S.O.P. #: 400-23
SUBJECT: TESTING OF FIRE HOSE
DIVISION: EMERGENCY OPERATIONS (CAREER)

Objective: To comply with the standard of care, use, inspection, service testing, and replacement of fire hose, couplings, nozzles, and fire hose appliances (NFPA 1962, 2018 edition).

Safety: Hose testing is a process that identifies weak hose by causing it to burst. Personnel shall secure the nozzle end of the hose to prevent personal injury if the hose line breaks and begins to whip about. Someone must be at the water supply shutoff valve at all times during the test. Personnel shall maintain a safe distance away from all hose and pumps while under pressure, unless absolutely necessary to exam for leaks, check pressure gauge, or shut down the system.

Section 1: Hose identification and record keeping

A. Each station shall maintain a complete record of each piece of hose in the master Excel spreadsheet located on the shared drive within the station folder marked as "HOSE TEST".

B. Information contained in the list shall include the following:
   a. Hose identification number will be marked with permanent marker behind the female coupling on each section of hose. 100 ft sections of hose with Storz couplings shall be marked on both ends. Markings shall remain legible.
      i. Each hose shall have the unit number listed:
         1. Unit number (E-XX)
      ii. Hose sizes will be identified using the following matrix:
         1. 1 ¾" – 100 series
         2. 2 ½" – 200 series
         3. 3" – 300 series
         4. 4" – 400 series
         5. 5" – 500 series
      iii. For example:
         1. 2 sections of 1 ¾" hose on E-7 would be identified as E7-101 and E7-102
         2. 3 sections of 4" hose on E-8 would be identified as E8-401 and E8-402
         3. Spare hose stored in the station shall continue with the same matrix
         4. There shall not be any duplication of numbers.
         5. When a section of hose is sent out, the replace hose will follow in succession and not inherit the number of the damaged hose.
   b. Size of hose
   c. Test pressure
   d. Date of test
   e. Name of the tester
   f. Results (Pass/Fail)
   g. Comments

Section 2: Utilization of the Rice Hose Test Machine

A. All hose testing shall be conducted utilizing the hose test machine when a hose testing machine is available, it is acceptable to go across battalion lines to acquire the closest available machine.

B. There will be two machines strategically located in each battalion. *(1st Battalion – Stations 11 & 17, 2nd Battalion - Stations 3 & 19, 3rd Battalion- Stations 6 & 7).* These stations will be responsible for tracking their locations when loaned out and returned.

C. Usage will need to be coordinated among the company officers in the battalion and the unit signed out prior to use. The A-shift company commander from the station housing the unit will be responsible for its accountability.

Section 3: Hose Test Procedures

A. Station Officers shall conduct an annual test for hose during the months of April or May. This includes all spare hose, hose carried on engines, foam unit, and ladder trucks (frontline and reserves) that are assigned to their station.

B. Each section of hose tested shall be visually and physically inspected prior to testing. The inspection of hose shall ensure cleanliness and no evidence of mildew, rot or damage by chemicals, burns, cuts, abrasions and vermin. Each section of hose shall include a visual inspection of the liner at each end for signs of liner delamination. If the liner shows signs of deterioration or delamination, the hose shall be taken out of service.

C. The total length of any hose line in the hose test layout to be service tested shall not exceed 300 feet.

D. The hose is marked, using a marker at the point where the couplings are connected to check for any slippage of the coupling under pressure. If the hose assembly shows any signs of coupling slippage, the hose shall have failed the test.

E. Three (3) inch and smaller size hose shall be hydrostatically tested at a pressure of three hundred (300) psi for a period of five (5) minutes, after all couplings have been tightened and air drained from the hose.

F. Four (4) inch hose shall be hydrostatically tested at a pressure of two hundred (200) psi for a period of five (5) minutes, after all couplings have been tightened and air drained from the hose.

G. Hard Sleeves are tested by being connected to a suction source and capped at the opposite end. A vacuum of 22 inches of mercury must be reached and maintained for 10 minutes. Check the tube liners for collapse (*This will be the only time apparatus is permitted to be used for testing unless approved by the OIC of Logistics*.)

H. LDH for hydrant connection should be tested under LDH spec. 5” LDH Red or Yellow at 200 PSI for 5 minutes.

I. Hose shall be tested utilizing the hose testing machine. 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.

J. The hose tester should be connected to a fire hydrant to provide its water supply. Lay out all hose that is to be tested in a straight line with no kinks or bends. When the hose lengths are connected to the hose tester, slowly fill each line with water from the hydrant. Using nozzles at the other end of the hose, crack open each nozzle one at a time to ensure all air has escaped from the hose. Turn on the hose testing machine and let it build pressure to approximately 45 PSI. With the hose at +/-45 PSI, it shall be checked at each coupling for leaks and tightened up as necessary. Each hose shall then be marked at the back of each coupling using an ink pen or permanent marker to determine if the coupling has slipped during the test.

K. The pressure shall be raised slowly until the 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. After the stabilization period, the hose shall hold the test pressure for 5 minutes without further pressure boosts.

L. While the hose is at the test pressure, it shall be inspected for leaks maintaining a 15 ft distance from the hose. Personnel shall never stand in front of the nozzle end of the hose while being tested.

