

## Chapter 7 Service Testing

### 7.1\* Service Test Pressure.

#### 7.1.1 Hose Manufactured Prior to July 1987.

**7.1.1.1** The service test pressure for hose manufactured prior to July 1987 to meet the requirements of the 1979 and previous editions of **NFPA 1961, Standard on Fire Hose**, shall be determined from **Table 7.1.1.1** based on the type of hose and the acceptance or proof test pressure that is stenciled on each length of hose and reads "Tested to \_\_\_ psi."

**Table 7.1.1.1 Service Test Pressures for Hose Manufactured Prior to July 1987**

Trade Size			New Hose Rated Acceptance Test Pressure		Service Test Pressure	
in.	mm	Jackets	psi	kPa	psi	kPa
Lined industrial, standpipe, and fire department						
1½-2½	38-65	Single	300	2070	150	1030
1½-4½	38-114	Single	400	2760	250	1720
1½-2½	38-65	Single	500	3450	250	1720
1½-4	38-100	Multiple	400	2760	250	1720
1½-4	38-100	Multiple	600	4140	250	1720
Lined forestry						
1 and 1½	25 and 38	Single	450	3100	250	1720
Relay supply						
3½-5	90-125	Single	400	2760	200	1380
5-6	125-150	Single	300	2070	150	1030
Pump supply (soft suction)						
4-6	100-150	Multiple	400	2760	200	1380

**7.1.1.2** The acceptance or proof test pressure that is stenciled on hose manufactured prior to July 1987 shall not be used for the service test pressure.

#### 7.1.2 Hose Manufactured July 1987 and After.

**7.1.2.1** The service test pressure for hose manufactured in July 1987 and after to meet the requirements of the 1987 and subsequent editions of **NFPA 1961, Standard on Fire Hose**, is stenciled on each length of hose and reads "Service Test to \_\_\_ psi per NFPA 1962" or "Service Test to \_\_\_ bar per NFPA 1962."

**7.1.2.2** New proof pressure tests for hoses shall only be conducted at the point of manufacture or at a facility equipped to perform these tests.

**7.1.2.3** Tests in the field shall not subject the hose to its proof test pressure.

**7.1.3\*** After the correct service test pressure has been determined for each length of hose to be tested, the service test shall be conducted as specified in Section **7.2**.

### 7.2 Service Test Procedure.

**7.2.1** Each length of hose to be service-tested shall be inspected as specified in Section **4.6**.

**7.2.2** Any length of hose that fails the inspection shall be removed from the service test area and repaired as

necessary or condemned.

**7.2.3** Lengths of hose to be tested simultaneously shall be of the same service test pressure and shall be considered the hose test layout.

**7.2.4\*** The total length of any hose line in the hose test layout to be service-tested shall not exceed 300 ft (91 m).

**7.2.5** The hose test layout shall be straight, without kinks or twists.

**7.2.6** All 3½ in. (89 mm) and larger diameter hose shall be service-tested while lying flat with a short length of smaller diameter hose with the same or higher proof pressure used to connect the pressure source to the hose being tested.

**7.2.7\*** A test location shall be selected that allows connection of the hose testing apparatus (pressure source) to a water source.

**7.2.8\*** A hose testing machine, a stationary pump, or a pump on a fire department apparatus shall be used as a pressure source.

**7.2.8.1** If a hose testing machine is used, the procedure defined in Section 7.6 shall be used.

**7.2.8.2** If a stationary pump or a pump on a fire department apparatus is used, the procedure defined in Section 7.7 shall be used.

**7.2.9** At the conclusion of the test, the hose records specified in Chapter 5 shall be updated to indicate the results of the service test for each length of hose tested.

**7.2.10\*** Any hose that fails the inspection defined in Section 4.6, bursts or leaks during the service test, or has couplings that leak or are otherwise found defective as defined in 6.2.3 shall be tagged as required in 5.1.6 or 5.3.6 and removed from service.

**7.2.10.1** If the hose leaks or the hose jacket fails inspection, a distinguishing mark noting the location of the defect(s) shall be placed on the hose.

**7.2.10.2** If the couplings fail or are defective, they shall be repaired or replaced.

**7.2.10.3\*** If the hose cannot be repaired, the couplings shall be removed from both ends.

**7.2.11** If the hose is repaired, or the couplings are repaired or replaced, the hose shall be service tested in accordance with Chapter 7 before being placed back in service.

**7.2.12** After testing, all hose shall be thoroughly cleaned, drained, and dried as specified in Section 4.7 before being placed in service or storage.

### **7.3 Unlined Hose.**

Unlined fire hose shall be replaced with an approved lined fire hose when service testing is required.

### **7.4 Booster Hose.**

**7.4.1\*** Booster hose shall be tested in accordance with Section 7.2 to 110 percent of its maximum working pressure.

**7.4.2** If a maximum working pressure cannot be determined for the hose, it shall be tested to 110 percent of the normal highest working pressure as used in the system.

