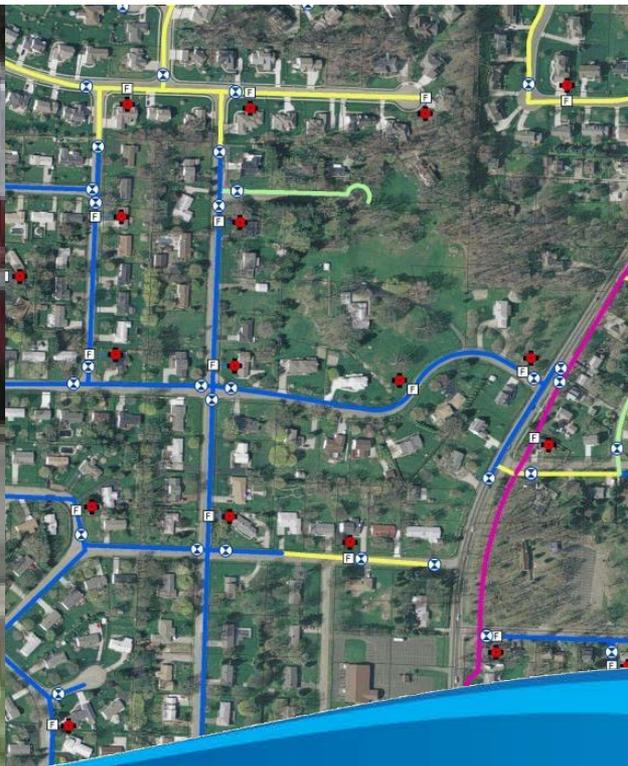


Why Should We Flow Test Hydrants?

Available Fire
Flow Rates

System Planning
Model Calibration

Maintenance
Management



Hydrant Flow Testing Considerations

Site Conditions



Dechlorination

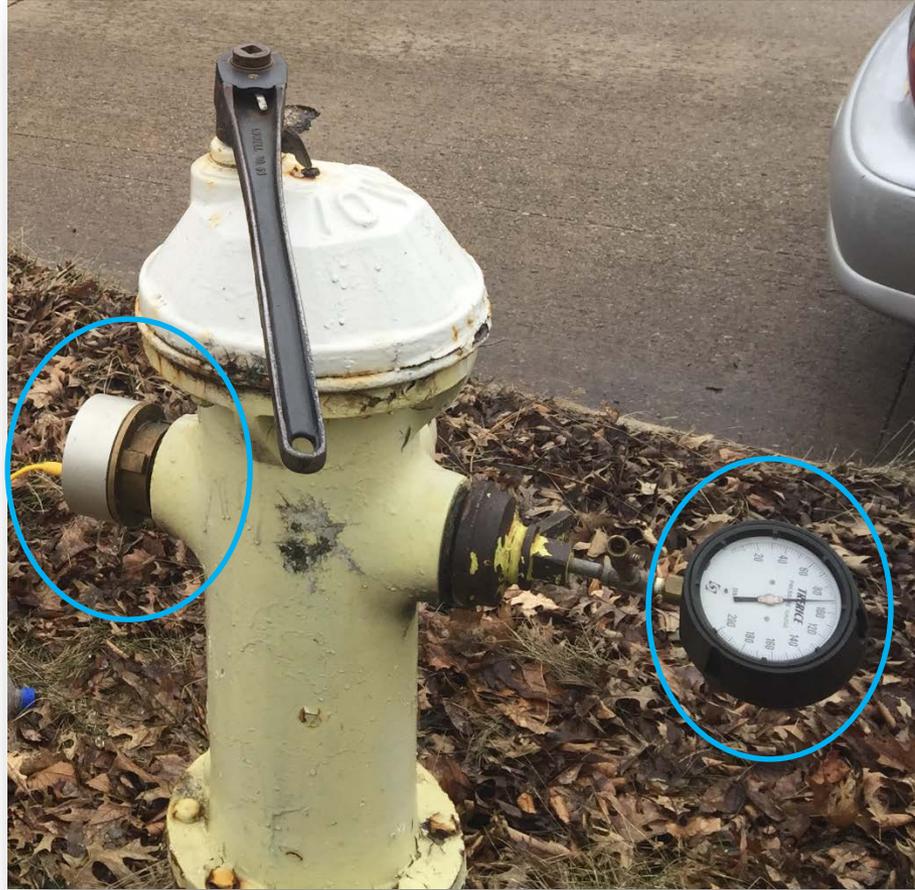


Orifice Size Matters



Hydrant Flow Testing Considerations

**ELECTRONIC
RECORDERS**



DIAL GAUGES



Hydrant Flow Testing Terms

Flow Hydrant

- Location of open hydrant flowing water

Pitot Pressure

- Pressure measured at center of flow stream
- Utilized to calculate the flow rate



