



Hydraulic Brake Hose Assemblies - Non-Jounce Coupled Stainless Steel Reinforced PTFE

1 Scope

This specification specifies the materials and performance requirements for Polytetrafluoroethylene (PTFE) stainless steel reinforced hose and coupled hose assemblies.

1.1 Material Description.

1.1.1 Material Identification. To properly define the hose assembly, the material specification number (GMW17552) is to be referenced.

1.1.1.1 Hose Construction.

1.1.1.1.1 Inner Tube. The inner tube shall consist of a smooth bore seamless tube of Polytetrafluoroethylene (PTFE) conductive or nonconductive resin conforming to the requirements of Type 1, Grade 4, Class B resin per ASTM D4895.

1.1.1.1.2 Wire Braid Reinforcement. The reinforcement shall consist of 0.20 mm to 0.40 mm diameter AISI type 316 stainless steel wire applied with a weaving construction of two over and two under such that a minimum of 90% coverage is achieved.

1.1.1.1.3 Steel Tube Insert Material. The steel tube insert material shall be GMW14658 Types GE, GN, GY, AN, AY, ZP, ZN, ZY, ZM or AISI type 316 stainless steel. It is acceptable to remove the plastic coating from the sealing service underneath the crimp area as long as the assembly meets the requirements of this specification.

1.1.1.2 Coupling Construction.

1.1.1.2.1 The coupling shall be designed, inserted and crimped so no internal hose abrasions, cuts or flaws shall result. Sharp corners shall be avoided where the coupling contacts the hose to prevent cutting of the hose when subjected to internal pressure. The coupling shall be designed to minimize flow restrictions. Engineering source approval requires submission of drawings showing coupling design and construction (i.e., connector, crimp collar, crimp process) and submission of sectioned samples to demonstrate that all of the coupling construction requirements in this paragraph have been met.

1.2 Symbols.

Not applicable.

1.3 Applicability. The hose assemblies are for use with hydraulic master cylinder brake line applications. The assemblies are suitable for use at temperatures of -40 °C to 150 °C. This type of hose assembly is *not intended* for applications requiring repeated flexing. It must be positioned to avoid contact with other components or surfaces.

1.4 Remarks. Dimensions and Tolerances. Hose supplied for this specification shall conform to the dimensions and tolerances shown in Table 1 for the identified size specified by the purchaser.

Table 1: Dimensions and Tolerances

Metric (SI) Units					
Size (mm)	PTFE Tube Inside Diameter (mm)		PTFE Tube Wall Thickness (mm)	Hose Wall Thickness (mm)	
	Minimum	Maximum	Minimum	Minimum	Maximum
4.75	4.25	5.25	0.61	1.14	1.65
4.75 OS	5.08	5.59	0.61	1.14	1.65
6.00	5.97	6.48	0.56	1.02	1.52
6.35	6.22	6.73	0.61	1.27	1.78
6.35 OS	6.55	7.06	0.61	1.27	1.78
7.94	7.57	8.38	0.63	1.27	1.78
7.94 OS	8.05	8.56	0.63	1.27	1.78

Note: OS: Over Sized Inner Diameter (ID) for use with (GMW14658 GN, GY, ZN, ZY) tube insert.

OS Oversized

SI System International

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D4895	FMVSS 106	SAE J1401
ASTM E4	ISO 9227	

2.2 GM Standards/Specifications.

9986360	GMW14270	GMW14872
GMW3059	GMW14658	

3 Requirements

Hose assemblies shall comply with all applicable requirements of FMVSS 106.

Coupled hose assemblies shall be tested for conformance with the following sections:

Table 2: Test Table

Section	Test	Number Samples
3.1	100% Pressure Test	See (Note 1)
3.2	Volumetric Expansion	4
3.3	Low Temperature Flex	2
3.4	Vacuum Collapse	4
3.5	Pressure Hold and Burst	4
3.6	Tensile	4
3.7	Heat Age/Cold Bend	2
3.8	Constriction	4
3.9	Salt Spray	6
3.10	Cyclical Corrosion	6
3.11	Overcrimp to Three Sigma Limits	16
3.12	Overcrimp to Damage	Design Dependent
3.13	Water Soak - Pressure Hold and Burst	4
3.14	Brake Fluid Compatibility, Constriction, Pressure Hold and Burst	4
3.15	Water Soak - Tensile	4
3.16	Hot Impulse	12

Note 1: Performed for all test samples before conducting test procedures 3.2 through 3.10, and 3.13 through 3.16.

Hose Tests: The number of samples to be tested for conformance to this section is specified within each test. In the event of failure of one sample in a performance test, two times the number of original samples for that test shall be retested. Failure of any one of the retest samples shall cause rejection of the entire lot. A lot is defined as that quantity of hose assemblies submitted for qualification testing. Hose tests should be completed by the hose manufacturer and submitted with package for engineering source approval.

Assembly Tests: The number of samples to be tested for conformance to this section is specified within each test. Except for the Constriction and 100% Pressure Tests, in the event of failure of one sample in a performance test, two times the number of original samples for that test shall be retested. Failure of any one of the retest samples shall cause rejection of the entire lot. A lot is defined as that quantity of hose assemblies submitted for qualification testing. All tested hose assemblies are to be destroyed after testing is completed.

Test Conditions: The ambient temperature of the testing room shall be $24^{\circ}\text{C} \pm 3^{\circ}\text{C}$. Except for the Low Temperature Resistance Test, tests samples are to be conditioned for a least 4 h at test room temperature prior to testing. Brake hose assemblies shall be new, unused and at least 24 h old.

Standard Test Samples: Test samples throughout this specification will be referred to as minimum crimp compression, nominal crimp compression and maximum crimp compression. Appendix A describes the requirements for these conditions. If not specified, the test samples shall be of nominal crimp compression.

3.1 100% Pressure Test. Before shipment by the supplier, each production brake line containing a hose assembly shall be given a final pressure test. Test parts per SAE J1401 4.2.1 except that dry air or nitrogen only shall be used and that the test pressure shall be 13.79 MPa minimum and 17.24 MPa maximum. The brake lines must hold the pressure, with no decay, for not less than 10 s, and not more than 25 s. Brake lines showing leaks shall be rejected and destroyed.

3.2 Volumetric Expansion Test (Four Samples). After 30 minutes of conditioning, test nominal inside diameter hose samples per SAE J1401 4.2.3. The maximum expansion rate of brake hose tested shall not exceed expansion rates in Table 3.