not OK
5	Hydro static or Non Destructive Electric test	IS 1239, Part-I Heavy Grade / ASTM A-106 Gr. A / ASTM A312 40S Gr. TP 304 (ERW)			OK / Not OK
6	Marking Details	Manufacturer trade mark			OK / Not OK
		Size of Pipe			
		Heat No			
		ET or Hydro Pressure			

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**B)Raw Material Verification Sheet:**

S.No	Descriptions	Observations/Comments
1.	Verification of in voice of raw materials procured for manufacturing of tube (in case of in houseTube Mill)	
2.	Thickness/diameter of raw materials for seamless manufacturing of tube (in case of in houseTube Mill)	
3.	Verification of ledger of raw material for incoming pipes, Dispatched quantity & balance both in weight & Quantity)	

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<b>C. Lot Size:</b> 100 sets or part thereof	
<b>D. Visual Check:</b> Specified sample size -10% Actual sample size—	
Specified	Observation
1. Pipe should be smooth, inside and outside must be free from defects and must be provided with parallel threads to IS: 554 wherever called for.	OK/Not OK
2. Pipe should be cleaned, free from dust/rust & moisture.	OK/Not OK
3. Painting (if included in Purchase Order): Exterior to be painted (a) Mid Brunswick green paint to IS No. 226 of IS: 5- 2007 ready mixed paint to IS: 119 for Brake pipe. (b) Ready mixed white finish paint to IS: 127 for feed pipe.	OK/Not OK
4. Welding Joints to pipe shall be in accordance with Procedure given in annexure A and for stainless steel pipe to Annexure B of the specification no. 04-ABR-02	OK/Not OK
5. Marking. 1. Stencil of mfg initial, month and year to be stamped on pipe after paint. 2. Punch in 4 mm size mfg. initial, month and year on flange	OK/Not OK

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<b>E. Dimensional Check:</b> Specified sample size-10%. Actual sample size-						
1. Check the pipes with piping layout as per RDSO Drg. For Relevant type of Wagon/Coach.				OK/Not OK		
2. Measure pipe OD& wall thickness for Seamless pipe as per IS-1239 ,Part-I heavy grade/ASTM A-106Gr.A and Stainless Steel pipe to ASTM A312 40S Gr.TP 304 (ERW & Seamless)				Observed dimensions		
Nominal Bore	Outer Diameter	Wall Thickness (Taking variation of +12.5% / - 0% on std. value)	Outer Diameter		Wall Thickness	
			Observed Value		Observed Value	
32mm	42.0 to 42.9 (IS-1239) 41.4 to 43.0 (ASTM A-106) 41.36 to 42.96 (ASTM A312)	4.0 to 4.5 3.55 to 4.0 3.56 to 4.0		Ok/ NotOk		Ok/ NotOk
25mm	33.3 to 34.2 (IS-1239) 33.00 to 33.8 (ASTM A-106) 32.60 to 33.80 (ASTM A312)	4.0 to 4.5 3.38 to 3.8 3.38 to 3.8		Ok/ NotOk		Ok/ NotOk
20mm	26.5 to 27.3 (IS-1239) 26.3 to 27.1 (ASTM A-106) 25.87 to 27.07 (ASTM A312)	3.2 to 3.6 2.87 to 3.22 2.87 to 3.22		Ok/ NotOk		Ok/ NotOk
15mm	21.0 to 21.8 (IS-1239) 20.9 to 21.7 (ASTM A-106) 20.54 to 21.74 (ASTM A312)	3.2 to 3.6 2.77 to 3.11 2.77 to 3.11		Ok/ NotOk		Ok/ NotOk
10mm	16.7 to 17.5 (IS-1239) 16.7 to 17.5 (ASTM 106) 16.35 to 17.55 (ASTM 312)	2.9 to 3.26 2.3 to 2.59 2.31 to 2.59		Ok/ NotOk		Ok/ NotOk
3. Ball Test: Pipes must be tested after bending for free Passage with a ball of following dia:				OK/Not OK		
32mm nominal dia pipe		28mm ball				
25mm nominal dia pipe		22mm ball				
20mm nominal dia pipe		16mm ball				
15mm nominal dia pipe		11mm ball				
10mm nominal dia pipe		8.5mm ball				
4. Threads checking with gauge.				OK/Not OK		
5. Thickness of Pipe material after threading 32 NB – 1.60 minimum 25 NB – 1.60 minimum 20 NB – 1.30 minimum 15 NB – 1.30 minimum 10 NB – 1.10 minimum						
6. Flange, Socket & 'O' Ring to be measured as per Drg.				OK/Not OK		

