INTRODUCTION

District Fire Apparatus Pump Testing is completed on an annual basis. Currently, pump testing for District apparatus is performed by Hi-Tech Emergency Vehicle Services. The test process ensures the following:

1. The Fire Pump will perform to ISO ratings for Class A Fire Pumps.
2. The Fire Pump Test will provide the District with baseline performance data for comparison with past pump tests to help determine repair or replacement, if necessary.
3. The Fire Pump Test will provide a training experience for personnel in drafting, hydraulics, and the mechanics of pumping apparatus.

This test is for Type I Engines, Trucks and Water Tenders (not Type 3 or Type 4). The pump testing will be done concurrent with its Annual Service Schedule.

INFORMATION

Before fire apparatus leaves the fire station for the annual pump test, it is imperative that all water and oil levels are checked and filled to capacity. The annual pump test will exercise the apparatus to its maximum limits for 60-minute durations.

Apparatus which does not meet the rated pumping capacity will be evaluated and further determinations made.

The following information is provided as examples of the specific components of an annual Fire Apparatus Pump Test.
PUMP TEST PREPARATION

REQUIRED EQUIPMENT:

☐ TWO 10 FOOT SECTIONS HARD SUCTION HOSE
  1000 GPM PUMP 5 INCH
  1250 GPM PUMP 6 INCH
  1500 GPM PUMP 6 INCH

☐ SUCTION HOSE CAP

☐ CAPS FOR PUMP SUCTIONS AND DISCHARGES

☐ SUCTION HOSE STRAINER (PROPER GPM RATING)

☐ 50 FOOT ROPE

☐ TOOL BOX (with wrenches and sockets)

☐ PUMP TEST GAUGE SET

☐ NOZZLE AND PITOT TEST SET

☐ TEFILON TAPE (for test gauge fittings)

☐ CLIP BOARD AND PENCIL

☐ PUMP TEST DATA SHEET (blank copies)

☐ PREVIOUS TEST DATA SHEETS

☐ RPM COUNTER

☐ PRIMING PUMP OIL

☐ 25 FOOT TAPE MEASURE

☐ HEARING PROTECTION

☐ PROTECTIVE CLOTHING AND SHOES

☐ SIX 50-FOOT SECTIONS OF 3-INCH HOSE

☐ STOP WATCH

☐ WATER THERMOMETER
TEST # 1

DRY PUMP VACUUM TEST

CHECK ALL FLUID LEVELS PRIOR TO STARTING TEST

1. SET UP AND CONNECT PUMP TEST GAGES (teflon tape on fittings)
2. DRAIN MAIN PUMP (close tank to pump valve)
3. CONNECT 20 FT. (TWO 10 FT. SECTIONS) OF HARD SUCTION HOSE TO PUMP SUCTION. (CHECK PUMP SUCTION STRAINER CONDITION; LEAVE IN PLACE.)
   1000 GPM PUMP 5 INCH HOSE
   1250 GPM PUMP 6 INCH HOSE
   1500 GPM PUMP 6 INCH HOSE
4. CAP HARD SUCTION HOSE
5. CLOSE ALL DISCHARGE, DRAIN, AND TANK FILLER VALVES
   5A. PLASTIC OVER DISCHARGE VALVES
6. CAP ALL PUMP INTAKES
7. UNCAP ALL PUMP DISCHARGES (caps may need to be reinstalled if valve leaks)
8. START ENGINE (engage main pump only if required to engage priming pump) (some HALE PUMPS)
9. RAISE ENGINE RPM'S TO 1000 AND START PRIMING PUMP
10. RUN PRIMING PUMP UNTIL MAXIMUM IN. Hg. IS ACHIEVED ON TEST GAUGE (record time required to reach both 22 in./, Hg. and max. in. Hg.)
11. TURN OFF ENGINE AND PRIMING PUMP, LISTEN FOR LEAKS
12. OBSERVE VACUUM READING FOR 5 MINUTES (maximum allowable drop 10 inches Hg. in 5 minutes)
13. RECORD TEST RESULTS ON TEST SHEET