Hydrant Flow Testing Terms

Residual Hydrant

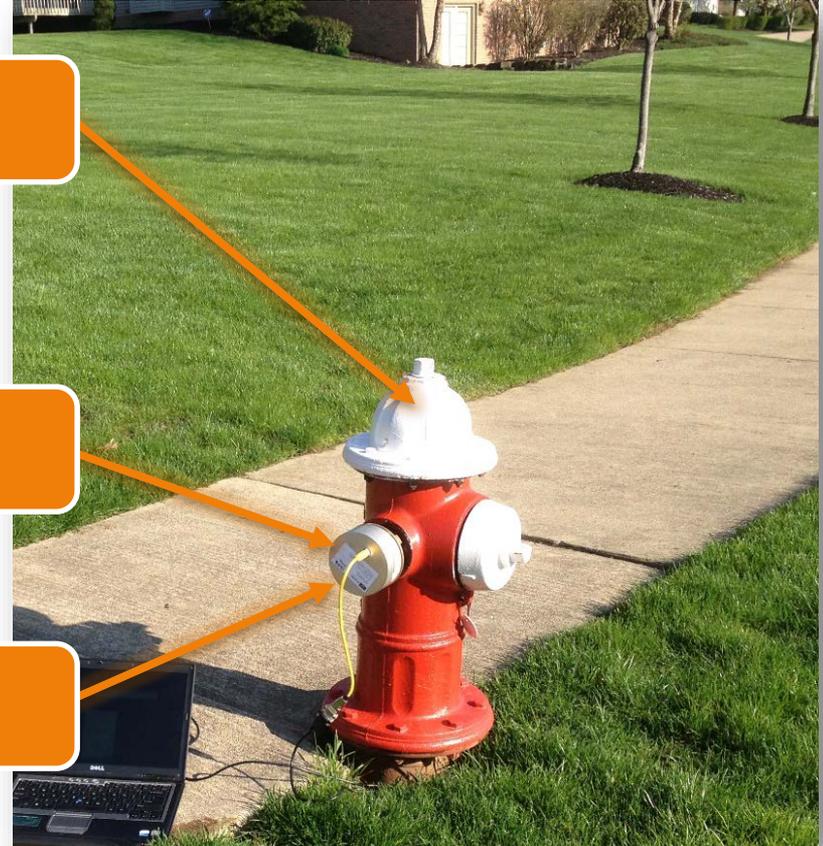
- Located near Flow Hydrant
- Utilized to measure pressure within the distribution system

Static Pressure

- Pressure during typical demands with no hydrants flowing

Residual Pressure

- Pressure measured while the flow hydrant is open



Hydrant Flow Testing Terms

Field Test Flow Rate

- Flow rate measured during the hydrant flow test
- Actual flow rate of water exiting the flow hydrant

Available Fire Flow Rate

- Calculated value based on the field test flow rate and the measured residual pressure during the test
- Standard for determining the fire flow rate available occurs at a residual pressure of 20 psi.



Calculation of Available Fire Flow

$$Q_R = Q_F \times \frac{h_r^{0.54}}{h_f^{0.54}}$$

Where:

- Q_r = the flow available at the desirable residual pressure, in gpm
- Q_f = the sum of the flows from all hydrants (from step 2), in gpm
- h_r = the difference in pressure between the static pressure measured at the residual hydrant and the desired residual pressure, in lb/in.²
- h_f = the difference between the static pressure and the residual pressure measured at the residual hydrant, in lb/in.²



Calculation of Available Fire Flow

Time Zone: EST	Pitot Pressure (psi) Flow Hyd.	Field Flow Rate (gpm)	Residual Hydrant Pressure Readings		Available Fire Flow (at 20 psi res.)
			Type	(psi)	
1:00:50 PM	0	0	Static	53	
1:01:00 PM	0	0	Static	54	
1:01:10 PM	0	0	Transition	51	
1:01:20 PM	16	753	Transition	41	
1:01:30 PM	32	1050	Residual	44	1966
1:01:40 PM	36	1113	Residual	45	2242
1:01:50 PM	33	1059	Residual	45	2145
1:02:00 PM	35	1102	Residual	45	2250
1:02:10 PM	34	1077	Residual	45	2212

Pressure from
flowing hydrant

Field Test
Flow Rate

Calculated
Available Fire
Flow Rate



Hydrant Flow Test Setup



Residual Hydrant

- Static Pressure
- Residual Pressure
- Test evaluates water available at this location



Flow Hydrant

- Pitot Pressure

Test Area

Hydrant Flow Test Procedure

1. Preparation

- Identify flow and residual hydrants
- Evaluate traffic control needs
- Confirm test equipment condition and availability