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**F. Chemical, Tensile & bend test as per related specification: (One sample per lot per Heat Number of Raw material to be tested from NABL accredited Laboratory).**

Specified sample size:

- a. Chemical Test (including Pipe, Socket and Flange)-1 No each.
- b. Tensile and Bend Test (Pipe only)-1 No each.
- c. Actual sample size:

**1. Chemical Test:**

**Freight stock fitted with BMBS**

- a. Feed / Brake pipe & Branch pipe as per stainless steel to ASTM A 312 schedule 40S GrTP-304(ERW).
- b. Flanges and fittings for Stainless steel (ERW) pipes to  
IS: 6911-1992 X 04 Cr. 19 Ni 9304 SI or  
ASTM A351/A351M-03 Gr CF8 J92600 or  
ASTM A182/A182M/12A

**Freight stock fitted with Conventional Brake system**

- c. Brake pipe / Feed pipe as per seamless to IS: 1239 (Part – 1) heavy grade/ ASTM A-106 GrA.

Flanges/fittings for seamless pipes of Freight stock as per

- IS: 2062- 2006 E 250 A or  
IS: 6911-1992 X 04 Cr. 19 Ni 9304 SI or  
ASTM A351/A351M-03 Gr CF8 J92600 or  
ASTM A182/A182M/12A

**Passenger stock fitted with BMBS**

- d. Feed / Brake pipe & Branch pipe as per stainless steel to ASTM A 312 schedule 40S GrTP-304(Seamless).
- e. Flanges and fittings for Stainless steel (ERW) pipes to  
IS: 6911-1992 X 04 Cr. 19 Ni 9304 SI or  
ASTM A351/A351M-03 Gr CF8 J92600 or  
ASTM A182/A 182M/12A

OK/Not OK

**2. Tensile & Bend Test:**

- a. Freight stock Brake pipe / Feed pipe / Branch pipe as per seamless to IS: 1239 (Part – 1) heavy grade/ ASTM A-106 GrA/ ASTM-A-312 schedule 40S GrTP-304(ERW).

Observed Values

OK / NOT OK

IS 1239 Pt.I, H	YS	UTS	% E
	NA	320 Mpa	20 min
ASTM A-106 Gr.A	205 MPa	330 Mpa	35 min
ASTM A 312 schedule 40S GrTP-304(ERW)	205 MPa	515 Mpa	35 min

Bend test at 180° angle.

- b. Passenger stock Brake pipe / Feed pipe / Branch pipes

Specification	YS (Min)	UTS (Min)	% E
ASTM-A-312 schedule 40S Gr TP-304(Seamless).	205 Mpa	515 Mpa	35 (Min)

Bend test at 180° angle.

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<b>G. Metal structure &amp; Macro Etching:</b> Metal structure & Macro Etching test (for Seamless pipe)– Pipe should sound and reasonably uniform material free from injurious laminations, cracks, seams, scabs, tears etc		OK/Not OK
<b>H. Leakage Test:</b> Specified sample size -5% of offered lot and in case of failure, 20% of reoffered lot. Actual sample size-		
Leak Test at 10kg/cm <sup>2</sup> compressed dry air pressure, dipping in water tank	OK/Not OK	
<b>I. Packing:</b>		
i. Outer ports & exposed threaded portion of pipes and joints are suitably covered with airtight protection caps.	Available/Not Available	
ii. Pipes and Joints should be adequately packed to prevent damage in handling and storage.	Adequate /Inadequate	
<b>J. Calibration status checked.</b>	OK/Not OK	

**K.** Dimension check for flange/ fitting for pipes as per RDSO DRG WD83062 S-06 Alt. 4 & WD83062 S-07 Alt. 6

Material for flange and fittings for BP/FP/Branch pipes are as per

- i) IS 6911-1992 X 04 Cr. 19 Ni 9304 SI
- ii) ASTM A351/A351M-03 Gr CF8 J92600
- iii) ASTM A182/A 182M/12A
- iv) IS : 2062– 2006 E250 A)

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