NOTE: THE PRIMING DEVICE SHALL NOT BE OPERATED ONCE THE 5 MINUTE TEST HAS BEGUN.
TEST # 2

PRIMING TEST

1. SET UP PITOT WITH PROPER NOZZLE FOR CAPACITY TEST
2. REMOVE SUCTION HOSE CAP AND REPLACE WITH STRAINER
3. ATTACH ROPE TO STRAINER AND SUCTION HOSE
4. PLACE HARD SUCTION HOSE INTO PIT
5. SUBMERGE STRAINER AT LEAST 24 INCHES BELOW WATER SURFACE
6. TIE OFF HOSE WITH ROPE (rope to relieve strain on hose)
7. USE CHAFING PAD ON HARD SUCTION HOSE AS NEEDED
8. MEASURE WATER LEVEL IN DRAFTING PIT, 10 FOOT MAXIMUM LIFT
   (measure top of water surface to eye of pump)
9. CHOCK WHEELS OF ENGINE
10. SET UP DISCHARGE HOSES TO PITO MANIFOLD
11. START ENGINE AND ENGAGE MAIN PUMP
12. PLACE TRANSFER VALVE IN PARALLEL POSITION (volume)
13. RAISE ENGINE RPM'S TO 1000 - 1200
14. START PRIMING PUMP AND STOP WATCH, TIME PRIMING TEST
    (time test ends when water discharges at nozzle and out of priming pump)
    1000 and 1250 GPM PUMPS -- 30 SECONDS
    1500 GPM PUMP -- 45 SECONDS
15. MAINTAIN MINIMUM OF 50 PSI PUMP PRESSURE
16. MAINTAIN WATER FLOW (to maintain prime and cool pump)
17. RECORD RESULTS ON WORKSHEET AND PROCEED TO TEST #3
TEST # 3

100% CAPACITY @ 150 P.S.I. NPP (20 MINUTES)

1. SELECT AND SET UP PROPER PITOT NOZZLE SIZE FOR GPM'S
   (pitot nozzle pressure 50 - 80 psi if possible)
   (same as previous year test if possible)

2. PLACE TRANSFER VALVE IN PARALLEL POSITION (volume)

3. SLOWLY RAISE PUMP PRESSURE AND PITOT NOZZLE PRESSURE TO DESIRED READINGS
   (pressure control device set above desired pump pressure)

4. START TIME TEST AND RECORD ALL GAUGE READINGS ON WORKSHEET

5. OBTAIN AND RECORD MANUAL PUMP COUNTER READING (one minute minimum)

6. CONTINUE TEST FOR 20 MINUTES

7. RECORD ALL GAUGE READINGS ON WORKSHEET
   (start of test, 5, 10, 15, 20 minutes)

8. MONITOR ENGINE AND PUMP PERFORMANCE
   (fluid levels, gauge readings, fluid leaks, hose fittings, etc.)

9. PROCEED TO TEST # 4
TEST # 4

OVERLOAD {SPURT} TEST

1. RAISE PUMP DISCHARGE PRESSURE TO 165 PSI
   (maintain same pitot pressure as test 3)
2. CONFIRM AND RECORD RESULTS ON PUMP TEST WORKSHEET
3. NO TIME REQUIREMENT, PROCEED TO TEST # 5
TEST # 5

PRESSURE CONTROL DEVICE TEST @ 150 PSI

1. MAINTAIN 150 PSI PUMP PRESSURE AND PITOT FLOW PRESSURE AS IN TEST 3
2. SET PRESSURE CONTROL DEVICE AT 150 PSI
3. SLOWLY CLOSE ALL DISCHARGE VALVES ONE AT A TIME
   (no faster than 3 seconds, no slower than 10 seconds)
4. OBSERVE AND RECORD PUMP DISCHARGE PRESSURE RISE ON WORKSHEET
   (pressure rise with all discharges closed should not exceed 30 psi)
5. OPEN DISCHARGE VALVES TO ORIGINAL FLOW PRESSURE AND PROCEED TO TEST # 6
TEST # 6

PRESSURE CONTROL DEVICE TEST @ 90 PSI

1. OBTAIN 90 PSI PUMP PRESSURE BY ADJUSTING ENGINE THROTTLE ONLY (do not change discharge valve settings from those used in test # 5 for capacity flow)
2. SET PRESSURE CONTROL DEVICE AT 90 PSI
3. SLOWLY CLOSE ALL DISCHARGE VALVES ONE AT A TIME (no faster than 3 seconds, or slower than 10 seconds)
4. OBSERVE AND RECORD PUMP DISCHARGE PRESSURE RISE ON WORKSHEET (pressure rise with all discharges closed should not exceed 30 psi)
5. OPEN DISCHARGE VALVE TO ALLOW WATER FLOW
6. PROCEED TO TEST # 7
TEST # 7