M. Hose that fails to hold test pressure due to leaks, bursting or separating during the 5 minute test, the test shall be stopped and the failed section of hose shall be removed from the test and tagged. Once removed, the 5 minute pressure test will need to be restarted for the remaining hose.

N. At the completion of the 5 minute pressure test, turn off the hose test machine and open the pressure release bleed valve and nozzles to drain water from the hose.

O. If, during the hose test, in the Officer's opinion, a section of hose does not meet the requirements of the test, it shall be tagged indicating the reason for failure and sent to Fire Supply for repair or replacement. A Form 133 shall be submitted noting the size, length and serial number of each piece of damaged hose. Leaks shall be identified by tying a rag around the area.

P. When returning the hose to the apparatus, it shall be reloaded so that the folds occur at different positions in order to prevent damage to the hose and the setting of permanent folds in the hose.

Appendix A: Rice Hydro Manual

RICE HYDRO, INC.
MANUFACTURER'S OPERATING INSTRUCTIONS
FIRE HOSE TESTER SERIES

CAUTIONS:

1. Power source must meet voltage, phase, hertz and amperage requirements of electric motor, as stated on label. If an extension cord is used, requires at least 12 gauge 3 wire with maximum of 25 foot length.
2. Check ALL fluid levels prior to operating the unit.
3. Protect the pump from freezing, FLUSH with anti-freeze.
4. DO NOT run dry or pump chlorine thru the unit.
5. **Supplying the unit with water, inlet pressure should not exceed 90 PSI.**

CONNECTING THE PUMP:

1. Check oil level of pump and engine (if gas unit), use 10W30 ND oil.
2. Connect inlet to fire hydrant.
3. Connect fire hose to be tested to suitable adapters on manifold outlets. Hose
4. Connect garden hose to back bleed & direct to a drain away for dry test area.
5. ASSURE MOTOR IS "OFF". Connect the power cord to a standard wall outlet. **Extension cord: when needed, a 12 gauge 3 wire, maximum 25 ft. length, plugged into a 20 amp breaker is required.**

OPERATING THE PUMP:

1. Close all ball valves, slightly crack open the ½ “bleeder ball valve.
2. Open inlet ball valve. Open outlet ball valves one at a time and allow each hose to be filled through manifold. Do not turn pump on at this time.
3. To ensure air is safely bled from hoses, bleed each hose, one line at a time with hydrant volume and pressure, utilizing a nozzle at the end of each hose.
4. When each line is filled, free of air, with nozzle closed, close the ball valve at the manifold outlet to seal the line. Bleed **ALL** outlets whether or not in use for testing. All air must be removed.
5. With back bleed open, turn on the pump. This will bleed air out of the pressure side of the pump - out to the drain area.
6. **Close the 1 ½ " ball valve at the inlet of manifold/unit, directing water flow from the hydrant to pressure side of pump. No pressure will build until this ball valve is closed.**
7. Slowly close the ½ " back bleed ball valve, check the gauge to verify pressure setting of relief valve.
8. The pressure regulator has been preset at the factory. ***To change this setting you must make this adjustment while the water is flowing freely, and under NO pressure.*** To adjust the pressure, first loosen the locknut. Turn the handle/knob clockwise to increase and counterclockwise to decrease the pressure. Place a ball valve or similar open and close valve at the end of the outlet hose, open and close this valve multiple times as needed, to check pressure setting and re-adjust as necessary. Upon reaching desired pressure setting, tighten locknut and prepare to begin test.

9. Open the 1½" ball valves at the outlets and begin building pressure in all the lines. In the event there is an acceptable leak in the system that must be overcome by leaving the pump running... Crack the ½ " back bleed valve allowing a small amount of clean fresh water to flow while in bypass. **Once pressure has been reached, close all ball valves and shut off pump.**

10. If the air has been bled as outlined, the pump will build pressure quickly and safely with only hose stretch to overcome. If a hose ruptures, the only volume of water available is through GPM of the pump. NO SURGE OF VOLUME, NO WILD LINE.

11. It is impossible to ensure that air is not caught behind couplings. If air is caught behind a coupling that fails - it could cause an explosion and fragmentary effect. DO NOT BEND OVER THE TOP OF THE PUMP. Treat hoses and couplings under pressure as dangerous.

TROUBLE SHOOTING:

NOT building pressure - Inlet ball valve has not been closed.

AIR, AIR AND MORE AIR - Ensure air is bled from hoses, manifold, piping. The length of time to build pressure and test hoses is directly related to overcoming air buildup.

Motor will not run - Verify plugged directly into wall outlet, or using minimum 12 gauge 3 wire, maximum 25' extension cord. Push thermal overload button to reset.

Gauge - Pegged or faulty, order new gauge.

WARNING: Operating, servicing and maintaining this equipment can expose you to chemicals including engine exhaust, carbon monoxide and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, operate and service your equipment in a well-ventilated area and wear gloves or wash your hands frequently when servicing your equipment. For more information go to: www.p65warnings.ca.gov

Appendix B: Tracking Log

BALTIMORE COUNTY FIRE DEPARTMENT

Annual Hose Testing Log

Station #: **Year:**

Hose ID	Hose diameter	Test pressure	Test date	Name of tester	Test Results (P/F)	Comments