

# PM000031

Revision 2

## FIRE HOSE AND NOZZLE INSPECTION AND TESTING

Maintenance Procedure  
Continuous Use  
[FP02]

**APPROVED FOR USE**

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## 1.0 INTRODUCTION

Specifically, this work will accomplish the following:

- Fire hose inspection and testing using fire pumper.
- Fire hose inspection and testing using hose test device.
- Booster hose testing using fire pumper.
- Hard suction hose testing.
- Restoration of fire hose.
- Nozzle inspection.
- Restoration of nozzles.

This procedure generates the following Quality records in accordance with WP 13-1, Quality Assurance Program Description (QAPD). Performance of this procedure generates a Resource Conservation and Recovery Act (RCRA) record.

- Attachment 1

## 2.0 REFERENCES

### BASELINE (DEVELOPMENTAL)

1062-96  
1996

29CFR1910.158  
WP04-AD3016  
WP12-FP.01  
WP13-1

FIRE PUMPER AND HOSE TEST  
DEVICE OPERATION AND  
MAINTENANCE MANUALS  
DOE FIRE PROTECTION HANDBOOK  
CARE, USE AND SERVICE TESTING  
OF FIRE HOSE INCLUDING  
COUPLINGS AND NOZZLES  
DOE FIRE PROTECTION HANDBOOK  
STANDPIPE AND HOSE SYSTEMS  
EQUIPMENT INACTIVATION  
FIRE PROTECTION PROGRAM  
WASHINGTON TRU SOLUTIONS LCC  
QUALITY ASSURANCE PROGRAM  
DESCRIPTION

WP 10-2  
WP 10-WC3010  
WP 10-WC3011  
WP 12 IS.01  
WP 13-1

MOIM  
Maintenance PM/MWI Controlled Document Processing  
Maintenance Process  
Industrial Safety Program  
Quality Assurance Program Description

REFERENCED (REQUIRED ON-HAND)

**3.0 MATERIAL LIST**

ITEM	MATERIAL DESCRIPTION	QTY	UNIT	PR / WHSE STOCK NO.
	NONE			

**4.0 EQUIPMENT LIST**

Fire Pumper or Fire Hose Test Device  
 Calibrated gauges (within 30 days of testing)  
 Gated Wye valve (with 1/4 inch hole drilled through the gate)  
 Nozzle(s) and/or Test Cap(s)  
 Spanner wrenches  
 Engraver  
 Marking pen  
 Coupling and Thread Graphite Lube  
 New gaskets supply  
 Vacuum pump  
 Electronic Vacuum gage  
 Hard suction hose adapter for vacuum pump  
 Hard suction hose adapter with transparent disk

**5.0 PRECAUTIONS**

The JOB HAZARDS CHECKLIST indicates types of hazards that may be present during the performance of this work. See the indicated section for precautions and mitigating actions.

**JOB HAZARDS CHECKLIST**

HAZARD	MITIGATED AT SECTION
OTHER HAZARD	<input type="checkbox"/> 8.1.18, <input type="checkbox"/> 8.1.23, <input type="checkbox"/> 8.1.23, <input type="checkbox"/> 8.2.21, <input type="checkbox"/> 8.2.26, <input type="checkbox"/> 8.3.15, <input type="checkbox"/> 8.3.19

## 6.0 LIMITATIONS

### 6.1. HOLD AND WITNESS POINTS

6.1.1. None

### 6.2. TAGOUT/LOCKOUT

6.2.1. None

### 6.3. OTHER LIMITATIONS

- All new hoses must be tested prior to use.
- The order of completion of this work may be modified or sections may be performed in parallel, provided that proper Tagout/Lockout is observed and that no Hold Points or precautionary actions associated with Warning statements are bypassed.
- Any employee who has a concern for employee safety, the safety of the environment, or the quality of the activity has the responsibility and authority to suspend the performance of that activity.
- Work shall be stopped when instructions can not be performed, field conditions change, or additional job hazards are identified.
- Brackets at the beginning of steps are optional place-keeping aids, and may be checked off as work progresses.
- All personnel affixing initials to this package shall provide the information listed in the PERSONNEL DATA TABLE.
- Troubleshooting or other activities outside the scope of this PM may require the initiation of a work order as directed by the Responsible Engineer or Zone Team Leader.