70% CAPACITY @ 200 P.S.I. NPP (10 MINUTES)

1. SELECT AND SET UP PROPER PITOT NOZZLE SIZE FOR REQUIRED GPM FLOW
   (pitot nozzle pressure 50 - 80 psi if possible)
   (same as previous year test if possible)

2. PLACE TRANSFER VALVE IN PARALLEL POSITION (volume)
   (check previous year test sheet for transfer valve position, use same position as previous year test)

3. SLOWLY RAISE PUMP PRESSURE AND PITOT NOZZLE PRESSURE TO DESIRED READINGS
   (pressure control device set above desired pump pressure)

4. START TIME TEST AND RECORD ALL GAUGE READINGS ON WORKSHEET

5. OBTAIN AND RECORD MANUAL PUMP COUNTER READING
   (one minute minimum)

6. CONTINUE TEST FOR 10 MINUTES

7. RECORD ALL READINGS ON WORKSHEET
   (start, 5 minutes, and 10 minutes)

8. MONITOR ENGINE AND PUMP PERFORMANCE
   (fluid levels, gauge readings, fluid leaks, hose fittings, etc.)

9. PROCEED TO TEST # 8
TEST # 8

50% CAPACITY @ 250 P.S.I. NPP (10 MINUTES)

1. SELECT AND SET UP PROPER PITOT NOZZLE SIZE FOR REQUIRED GPM FLOW
   (pitot nozzle pressure 50 - 80 psi if possible)
   (same as previous year test if possible)

2. PLACE TRANSFER VALVE IN SERIES POSITION (pressure)
   (check previous year test sheet for transfer valve position, use same position as previous year test)

3. SLOWLY RAISE PUMP PRESSURE AND PITOT NOZZLE PRESSURE TO DESIRED READINGS
   (pressure control device set above desired pump pressure)

4. START TIME TEST AND RECORD ALL GAUGE READINGS ON WORKSHEET

5. OBTAIN AND RECORD MANUAL PUMP COUNTER READING
   (one minute minimum)

6. CONTINUE TEST FOR 10 MINUTES

7. RECORD ALL READINGS ON WORKSHEET
   (start, 5 minutes, and 10 minutes)

8. MONITOR ENGINE AND PUMP PERFORMANCE
   (fluid levels, gauge readings, fluid leaks, hose fittings, etc.)

9. PROCEED TO TEST # 9
TEST # 9

PRESSURE CONTROL DEVICE TEST @ 250 PSI

1. OBTAIN 250 PSI PUMP PRESSURE BY ADJUSTING ENGINE THROTTLE ONLY
   (do not change discharge valve settings from those used in test # 8 for capacity flow)

2. SET PRESSURE CONTROL DEVICE AT 250 PSI

3. SLOWLY CLOSE ALL DISCHARGE VALVES ONE AT A TIME
   (no faster than 3 seconds, or slower than 10 seconds)

4. OBSERVE AND RECORD PUMP DISCHARGE PRESSURE RISE ON WORKSHEET
   (pressure rise with all discharges closed should not exceed 30 psi)

5. OPEN DISCHARGE VALVE TO ALLOW WATER FLOW

6. SLOWLY REDUCE ENGINE SPEED, AND SHUT OFF WATER FLOW

7. DISENGAGE MAIN PUMP

8. IDLE ENGINE FOR 10 MINUTES BEFORE SHUTTING DOWN
   (to cool engine)
END OF TEST PROCEDURES

1. CHECK ENGINE FOR ABNORMALITIES OR FLUID LEAKS  
   (check under engine for leaks)
2. CHECK AND REFILL ALL ENGINE FLUIDS
3. CHECK AND RETURN ALL EQUIPMENT USED
4. CLEAN TEST AREA
5. NOTE ALL PROBLEMS OR OBSERVATIONS ON WORKSHEET
6. ADVISE DUTY B/C OF ANY OUT OF SERVICE EQUIPMENT OR SUSPECTED PROBLEMS
7. COMPLETE "FINAL RESULTS" SECTION OF WORKSHEET  
   (average results of tests)
8. COMPLETE AND SIGN WORKSHEET, RETURN WORKSHEET TO ADMINISTRATION BUILDING.