## PRODUCT OVERVIEW

### THERMOMETERS

<table>
<thead>
<tr>
<th>SERIES</th>
<th>NAME</th>
<th>INPUT</th>
<th>TYPE</th>
<th>RANGE</th>
<th>RESOLUTION</th>
<th>PRECISION</th>
<th>PROTECTION</th>
<th>MEASURING DISTANCE</th>
<th>MEASUREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQTIA-A</td>
<td>AQTIA-AP1</td>
<td>J, K, T thermocouples</td>
<td>± (0.05% + 1 digit)</td>
<td>0 to 600°C</td>
<td>± 0.05°C</td>
<td>150 Vrms</td>
<td>600 Vrms</td>
<td>3 digits</td>
<td>±0.13% reading + 1.4°F + .006°/°F</td>
</tr>
<tr>
<td>AQTIA-B</td>
<td>AQTIA-VP1</td>
<td>J, K, T thermocouples</td>
<td>± (0.1% + 3 digits)</td>
<td>0 to 600°C</td>
<td>± 0.1°C</td>
<td>1000 Vrms</td>
<td>1000 Vrms</td>
<td>3 digits</td>
<td>± (0.1% + 3 digits)</td>
</tr>
<tr>
<td>AQTIA-P</td>
<td>AQTIA-VP2</td>
<td>J, K, T thermocouples</td>
<td>± (0.2% + 5 digits)</td>
<td>0 to 600°C</td>
<td>± 0.2°C</td>
<td>150 psig (100 psi)</td>
<td>150 psig (100 psi)</td>
<td>3 digits</td>
<td>± (0.2% + 5 digits)</td>
</tr>
</tbody>
</table>

### MULTIMETERS

<table>
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<tr>
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<tr>
<td>TAC3-K</td>
<td>TAC-L</td>
<td>DC Voltage: 0.1 mV to 600 V</td>
<td>± (0.05% + 1 digit)</td>
<td>0 to 600 V</td>
<td>± 0.05 V</td>
<td>600 Vrms</td>
<td>150 Vrms</td>
<td>3 digits</td>
<td>±0.13% reading + 1.4°F + .006°/°F</td>
</tr>
<tr>
<td>TAC3-K</td>
<td>TAC-L</td>
<td>AC Voltage: 0.5 V to 600 V</td>
<td>± (0.1% + 3 digits)</td>
<td>0 to 600 V</td>
<td>± 0.1 V</td>
<td>1000 Vrms</td>
<td>1000 Vrms</td>
<td>3 digits</td>
<td>± (0.1% + 3 digits)</td>
</tr>
<tr>
<td>TAC3-K</td>
<td>TAC-L</td>
<td>AC Current: 0.01 A to 10 A</td>
<td>± (1.5% + 5 digits)</td>
<td>0 to 10 A</td>
<td>± 1.5 A</td>
<td>150 psig (100 psi)</td>
<td>150 psig (100 psi)</td>
<td>3 digits</td>
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### PRESSURE METER

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<tr>
<td>PUB-1</td>
<td>PUB-2</td>
<td>Pressure: 0.1 psig to 600 psig</td>
<td>± (1.0% + 3 digits)</td>
<td>0 to 600 psig</td>
<td>± 1.0 psig</td>
<td>60 psig (20 psi)</td>
<td>60 psig (20 psi)</td>
<td>3 digits</td>
<td>± (1.0% + 3 digits)</td>
</tr>
<tr>
<td>PUB-1</td>
<td>PUB-2</td>
<td>Pressure: 1.0 psig to 50 psig</td>
<td>± (1.0% + 2 digits)</td>
<td>0 to 50 psig</td>
<td>± 1.0 psig</td>
<td>60 psig (20 psi)</td>
<td>60 psig (20 psi)</td>
<td>3 digits</td>
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### ULTRASONIC FLOWMETER

