Clark County Department of Building & Fire Prevention

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TITLE: **Testing of Pressure Reducing Valves**

SCOPE: Clark County Department of Building & Fire Prevention requirements for the acceptance and periodic testing of pressure reducing valves associated with fire protection systems.

PURPOSE: This guideline is to standardize plan/permit requirements required by the Fire Prevention in accordance with Clark County Fire Code and local amendments, National Fire Protection Association (NFPA) 13, NFPA 14, NFPA 25 and current manufacturer specifications associated with the pressure reducing valves.

DEFINITIONS:

Assessor's Parcel Number (APN): A unique number assigned to each property by the Clark County Assessor's office.

Listed: Equipment, materials, or services included in a list published by a nationally recognized testing laboratory that is acceptable to the authority having jurisdiction

General Pressure Reducing Valve: Device that restricts downstream static and residual pressures. May be either direct-acting or pilot-operated.

Master Pressure Reducing Valve: Generally a pilot-operated PRV, Master PRVs control the pressures to a zones of systems containing more than one sprinkler system and/or standpipe valve. Master PRVs typically allow for numerous other downstream valves to not be pressure reducing.

Sprinkler Pressure Reducing Valve: PRV that regulates downstream static and residual pressures for a single sprinkler system. These are generally a direct-acting PRV.

Standpipe Pressure Reducing Valve: PRV that regulates downstream static and residual pressures for a single standpipe hose valve. These are generally a direct-acting PRV.

SPECIFICATIONS AND REQUIREMENTS:

Testing of Master, Sprinkler, and Standpipe Pressure Reducing Valves (PRVs) is necessary to ensure that the PRVs provide sufficiently high pressure in order to ensure system operation, while also limiting pressures low enough to meet the listings of downstream components.

ACCEPTANCE TESTING

Pre-flow

1. Determine the flow and pressure criteria for the PRV. Flow and pressure criteria must be determined by review of the approved plans. Flow and pressure shall be in accordance with manufacturer data.

2. Determine how flow will be captured. Flow must be directed to a drain, captured in a tank, or flowed outdoors in a manner approved by the AHJ. When flowing to a drain, the drain size shall be equal to or greater than the PRV size.

3. Determine how pressure downstream of the PRV will be measured. Typically, the pressure is measured with a pressure gauge immediately downstream of the PRV device.

4. Determine how flow rate will be measured. The flow rate must be verified to ensure that the required system flow is being flowed through the PRV device. Typically, this is accomplished with an in-line flow meter located immediately after the PRV discharge and discharge gauge.

5. Pre-connect hose or temporary piping from the PRV discharge to the drain/tank/outdoors, while adding in-line pressure gauge and flow meter.

6. Determine how flow through the PRV is controlled with a valve for the purpose of this test. The test control valve must be situated downstream of the PRV, pressure gauge, and flow meter.

Flow

1. Start the fire pump.

2. Record the static pressure downstream of the PRV.
3. Open the PRV test control valve.

4. After flow stabilizes, record the residual pressure downstream of the PRV and the flow through the flowmeter.

5. Close the PRV test control valve.

6. Tag the valve with the date of the test and the flow and pressure.

7. Record the valve location, flow and pressure.

8. After testing is complete, turn off the fire pump and return pump to automatic mode.

Post-Test

1. Compare test data to the plans to ensure that the PRV does not allow a higher static pressure, does not deliver a lower residual pressure.

PERIODIC TESTING

Pre-flow

1. Determine the flow and pressure criteria for the PRV. Flow and pressure criteria must be determined by review of the originally approved plans or by review of original acceptance records. When such records do not exist, the required flow and pressure criteria must be calculated in a manner approved by the AHJ. Flow and pressure shall be in accordance with manufacturer data.

2. Determine how flow will be captured. Flow must be directed to a drain, captured in a tank, or flowed outdoors in a manner approved by the AHJ. When flowing to a drain, the drain size shall be equal to or greater than the PRV size. Where existing installations do not provide test outlets, such as the case may be for sprinkler system PRVs and master PRVs, temporary outlets must be provided, or other means acceptable to the AHJ shall be established to provide full system flow through the PRV.

3. Determine how pressure downstream of the PRV will be measured. Typically, the pressure is measured with a pressure gauge immediately downstream of the PRV device. Where a pressure gauge is not already installed downstream of the PRV, a temporary gauge installation must be provided, or other means acceptable to the AHJ shall be established to accurately measure pressures downstream of the PRV.

4. Determine how flow rate will be measured. The flow rate must be verified to ensure that the required system flow is being flowed through the PRV device. Typically, this is accomplished with an in-line flow meter located immediately after the PRV discharge and discharge gauge. Where a flow meter is not installed, temporary means to measure flow must be provided, or other means acceptable to the AHJ shall be established to accurately measure flows through the PRV.

5. Pre-connect hose or temporary piping from the PRV discharge to the drain/tank/outdoors, while adding in-line pressure gauge and flow meter.

6. Determine how flow through the PRV is controlled with a valve for the purpose of this test. The test control valve must be situated downstream of the PRV, pressure gauge, and flow meter.

Flow

1. Start the fire pump.

2. Record the static pressure downstream of the PRV.

3. Open the PRV test control valve.

4. After flow stabilizes, record the residual pressure downstream of the PRV and the flow through the flowmeter.

5. Close the PRV test control valve.

6. Tag the valve with the date of the test and the flow and pressure.

7. Record the valve location, flow and pressure.

8. After testing is complete, turn off the fire pump and return pump to automatic mode.

Post-Test

1. Compare test data to previous data to ensure that the PRV does not allow a higher static pressure, does not deliver a lower residual pressure, and provides for as much flow as the static pressure, residual pressure and flow determined on the plans. Where previous data is not available, compare the recorded data to the calculated pressure and flow requirements approved by the AHJ.

RECORD KEEPING

For each PRV, the following information shall be recorded:

1. PRV location.
2. System served by each PRV.
3. PRV make and model number.
4. Provide a copy of the manufacturer's specifications for the PRV.
5. PRV setting (if applicable).
6. Static pressure downstream of the PRV, calculated/required.
7. Static pressure downstream of the PRV, tested.
8. Residual pressure downstream of the PRV, calculated/required.
9. Residual pressure downstream of the PRV, tested.
10. Flow GPM through the PRV, minimum calculated/required.
11. Flow GPM through the PRV, tested.

Records shall be maintained on-site available for review by the AHJ upon request.