

TABLE 3.—COMPARISON OF VACUUM BRAKE HOSE REQUIREMENTS/PROCEDURES IN FMVSS NO. 106 AND SAE J1403—Continued

Requirement/Procedure		Existing FMVSS No. 106		SAE J1403
Deformation	x	Compression test	No corresponding test
End Fitting Corrosion Resistance hose end fittings.	x	Same as for hydraulic brake hose end fittings.		No corresponding test

Note 1: NHTSA proposes performing layer adhesion test once vacuum hose has been conditioned during swell test. NHTSA considers a stand-alone adhesion test unnecessary.

The agency notes that plastic vacuum brake tubing is being used in automotive applications, as it has been requested to issue legal interpretations on the application of requirements in Standard No. 106 to this type of material. This may lead to a situation similar to that for air brake hose, for which both rubber hose and plastic tubing are widely used and the agency is now proposing to create separate requirements for each type of hose. The agency is not aware of an SAE or other industry standard for plastic vacuum brake hose and therefore is not currently proposing any separate requirements for this material. If a suitable industry standard is developed for plastic vacuum brake tubing, the agency may consider adopting those requirements into Standard No. 106 as appropriate, as part of a future rulemaking activity.

D. Plastic Air Brake Tubing

NHTSA's performance requirements and test procedures relating to plastic air brake tubing are located in paragraph S7., *Requirements—Air brake hose, brake hose assemblies, and brake hose end fittings*, and paragraph S8., *Test procedures—Air brake hose, brake hose assemblies, and brake hose end fittings*. The corresponding SAE requirements/procedures are contained in SAE Surface Vehicle Standard J844, *Nonmetallic Air Brake System Tubing*, Rev. June 1988 (SAE J844).

Standard No. 106's requirements for plastic air brake tubing are the same as those for rubber air brake tubing. NHTSA tentatively concludes that FMVSS No. 106 does not adequately address the performance requirements for plastic air brake tubing because of the significant difference in the materials, construction, and end fittings of plastic air brake tubing compared with rubber air brake hose. The agency tentatively concludes that due to the current requirements in the FMCSRs, plastic air brake tubing as widely used on air-braked vehicles has been, up until this time, compliant with SAE J844. Therefore, if SAE J844 compliance is no longer required by the FMCSRs, as has been proposed by the FHWA, then the potential exists that the

requirements currently in Standard No. 106 will not adequately ensure the continued safe performance of plastic air brake tubing.

NHTSA proposes that the substantive requirements/procedures in SAE J844 be incorporated into FMVSS No. 106, including dimensional specifications, classifications, burst test, moisture absorption test, ultraviolet resistance test, cold temperature flexibility test, heat aging test, resistance to zinc chloride and methyl alcohol tests, boiling water stabilization and burst tests, cold temperature impact test, collapse resistance test, and hot tensile strength test. NHTSA proposes that two performance requirements currently in Standard No. 106 for air brake hoses, ozone resistance and oil resistance, continue to be required for plastic tubing. However, for the oil resistance test, NHTSA proposes a new test procedure consisting of oil conditioning followed by a burst test, rather than the volumetric expansion specification currently in Standard No. 106, as a test condition more appropriate for plastic tubing.

The agency also proposes incorporating the classifications and dimensional specifications from SAE Surface Vehicle Standard J1394, *Metric Nonmetallic Air Brake System Tubing*, Rev. April 1991, into FMVSS No. 106. Although not referenced by the petitioners, this standard contains requirements for plastic air brake tubing manufactured in metric sizes. NHTSA tentatively concludes that it is appropriate to include requirements for both metric and inch sizes of plastic air brake tubing.

Plastic air brake tubing is typically sold separately from the end fittings and therefore it is generally not sold or supplied as an air brake hose assembly, with the exception of coiled hoses used between tractors and trailers which are often pre-assembled using permanently-attached end fittings. In light of this, the SAE has developed separate standards for plastic air brake tubing and plastic air brake tubing assemblies and end fittings. SAE J844 contains performance requirements for plastic air brake tubing, while SAE Surface Vehicle

Standard J1131, *Performance Requirements for SAE J844 Nonmetallic Tubing and Fitting Assemblies Used in Automotive Air Brake Systems*, contains performance requirements for plastic air brake tubing assemblies and end fittings.

The requirements in S7 of FMVSS No. 106 were developed for rubber air brake hose that is sized according to internal diameter (ID). Paragraph S7 contains few references to plastic/nylon tubing that, unlike rubber air brake hose, is sized according to outside diameter (OD) and is a significantly different product than rubber hose. Plastic tubing is generally manufactured from nylon but the generic term plastic is used in this notice to account for other types of plastic that may be used for this application. As previously discussed, the applicability of Table III in Standard 106 was amended so that it would only be applicable to brake hoses made from synthetic or natural elastomeric rubber, thus there are no dimensional requirements for plastic tubing in FMVSS No. 106. NHTSA proposes that new dimensional requirements for plastic air brake tubing be included in Standard No. 106 based on the dimensions currently used in SAE J844 (inch units) and SAE J1394 (metric units).

Non-coiled plastic tubing is used for air system plumbing to connect components that maintain a basically fixed relationship during vehicle operation. Coiled plastic tubing is generally used in flexible connections such as between a tractor and a semi-trailer. By coiling a long length of relatively stiff plastic tubing, a flexible coiled arrangement is obtained. Non-coiled tubing differs from conventional rubber hose in that it would not be used between components that experience relative motion, although it would still be subjected to vibration and other loads.

1. Classification

FMVSS No. 106 references Type I and Type II air brake hose and reusable end fittings which are required to be labeled as either "AI" or "AII." SAE J844 and SAE J1394 classify plastic tubing as "A"