

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J343 Test and Test Procedures for SAE 100R Series Hydraulic Hose and Hose Assemblies

SAE J517 Hydraulic Hose

SAE J1273 Recommended Practices for Hose Assemblies

SAE J1475 Hydraulic Hose Fittings for Marine Applications

SAE J1527 Marine Fuel Hoses

SAE J1942-1 Qualified Hoses for Marine Applications

2.1.2 ASTM Publication

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 1141-98 Specification for Substitute Ocean Water

2.1.3 MSHA Publication

Available from MSHA, 1100 Wilson Boulevard, 21st Floor, Arlington, VA 22209-3939, Tel: 202-693-9400, www.msha.gov.

MSHA 30 CFR 18.65 Conservation of Power and Water Resources—Subchapter B—Regulations Under the Federal Power Act

2.1.4 ISO Publication

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 15541 Ships and marine technology—Fire resistance of hose assemblies—Requirements for the test bench

3. HOSE APPLICATION/CONSTRUCTION

Hose construction and performance shall conform to Table 1.

TABLE 1 - HOSE APPLICATION/CONSTRUCTION

Code	Application	Maximum Working Pressure	Hose Reinforcement/ Construction	Requirements	Notes
HF	All Services	⁽¹⁾⁽²⁾	Plies or braids of steel wire with or without textile ⁽³⁾	Sections 6, 7, 8, 9, 10, 11 (SAE J517 may be substituted for Section 9)	Acceptable for Codes H, VW, NVW, and F applications ⁽²⁾
H	Fluid Power (Hydraulic Systems)	⁽¹⁾	Plies or braids of steel wire or textile ⁽³⁾	Sections 6, 7, 9, 10, 11 (SAE J517 may be substituted for Section 9)	Acceptable for Codes H, VW, and NVW applications
F	Lube Oil and Fuel Systems	⁽¹⁾	Plies or braids of steel wire with or without textile ⁽³⁾	Sections 6, 7, 8, 9, (impulse per 9E not required) 10, 11	Acceptable for Codes F, VW, and NVW applications
VW	Vital and Nonvital Fresh and Salt Water	⁽¹⁾	Plies or braids of steel wire or textile ⁽³⁾	Sections 6, 7, 10, 11	Acceptable for Codes VW and NVW applications
NVW	Nonvital Water and Pneumatic	0.34 MPa	Optional	Sections 6, 7, 10, 11	Acceptable for Code NVW application only

1. As rated by SAE J517 or as rated by manufacturer.

2. Maximum working pressure for lube oil and fuel systems applications (Code F) may be less than maximum working pressure for other systems applications, e.g., Code H. Refer to manufacturer's catalog and Hose Assemblies List, SAE J1942-1.

3. Wire helix construction may be used on suction and return lines in conjunction with a textile reinforcement.

4. FITTINGS

Fittings shall conform to SAE J1475 where applicable. Only hose and fitting combinations that have been tested and passed the requirements of this document as hose assemblies are acceptable. Push-on fittings, quick disconnect couplings and fittings with a single worm-gear clamp or a single band around the hose are unacceptable.

5. QUALIFICATION TESTS

For qualification to this document, hose and/or assemblies made from, shall conform to the tests and requirements specified in Table 1 for each hose application.

Testing shall conform to SAE J343 except as noted.

Manufacturers wishing to have their hose assemblies listed in SAE J1942-1 shall:

- a. Successfully test their hose to the requirements of Table 1.
- b. Submit a letter of certification to the SAE J1942 test requirements for each specific type of hose tested. All sizes should be included in the same letter, which must also include all of the information necessary to make a SAE J1942-1 listing.
- c. The SAE will review the letter and may, at their discretion, request to see some or all of the test results. A copy of the submittal letter marked "Accepted For Listing" will be returned to the applicant and a duplicate copy sent to the USCG.
- d. The cutoff date for inclusion of a hose listing in the annual SAE Handbook is April 30 of the preceding year. However, listed hoses may be used on vessels as soon as the "Accepted for Listing" letter is issued by the SAE.

