

<p style="text-align: center;"><b>TOWNSHIP FIRE DEPARTMENT</b> <b>CHAPTER 3: SUGGESTED OPERATING GUIDELINES</b></p>
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Part 1: Maintenance and Repair Guidelines

Subject: Care & Use of Fire Hose, Couplings & Nozzles Including Service Testing

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Section: 3-1-1

Effective Date: 10-28-02

Reviewed/Revised Date: 06-28-10

- 1.01 Purpose. To provide guidelines for the care of fire hose, couplings, and nozzles including record keeping, inspecting and service testing.
- 1.02 Goal. These guidelines will be in effect for all members of Township Fire Department, Inc.
- 1.03 Definitions.
  - A) Attack Hose. Hose designed to be used by trained firefighters to combat fires beyond the incipient stage.
  - B) Booster Hose. A non-collapsible hose used under positive pressure having an elastomeric or thermoplastic tube, a braided or spiraled reinforcement, and an outer shell protective cover.
  - C) Forestry Hose. A hose designed to meet specialized requirements for fighting wildland fires.
  - D) Suction Hose. A hose used for drafting water from static supplies (creeks, rivers, wells, etc.). It can also be used for supplying pumps on fire apparatus from hydrants if designed for that purpose. The hose contains a semi rigid or rigid reinforcements designed to prevent collapse of the hose under vacuum.
  - E) In Use. Hose being used during fire suppression or during training.
  - F) Large-Diameter Hose. A hose 3½ inch size or larger.
  - G) Psi. Pounds per square inch.
  - H) Service Test. Hydrostatic test conducted by users of all in-service hose to determine suitability for continued service.

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1.04 Attack Hose, Supply Hose, and Forestry Hose.

- A) Hose shall be inspected after each use and service tested prior to being placed in service for the first time and at least annually thereafter.
- B) Hose carried on fire apparatus shall be loaded in such a way that air can circulate under the hose load to eliminate or reduce the growth of mildew in the hose jackets and rust and corrosion in the hose compartment. Only clean, dry hose shall be placed in service. Clean, wet hose should only be loaded when clean, dry hose is not available. In those cases, once dry hose becomes available remove the wet hose and replace with dry hose.

1.05 Large-Diameter Supply Hose.

- A) Large-diameter hose marked SUPPLY HOSE shall not be used at operating pressures exceeding 185 psi when relaying water from pumper to pumper, and when directing supply attack lines, master stream appliances, portable hydrants, manifolds, and standpipe and sprinkler systems.
- B) A pressure and volume relief device with adequate capabilities and a maximum setting, not to exceed the service test pressure of the hose being used, shall be used on the discharge side of the pump when large-diameter supply hose is being used to supply attack lines, manifolds, and standpipe and sprinkler systems.
- C) Where large-diameter hose marked SUPPLY HOSE is used between fire department pumpers, the suction of each receiving pumper shall be equipped with a relief valve. The maximum pressure setting of the relief valve(s) shall not be more than 10 psi over the static pressure of the water source to which it is connected or not more than 10 psi over the discharge pressure of the supply pumper in a relay. In no event shall it exceed the working pressure of the hose used with the system.

1.06 Booster and Suction Hose.

- A) The hose shall be inspected after each use, and prior to being placed in service for the first time and at least annually thereafter.
- B) Hose shall be stored out of direct sunlight and as recommended by the manufacturer.

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- C) Hose that has the reinforcement exposed shall be removed from service and repaired or condemned.

1.07 Inspecting.

- A) Physical inspection shall determine that the hose jacket, couplings, gaskets and any nozzle are free of debris, and exhibit no evidence of mildew, rot, or damage by chemicals, burns, cuts, abrasion, vermin or vandalism. Any defects should be corrected if possible.
- B) If the hose fails the physical inspection, it shall be removed from service, repaired as necessary and service tested as outlined in this SOG or condemned.
- C) During the inspection, a check shall be made to determine if the service test of the hose is current.