Hydrant Flow Test Procedure

2. Residual Hydrant

- Locate hydrant and properly flush to remove sediment
- Install pressure gauge
- Open hydrant, confirm no leaking, read gauge and record as static pressure



Hydrant Flow Test Procedure

3. Flow Hydrant

- Locate hydrant
- Estimate discharge path, establish traffic control
- Install pitot pressure measurement gauge
- Open hydrant, record pitot pressure



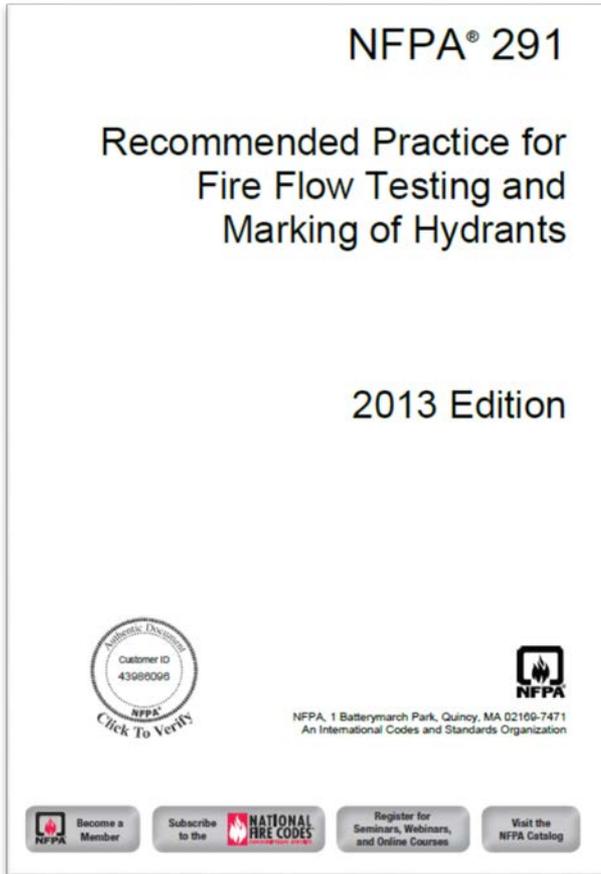
Hydrant Flow Test Procedure

4. Documentation

- Record all measurements
- Record all asset information
- Determine *Field Test Flow Rate*
- Determine *Available Fire Flow Rate*
- Record Lessons Learned



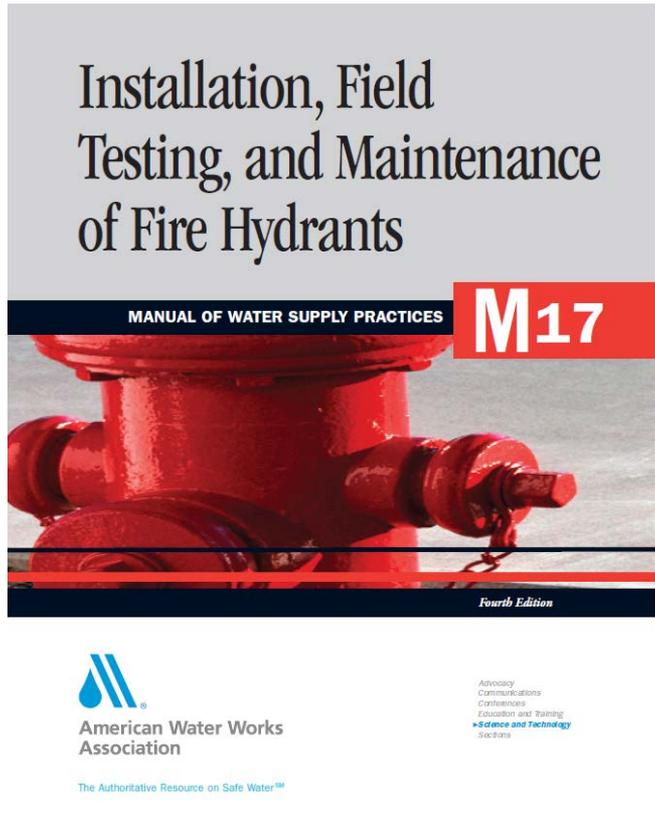
Published Guidelines



- National Fire Protection Association
- Hydrant testing every 5 years
- Drop in pressure of at least 25% during test
- Alternative – testing achieves desired flow rate needed for fire fighting



Published Guidelines



- American Water Works Association
- Hydrant testing every 10 years
- Drop in pressure of at least 10 psi during test
- Alternative – open multiple hydrants/ports to achieve pressure reduction