6. IMMERSION-BURST TEST

One 450 mm assembly, uncapped, shall be completely immersed in a nonpressurized, closed container filled with synthetic sea water conforming to ASTM D 1141-98 for $48 \text{ h} \pm 1 \text{ h}$ at $70 \text{ }^\circ\text{C} \pm 1 \text{ }^\circ\text{C}$. The assembly shall then be removed and held for $48 \text{ h} \pm 1 \text{ h}$ in air at room temperature $21 \text{ }^\circ\text{C} \pm 2.5 \text{ }^\circ\text{C}$. Following this aging, the assembly shall be subjected to the burst test specified in SAE J343.

Burst shall not occur at a pressure less than four times the maximum working pressure of the hose. Within 0.5 h following the burst test, the hose shall be cut apart and the reinforcement examined for signs of corrosion and/or deterioration. The wire of wire reinforced hose shall not show red rust.

7. FLAME RESISTANCE TEST

The hose cover shall pass the MSHA (Mine Safety Health Administration) flame resistance requirements of 30 CFR 18.65. In lieu of testing the hose cover, it may be protected by a fire sleeve of suitable material that conforms to the flame resistance criteria of 30 CFR 18.65.

8. FIRE RESISTANCE TEST

The test described in paragraph 8.2 is becoming the preferred method for qualifying hose assemblies. Manufacturers qualifying hoses to this specification may do so using either test method. Hose assemblies currently listed in SAE J1942-1 were qualified using the existing 2.5 Minute Fire Test (paragraph 8.1). These hoses will now be identified as SAE J1942 Type "A" hose.

Manufacturers who wish to requalify their existing hose or new hose to the 30 minute test (paragraph 8.2) these hoses will be identified as SAE J1942 Type "B".

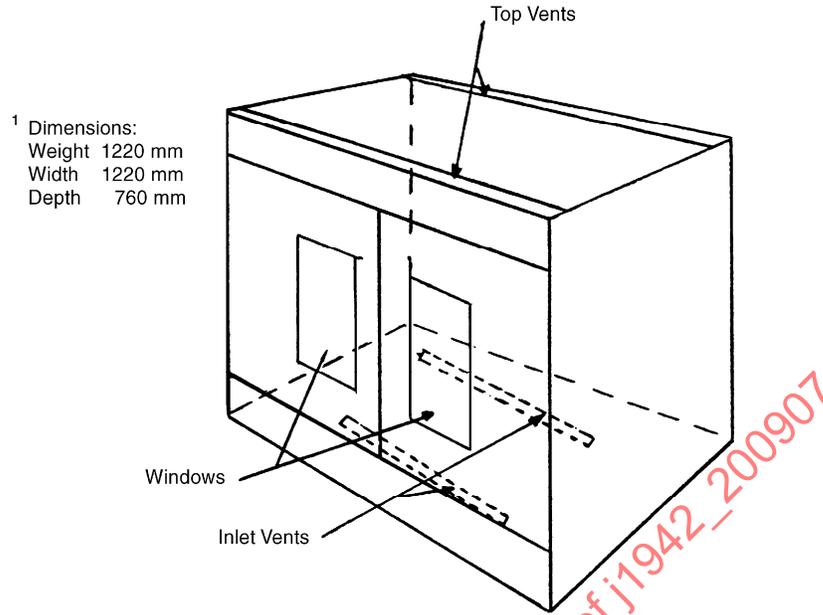
8.1 2.5 Minute Fire Test

For hose 51 mm inside diameter and smaller, three assemblies are to be consecutively tested for fire resistance. For hoses larger than 51 mm inside diameter, one hose assembly shall be tested. Free hose length measured between the fittings shall be 400 to 600 mm. At least one end fitting shall be positioned to be engulfed in the flame. The hose shall be positioned 230 mm above the top edge of an open pan the size of 215 x 355 x 13 mm. Sufficient heptane or other equivalent fuel shall be added to the pan to provide for a 2-1/2 min burn.