1.08 Cleaning and Drying.

- A) After each use, all hose shall be cleaned.
- B) If the dirt cannot be brushed from it or if it has come in contact with harmful materials, the hose shall be washed.
- C) All hose shall be drained and thoroughly dried before being placed in service or in storage.
- D) If, during use, the hose has been exposed to hazardous materials, it shall be decontaminated by the method approved for the contaminate.
- E) Poly or rubber jacketed hose shall be permitted to be wiped dry.
- F) Hose shall not be dried on hot pavements or under intense sunlight.

1.09 Storage.

- A) Hose in storage shall be kept out of direct sunlight and in a well-ventilated location. Hose shall be stored only after it has been properly inspected, service-tested if required, cleaned, and dried.

1.10 Hose Records.

A) Each length of hose shall be assigned an identification number for use in recording its history throughout its service life. The identification number shall be stenciled or printed on the hose jacket using an ink or paint that is not harmful to the hose. It is permissible to stamp or engrave the identification number on the bowl or swivel of the female coupling in a manner that prevents damage to the coupling.

B) The following information shall be included in the identification number:

- 1) The station number (i.e. 1, 2, 3, 4, or 5)
- 2) The hose number (i.e. 12, 64, 101 etc.)
- 3) The year the hose was first put into service (i.e. 99, 00, 01)

An example of a hose identification number would be: 2-64-00

C) Records of hose used by TFD shall be kept as part of the department's equipment inventory.

D) Out-of-service hose shall be properly tagged with the reason for removal from service on the tag. The out-of-service hose should be then given to the Chief Mechanic to be repaired or replaced.

1.11 Nozzles, Couplings, and Gaskets.

A) All nozzles shall be inspected after each use and at least annually. The nozzle inspection shall include verification of the following:

- 1) Waterway clear of obstructions
- 2) No damage to tip
- 3) Full operation of adjustments such as pattern selection and so forth
- 4) Proper operation of the bail/shutoff valve, if so equipped
- 5) No missing parts
- 6) Thread gasket in place and in good condition

When necessary, thoroughly clean nozzles with soap and water. Clean and lubricate any moving parts that appear to be sticking according to manufacturer's recommendations.

B) If the nozzle fails the inspection for any reason, it shall be removed from service and given to the Chief Mechanic to be repaired or replaced.

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- C) If during use, there is an obstruction that cannot be removed by flushing the nozzle, the nozzle shall be removed from the hose line and the obstruction removed through the connect end as soon as possible, since any further attempt to force the obstruction out through the tip can damage the nozzle.
- D) Nozzles shall not be dropped or thrown.
- E) Nozzles shall be opened and closed slowly to eliminate unnecessary strain on the hose couplings and to prevent water hammer.
- F) Couplings shall be kept in serviceable condition. After each use, and during each hose service test, they shall be visually inspected for the following:
  - 1) Damaged threads
  - 2) Corrosion
  - 3) Slippage on the hose
  - 4) Out-of round
  - 5) Swivel not rotating freely
  - 6) Missing lugs
  - 7) Loose external collar
  - 8) Missing or damaged swivel gasket
  - 9) Other defects that impair operation
- G) Defective couplings shall be removed from service and the couplings be repaired or replaced.
- H) Care should be taken not to drop the couplings on the pavement or other hard surfaces that can cause damage to the swivel section or the exposed threads.
- I) When dragging hose, care should be taken to protect the couplings from damage by folding the coupling over onto the hose, leaving the couplings connected together, or carrying the couplings.
- J) Care should be taken to prevent vehicles from driving over couplings.
- K) When couplings are attached or reattached to hose, the hose shall be tested at its service test pressure.
- L) The date and the nature of the re-coupling or repair and the identity of the person performing the repair shall be recorded for each length of hose.

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- M) Swivel gaskets shall be inspected for presence, tight fit, and lack of deterioration. If defective, it shall be replaced with a new gasket.
- N) The swivel part of the female coupling if needed can be submerged in a container of warm, soapy water and worked forward and backward to thoroughly clean the swivel. The threads of the male and female coupling can be cleaned if needed with a suitable brush, and it may be necessary to use a wire brush if tar, asphalt, or other foreign material clogs threads.

