



Why Water Meters Matter

The New York City Department of Environmental Protection's Operational Excellence Program (OpX)

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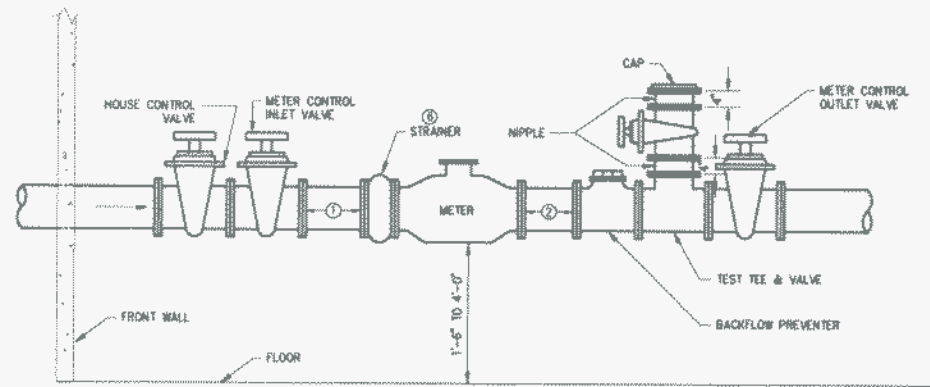
ASPE NYC Chapter April 2, 2014

Observations and Goals for This Evening



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- Observation: Plumbing Engineers and Licensed Plumbers usually do not pay attention to water meter specifications
 - Topic: Meter technology and product choices do matter
 - Topic: Meter technology has been advancing in the last decade
 - Topic: Options for data communication (BMS, Benchmarking) have increased

Large Meter Setting Design Basics



- Straight pipe length required: five pipe diameters before and three after the meter
- Straight pipe length can include the strainer and any normally-open valves
- Inlet and outlet isolation valves: full-port ball valves up through 2"
- 3" and larger: rising stem, resilient-seated, epoxy-coated gate valves (domestic) or OS&Y (fire service)
- Level +/- 10 degrees (single-jet meters)
- Not on the floor and not too high (1.5' – 3' AFF)

Traditional Meter Technologies

Advantages

- Long useful life for smaller sizes (15+ years) ($\frac{5}{8}$ " – 1")
- Good accuracy at low flow rates for small sizes

• Disadvantages

- Size limited: $\frac{5}{8}$ " – 2"
- High pressure drop at high flow rates
- Mediocre accuracy for larger sizes at low flow rates (2" under 2 gpm)
- Not appropriate for services with fire protection sprinklers



Advantages

- Very accurate at high flow rates
- Low pressure drop at most flow rates
- Available in many sizes (2" – 20")
- Designed for relatively constant flow rate applications



Disadvantages

- Modest or poor accuracy at low flow rates
- Not appropriate for services with fire protection sprinklers in standard configurations

Advantages

- Combines some positive features of PD and Turbine designs
- Low pressure drop at most flow rates
- Available in many sizes (2" – 8")

Disadvantages

- Loses accuracy within several years if not regularly rebuilt and maintained
- Not appropriate for services with fire protection sprinklers in standard configurations