### **7.5\* Suction Hose.**

**7.5.1** Suction hose shall be dry-vacuum tested using the following procedure.

(A) The hose shall be attached to a suction source.

(B) The free end shall be sealed with a transparent disk and connected to an accurate vacuum measuring instrument.

(C) A 22 in. mercury (0.75 bar or 74.5 kPa) vacuum shall be developed.

(D) While holding the vacuum for 10 minutes, the interior of the hose shall be inspected through the transparent disk.

(E) There shall be no signs of physical damage or collapse of the lining into the waterway.

### 7.6 Service Test Using a Hose Testing Machine.

The procedure defined in this section shall be used when hose is service-tested using a hose testing machine.

**WARNING:** Because there is a potential for catastrophic failure during the service testing of fire hose, it is vital that safety precautions be taken to prevent exposure of anyone to this danger. Do not deviate from the procedures prescribed in this section.

**7.6.1 Hose Testing Machine Integrity.** The condition of the hose testing machine shall be thoroughly checked daily before each testing session and before the machine is used after being transported to a new testing site.

**7.6.1.1** The hose testing machine shall be carefully examined for damaged components that might fail during the test.

**7.6.1.2** If any damage is discovered, the hose testing machine shall not be used until the damaged component (s) is repaired or replaced.

**7.6.1.3** A pressure leak integrity test shall be performed on the machine to determine whether the pressurized outlet side of the machine and its related components are leak-free.

**7.6.1.3.1** The fire hose outlet connection(s) of the machine shall be capped or otherwise closed.

**7.6.1.3.2** Pressure shall be applied through the machine using the integral pump to a level that is 10 percent higher than the highest service test pressure needed for the hose to be tested.

**7.6.1.3.3** The pressure shall be held for 3 minutes with the pump turned off.

**7.6.1.3.4** If leaks are detected, the testing machine shall not be used until the leaking component(s) is repaired or replaced.

**7.6.1.4** The test gauge that is used to read the test pressure shall have been calibrated within the previous 12 months.

### 7.6.2 Conducting the Test.

**7.6.2.1** The test layout shall be connected to the outlet side of the water supply valve on the hose testing machine.

**7.6.2.2** A test cap with a bleeder valve shall be attached to the far end of each hose line in the test layout. If a test cap is not available, a nozzle with a nontwist shutoff shall be permitted to be used.

**7.6.2.3** With the test cap valve or the nozzle open, the pressure shall be raised gradually to 45 psi  $\pm$  5 psi (3.1 bar  $\pm$  0.35 bar or 310 kPa  $\pm$  35 kPa).

**7.6.2.4\*** After the hose test layout is full of water, all the air in each hose line shall be exhausted by raising the discharge end of each hose line above the highest point in the system.

**WARNING:** Take care to remove all air from the hose before the valve in the test cap or the nozzle is closed and the pressure raised. The development of test pressures introduces a serious accident potential if air remains in the system.

**7.6.2.5** The nozzle or test cap valve shall be closed slowly, and then the outlet water supply valve shall be closed.

**7.6.2.6\*** The hose directly in back of the test cap or the nozzle shall be secured to avoid possible whipping or other uncontrolled reactions in the event of a hose burst.

**7.6.2.7** With the hose at 45 psi  $\pm$  5 psi (3.1 bar  $\pm$  0.35 bar or 310 kPa  $\pm$  35 kPa), it shall be checked for leakage at each coupling and the couplings tightened with a spanner wrench where necessary.

**7.6.2.8** Each hose shall then be marked at the end or back of each coupling to determine, after the hose has been drained, if the coupling has slipped during the test.

**7.6.2.9** All personnel other than those persons required to perform the remainder of the procedure shall clear the area.

**7.6.2.10** The pressure shall be raised slowly at a rate not greater than 15 psi (1 bar or 103 kPa) per second until the service test pressure is attained and then maintained, by pressure boosts if necessary, for the duration of the stabilization period.

**7.6.2.11** The stabilization period shall be not less than 1 min per 100 ft (30 m) of hose in the test layout.

**7.6.2.12** After the stabilization period, the hose layout shall hold the service test pressure for 3 minutes without further pressure boosts.

**7.6.2.13** While the hose test layout is at the service test pressure, it shall be inspected for leaks.

**7.6.2.13.1** If the inspecting personnel walk the test layout to inspect for leaks, they shall be at least 15 ft (4.5 m) to the left side of the nearest hose line in the test layout. The left side of the hose line shall be defined as that side that is to the left when facing the free end from the pressure source.

**7.6.2.13.2** Personnel shall never stand in front of the free end of the hose, on the right side of the hose, or closer than 15 ft (4.5 m) on the left side of the hose, or straddle a hose in the test layout during the test.