1.12 Service Test Pressure.

- A) The service test pressure for hose pre July 1987 owned by TFD shall be in accordance to the following table:

<u>Hose Size</u>	<u>Test Psi</u>
1" (forestry)	250
1½" – 3"	250
4" – 6" Supply Hose	200

- B) Hose manufactured in July 1987 and after shall be tested to the pressure indicated on the hose.

1.13 Service Test Procedures.

- A) Each length of hose to be service-tested shall be inspected as specified in this SOG.
- B) Any length of hose that fails the inspection shall be removed from the service test area and repaired as necessary or condemned.
- C) Each length of hose to be tested simultaneously shall be of the same service test pressure. The total length of any hose in the test layout to be service-tested shall not exceed 300 ft. The layout shall be straight, without kinks or twists.
- D) Hose shall be tested in a location that has adequate room to layout the hose in straight runs, free of kinks or twists. The site should be isolated from traffic as much as possible. If testing is done at night, the area should be well lighted. The test area should be as smooth and free from dirt and debris as possible. A slight grade will facilitate the draining of water from the hose lines. A water source sufficient for filling the hose is also necessary.

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- E) A hose testing machine, a stationary pump, or a pump on a fire department apparatus shall be used as a pressure source.
- F) At the conclusion of the test, the test results for each length of hose service-tested shall be recorded. The record shall indicate the test date, the hose size, the hose identification number, the test pressure, the test method (i.e. pumper, hose tester), and if the hose passed or failed (see example of TFD Fire Hose Test Record).
- G) All hose failing the physical examination, bursting, leaking, or having couplings that fail because of slippage or leakage shall be tagged, removed from service, and repaired or discarded. Hose that has been repaired shall be service-tested again before being placed back in service.
- H) For leaking hose or hose jackets failing the physical examination, a distinguishing mark noting the location of the defects shall be placed on the hose. It is recommended that a piece of duct tape be wrapped around the hose in the direct vicinity of the defect and on the duct tape write down what the defect is. For defective couplings, the coupling shall be cut from the hose.

1.14 Service Test Using a Hose Testing Machine.

- A) The hose-testing machine shall be carefully examined for damaged components that may fail during the test. If any damage is discovered, the hose-testing machine shall not be used until the damaged component(s) is repaired or replaced.

**HYDROSTATIC HOSE TEST PUMP TESTING PROCEDURE**  
**HOOKING UP THE PUMP**

- 1) Connect inlet to water source outlet with 1½" or larger hose.
- 2) Connect fire hose to be service-tested to suitable adapters on manifold outlets on the hose-testing machine. Hose should have nozzles or shut-offs on the end to bleed the air from the lines.
- 3) Connect garden hose to back bleed and direct to a drain area away from the test area to keep this area dry.
- 4) Ensure pump is "OFF". Connect the pump electrical plug to a standard 120-volt outlet. It is recommended using a Ground Fault Circuit Interrupter (G.F.C.I.) as it could save your life in the case of an electrical short.

#### OPERATING THE PUMP

- 1) Close all ball valves, except the ½” ball valve on the test pump.
  - 2) Open the water inlet ball valve. Open one water outlet ball valve and allow that hose to fill through the manifold. NOTE: the pump is not turned on at this point.
  - 3) To ensure that air is safely bled from the hoses, bleed each line one at a time with the water volume and pressure from the water source utilizing a nozzle or shut off on the end of each line. THIS IS VERY IMPORTANT.
  - 4) When each line is filled and free of air, close the nozzle or shut off the end of each line. Close the water outlet ball valve to each line to seal each line. Even if you are not using all four outlets, bleed them with full water source pressure. *All air must be out of the system.*
  - 5) With the back bleed open, turn on the pump. This will bleed the air from the high-pressure side of the pump out to the drain. When air is bled, close the back bleed.
  - 6) Close the 1½ “ball valve at the inlet of the manifold. No pressure will build until this valve is closed.
  - 7) Open the 1½” ball valves at the outlets and begin building pressure in all the lines. With the hose at 45 psi  $\pm$  5 psi personnel shall walk the hose layout to check for leakage at each coupling and the couplings tightened with a spanner wrench where necessary. Each hose shall then be marked at the end or back of each coupling to determine, after the hose is drained, if the coupling has slipped during the test.
  - 8) All personnel other than those required to perform the remainder of the test procedure shall clear the area.
  - 9) The pressure shall then be raised slowly at a rate not greater than 15 pounds per second until the service test pressure is attained and then maintained, by pressure boosts if necessary, for the duration of the stabilization period. The stabilization period shall not be less than 1 minute per 100 ft. of hose in the test layout.
  - 10) After the stabilization period, the hose layout shall hold the service test pressure for 3 minutes without further pressure boosts.
- B) While the hose test layout is at service test pressure, it shall be inspected for leaks. The inspecting personnel shall walk the test layout to inspect for leaks. Personnel shall be at least 15 ft. from the hose line in the test layout. Personnel shall never stand closer than 15ft. or straddle a hose in the test layout during the test.