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<tr>
<td>PUB-1</td>
<td>PUB-2</td>
<td>Flow Rate: 0.05 to 19,999 RPM</td>
<td>± (0.05% + 3 digits)</td>
<td>0 to 19,999 RPM</td>
<td>± 0.05 RPM</td>
<td>60 psig (20 psi)</td>
<td>60 psig (20 psi)</td>
<td>3 digits</td>
<td>± (0.05% + 3 digits)</td>
</tr>
<tr>
<td>PUB-1</td>
<td>PUB-2</td>
<td>Flow Rate: 0.05 to 19,999 RPM</td>
<td>± (0.1% + 2 digits)</td>
<td>0 to 19,999 RPM</td>
<td>± 0.1 RPM</td>
<td>60 psig (20 psi)</td>
<td>60 psig (20 psi)</td>
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<tr>
<td>TAC3-K</td>
<td>TAC-L</td>
<td>Surface speed: 0.05 to 25 m/s</td>
<td>± (0.05% + 1 digit)</td>
<td>0 to 25 m/s</td>
<td>± 0.05 m/s</td>
<td>600 Vrms</td>
<td>150 Vrms</td>
<td>3 digits</td>
<td>±0.13% reading + 1.4°F + .006°/°F</td>
</tr>
<tr>
<td>TAC3-K</td>
<td>TAC-L</td>
<td>Surface speed: 0.25 to 25 m/s</td>
<td>± (0.1% + 3 digits)</td>
<td>0 to 25 m/s</td>
<td>± 0.25 m/s</td>
<td>1000 Vrms</td>
<td>1000 Vrms</td>
<td>3 digits</td>
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</tr>
<tr>
<td>TAC3-K</td>
<td>TAC-L</td>
<td>Surface speed: 0.5 to 25 m/s</td>
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</table>

### AIR FLOW HOODS

- **Model:** N/A
- **Units:** N/A
- **Range:** N/A
- **Accuracy:** N/A
- **Features:** None

### Manometers

- **Type:** Pitot tubes
- **Units:** N/A
- **Range:** 99,999 (CFM or m³/s)
- **Accuracy:** ±1% of reading

### THERMO-ANEMOMETERS

- **Units:** N/A
- **Range:** ±3% FS
- **Accuracy:** ±0.5% FS

### THERMOMETERS

- **Units:** 304 SS
- **Range:** ±0.5°F (±0.28°C)
- **Accuracy:** ±2% FS

### OVERVIEW

- **Product:** HVAC
- **Approvals:** CE, FCC
- **RAM:** 1 GB & ROM 4 GB
- **Surface speed:** 0.05 to 0.5 to 19,999 RPM; Contact: ±0.05%

### SERIES AQTIA-AP2

- **Units:** 999,999 in selected flow
- **Range:** 0 to 6000 FPM
- **Accuracy:** ±0.54°F (±0.3°C)

### SERIES AQTIA-VP2

- **Units:** 9,999 in selected flow
- **Range:** 0 to 6000 FPM
- **Accuracy:** ±0.54°F (±0.3°C)

### SERIES VT-300

- **Units:** 99,999 in selected flow
- **Range:** 0 to 6000 FPM
- **Accuracy:** ±0.5°F (±0.28°C)

### SERIES 471B

- **Units:** 9,999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES 473B

- **Units:** 99,999 in selected flow
- **Range:** 40 to 2000 CFM (68 to 3398 m³/h)
- **Accuracy:** ±3% of reading

### SERIES SAH

- **Units:** 9,999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES TAC3-K

- **Units:** 999.999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES TAC-L

- **Units:** 999.999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES AQTIA-WDPM

- **Units:** 999,999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES 477AV

- **Units:** 999,999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES 477B

- **Units:** 999,999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES 475

- **Units:** 999,999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### SERIES 490A

- **Units:** 999,999 in selected flow
- **Range:** 40 to 5000 FPM
- **Accuracy:** ±3% of reading

### DC Voltage

- **Range (Accuracy):** 0.1 mV to 600 V (±1% + 3 digits)

### AC Voltage

- **Range (Accuracy):** 0.1 mV to 600 V (±1% + 3 digits)

### DC Current

- **Range (Accuracy):** 0.01 A to 10 A (±1% + 5 digits)

### AC Current

- **Range (Accuracy):** 0.1 A to 400 A (±1% + 5 digits)

### Resistance

- **Range (Accuracy):** 0.1 to 40 MΩ (±1% + 5 digits)

### MULTIMETERS

- **RAM:** 1 GB & ROM 4 GB
- **Readings:** 40 readings
- **Accuracy:** ±0.1% FS

### TACHOMETERS

- **Measuring Distance:** ±0.01% of reading
- **Service:** ±0.2 sec

### APPROVALS

- **CE:** CE
- **FCC:** CE
- **FM:** CE

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AIR BALANCING TEST INSTRUMENT KITS

The AQTIA KITS 490A-HKITSAH provides an all-in-one solution for air balancing. It includes the versatile, hand-held, battery-operated manometers available in several models, and the SAH adapter base kit for canvas hood. The SAH-22 Smart Air Hood™ Balancing Instrument is a Wi-Fi direct wireless communication provides a range up to 200 yards enabling accurate readings and data can be transferred from the Model to the mobile gateway in hard carrying case with NIST certificate.