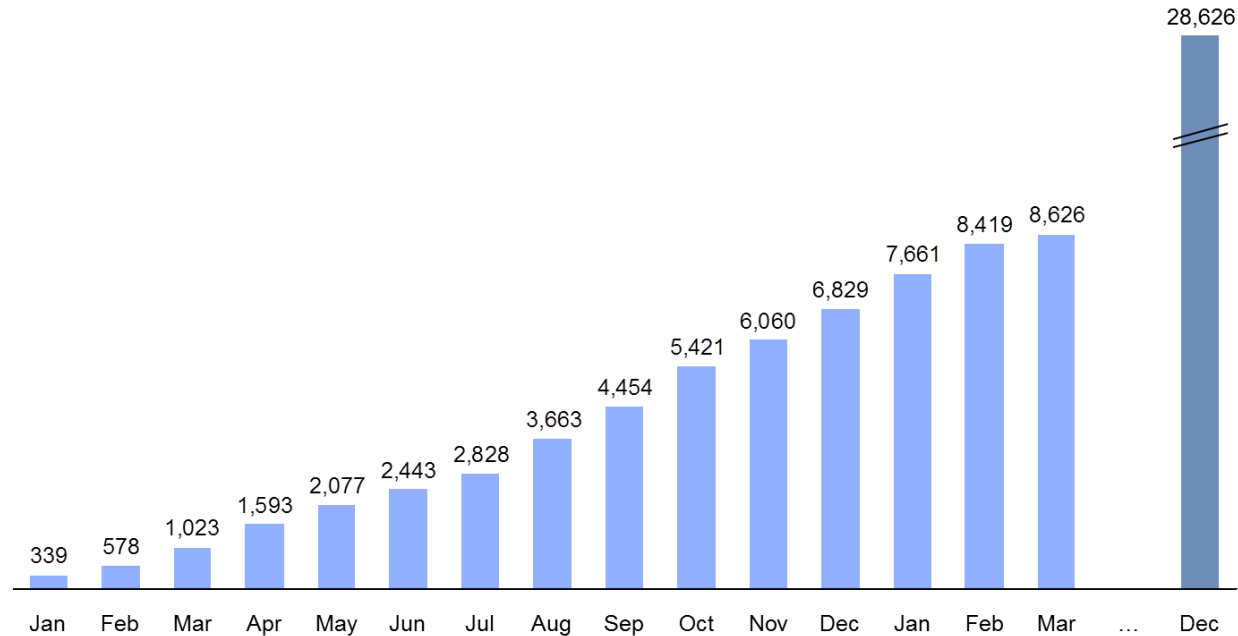


Elements of Large Meter Program



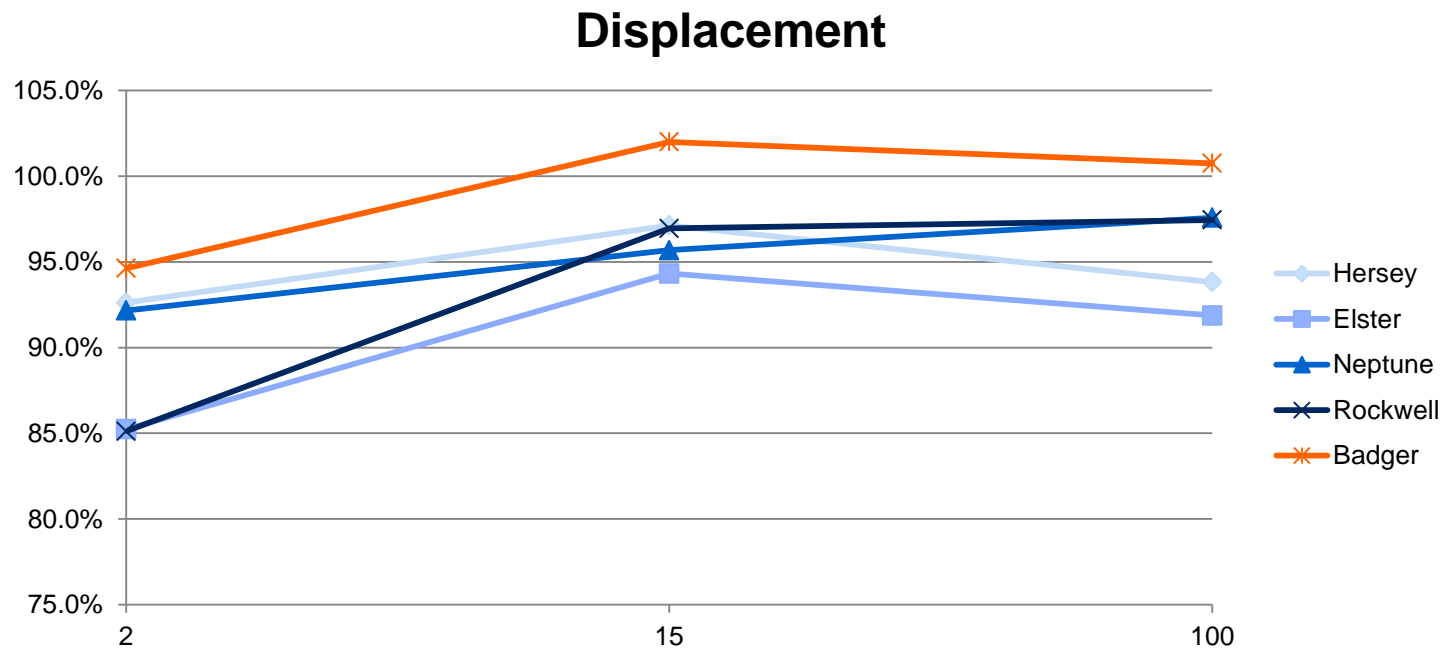
- Commission new Meter Testing Facility
- Develop model incorporating daily flow, building characteristics, meter age and design to prioritize meters for replacement (Veolia Water)
- Accuracy test large numbers of removed meters
- Data logging to study actual use profiles in buildings
- Use AMR system daily reads to track “before”/”after” results