**7.6.2.14** If the hose test layout does not hold the service test pressure for the 3-minute duration, the service test shall be terminated.

**7.6.2.14.1** The length(s) of hose that leaked shall have failed the test.

**7.6.2.14.2** The test layout shall be drained and the defective hose removed from the test layout.

**7.6.2.14.3** The service test shall be restarted beginning with the procedures required in [7.6.2.1](#).

**7.6.2.15** After 3 minutes at the service test pressure, each test cap or nozzle shall be opened to drain the test layout.

#### **7.6.2.16 Coupling Slippage.**

**7.6.2.16.1** The marks placed on the hose at the back of the couplings shall be observed for coupling slippage.

**7.6.2.16.2** If the coupling has slipped, the hose shall have failed the test.

### **7.7 Service Test Using a Stationary Pump or a Pump on a Fire Department Apparatus.**

The following procedure shall be used when hose is to be service-tested using a stationary pump or a pump on a fire department apparatus.

**WARNING:** Because there is a potential for catastrophic failure during the service testing of fire hose, it is vital that safety precautions be taken to prevent exposure of anyone to this danger. Do not deviate from the procedures prescribed in this section.

**7.7.1** The test gauge that is used to read the test pressure shall have been calibrated within the previous 12 months.

**7.7.2\*** A hose test valve consisting of a fire department gate valve with a  $\frac{1}{4}$  in. (6.4 mm) opening drilled through the gate and designed to withstand the service test pressures shall be used between the pump and the hose test layout.

**7.7.3** The test layout shall be connected to the hose test valve.

**7.7.3.1** If a pump on a fire apparatus is used, the hose test valve shall not be attached to any discharge outlet at or adjacent to the pump operator's position.

**7.7.3.2** The hose test valve end of the hose line shall be secured with a belt tie-in or rope hose tool at a point 10 in. to 15 in. (250 mm to 400 mm) from the coupling.

**7.7.4** A test cap with a bleeder valve shall be attached to the far end of each hose line in the test layout. If a test cap is not available, a nozzle with a nontwist shutoff shall be permitted to be used.

**7.7.5** With the hose test valve open and the test cap valve or nozzle open, the pressure shall be gradually raised to 45 psi  $\pm$  5 psi (3.1 bar  $\pm$  0.35 bar or 310 kPa  $\pm$  35 kPa).

**7.7.6\*** After the hose test layout is full of water, all air in each hose line shall be exhausted by raising the discharge end of each hose line above the highest point in the system.

**WARNING:** Take care to remove all air from the hose before the valve in the test cap or the nozzle is closed and the pressure raised. The development of test pressures introduces a serious accident potential if air remains in the system.

**7.7.7** The nozzle or test cap valve shall be closed slowly, and then the hose test valve shall be closed.

**7.7.8\*** The hose directly in back of the test cap or the nozzle shall be secured to avoid possible whipping or other uncontrolled reactions in the event of a hose burst.

**7.7.9** With the hose at 45 psi  $\pm$  5 psi (3.1 bar  $\pm$  0.35 bar or 310 kPa  $\pm$  35 kPa), it shall be checked for leakage at each coupling and the couplings tightened with a spanner wrench where necessary.

**7.7.10** Each hose shall then be marked at the end or back of each coupling to determine, after the hose has been drained, if the coupling has slipped during the test.

**7.7.11** All personnel other than those persons required to perform the remainder of the procedure shall clear the area.

**7.7.12** The pressure shall be raised slowly at a rate not greater than 15 psi (1 bar or 103 kPa) per second until the service test pressure is attained and then maintained for 3 minutes.

**7.7.13** While the test layout is at the service test pressure, the hose shall be inspected for leaks.

**7.7.13.1** If the inspecting personnel walk the test layout to inspect for leaks, they shall be at least 15 ft (4.5 m) from either side of the nearest hose line in the test layout.

**7.7.13.2** Personnel shall never stand in front of the free end of the hose, or closer than 15 ft (4.5 m) on either side of the hose, or straddle a hose in the test layout during the test.

**7.7.14** If, during the test, a section of hose is leaking or a section bursts, the service test shall be terminated.

**7.7.14.1** The length(s) of hose that leaked or burst shall have failed the test.

**7.7.14.2** The test layout shall be drained and the defective hose removed from the test layout.

**7.7.14.3** The service test shall be restarted beginning with the procedures required in [7.7.3](#).

**7.7.15** After 3 minutes at the service test pressure, the pump shall be shut down, the hose test valve opened, the pressure allowed to equalize with the source, the pump discharge gates closed, and each test cap valve or nozzle opened to drain the test layout.

#### **7.7.16 Coupling Slippage.**

**7.7.16.1** The marks placed on the hose at the back of the couplings shall be observed for coupling slippage.

**7.7.16.2** If the coupling has slipped, the hose shall have failed the test.

#### **NEXT CHAPTER**