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AIR BALANCING HVAC SYSTEMS

METHODS OF AIR BALANCING

Predictive Balancing is a method of predicting the optimal flow set point for Key. Predictive Balancing calculates the ideal flow set point for Terminal 2 and predicts flows for Terminals 1, 3, and 4. After adjusting the Terminal 2 flow to the ideal flow set point, Predictive Balancing calculates the ideal set point for Terminal 3 and predicts the new flow for Terminal 3. Finally, Predictive Balancing calculates the ideal flow for Terminal 4 so the key flows are correctly adjusted. Predictive Balancing is a method of predicting the optimal flow set point for Key.

Figure 1 – Traditional Air Flow Hood (left picture) versus Dwyer Smart Air Hood (right picture)

Figure 2 – Proportional Balancing

Figure 3 – Predictive Balancing

Figure 1 – Traditional Air Flow Hood (left picture) versus Dwyer Smart Air Hood (right picture)

Figure 2 – Proportional Balancing

Figure 3 – Predictive Balancing

METHODS OF AIR BALANCING

For traditional proportional balancing, an air flow hood, or capture hood, is placed over the terminal to capture the total flow. This flow is then measured and compared to the design flow. The flow is then adjusted to bring the terminal within the design range. The Predictive Balancing (reference Figure 3) process begins by opening the dampers to capture the total flow. The total flow is distributed into the branch ducts and branch dampers in sequence. However, the most common method of air balancing is the Predictive Balancing process.

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AIR BALANCING HVAC SYSTEMS

METHODS OF AIR BALANCING

There are several methods for balancing HVAC systems. The most common method is the Proportional Method. This method involves adjusting terminal dampers in sequence and proportionally until all terminals are delivering the design flow. Predictive Balancing is a process that guides the balancing technician on how to properly set the flow for each terminal in order to optimize the system's design. Flow rates are tested, adjusted, and branch dampers in sequence. However, the most common method of system balancing is called proportional balancing.

PREDICTIVE BALANCING

Predictive Balancing is a method of predicting the optimal flow set point for each terminal in order to minimize backpressure and provide a more even air flow. It allows for the optimal flow set point for each terminal to be calculated and provides a more even air flow that minimizes backpressure. Predictive Balancing is designed to be a faster method of balancing that comes with the SMART Air Hood ™ Balancing Instrument and guides balancers through the process. All of our Pitot tubes are constructed of 304 SS and can tolerate most liquid media compatible with 316LSS. The ergonomic design is much lighter and easier to work with than the existing bulky air hoods, providing greater maneuverability and less backpressure. The Patent pending Quad Flow Design Technology directs the circulating air to patterns to provide a more even air flow that minimizes backpressure. Predictive Balancing is a method of predicting the optimal flow set point for each terminal in order to minimize backpressure and provide a more even air flow. It allows for the optimal flow set point for each terminal to be calculated and provides a more even air flow that minimizes backpressure. Predictive Balancing is designed to be a faster method of balancing that comes with the SMART Air Hood ™ Balancing Instrument and guides balancers through the process. All of our Pitot tubes are constructed of 304 SS and can tolerate most liquid media compatible with 316LSS. The ergonomic design is much lighter and easier to work with than the existing bulky air hoods, providing greater maneuverability and less backpressure. The Patent pending Quad Flow Design Technology directs the circulating air to patterns to provide a more even air flow that minimizes backpressure. Predictive Balancing is a process that guides the balancing technician on how to properly set the flow for each terminal in order to optimize the system's design. Flow rates are tested, adjusted, and branch dampers in sequence. However, the most common method of system balancing is called proportional balancing.

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AIR BALANCING TEST INSTRUMENT KITS

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**AIR BALANCING**

**AQTI KITS 490A-HKIT**

To perform accurate air balancing, it is essential to use quality test instruments. Among the available options, the AQTI Series of test instruments stands out for its versatility and reliability. These instruments are designed to meet the requirements of HVAC system balancing and provide the necessary tools for precise measurements.

**Air Balancing Test Instruments**

The AQTI Series offers a comprehensive range of test instruments, including digital manometers, anemometers, and humidity meters, which are essential for air balancing tasks. The Series includes popular models such as the AP1, RP2, VP2, WDPM, 5 in w.c. manometer, and AP2, which are specifically designed for HVAC applications.