Large Meter Program



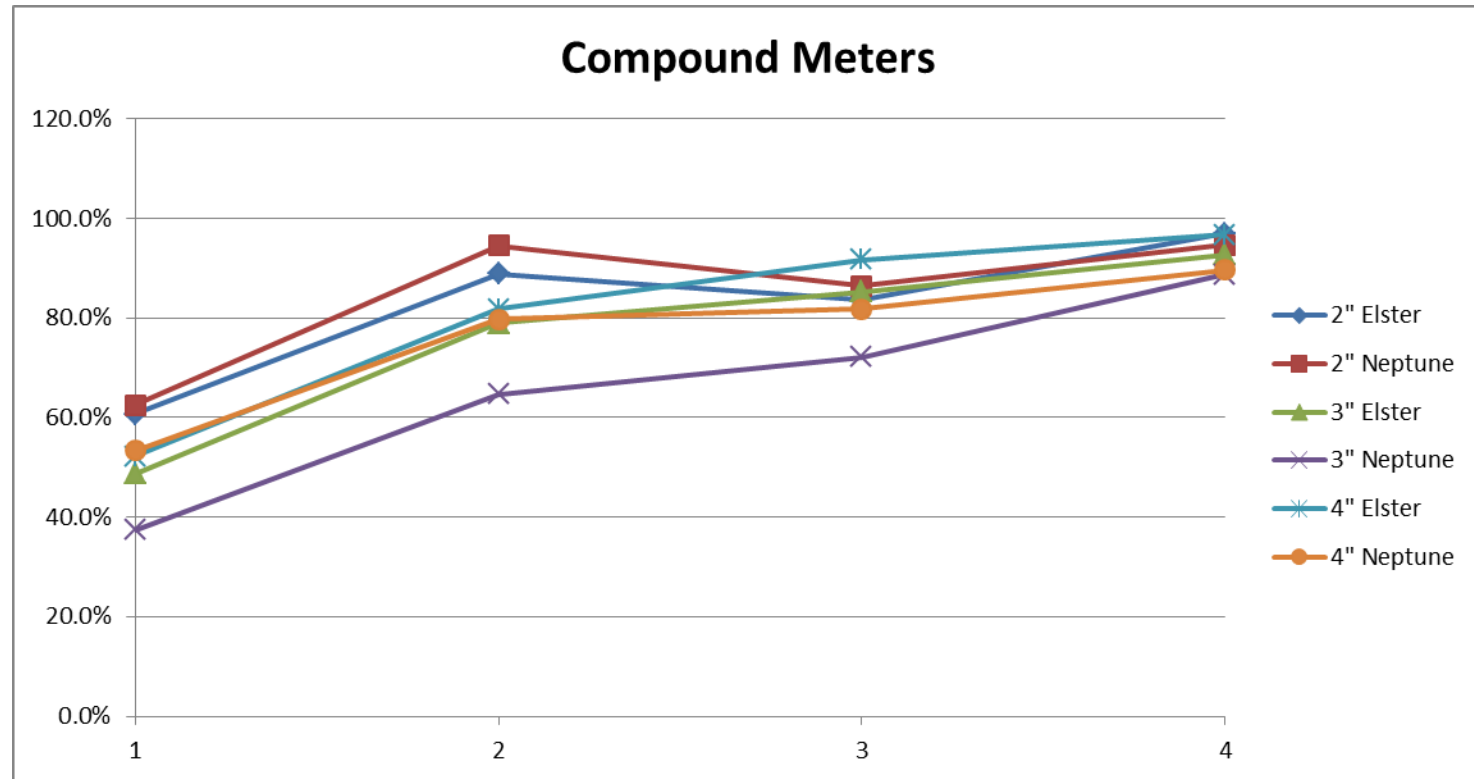
- 70,000 large meters in the system sized 2 inches or larger
- 28,000 meters targeted for replacement
- 8,000 replaced as of March 2014
- Estimated annual revenue from project \$50 Million
- 3,200 meter accuracy tests performed to date

