

RAIL COACH FACTORY, KAPURTHALA

MD46111

Date: 27.01.2014

Sub: Specification no. MDTS-234 Rev-01 for Schedule of Technical Requirements for TPV Synthetic Thermoplastic Water Hose in Passenger Coaches. .

Please find enclosed a copy of spec. no MDTS-234 Rev-01 for Schedule of Technical Requirements for TPV Synthetic Thermoplastic Water Hoses in Passenger Coaches.


(Suraj Prakash)
Dy CME/D-1





Dy CPLE-III

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RAIL COACH FACTORY KAPURTHALA	SCHEDULE OF TECHNICAL REQUIREMENTS FOR TPV SYNTHETIC THERMOPLASTIC WATER HOSE IN PASSENGER COACHES	MDTS- 234 REV - 01 PAGE 1 OF 6 DATE 27.01.14
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Rev. No	Details of Changes	Date
01	Specification revised	27.01.2014


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1.0 SCOPE:

- 1.1 Schedule of Technical requirements for Marine blue Opaque water hose made from synthetic thermoplastic TPV based material for the circulation of water in passenger coaches suitable at working pressure of 1 MPa.

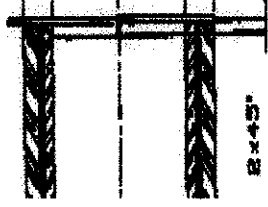


Figure 1

- 1.2 The hose shall be manufactured from thermoplastic TPV able to withstand temperature +100°Celsius to -20°Celsius.

2.0 REQUIREMENTS:

- 2.1 The hose shall be manufactured from TPV or TPE-V (blend of PP with elastomer EPDM)
- 2.2 Size: size of the hoses shall be as indicated in the drawings, viz, Hose with 12.5mm, 20mm, 31.5, and 50.00mm ID.
- 2.3 Working Pressure: The thermoplastic TPV hoses shall be able to withstand minimum working Pressure of 1 MPa.

3.0 CONSTRUCTION:

- 3.1 The inner surface of thermoplastic TPV based water hoses shall be quite smooth.
- 3.2 Reinforcement: Synthetic fiber reinforcement of nylon or polyester fiber interlock braided in between the lining & cover.
- 3.3 The inner surface and outer surface shall be of uniform thickness, reasonably concentric and free from air blisters, porosity and splits.
- 3.4 The outer surface shall have straight grains for better grip & better fatigue during passenger coach operations.

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4.0 DIMENSION AND TOLERANCES:

The specified size of hoses shall be as below:

Nominal Bore size (mm)	Tolerance on Nominal Bore Size (mm)	Outer Diameter (mm)	Tolerance on Outer Diameter (mm)
12.50	+0.75 -1.25	17.00	+1.0 -0.0
20.00	+0.75 -1.25	25.00	+1.0 -0.0
31.50	+1.25	41.00	+1.5 -0
50.00	+1.50	61.00	+1.5

Tolerance on Hose length shall be $\pm 1\%$.

5.0 PHYSICAL TESTS ON FINISHED HOSES:

5.1 Tensile strength and Elongation at break

The hose pipe when tested in accordance with the method prescribed in Clause 5 of IS: 443-1975 for both lining and cover shall comply with the requirements shown below.

<u>Tensile Strength</u> (Min) 5.0 MPa	<u>Elongation at break</u> (Min) 250 %
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5.2 Adhesion:

When tested in accordance with the method prescribed in method of IS: 3400 (Part-5), the minimum value of adhesion between the hose pipe and reinforcement shall not be less than 1.5 KN/m.


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5.3 Loss in mass on Heating:

Samples of lining & cover, when tested in accordance with method prescribed in Appendix 'A' of IS: 12585-1988 shall not show loss in mass, greater than 4 percent.

5.4 Bend radius:

When tested by Method-A specified in IS: 12656:1989 using a minimum radius of curvature of five times the nominal bore size, the hose shall show no signs of collapse.

5.5 Low temperature Flexibility:

When tested by method specified in IS : 12657:1989 at -20 degree Celsius the hose shall be capable to bend to a radius of 10 times the nominal bore size without kinking or any sign of cracking, and with a maximum increase in stiffness of 15 times.

5.6 Pressure Requirements:

When tested in accordance with the method prescribed in Para 8 of IS: 443-1975, the hose shall comply with the requirements given below and shall show no leakage, rupture or porosity, at proof pressure as given below:

Proof Pressure Min (MPa)	Changes in Diameter at proof pressure (Percent)	Change in length at Proof Pressure (Percent)	Min Burst Pressure (MPa)
1.6	± 7	± 7	3.15

6.0 MARKINGS

Each length of the hose shall bear the following information:

- 6.1 Manufacturer, s name & trade mark.
- 6.2 RCF specification no.
- 6.3 Nominal bore size.
- 6.4 Design working pressure
- 6.5 Quarter and the year of manufacturer.

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7.0 MATERIAL:

- 7.1 The material used for manufacturer of Thermoplastic TPV hoses shall be of Thermoplastic TPV (Neoplast 173 FTEB M3 of M/s Zyllog Plast Alloys or Santoprene 201-73 of M/s Exxon Mobil Chemicals or Sarlink 3400/4175 Series grade of M/s Teknor Apex Co. USA) conforming to the properties specified in this specification. Use of regenerated /reconstituted material is not permitted.
- 7.2 The polyester & nylon thread used in for manufacturer of Thermoplastic TPV hoses have square woven.
- 7.3 The Manufacturer of Thermoplastic TPV hoses shall have a valid tie-up in form of written Memorandum of Understanding (MOU) with original manufacturers OR their authorized representatives of raw material as above in para 7.1, covering supplies and technical support for at least three years.

8.0 PROPERTIES OF RAW MATERIAL:

The raw materials used in manufacturer of Thermoplastic TPV hose shall confirm to the requirement as given below:

Properties	Test Method	Unit	Specifications
a. Hardness	ASTM-D-2240	Shore A	75±5
b. Specific Gravity	ASTM-D-792	-	0.90±0.05
c. Tensile strength	ASTM-D-412	MPa	6.5 min
d. 100% Modulus	ASTM-D-412	MPa	3.5 min
e. Elongation at break	ASTM D-412	%	275 min
f. Tear Strength	ASTM-D-624	kN/m	25min
g. Compression set At 70 °C for 22hrs	ASTM-D-395B	%	40 max
h. Brittleness Temperature	ASTM D-746	°C	-40 max
i. Water Absorption	ASTM-D-570	%	1.0 max

9.0 TYPE TEST:

The tests specified in S.No. 8 above shall be Type tests and the same shall be carried out by the firm from NABL accredited laboratory. The validity of the type test shall be 12 months. The firm should be able to submit necessary test certificates at the time of inspection of material to the inspecting agency.

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10.0 SAMPLING CRITERIA:

For the purpose of ascertaining the conformity of the hose in a consignment of this specification, the scale of sampling and the criteria for conformity shall be as prescribed in IS: 443.

11.0 ACCEPTANCE TEST:

Unless otherwise agreed between the purchaser and the supplier, the tests mentioned under S.No.5 above shall be acceptance test and should be carried out on each lot/batch manufactured and offered for inspections

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