**AQTI AP2**

- **Product Features:**
  - Mobile gateway in hard carrying case with NIST certificate
  - Anemometer probe, thermo-hygrometer probe, and 12˝ Pitot Tube, 18˝
  - Wired Professional Kit includes 10 in w.c. Manometer, 477AV-0-PKIT
  - **Popular Models:**
    - AP1
    - RP2
    - VP2
    - WDPM

**Air Balancing HVAC Systems**

**Methodology of Air Balancing**

Air balancing is a critical process in HVAC systems, ensuring that the airflow is distributed evenly throughout the building. This process involves measuring the airflow at various points in the system and adjusting the dampers accordingly. The goal is to achieve the desired airflow rate at each terminal, ensuring proper cooling and heating.

**Proprietary Balancing**

The AQTI Series of test instruments is designed to simplify the balancing process. The Series includes features such as mobile gateways and wireless communications, allowing technicians to perform balancing tasks efficiently and accurately.

**Predictive Balancing**

The AQTI Series also offers Predictive Balancing technology, which uses advanced algorithms to guide the technician through the balancing process. This technology helps to reduce the time and effort required for traditional balancing methods, making it a valuable tool for HVAC professionals.

**SAFETY PRECAUTIONS**

When using air balancing test instruments, it is crucial to follow safety precautions to prevent accidents and damage to equipment. These precautions include:

- **Proper Training:** Ensure technicians are trained in the safe operation of the test instruments.
- **Regular Maintenance:** Regularly inspect and service the equipment to ensure safety and performance.
- **Work Area Safety:** Maintain a clear and safe work area to prevent accidents.

**Conclusion**

Air balancing is a vital process in the operation of HVAC systems, ensuring comfort and efficiency. The AQTI Series of test instruments provides the tools necessary for accurate and efficient air balancing, making it an essential investment for HVAC professionals.

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*Figure 1 – Traditional Air Flow Hood (left picture)*

*Figure 2 – Predictive Balancing (right picture)*

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*Figures from Dwyer Instruments, Inc.*

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*Figures from AQTI Instruments, Inc.*
**AIR BALANCING TEST INSTRUMENT KITS**

**AQTI KITS 490A-HKITSAH**

- Differential pressure measurements.
- Professional kits are available that include the components.
- Anemometer probe, thermo-hygrometer probe, and 12˝ Pitot Tube, 18˝ UHH-BTG wireless unit, AP2, RP2, VP2, WDPM, 5 in w.c. manometer, UHH-BTG wireless pressure gauge.

- Air quality test instrument kit with UHH2 base.

**SMART AIR HOOD™ BALANCING INSTRUMENT**

- Predictive Balancing is a method of predicting the optimal flow setting for each sequential terminal. With the Predictive Balancing, the technician predicts the flow setting for each terminal based on the flow settings of adjacent terminals.

**AIR QUALITY TEST INSTRUMENT KITS**

- The Predictive Balancing (reference Figure 3) process begins by opening Terminal 2 and then adjusting Terminal 3 to a flow set point.

**AIR BALANCING HVAC SYSTEMS**

- Methodology of Air Balancing:
  - The first method is to balance the system sequentially. The technician will balance each terminal one at a time, ensuring that the flow is within the design range.
  - The second method is to balance the system proportionally. The technician will adjust the flow of all terminals simultaneously to ensure that the flow is within the design range.

**SMART AIR HOOD™ FEATURES/BENEFITS**

- Patent pending Quad Flow Design Technology directs the circulating air through the hood, providing greater maneuverability and less physical stress.
- The rugged polypropylene base hood features Quad Airflow Technology for controlling air flow and minimizing back flow.
- The SAH-22® is the only single operator manual air balancing instrument designed to balance both large and small branches in a single operation for all SAH models.

**AIR QUALITY TEST INSTRUMENT KITS**

- The SMART Air Hood™ Balancing Instrument is the most advanced air hood balancing solution on the market, with features such as a wireless differential pressure transducer, a high-resolution display, and a rugged and durable design.

**ADAPTER HOOD ACCESSORIES**

- Canvas hood, 2´ x 4´ (0.6 m x 1.2 m)
- Canvas hood 1´ x 4´ (0.3 m x 1.2 m)
- Canvas hood 1´ x 2´ (0.3 m x 0.6 m)
- Canvas hood 1´ x 6´ (0.3 m x 1.8 m)

**PITOT TUBE KITS**

- Popular Models:
  - 500 psi Hydronic Differential Pressure Manometer Kit with 160-KIT 160F-KIT
  - Canvas hood 2 times (21 in x 44 in)
  - Commercial model for balancing up to 3000 CFM (500 psi)
  - 160F-00-KIT

**POPULAR MODELS**

- Each kit comes with 160F Pitot Tubes with existing 304 SS.
- Stores up to 40 readings for later recall.
- Up to 0.5% accuracy.
- Protective carrying case prevents damage during transport.