## 7.0 PREREQUISITES

### 7.1. ADMINISTRATIVE

7.1.1. Personnel performing this work review these work instructions and appropriate sections of the references listed in the REFERENCED (REQUIRED ON HAND) section.

- 7.1.2. Before starting work, FSM conduct a pre-job safety meeting.

### **SIGN-OFF FSM**

- 7.1.3. Record work order number on Attachments.

### 7.2. TASK PREPARATION

- 7.2.1. Obtain materials and equipment shown in Materials and Equipment section.

## **8.0 PERFORMANCE**

### 8.1. FIRE HOSE INSPECTION AND TESTING USING FIRE PUMPER.

- 8.1.1. Inspect hose jacket for defects, couplings and threads for damage, and gaskets for wear.
- 8.1.2. If there is damage, tag hose with equipment inactivation tag and remove for repair or disposal

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### **NOTE**

This note applies to section  8.1.3

Fire hose is marked with an identification number and test date on the swivel coupling.  
If new hose, assign an identification number

- 
- 8.1.3. Record identification number.
- 8.1.4. Record hose diameter (e.g., 1½ in., 1¾ in., 2½ in., 3 in.).
- 8.1.5. Record hose length in ft.
- 8.1.6. Record hose coupling size (e.g., 1½ in., 2½ in.).
- 8.1.7. Record hose type (inner jacket lined or unlined).
- 8.1.8. Record hose construction (outer jacket cotton or rubber).
- 8.1.9. Record hose manufacturer (e.g., Angus, Century, National).

**CAUTION**

This caution applies to section [ ] 8.1.10

Hoses will be tested to service test pressure. Hose manufactured prior to July 1987 maybe stenciled with the acceptance or proof test pressure Example (Tested to \_\_\_ psi).

**THIS IS NOT THE SERVICE TEST PRESSURE.** The service test pressure must be determined using **NFPA 1962 Pamphlet**. Hoses manufactured after July 1987 will be stenciled with "Service Test to XXX psi per NFPA 1962"

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**NOTE**

This note applies to section [ ] 8.1.10

Lined fire hose must be tested at Service Test Pressure , with no more than 300 ft connected in a single run (excluding nozzles and couplings).

- 
- [ ] 8.1.10. Connect hose to gated Wye valve from pumper
  - [ ] 8.1.11. Verify hose is straight, without kinks or twists.
  - [ ] 8.1.12. If new hose, mark each coupling for slippage.
  - [ ] 8.1.13. If hose is already in service, verify that coupling is marked for slippage.
  - [ ] 8.1.14. Connect nozzle or test cap to far end of hose.

**CAUTION**

This caution applies to section [ ] 8.1.15

Pump operator must stay at pump, at all times, to shut off pump or valves in case of an emergency. To prevent sudden pressure changes, operate engine throttle slowly.

- [ ] 8.1.15. Open gated Wye valve.
- [ ] 8.1.16. Open nozzle or test cap valve.
- [ ] 8.1.17. Raise pressure gradually to 45 psi  $\pm$  5 psi.

**WARNING**

**This warning applies to section [ ] 8.1.18**

Air in hose line introduces a serious accident potential.

- [ ] 8.1.18. Verify air is removed from hose by raising discharge end, of each hose line, above the highest point in the system.
- [ ] 8.1.19. Close nozzle or test cap valve slowly.
- [ ] 8.1.20. Close gated Wye valve and then partially reopen valve.
- [ ] 8.1.21. Check each coupling for leakage.
- [ ] 8.1.22. If there is leakage, retighten couplings.

**WARNING**

**This warning applies to section [ ] 8.1.23**

Personnel must remain at least 15 ft from pressurized hose. Do not stand over or straddle hose, or crossover charged lines.

**CAUTION**

This caution applies to section [ ] 8.1.23

Open and close valves and nozzles slowly to prevent water hammer.

