# TESTING OF FIRE PUMP-EQUIPPED AUTOMOTIVE OR MOBILE FIRE APPARATUS

A facility may use fire pump equipped automotive or mobile fire apparatus (pumper) manned by the private fire brigade as an adjunct to fixed fire protection systems. This section details test procedures for this apparatus as part of the facility's Fire Protection Equipment Inspection Program as described in *OVERVIEW*.

## POSITION

Tests of private fire department pumpers are conducted to determine that the apparatus will satisfactorily deliver contract pumping requirements at the time of purchase, and to determine the pumping capacity available after the pumper has been in service for a period of time.

As a minimum, conduct an initial delivery (acceptance) test, subsequent service tests on an annual basis, and additional service testing whenever the pump has been repaired or modified. Require the manufacturer to conduct delivery tests as part of the purchase contract. Make results available for AXA XL Risk Consulting review.

## TESTING

Detailed procedures for the acceptance testing of mobile fire pumping apparatus can be found in NFPA 1901. Requirements for service tests are found in NFPA 1911. Facility maintenance should be thoroughly familiar with the testing procedures and capable of conducting service tests. In addition to the requirements of the NFPA standards, the AXA XL Risk Consulting recommends the following:

- Always conduct a delivery test with the pumper operating at draft (taking suction under a lift).
- Preferably conduct service tests with the pumper operating at draft (taking suction under a lift). In very rare cases it may be necessary to run service tests (but never delivery tests) by connecting to a hydrant. However, this procedure does not test the ability of the priming system or of the pump to maintain prime. Connect the hydrant to a large enough water main to assure a sufficient supply of water. Preferably use a hydrant with a static pressure below 40 psi (2.8 bar).
- Connect the suction so that no portion is higher than the suction inlet on the pumper. Check the suction hose rubber gaskets to be certain they are in place. Use a rubber mallet to tighten the suction hose fittings. If salt water or oily water must be used, thoroughly flush the pumper and all equipment with fresh water after the test.

- Size nozzle tip(s) to afford a nozzle pressure that permits accurate pitot readings, i.e., not too low a pressure, nor should pressure be so high as to make it difficult to hold the pitot tube in the stream.
- **Secure the nozzle(s) by tying or staking down!**
- Arrange for safe disposal of water discharged.
- Make certain that the pump transmission is engaged and that the engine transmission is in the proper gear.
- Disengage all automatic pressure regulators or relief valves so that they will not exercise control over the pump.
- Close all drain valves, booster tank valves, auxiliary suction valves and discharge valves. Make certain all suction inlets, other than the one being used, are tightly capped.
- Prime the pump, noting the amount of time it takes to fill the suction (not longer than 45 seconds).
- Unlike a stationary fire pump, a “churn” or “shut-off” point is not obtained during a pumper test. With the pump primed and the engine running at a fast idle, advance the throttle slightly and slowly open one hose valve. Run the pumper in this condition for several minutes to allow engines and transmissions to warm up.
- Once the pumper is warmed up, advance the throttle until the pump-panel tachometer indicates the rated speed for the first test point. Compare the pump-panel tachometer with the pumper-cab tachometer to obtain an indication of its accuracy. The cab tachometer is usually direct-mechanical while the panel tachometer is usually indirect-electric.
- When rated speed is obtained, slowly open the discharge valve(s) and manipulate the throttle until the discharge test gauge gives a corrected net reading that corresponds with the rated pressure, and the tachometer on the pump panel indicates the rated speed. Lock the discharge valve(s) handle(s) to hold them at the correct setting.
- Take pitot reading(s) to determine how close the actual discharge is to the rated discharge. Verify the pump speed with a revolution counter for one minute. (Note: The revolution counter connection is often geared to read ½ or ⅓ of actual speed and will be so marked.) Adjust the discharge valve position and throttle setting to balance pump discharge, pressure and speed.
- When the pump is operating correctly at the desired test point, the test begins. Continue the test for the duration specified.
- During the entire time the engine is running, check engine temperature and oil pressure, transmissions overheating, unusual vibrations, and pump casing or connection leaks. Note any defects.

## TEST RESULTS

Form N-488 may be used to record the results of either a delivery or service test.

# SAMPLE N-488

## PUMPER TEST RESULTS

**CLIENT:** _____ **LOC ID:** _____ / _____

**LOCATION:** _____ **DATE:** _____

**BY:** _____

**PUMPER:** Manufacturer _____ Model _____ Serial No. _____

**ENGINE:** Make _____ Model _____ BHP _____ at _____ rpm

**PUMP:** Make _____ Model _____ Torque _____ at _____ rpm

Rated _____ gpm (L/min) at 150 psi (10.3 bar) at _____ rpm In _____ Gear, ratio _____

_____ gpm (L/min) at 200 psi (13.8 bar) at _____ rpm In _____ Gear, ratio _____

_____ gpm (L/min) at 250 psi (17.2 bar) at _____ rpm In _____ Gear, ratio _____

Location of test _____ Elevation _____ ft (m)

Suction layout: Size _____ In. (mm); Length _____ (ft) m: Lift _____ ft (m)

Ratio revolution counter to pump speed _____ Suc. Water temp. _____ (start) _____ (end)

Primer type _____ Time to prime _____ sec

Engine temp. _____ (start) _____ (end) Oil pres. _____ (start) _____ (end) Oil level _____ (start) _____ (end)

## CAPACITY TEST

Discharge layout _____ Tip fed by _____ line(s), each of _____ Length

_____ Tip fed by _____ line(s), each of _____ Length

_____ Tip fed by _____ line(s), each of _____ Length

| Time | Disc. Gauge psi (bar') | | | Suction Pressure* psi (bar) | Net Pres. psi (bar) | Pitot Pressure psi (bar) | Flow gpm (L/min) | Counter | | Ratio | Speed rpm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Panel | Test | ± | | | | | End | Start | | |
| | | | | | | | | | | | |
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*(elevation lift in ft + suction hose lift in ft) × 0.433 psi/ft OR (elevation lift in m + suction hose lift in m) × 0.098 bar/m

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CLIENT: _____ LOC ID: _____ / _____

## 70% CAPACITY TEST

Discharge layout _____ Tip fed by _____ line(s), each of _____ Length

_____ Tip fed by _____ line(s), each of _____ Length

_____ Tip fed by _____ line(s), each of _____ Length

| Time | Disc. Gauge psi (bar) | | | Suction Pressure* psi (bar) | Net Pres. psi (bar) | Pitot Pressure psi (bar) | Flow gpm (L/min) | Counter | | Ratio | Speed rpm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Panel | Test | ± | | | | | End | Start | | |
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## 50% CAPACITY TEST

Discharge layout _____ Tip fed by _____ line(s), each of _____ Length

_____ Tip fed by _____ line(s), each of _____ Length

_____ Tip fed by _____ line(s), each of _____ Length

| Time | Disc. Gauge psi (bar) | | | Suction Pressure* psi (bar) | Net Pres. psi (bar) | Pitot Pressure psi (bar) | Flow gpm (L/min) | Counter | | Ratio | Speed rpm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Panel | Test | ± | | | | | End | Start | | |
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*(elevation lift in ft + suction hose lift in ft) × 0.433 psi/ft OR (elevation lift in m + suction hose lift in m) × 0.098 bar/m

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