

Because the agency is now proposing separate requirements for plastic tubing in a new section of FMVSS No. 106, NHTSA proposes to delete the lower tensile strength limits for hose that are used for purposes other than connections between a frame and axle or between a towed and towing unit.

The agency proposes that all rubber brake hose meet the requirements for hose that is used between a frame and axle or between a towed and towing unit. NHTSA tentatively concludes that rubber hoses are no longer used extensively for other purposes on heavy vehicles, as plastic tubing is used for most chassis plumbing of air systems. An example of a chassis plumbing use for rubber hose is to connect an air dryer to the wet tank, although here again many vehicles use plastic tubing in this application. NHTSA tentatively concludes that these rubber hoses are of sufficient diameter to have the mechanical strength to meet the higher, frame-to-axle tensile strength requirements. These requirements are similar to the ones originally proposed for FMVSS No. 106 prior to the accommodation of plastic tubing strength requirements. In addition, these tensile strength requirements are currently specified in SAE J1402, which does not distinguish based on the application of the hose and includes the higher force specification. SAE J1402 does not specify a stand-alone tensile strength test, but does specify a water absorption test followed by a tensile strength test, described below. NHTSA welcomes comments on the proposed tensile strength requirements and information on any alternate tensile strength requirements that might be appropriate for rubber hose.

NHTSA also proposes to delete the reference to FMCSR § 393.45 in paragraph S7.3.10 because NHTSA is proposing to incorporate into FMVSS No. 106 many of the SAE requirements referenced in § 393.45 for plastic air brake tubing.

14. Water Absorption and Tensile Strength

FMVSS No. 106 specifies that a hose assembly be immersed in distilled water for 70 hours at room temperature and, within 30 minutes of being removed from the water, be subjected to the tensile strength test and requirements described above. A coiled nylon tube assembly can either meet these specifications/requirements or, alternatively, the requirements in FMCSR § 393.45.

SAE J1402 specifies bending a hose assembly around a test cylinder and, with its ends capped, immersed in tap water at room temperature for 168 hours. Following this, the hose assembly is subjected to a tensile pull test, with the following force levels specified to be achieved without separation or rupture: 250 pounds for hose of ¼ inch, or 6.4 mm, or less, nominal ID; 325 pounds for hose larger than ¼ inch or 6.4 mm. Thus, the tensile strength required in SAE J1402 is similar to that in FMVSS No. 106 for a hose used between a frame and axle, or between a towed and towing vehicle. SAE J1402 does not, however, include lower tensile strength values for hoses that are used between components that do not experience substantial relative motion and it also does not address plastic tubing.

Although the SAE J1402 test specifies a longer water conditioning period than FMVSS No. 106, which would make those specifications more severe, FMVSS No. 106 specifies that the ends of the hose assembly be left open thereby exposing the inside of the hose to water. SAE J1402 also specifies that tap water rather than distilled water (as specified in FMVSS No. 106) be used in this test, which could introduce variability in test results depending on compounds that are in the tap water at any particular location. On balance, it would be difficult to state which test condition is more severe, but NHTSA proposes that the current requirements in paragraph S7.3.11, *Water absorption and tensile strength*, be retained, except as modified by proposed changes to the stand-alone tensile strength

requirements discussed above. NHTSA also proposes to delete the reference to FMCSR § 393.45 in S7.3.11.

15. Zinc Chloride Resistance

Paragraph S7.3.12, *Zinc chloride resistance*, of FMVSS No. 106 requires that a hose assembly be immersed in a 50 percent zinc chloride aqueous solution for 200 hours, with no visible cracks permitted when viewed with 7 power magnification. SAE J1402 does not include a similar requirement. NHTSA does not propose any changes in Standard No. 106's zinc chloride resistance requirements.

16. End Fitting Corrosion Resistance

FMVSS No. 106 requires that air brake hose end fittings meet the same requirements as those specified for hydraulic brake hose end fittings. As is the case for hydraulic brake hoses per SAE J1401, SAE J1402 references the ASTM B117 Method of Salt Spray (Fog) Testing while FMVSS No. 106 references ASTM B117–64. Unlike SAE J1401, SAE J1402 does not exclude brass end fittings from this requirement. While SAE J1402 does not specify the attitude of the brake hose assembly in the chamber, FMVSS No. 106 specifies a 30-degree from vertical angle. Because FMVSS No. 106's end fitting corrosion resistance requirements appear to be more rigorous, NHTSA does not propose any changes to these requirements.

17. Minimum Bend Radius

SAE J1402 specifies minimum bend radius requirements for hose as installed on a vehicle. NHTSA tentatively concludes it would not be appropriate to add these requirements to FMVSS No. 106 because FMVSS No. 106 regulates the properties of brake hoses as stand-alone motor vehicle equipment rather than use requirements.

The table below summarizes the differences between the air brake hose requirements/procedures of FMVSS No. 106 and SAE J1402 and indicates which requirements/procedures NHTSA proposes incorporating into the standard.

TABLE 2.—COMPARISON OF AIR BRAKE HOSE REQUIREMENTS/PROCEDURES IN FMVSS NO. 106 AND SAE J1402

Requirement/procedure		Existing FMVSS No. 106		SAE J1402
Air Brake Hoses				
“X” Indicates Requirements/Procedures Proposed To Be Included in FMVSS No. 106				
Dimensional Specifications	x	Similar, does not include Type A hose		Similar, but includes Type A hose.
Constriction	x	Similar, includes end fittings		Similar but does not include end fittings.
High Temperature Resistance		Similar, but larger test cylinder radii	x	Similar, but smaller test cylinder radii.