2" Positive Displacement Meter Accuracy



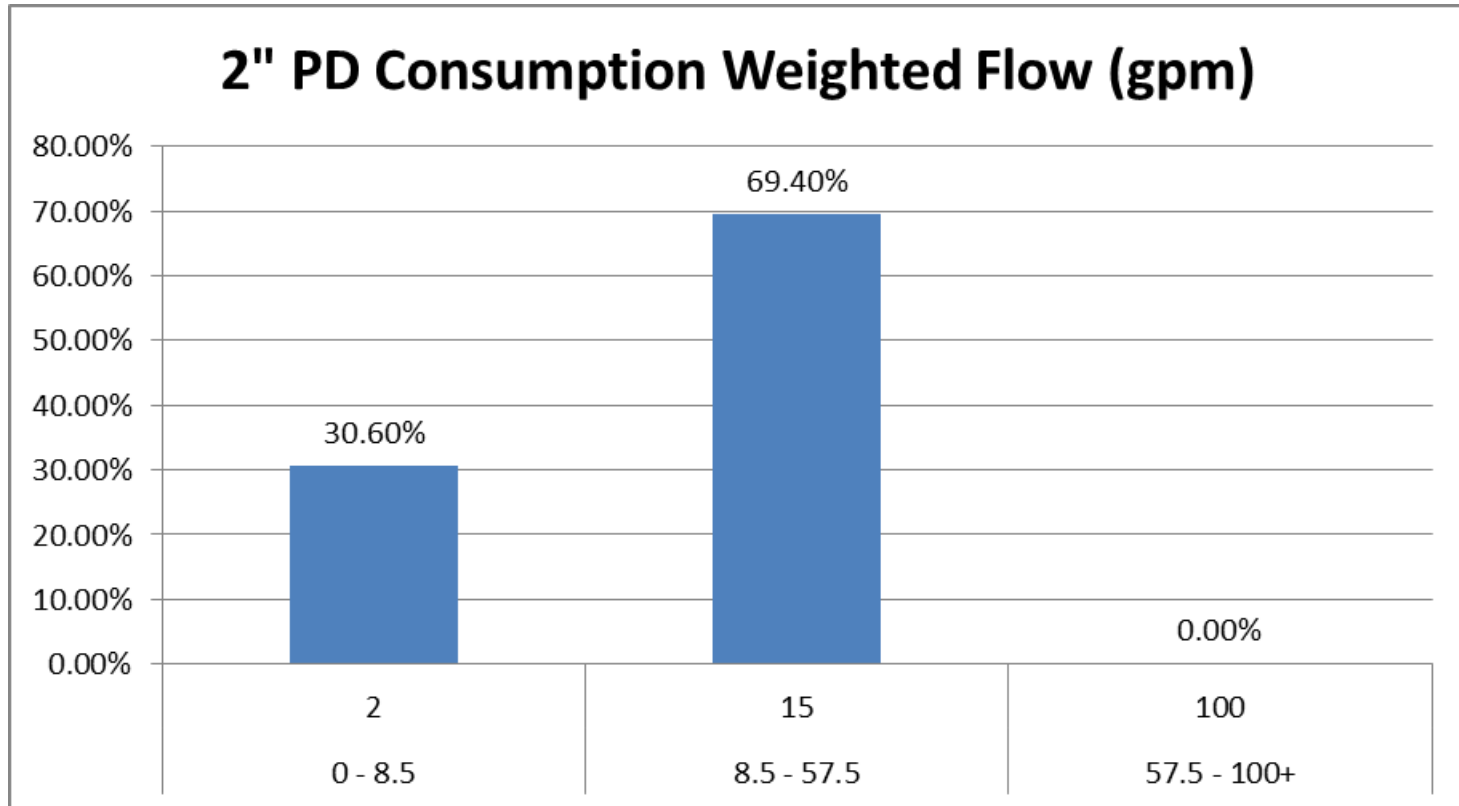
Tests at 2 gpm, 15 gpm and 100 gpm, 7 years old +