Thermocouples shall be mounted so as to sense the flame temperature in the same plane and elevation as the hose assembly. The assembly shall be pressurized with water to the maximum working pressure and maintained during the burning portion of the test. Following ignition of the fuel, timing shall begin and the temperature shall be monitored. The temperature shall reach a minimum of $650 \text{ }^\circ\text{C}$ but shall not exceed $730 \text{ }^\circ\text{C}$. (If $650 \text{ }^\circ\text{C}$ is not reached, the test must be repeated with a new sample. If $730 \text{ }^\circ\text{C}$ is exceeded, results may be discarded and the test repeated).

At the end of the 2-1/2 min of fire exposure, the flame shall be extinguished and pressure relieved. Water from a source located 915 mm above the specimen shall flow through the assembly. Failure to achieve free flow shall constitute failure. With free flow established, the assembly shall be pressurized to the maximum working pressure for 30 seconds. Leakage during the fire exposure or subsequent pressure test constitutes a failure. Reference Figures 1 and 2 for fire test set-up and test chamber.

NOTE: Hose assemblies may use protective fire sleeves.



¹ Dimensions may vary slightly provided that all other test parameters in Section 8 are met.

FIGURE 1 - FIRE TEST CABINET

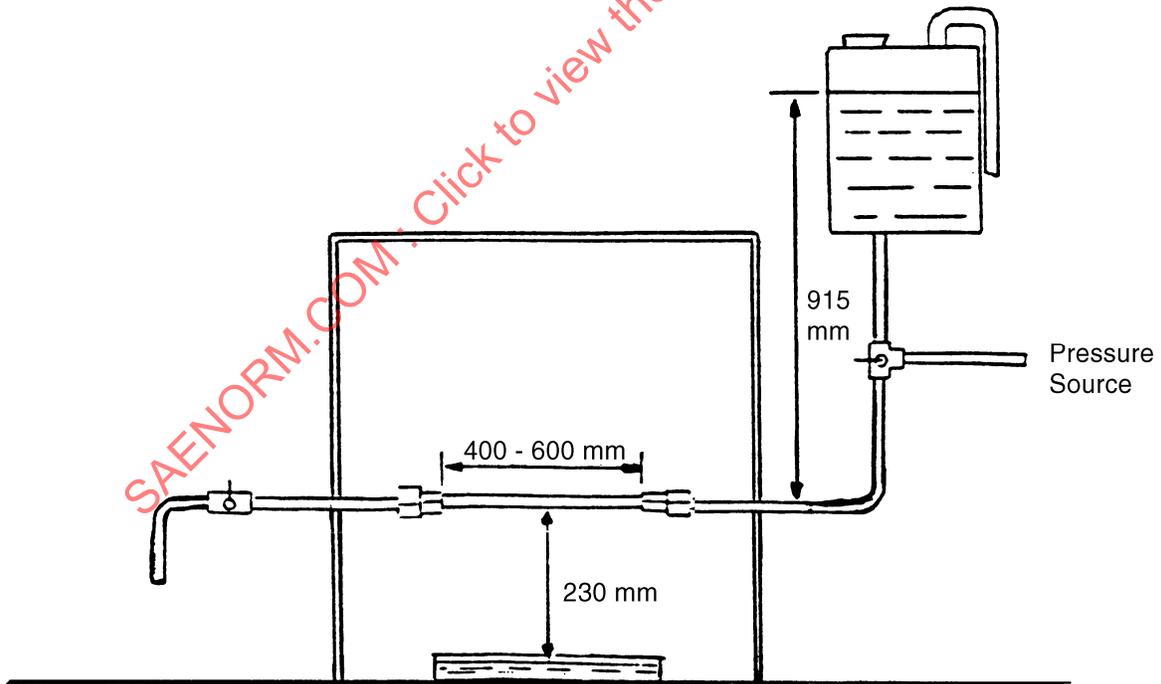


FIGURE 2 - TEST SET-UP

8.2 30 Minute Fire Test

For hose assemblies up to and including 100 mm in diameter. This procedure may be used for larger sizes provided that proper test bench (ISO 15541) conditions are obtained. Tests shall be conducted on a minimum of three assemblies of different nominal diameters, of the same construction. One each of the smallest, middle and largest sizes within a series shall be tested. Free hose length measured between the connectors shall be a minimum of 500 mm. The hose assembly shall be installed on the test bench (ISO 15541) so that the burner end extends beyond the hose connector by at least 20 mm so that one connector is completely engulfed in the flame with the hose positioned so that it is centered over the flame. To ensure that the flame engulfs the test specimen the minimum burner width from Table 2 shall be used.