- [ ] 8.1.23. Slowly pressurize hose up to Service Test Pressure and maintain pressure for 5 minutes.
  - [ ] 8.1.24. Record final test pressure in "PSI/VAC" column.
  - [ ] 8.1.25. Inspect hose and couplings for leaks, and slippage of coupling.
  - [ ] 8.1.26. Slowly reduce test pressure after 5 minutes.
  - [ ] 8.1.27. If hose maintains Service Test Pressure and no hose couplings slipage, record Pass in "Results" column.
  - [ ] 8.1.28. If hose failed, record reason (e.g. coupling blew off, hose coupling slipped) in the "Reason for Failure" column.
  - [ ] 8.1.29. If hose failed, remove from service and tag hose with equipment inactivation tag.
  - [ ] 8.1.30. If hose passes inspection and testing, engrave present month and year on swivel coupling.
  - [ ] 8.1.31. Proceed to step 8.5.
- [ ] 8.2. FIRE HOSE INSPECTION AND TESTING USING HOSE TEST DEVICE.

- 8.2.1. Inspect hose jacket for defects, couplings and threads for damage, and gaskets for wear.
- 8.2.2. If there is damage, tag hose with equipment inactivation tag and remove for repair or disposal.

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**NOTE**

This note applies to section  8.2.3

Fire hose is marked with an identification number and test date on the swivel coupling.  
If new hose, assign an identification number.

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- 8.2.3. Record identification number.
- 8.2.4. Record hose diameter (e.g., 1½ in., 1¾ in., 2½ in., 3 in.).
- 8.2.5. Record hose length in ft.
- 8.2.6. Record hose coupling size (e.g., 1½ in., 2½ in.)
- 8.2.7. Record hose type (inner jacket lined or unlined).
- 8.2.8. Record hose construction (outer jacket cotton or rubber).
- 8.2.9. Record hose manufacturer (e.g., Angus, Century, National).

**CAUTION**

This caution applies to section [ ] 8.2.10

Hoses will be tested to service test pressure. Hose manufactured prior to July 1987 maybe stenciled with the acceptance or proof test pressure Example (Tested to PSI). **THIS IS NOT THE SERVICE TEST PRESSURE.** The service test pressure must be determined using **NFPA 1962 Pamphlet**. Hoses manufactured after July 1987 will be stenciled with "Service Test to XXX PSI per NFPA 1962"

**NOTE**

This note applies to section [ ] 8.2.10

Lined fire hose must be tested at Service Test Pressure , with no more than 300 ft connected in a single run (excluding nozzles and couplings).

- [ ] 8.2.10. Connect hose to hose test device.
- [ ] 8.2.11. Connect supply hose to hydrant and secure test device from movement.
- [ ] 8.2.12. Verify hose is straight, without kinks or twists.
- [ ] 8.2.13. If new hose, mark each coupling for slippage.
- [ ] 8.2.14. If hose is already in service, verify that coupling is marked for slippage.
- [ ] 8.2.15. Connect nozzle or test cap to far end of hose.

**CAUTION**

This caution applies to section [ ] 8.2.16

Hose test device operator must stay at hose test device at all times, to shut off pump or valves in case of an emergency.

- [ ] 8.2.16. Close supply manifold valve on the hose test device.
- [ ] 8.2.17. Open fire hydrant slowly.
- [ ] 8.2.18. Open nozzle or test cap valve.
- [ ] 8.2.19. Slowly open manifold supply valve on hose test device.
- [ ] 8.2.20. Raise pressure gradually to 45 psi  $\pm$  5 psi.

**WARNING**

**This warning applies to section [ ] 8.2.21**

Air in hose line introduces a serious accident potential.

- [ ] 8.2.21. Verify air is removed from hose by raising discharge end, of each hose line, above the highest point in the system.
- [ ] 8.2.22. Close nozzle or test cap valve slowly.
- [ ] 8.2.23. Check each coupling for leakage.
- [ ] 8.2.24. If there is leakage, retighten couplings.
- [ ] 8.2.25. Shut manifold supply valve on hose test device.

**WARNING**

**This warning applies to section [ ] 8.2.26**

Personnel must remain at least 15 ft from pressurized hose. Do not stand over or straddle hose, or crossover charged lines.

**CAUTION**

This caution applies to section [ ] 8.2.26

Open and close valves and nozzles slowly to prevent water hammer.

**CAUTION**

This caution applies to section [ ] 8.2.26

Do not shut off hydrant supply to hose test device while the pump is running.

