



Material Specification for Transmission Venting Hoses Single and Double Layered

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

This standard covers the material requirements of hoses for use with transmission fluids and related evaporative and vacuum systems. Hoses are intended to withstand continuous service temperatures from -40 °C to the upper temperatures defined in the respective construction. The material content of the hose is defined by the construction class designation for the hose.

1.1 Purpose/Material Description. Each hose type shall be defined by construction. The designation for the hose is defined as GMW17862 Type Y, where Y defines the construction of the hose per 3.2.1, and Table 1.

1.1.1 Construction Type A. Hoses are defined as consisting of a smoothbore tube of Nitrile Butadiene Rubber (NBR) copolymer compound and a cover of Chlorosulfonated Polyethylene (CSM) or Chlorinated Polyethylene (CM) compound. The hoses and/or hose assemblies are capable of giving satisfactory service at temperatures of -40 °C to the continuous temperature of +125 °C, and +150 °C excursion temperature.

1.1.2 Construction Type B. Hoses are defined as consisting of a single wall of Ethylene Acrylic Copolymer (AEM, DuPont VAMAC) compound. The hoses and/or hose assemblies are capable of giving satisfactory service at temperatures of -40 °C to the continuous temperature of +150 °C and +165 °C excursion temperature.

1.1.3 Construction Type C. Hoses are defined as consisting of a smoothbore tube of Ethylene Acrylic Copolymer (AEM) compound and a cover of fluorinated elastomers (FKM) compound. The hoses and/or hose assemblies are capable of giving satisfactory service at temperatures of -40 °C to the outer continuous temperature of +200 °C and +225 °C excursion temperature.

1.1.4 Construction Type D. Hoses are defined as consisting of a single wall of high temperature resistance advanced Ethylene Acrylic Copolymer (AEM) technology with improved high temperature resistance. The hoses and/or hose assemblies are capable of giving satisfactory service at temperatures of -40 °C to the continuous temperature of +170 °C and +180 °C excursion temperature.

1.1.5 Tube Marking. The tubing shall be legibly marked with the following information in the sequence stated: Nominal inside diameter expressed as fraction of an inch (e.g., 3/8 in), GM specification number (GMW17862) and hose type, date code, tube manufacturer's code identification as designated by Rubber Manufacturers Association, and the manufacturing plant location code. Such marking shall be printed parallel to the axis in vivid color (per part specific drawing definition, if not use default orange color) block letters not < 3 mm high and the open space between the specified markings shall not exceed 25 mm. If hose is too short to meet the printing requirement, discuss with Design Release Engineer (DRE) for a proper part mark.

1.1.6 The date code shall consist of six digits: the first two digits shall represent the month (01 through 12) of the year, the next two shall represent the day of the month (01 through 31), and the last two shall be the last two digits of the year.

1.2 Symbols. Not applicable.

1.3 Applicability. Transmission venting hoses for under-the-hood applications.

1.4 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ASTM D380	ISO 36	ISO 48	ISO 1817
ASTM D413	ISO 37	ISO 188	ISO 23529
ASTM D573			

2.2 GM Standards/Specifications.

9986354	B 040 2030	GMW15423	GMW16974
9986368	GMW3059	GMW16444	GMW16974
9986505	GMW14270	GMW16954	GMW17507
9986530 (ID)	GMW14291	GMW16955	

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

2.3 Additional References.

- AW-1 ATF per B 040 2030
- GM Statement of Requirements (SOR)
- Pentosin FFL-4

3 Requirements

3.1 Resources.

3.1.1 Test Samples. Unless otherwise specified, the shape, size, and number of test pieces shall be in accordance with the relevant test methods. Minimum of three (3) test samples (hoses) are required for inspection testing. Report both individual and averaged values. Unless otherwise specified, samples are finished parts or to be taken from finished parts. Where the dimensions of the finished parts do not allow preparing of test pieces, tests are to be performed on sheet material of the same production batch. The same state of cure between slabs or buttons and finished parts must be assured by appropriate tests, which must be described in the test report. If not otherwise stated, mechanical properties in delivery state and after heat or fluid immersion are to be tested at $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$, and with the same test methods.

3.1.2 Conditioning. Conditioning shall be as specified in the relevant test methods.

3.1.2.1 Environmental Conditions. The minimum time between vulcanization and testing of elastomers shall be 72 h. The test pieces shall be maintained at a temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for at least 8 h prior to test and shall be free from strain during this period. Ambient temperature test conditions shall be held to $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. All other temperatures shall be held to $\pm 3\text{ }^{\circ}\text{C}$ and all pressures from 0 kPa thru 690 kPa unless otherwise noted.

3.1.3 Equipment. Conforming to the relevant test methods.

3.1.4 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.5 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to its physical definition.

3.1.6 Facilities. Conforming to the relevant test methods.

3.1.7 Deviations. Deviations from the requirements of this specification shall have been agreed upon by the GM Materials Engineer generating the engineering source approval. Such deviations shall be specified on component drawings, test certificates, reports, etc.

3.2 Hose Construction.

3.2.1 Construction. The construction of the hoses defines the material content and construction of the hoses. The following materials are used in the various constructions.