TABLE 2 - MINIMUM BURNER WIDTH

Outside Diameter of Hose	Dimensions are in millimeters	
	Minimum Width of Burner	
5 to 25	50	
From 25 to 75	100	
From 75 to 125	150	
From 125 to 150	200	
From 150 to 200	250	

Test specimen shall be flushed with test medium water for at least one (1) minute to remove as much air as possible from the test specimen. Thermocouples shall be mounted so temperatures can be measured at the positions indicated in Figure 3.

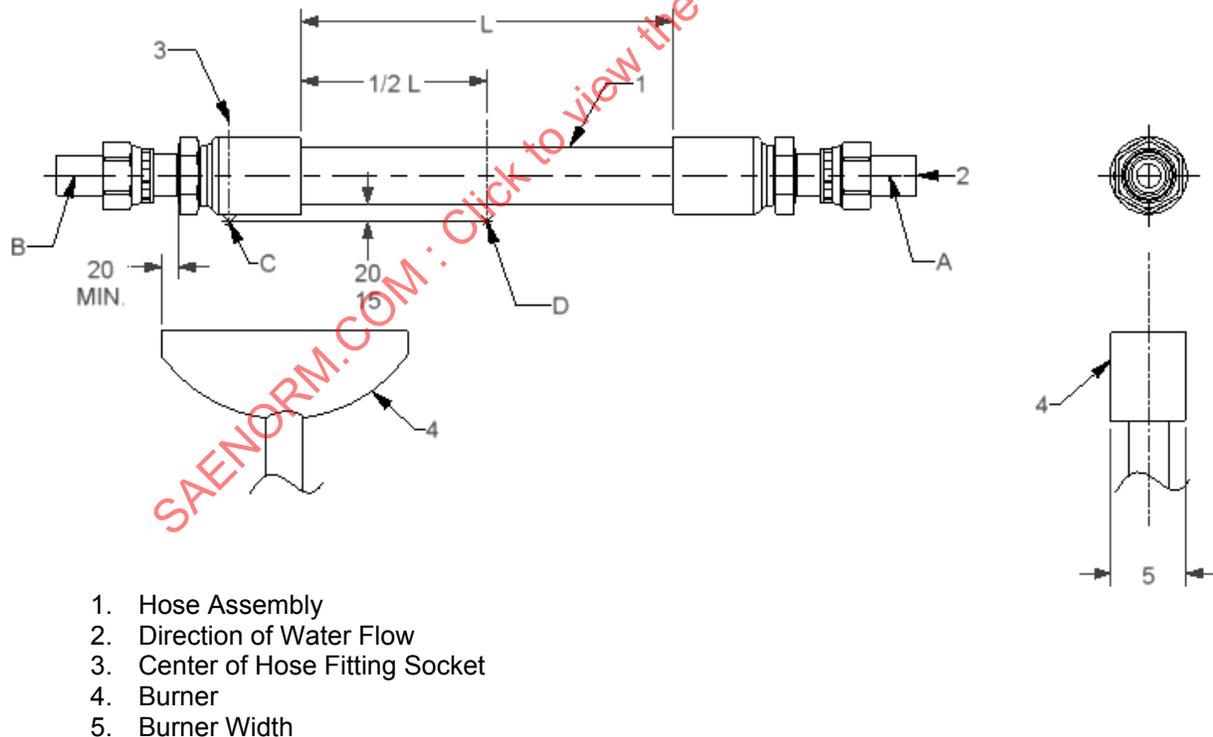


FIGURE 3 - TEST SPECIMEN TO FLAME ARRANGEMENT

The test specimen shall be subjected to a working pressure of 0.5 ± 0.02 MPa as provided for the test. The test duration starts at the moment the test specimen is subjected to the test temperature (flame temperature), which shall have been reached at both measuring points. The duration of the test is 30 minutes. The temperatures according to Table 3 shall be observed. The velocity of the water flow through the test specimen will need to be adjusted to ensure the water temperatures indicated in Table 3 are maintained.