2" – 4" Compound Meter Accuracy

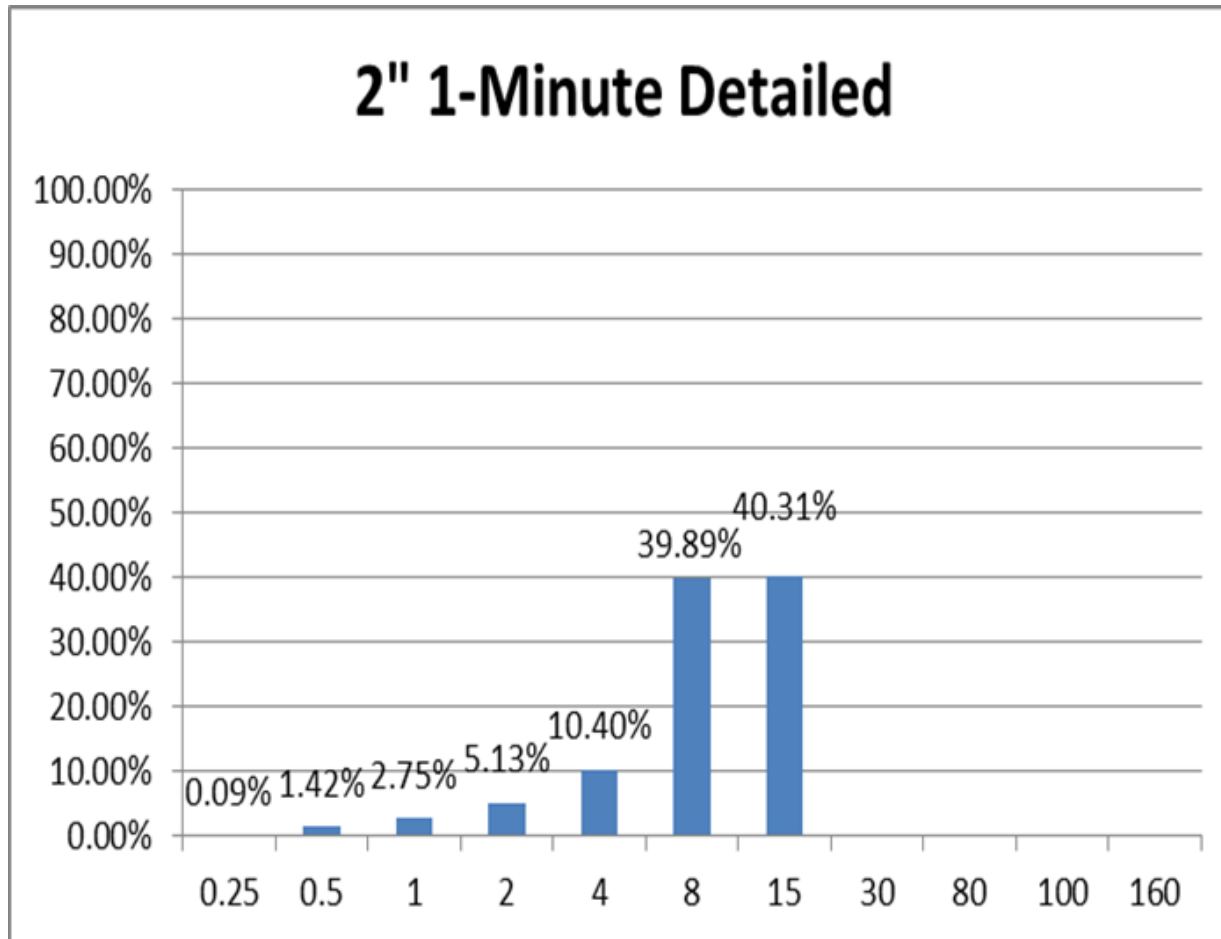


Tests at 0.5 gpm, 3 gpm, 15 gpm and 200-350 gpm (depending on size), 7+ years old