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- C) If the hose test layout does not hold the service pressure for the 3 minute duration, the service test shall be terminated and the length(s) of hose that leaked shall have failed the test. The test layout shall be drained and the defective hose removed from the test layout. The service test shall be restarted from the beginning.
- D) After 3 minutes at the service test pressure, each test cap or nozzle shall be opened to drain the water in the test layout.
- E) The markings placed on the hose at the back of the couplings shall be observed for coupling slippage. If the coupling has slipped, the hose shall have failed the test.

NOTE: For more detailed instructions and a trouble-shooting guide refer to the hose testing machine manufacturer's instructions.

1.15 Service Test Using a Stationary Pump or a Pump on a Fire Department Apparatus.

- A) An approved gate or ball hose test valve consisting of a ¼" opening drilled through the gate and designed to withstand the service test pressure shall be used between the pump and the hose test layout.
- B) The hose test layout shall be connected to the hose test valve. The hose test valve end of the hose shall be secured with a belt tie-in or a rope hose tool at a point 10-15 inches from the coupling.
- C) 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. After the hose test layout is full of water, all air in each hose line shall be exhausted. The nozzle or test cap valve shall be closed slowly, then the hose test valve shall be closed.
- D) The hose directly in back of the test cap or the nozzle shall be secured to avoid possible whipping or other uncontrolled reaction in the event of a hose burst.
- E) With the hose at 45 psi  $\pm$  5 psi it shall be checked for leakage at each coupling and the couplings tightened with a spanner wrench where necessary. 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.

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- F) All personnel other than those required to perform the remainder of the test procedure shall clear the area.
- G) The pressure shall be raised slowly at a rate not greater than 15 psi per second until the service test pressure is attained and then maintained for 3 minutes.

While the hose test layout is at service test pressure, it shall be inspected for leaks. The inspecting personnel shall walk the test layout to inspect for leaks. Personnel shall be at least 15 ft. from the hose line in the test layout. Personnel shall never stand closer than 15 ft. or straddle a hose in the test layout during the test.

- H) If the test layout does not hold the service pressure for the 3 minutes duration, the service test shall be terminated and the length(s) of hose that leaked shall have failed the test. The test layout shall be drained and the defective hose removed from the test layout. The service test shall be restarted from the beginning.
- I) 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.
- J) The markings placed on the hose at the back of the couplings shall be observed for coupling slippage. If the coupling has slipped, the hose shall have failed the test.

1.16 Safety.

Exercise care when working with charged hose lines while service testing. Pressurized hose is potentially dangerous because of its tendency to whip back and forth if a break occurs such as when a coupling pulls loose. Of the two hose service testing procedures, the use of a hose-testing machine is the preferred method. If a hose rupture does occur, the only volume of water available is through the 3-gpm pump. This means no surge of volumes of water and no wild line.

Additional safety measures to be taken when service testing fire hose include:

- A) All operating personnel in the area of the pressurized hose shall wear a hardhat or fire helmet, and eye protection in the form of safety glasses or goggles. Faceshields alone are not adequate eye protection.
- B) It is further recommended that all personnel participating in hose testing wear gloves for hand protection.
- C) Traffic cones shall be used when the test site is exposed to vehicle traffic.

Care should be taken 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.

Retesting repaired or recoupled fire hose can be extremely dangerous. Extreme care shall be taken to prevent exposure of anyone to the hose during the test.



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