- [ ] 8.2.26. Start Pump on hose test device.
- [ ] 8.2.27. Slowly pressurize hose up to Service Test Pressure and maintain pressure for 5 minutes.
- [ ] 8.2.28. Record final test pressure in "PSI/VAC" column.
- [ ] 8.2.29. Inspect hose and couplings for leaks, and slippage of coupling.
- [ ] 8.2.30. Slowly reduce test pressure after 5 minutes.
- [ ] 8.2.31. If hose maintains Service Test Pressure and no hose couplings slippage, record Pass in "Results" column.
- [ ] 8.2.32. If hose failed, remove from service and tag hose with equipment inactivation tag.

- 8.2.33. If hose passes inspection and testing, engrave present month and year on swivel coupling.
- 8.2.34. Proceed to step 8.5.
- 8.3. BOOSTER HOSE TESTING USING FIRE PUMPER.
  - 8.3.1. Inspect hose jacket for defects, couplings and threads for damage, and gaskets for wear.
  - 8.3.2. If there is damage, tag hose with equipment inactivation tag and remove for repair or disposal.

**NOTE**

This note applies to section  8.3.3  
Fire hose is marked with an identification number and test date on the swivel coupling.  
If new hose, assign an identification number.

- 8.3.3. Record identification number.
- 8.3.4. Record hose diameter (e.g., 3/4 in., 1 in.).
- 8.3.5. Record hose length in ft.
- 8.3.6. Record hose coupling size (e.g., 3/4 in., 1 in.).
- 8.3.7. Record hose construction (booster hose).
- 8.3.8. Record hose manufacturer (e.g., Angus, Century, National).
- 8.3.9. Verify hose is straight, without kinks or twists.
- 8.3.10. If new hose, mark each coupling for slippage.
- 8.3.11. If hose is already in service, verify that coupling is marked for slippage.
- 8.3.12. Connect nozzle or test cap to far end of hose.

**CAUTION**

This caution applies to section **Error! Reference source not found.**

Pump operator must stay at pump, at all times, to shut off pump or valves in case of an emergency. To prevent sudden pressure changes, operate engine throttle slowly.

- 8.3.13. Open nozzle or test cap valve.
- 8.3.14. Raise pressure gradually to 45 psi  $\pm$  5 psi.

**WARNING**

**This warning applies to section [ ] 8.3.15**  
Air in hose line introduces a serious accident potential.

- 8.3.15. Verify air is removed from hose by raising discharge end, of each hose line, above the highest point in the system.
- 8.3.16. Close nozzle or test cap valve slowly.
- 8.3.17. Check each coupling for leakage.
- 8.3.18. If there is leakage, retighten couplings

**WARNING**

**This warning applies to section [ ] 8.3.19**

Personnel must remain at least 15 ft from pressurized hose. Do not stand over or straddle hose, or crossover charged lines.

**CAUTION**

This caution applies to section [ ] 8.3.19

Open and close valves and nozzles slowly to prevent water hammer

- [ ] 8.3.19. Slowly pressurize hose up to 110 psi and maintain pressure for 5 minutes
  - [ ] 8.3.20. Record final test pressure in "PSI/VAC" column.
  - [ ] 8.3.21. Inspect hose and couplings for leaks, and slippage of coupling.
  - [ ] 8.3.22. Slowly reduce test pressure after 5 minutes.
  - [ ] 8.3.23. If hose maintains 110 psi and no hose couplings slipage, record Pass in "Results" column
  - [ ] 8.3.24. If hose failed, record reason (e.g., coupling blew off, hose coupling slipped) in "Reason for Failure" column.
  - [ ] 8.3.25. If hose failed, remove from service and tag hose with equipment inactivation tag.
  - [ ] 8.3.26. If hose passes inspection and testing, engrave present month and year on swivel coupling.
  - [ ] 8.3.27. Proceed to step 8.5.
- [ ] 8.4. HARD SUCTION HOSE TESTING.

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**NOTE**

This note applies to section [ ] 8.4.1

Fire hose is marked with an identification number and test date on the swivel coupling.  
If new hose, assign an identification number.