2" PD Meter Flow Profile

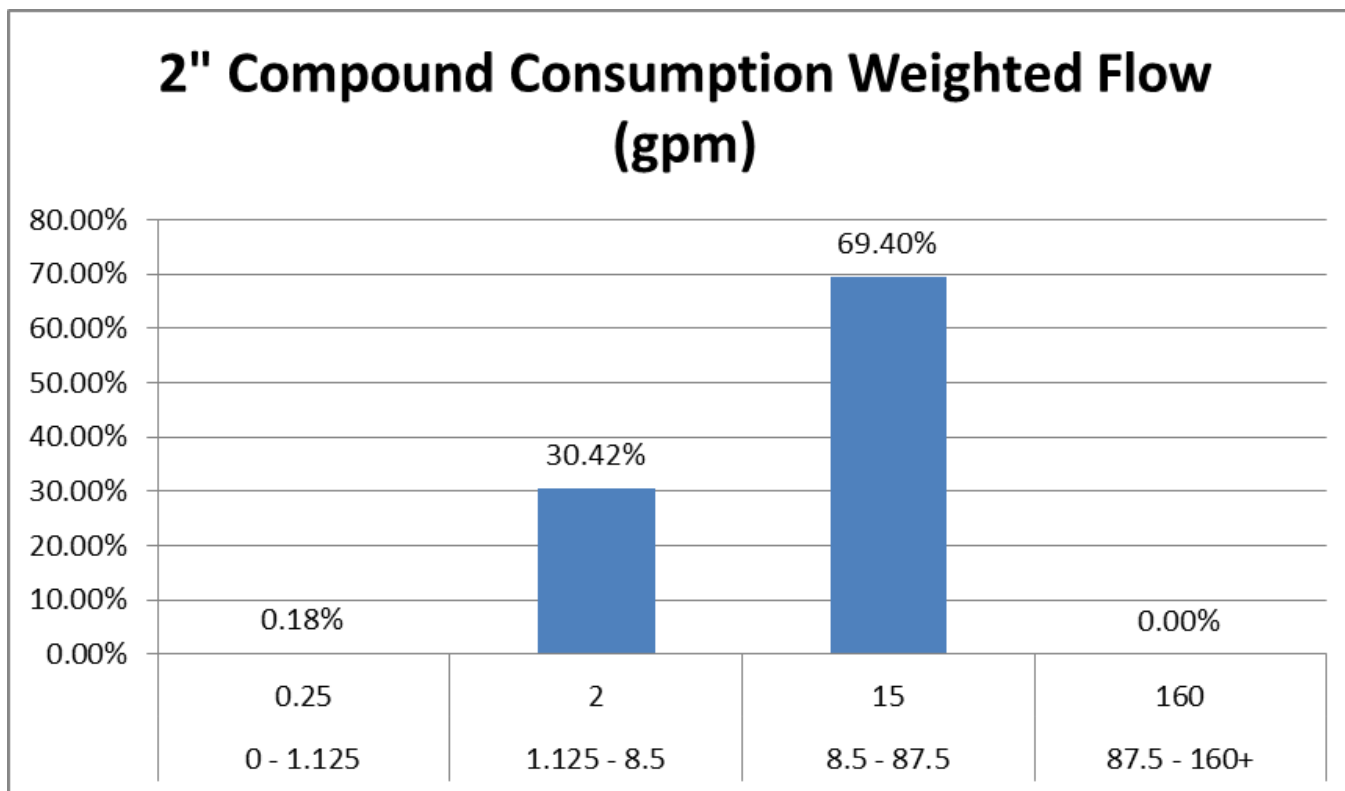


Maximum continuous flow rate is 100 gpm

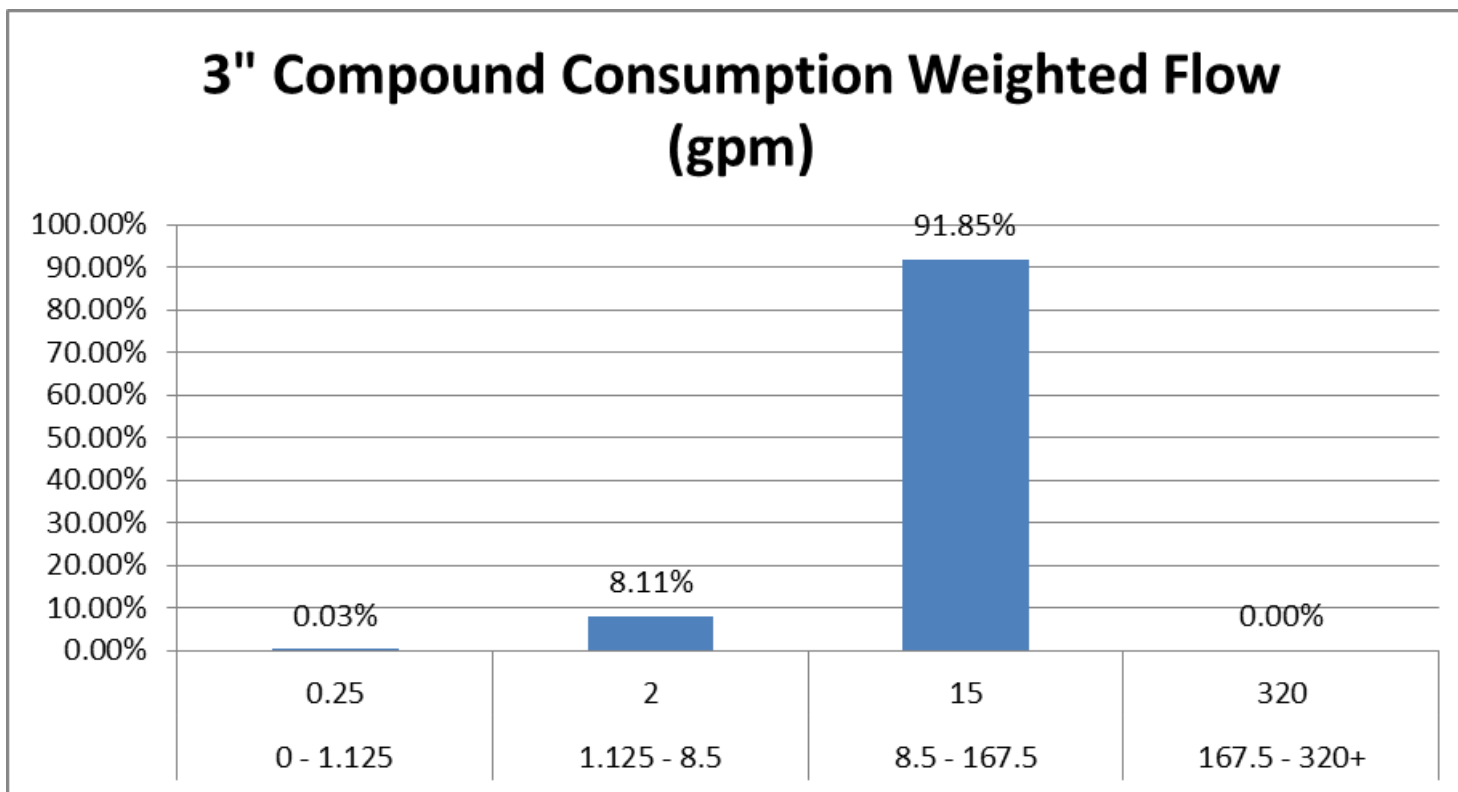


Maximum continuous flow rate is 100 gpm

2" Compound Meter Flow Profile



3" Compound Meter Flow Profile



New Meters on the Block – Single Jets



- Highest accuracy at low flow rates – most accurate meter at 1½” or 2” size
- Low pressure drop at low-medium flow rates
- Multiple optional outputs: three-wire AMR, 900 MHz radio, pulse, 4-20 ma and Verizon cell
- Built-in data logging
- Higher resolution: 1 CF through 2” size, 10 CF for larger sizes
- Disadvantage: Not appropriate for high flow-rate pumped applications

New Meters on the Block – Electronic



- Extremely low pressure drop and wide flow range
- No maintenance, long accurate life projected
- Reasonable accuracy at low flow rates
- Light-weight fire service type meter
- Dual output (AMR and pulse) and 1 CF resolution expected by late 2014
- Disadvantage: until high-res unit is available only HCF resolution

New Meters on the Block – Advanced Turbine



- Sensus OMNI C2 and T2 approach the low-flow accuracy of a compound or single-jet
- Relatively low pressure drop
- Higher read resolution: 1 CF compared to 10 CF or 100 CF
- Dual output: Three-wire utility AMR and pulse with data logging (optional)
- Disadvantages:
 - Heavy in sizes 6" and larger, Non-standard lay lengths

- Will the new meters “age” well?
- Will the batteries last?
- Down size (“right size”) meters?
 - New construction
 - Retrofit
- Use strainers even for meters that don’t require one?
(Electronic and Single-Jet)

Questions?



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