**APPLICATION SOFTWARE**

- Display flow measurements from SAH adapter base kit for canvas hood.
- Includes 2´ x 2´ hood, handheld test instrument, and operation for all SAH models.)

**SMART AIR HOOD™ PATENT PENDING**

- Flow Design Technology for controlling air flow and minimizing back flow.
- Single operator can balance a branch in less time than traditional balancing methods.
- The rugged polypropylene base hood features Quad Airflow Technology for controlling air flow and minimizing back flow.
- The SAH-22® is the only single operator manual air balancing instrument designed to balance both large and small branches in a single operation for all SAH models.
### THERMOMETERS

<table>
<thead>
<tr>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>999,999 in selected flow</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
<tr>
<td>N/A</td>
<td>±0.54°F (±0.3°C)</td>
</tr>
<tr>
<td>±2% RH</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
<tr>
<td>±3% RH</td>
<td>±0.54°F (±0.3°C)</td>
</tr>
<tr>
<td>±2% RH</td>
<td>±0.5°F (±0.28°C)</td>
</tr>
<tr>
<td>N/A</td>
<td>±0.54°F (±0.3°C)</td>
</tr>
</tbody>
</table>

### THERMO-ANEMOMETERS

<table>
<thead>
<tr>
<th>Wet Bulb Range</th>
<th>Humidity Range</th>
<th>Air Velocity Range</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 100% RH</td>
<td>0.1 to 99.9% RH</td>
<td>0 to 6000 FPM</td>
<td>5/16˝ (8 mm) [standard] or 7/16˝ (11 mm)</td>
</tr>
<tr>
<td>0 to 100% RH</td>
<td>0.1 to 99.9% RH</td>
<td>0 to 6000 FPM</td>
<td>8 to 216˝ (203 to 5486 mm) 18 to 60˝ (457 to 1524 mm)</td>
</tr>
</tbody>
</table>

### PRODUCT OVERVIEW

- **SERIES 160**: 160F 166T 160G ANE-1
- **SERIES AQTIA-AP2**: AQTIA-VP2 VT-300 473B 471B
- **SERIES SAH**: 98.4 to 3937 FPM
- **SERIES PUB**: 40 to 5000 FPM

### TACHOMETERS

- **Non-contact**: 2.5 to 1999.9 m/min, ±0.01% of reading
- **Contact**: ±(0.05% + 1 digit)

### HVAC TEST & BALANCING EQUIPMENT

- **Pressure Measurement**
  - **DC Voltage**: 0.1 mV to 600 V (0.8% + 2 digits); AC Voltage: 0.1 V to 600 V (0.8% + 2 digits); DC Current: 0.01 A to 10 A (1.2% + 3 digits); AC Current: 0.1 uA to 10 A (1.0% + 3 digits)
  - **Pressure Limits**: 10 psi (2 to 10 in w.c.); 20 psi (20 to 30 in w.c.); 30 psi (200 in w.c. to 101 psi); 5 psig (1 to 10 in w.c.); 15 psi (100 in w.c.); 20 psi (200 in w.c.); 60 psig (20 to 30 psi); 30 psig (15 psi); 60 psig (200 psi); 150 psig (100 psi); 200 psig (100 psi); 400 psig (150 psi)

### APPROVALS

- **Memory**: RAM 1 GB & ROM 4 GB
- **Range**: 40 to 2000 CFM (68 to 3398 m3/h)

### PROTECTION

- **Surface speed**: 0.05 to 4.982 to 689.5 kPa
- **(200 to 350 in w.c.) 15 psi (100 in w.c.); 45 psi (500 psi) 150 psig (100 psi); 200 psig (100 psi); 600 Vrms 1000 Vrms N/A N/A

### SERVICE

- **Non-corrosive dry gases** Air and compatible gases Air and compatible gases Air and compatible liquids

### ULTRASONIC FLOWMETER

- **Series**: MM-1 MM-2 CM-2 CM-3
- **Flow Rate**: 0.33 to 65.62 ft/s (0.1 to 20 m/s)
- **Accuracy**: ±0.5 to 2% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±3% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm); ±6% of flow reading for flow rate > 0.66 ft/s (0.2 m/s) and pipe ID > 2.95˝ (75 mm)

### CONTACT INFORMATION

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