- Nitrile Butadiene Rubber (NBR)
- Chlorosulfonated Polyethylene (CSM)
- Chlorinated Polyethylene (CM)
- Ethylene Acrylic Copolymer (AEM)

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- Fluorinated Elastomers (FKM)
- High Temperature Resistance Ethylene Acrylic Copolymer (High Temp AEM)

Hose construction are determined by the maximum temperature exposure of the transmission venting hoses. Table 1 provides a generic construction selection guideline.

Table 1: Construction Type and Usage

Inner Materials (Lining)	Outer Materials (Cover)	Application Temperature		Construction Type Coding
		Continuous	Excursion	
NBR	CSM-CM	125 °C	150 °C	A
AEM	None	150 °C	165 °C	B
AEM	FKM	200 °C	225 °C	C
High-Temp-AEM	None	170 °C	180 °C	D

3.2.2 Transmission Fluid Compatibility. The default automatic transmission fluid (ATF) is DEXRON® VI per GMW16444, defined as GMW16955 Code L. To be approved under this specification, suppliers should test their materials in the default ATF.

Since other ATFs are used in GM transmissions; it is the supplier's responsibility to ensure the proposed material shows good fluid resistance in the fluid specified in GM Statement of Requirements (SOR) and/or GM drawings. In any doubt, contact the part releasing engineer for direction. GM designated fluids may include, but is not limited to the following: GMW16444, GMW16974, 9986368, 9986354, 9986505, 9986530 (See Note), GMW16954, Pentosin FFL-4, and AW-1 ATF per B 040 2030.

(Note) = The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.2.3 Dimensions and Tolerances. Hoses furnished to this specification shall conform to the dimensions and tolerances shown in Table 2 for hoses of construction Type A and Type C (double layers); or Table 3 for hoses of construction Type B and D (single layer) for the size (nominal inside diameter) specified by the purchaser. For hoses requiring a cover, the hose cover wall thickness shall be between 25% and 40% of total wall thickness.

Concentricity based on total indicator reading between inside bore of hose and outer surface of hose shall not exceed the values given as follows:

- Sizes 6.35 mm and under: 0.80 mm.
- Sizes over 6.35 mm and up to 12.70 mm: 1.0 mm.
- Sizes over 12.70 mm: 1.3 mm.

Table 2: Dimensions and Tolerances (Type A and Type C -- Double Layer Hoses)

Metric Units					Customary Units				
Size Millimeters (mm)	Inside Diameter (mm)		Outside Diameter (mm)		Size (inches)	Inside Diameter (inches)		Outside Diameter (inches)	
	Max	Min	Max	Min		Max	Min	Max	Min
3.97	4.37	3.57	9.70	9.50	5/32	0.172	0.140	0.383	0.337
4.76	5.16	4.36	10.90	9.74	3/16	0.204	0.172	0.429	0.383
5.56	5.96	5.16	11.69	10.53	7/32	0.235	0.203	0.461	0.415
6.35	6.75	5.95	13.28	12.12	1/4	0.266	0.234	0.530	0.477
7.14	7.54	6.74	14.07	12.91	9/32	0.297	0.265	0.554	0.508
7.94	8.34	7.54	14.87	13.71	5/16	0.328	0.296	0.585	0.539
8.73	9.13	8.33	15.66	14.50	11/32	0.360	0.328	0.617	0.571
9.53	9.93	9.13	16.46	15.30	3/8	0.391	0.359	0.648	0.602
11.11	11.69	10.53	19.05	17.47	7/16	0.461	0.415	0.750	0.688
12.70	13.28	12.12	20.63	19.05	1/2	0.523	0.477	0.812	0.750
15.88	16.67	15.09	24.60	23.02	5/8	0.656	0.594	0.969	0.907
19.05	19.84	18.26	29.37	27.79	3/4	0.781	0.719	1.156	1.094

Max = Maximum, Min = Minimum

Table 3: Dimensions and Tolerances (Type B -- Single Layer Hoses)

Metric Units					Customary Units				
Size Millimeters (mm)	Inside Diameter (mm)		Outside Diameter (mm)		Size (inches)	Inside Diameter (inches)		Outside Diameter (inches)	
	Max	Min	Max	Min		Max	Min	Max	Min
2.78	3.18	2.63	6.86	5.48	7/64	0.125	0.093	0.270	0.230
3.97	4.37	3.57	8.43	7.42	5/32	0.172	0.140	0.332	0.292
4.76	5.16	4.36	9.25	8.23	3/16	0.204	0.172	0.364	0.324
5.56	5.96	5.16	10.03	9.02	7/32	0.235	0.203	0.395	0.355
6.35	6.75	5.95	13.28	12.12	1/4	0.266	0.234	0.523	0.477
7.14	7.54	6.74	14.07	12.91	9/32	0.297	0.265	0.554	0.508
7.94	8.34	7.54	14.87	13.71	5/16	0.328	0.296	0.585	0.539
8.73	9.13	8.33	15.66	14.50	11/32	0.360	0.328	0.617	0.571
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12.70	13.28	12.12	20.63	19.05	1/2	0.523	0.477	0.812	0.750
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