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- [ ] 8.4.1. Record identification number.
- [ ] 8.4.2. Record hose diameter (e.g., 2½ in., 3 in, 5in.).
- [ ] 8.4.3. Record hose length in ft..
- [ ] 8.4.4. Record hose coupling size (e.g., 2½ in., 3in., 5 in.).
- [ ] 8.4.5. Record hose type (inner jacket lined or unlined).
- [ ] 8.4.6. Record hose construction (outer jacket cotton or rubber).
- [ ] 8.4.7. Record hose manufacturer (e.g., Angus, Century, National).
- [ ] 8.4.8. Attach a vacuum pump and accurate vacuum gage to female end of hose.
- [ ] 8.4.9. Install a transparent disk to the male end of hose.
- [ ] 8.4.10. Start vacuum pump and draw a 22 inch vacuum on hose under test.
- [ ] 8.4.11. Maintain vacuum for ten minutes.
- [ ] 8.4.12. Inspect the lining of hose through the transparent disk for any sign of lining collapsing into the water way.
- [ ] 8.4.13. Record final test vacuum in "PSI/VAC" column.
- [ ] 8.4.14. If hose maintains 22 inches of vacuum and no liner collapse, record "Pass" in "Results" column.
- [ ] 8.4.15. Record Fail in "Results" column if: hose does not maintain 22 inches of vacuum or any liner collapse occur.
- [ ] 8.4.16. If hose failed, record reason (e.g., did not maintain 22 vacuum) in the "Reason for Failure" column.
- [ ] 8.4.17. If hose passes inspection and testing, engrave present month and year on swivel coupling.

- 8.4.18. If hose failed, remove from service and tag hose with equipment inactivation tag.
- 8.5. RESTORATION OF FIRE HOSE.
  - 8.5.1. Return hose back to service or storage.
  - 8.5.2. FSM or designee, review completed form for completeness and print name, sign and date form. FSM or designee may make additional comments on form.
  - 8.5.3. FSM or designee, file original, and return copy with CHAMPS cover sheet for filing in accordance with RCRA and ES Records Inventory and Disposition Schedule (RIDS).
- 8.6. NOZZLE INSPECTION.
  - 8.6.1. Record the following nozzle information:
    - 8.6.1.1. Manufacturer
    - 8.6.1.2. Identification number
    - 8.6.1.3. Location
  - 8.6.2. Inspect nozzle for the following:
    - 8.6.2.1. Obstructions in waterway
    - 8.6.2.2. Tip and thread damage, threaded swivel coupling works freely
    - 8.6.2.3. Full operation of adjustments (e.g., pattern selection)
    - 8.6.2.4. Shutoff valve operation (if equipped)
    - 8.6.2.5. Missing or damaged parts
    - 8.6.2.6. Gasket in good condition
  - 8.6.3. Record pass or fail, and any comments on form.
- 8.7. RESTORATION OF NOZZLES.
  - 8.7.1. Return nozzles back to service or storage.
- 8.8. TASK VERIFICATION
  - 8.8.1. Equipment Testing

8.8.1.1. None

8.8.2. Operational Testing

8.8.2.1. None

8.9. RESTORATION TO OPERATIONAL STATUS

8.9.1. FSM conduct post-job review.

**SIGN-OFF SHEET**

**PREREQUISITES**

<b>Section</b>	<b>Action</b>	<b>Initials</b>
[ ] 7.1.2	Before starting work ,FSM conduct a pre-job safety meeting.	<b>EST</b> ____ <b>EST</b> ____ <b>FSM</b> ____

**PERFORMANCE**

**FIRE HOSE RECORD FORM**

ID#	SIZE (DIA)	LENGTH	COUPL SIZE	HOSE TYPE	CONSTR	MFG	PSI/VAC	RESULTS	REASON FOR FAILURE
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
								<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	

Nozzle Form

ID #	Mfg	Location	Results	Comments
			[ ] PASS [ ] FAIL	
			[ ] PASS [ ] FAIL	
			[ ] PASS [ ] FAIL	
			[ ] PASS [ ] FAIL	
			[ ] PASS [ ] FAIL	
			[ ] PASS [ ] FAIL	
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			[ ] PASS [ ] FAIL	
			[ ] PASS [ ] FAIL	

FSM or designee, review completed form for completeness

\_\_\_\_\_

FSM

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DATE

Comments:

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**PERSONNEL DATA**

PRINTED NAME	SIGNATURE	INITIALS	DATE