

set the temperature of the environmental chamber to minus 40 °F. After 500,000 cycles, set the temperature of the environmental chamber to 220 °F. After 750,000 cycles, set the temperature of the environmental chamber to minus 40 °F. Measure the air flow rate just prior to 1,000,000 cycles and if the compressed air flow rate supplied to the air brake tubing assembly exceeds 50 cm<sup>3</sup> per minute this constitutes failure of the test. Stop the cycling at 1,000,000 cycles and set the environmental chamber temperature to 75 °F, while air pressure is still supplied to the air brake tubing assembly. After 1 hour, measure the compressed air flow rate supplied to the air brake tubing assembly and if the rate exceeds 25 cm<sup>3</sup> per minute this constitutes failure of the test.

(iv) For end fittings that use a threaded retaining nut, apply 20 percent of the original tightening torque as measured in S11.3.22, in the direction of tightening. If the retention nut visibly moves, this constitutes a failure of the test.

**S12.24 End fitting retention test.**

(a) *Apparatus.* A source of hydraulic pressure that includes a pressure gauge or monitoring system, and uses a petroleum-based hydraulic fluid with a pour point of less than minus 40 °F.

(b) *Preparation.* Utilize an air brake tubing assembly or prepare an air brake tubing assembly with a free length of twelve inches in accordance with the end fitting manufacturer's instructions. Attach one end of the assembly to the hydraulic pressure supply and plug the other end of the assembly, and fill the assembly with hydraulic fluid and bleed any air from the assembly. Increase the hydraulic pressure inside the tubing assembly at a constant rate to 50 percent of the burst pressure for the size of tubing being tested as specified in Table VIII within a period of 5 seconds, and hold this pressure for 30 seconds. Then increase the hydraulic pressure inside the tubing assembly at a constant rate to the burst pressure for the size of tubing

being tested as specified in Table VIII within a period of 5 seconds. Visually inspect the assembly for leakage or separation at the end fittings.

**S12.25 Thermal conditioning and end fitting retention test.**

(a) *Apparatus.* A source of hydraulic pressure that includes a pressure gauge or monitoring system, uses a petroleum-based hydraulic fluid with a pour point of less than minus 40 °F, and is constructed so that an air brake tubing assembly mounted to it can be conditioned in an environmental test chamber.

(b) *Preparation.* Utilize an air brake tubing assembly or prepare an air brake tubing assembly with a free length of twelve inches in accordance with the end fitting manufacturer's instructions. Attach one end of the assembly to the hydraulic pressure supply and plug the other end of the assembly, fill the assembly with hydraulic fluid and bleed any air from the assembly, and place the tubing assembly inside an environmental chamber. Conduct the following tests:

(i) With atmospheric pressure applied to the hydraulic fluid inside the tubing assembly, set the environmental chamber temperature to 200 °F and condition the tubing assembly for 24 hours.

(ii) With the temperature maintained at 200 °F, increase the hydraulic pressure inside the tubing assembly at a constant rate to 450 psig within a period of 5 seconds, and hold this pressure for 5 minutes.

(iii) Decrease the pressure inside the tubing assembly to atmospheric and set the temperature of the environmental chamber to 75 °F. Condition the tubing assembly at this temperature for 1 hour.

(iv) Set the temperature of the environmental chamber to minus 40 °F and condition the tubing assembly for 24 hours.

(v) With the temperature maintained at minus 40 °F, increase the hydraulic pressure inside the tubing assembly at a constant rate to 450 psi within a period of 5 seconds, and hold this pressure for

5 minutes. Visually inspect the assembly for leakage or separation at the end fittings.

**S12.26 End fitting serviceability.**

(a) *Apparatus.* A source of air pressure that includes a pressure gauge or monitoring system and is equipped with a mass flow meter.

(b) *Preparation.* Prepare a 12 inch length of plastic air brake tubing and plug one end. Assemble the end fitting with the threaded retention nut on the other end of the tubing according to the end fitting manufacturer's instructions, and then disassemble the fitting. Repeat the assembly and disassembly sequence three more times, and then reassemble the end fitting (five total assembly steps).

(c) Attach the end fitting with the threaded retention nut to the source of air pressure. Pressurize the tubing assembly to a pressure of 120 psi in a period of two seconds. If the end fitting leaks, measure and record the leakage rate using the mass air flow meter.

**S12.27 End fitting corrosion resistance.** Conduct the test specified in S6.9 using a plastic air brake tubing assembly.

**S13. Test conditions.** Each hose assembly or appropriate part thereof shall be able to meet the requirements of S5, S7, S9, and S11, under the following conditions.

**S13.1 The temperature of the testing room is 75 °F.**

S13.2 Unless otherwise indicated, the test samples are stabilized at test room temperature prior to testing.

S13.3 The brake hoses and brake hose assemblies are at least 24 hours old, and unused.

S13.4. Specified test pressures are gauge pressures (psig).

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