# Wastewater Treatment Plant Flow Meter Selection Guide

## A. Open Channel Flow Meters:

<table>
<thead>
<tr>
<th>PFS Model No</th>
<th>Ideal Use</th>
<th>Size Range</th>
<th>System Configuration &amp; Accuracy</th>
<th>Life Expectancy &amp; Warranty</th>
<th>Installation Limitations &amp; Requirements</th>
<th>Cost Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halmi Nozzle PFS-HN</td>
<td>Open channel sewage or sludge</td>
<td>3”-60”</td>
<td>With ultrasonic: +/-3% of max rate depending on flow rate range</td>
<td>Depending on materials, 50 year expected life with 5 year warranty. Available in steel, S/S and fiberglass</td>
<td>Pipe to free discharge flow: meter can be configured to accept high velocity flow conditions which other devices cannot.</td>
<td>Low</td>
</tr>
</tbody>
</table>

### PFS-HN Special Design Features:
1. The HN design can be configured to handle excessive pipe slope or velocity conditions which render the traditional Parshall Flume highly inaccurate.
2. The basic accuracy of a Parshall flume is considered to be +/-5.0% at max rate. The basic accuracy of the PFS-HN is +/-2.0% of max rate. The HN can be used with a number of secondary read-out devices such as ultrasonic level, pressure transmitter, capacitance probe and others. Parshall Flumes have a limited number of secondary instrument read-out devices that they can be used with.
3. Parshall Flumes and other standard flumes are liners that need to be backfilled with concrete which often times results in distortion of the flume profile that significantly affects their installed accuracy: the PFS-HN is self supporting, does not required any concrete work and can be used for a wider minimum to maximum flow rate range with the addition of the optional HN restrictor package.
4. Because the HN does not require concrete backfilling, it results in a simpler and less expensive installation cost.
5. With laboratory flow calibration, HN accuracy is +/-1.0% of max rate.
6. Lower headloss compared to other free discharge devices.

| Halmi Parshall Flume PFS-HPF | Open channel sewage or sludge | 3”-60” | With ultrasonic: +/-3.0% of max rate depending on flow rate range | Depending on materials, 50year expected life with 5 year warranty. Available in steel, S/S or fiberglass | Pipe to pipe flow with wide flow range capability: can be configured for high velocity flow conditions which Parshall Flumes cannot accommodate | Low |

### HPF Special Design Features:
1. The HPF design can be configured to handle excessive pipe slope or velocity conditions which render the traditional Parshall Flume highly inaccurate.
2. The basic accuracy of a Parshall flume is considered to be +/-5.0% at max rate. The basic accuracy of the PFS-HPF is +/-2.0% of max rate. The HPF can be used with a number of secondary read-out devices such as ultrasonic level, pressure transmitter, capacitance probe and others. Parshall Flumes have a limited number of secondary instrument read-out devices that they can be used with.
3. Parshall Flumes and other standard flumes are liners that need to be backfilled with concrete which often times results in distortion of the flume profile that significantly affects their installed accuracy: the PFS-HPF is self supporting, does not required any concrete work and can be used for a wider minimum to maximum flow rate range with the addition of the optional HPF restrictor package.
4. Because the HPF does not require concrete backfilling, it results in a simpler and less expensive installation cost.
5. With laboratory flow calibration, HPF accuracy is +/-1.0% of max rate.
6. Much lower headloss compared to the Parshall Flume.
# B. Pressurized Flow Meters for Sewage: (High accuracy requirements)

<table>
<thead>
<tr>
<th>Model</th>
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<th>Size Range</th>
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<tbody>
<tr>
<td>HVT-SM</td>
<td>Sewage &amp; Sludge, ideal for discharge permit or billing applications</td>
<td>6” to 180”</td>
<td>With smart DP transmitter accuracy at the totalizer is better than +/-1.0% over 8:1 Range: with multiple transmitters will provide high accuracy over 100:1</td>
<td>Depending on materials, 100 years &amp; 25 year warranty on the venturi &amp; 5 years on the complete system.</td>
<td>Pipe to pipe flow in pressurized pipe</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**SM Special Features:**
1. The PFS-SM utilizes sealed diaphragm sensors connected to a smart DP transmitter with up to 65 feet of shielded capillary tubing – this protects the system from clogged sensing lines as well as eliminates any concern for air entrapment or dewatering conditions. By contrast, magnetic meters do not operate well in applications where there is entrained air.
2. The PFS-SM system includes an in-place DP transmitter calibration assembly that allows the user to perform a calibration on the transmitter without stopping the flow or removing any equipment from service. Once installed, magnetic flow meters cannot be calibrated unless removed and calibrated in a calibration facility.
3. Materials of construction can be cast iron, ductile iron, steel, stainless steel or any other suitable material. The overall length of the venturi meter is available in standard lengths or shorter (same as magnetic flow meter lengths) according to specific application requirements.
4. In cases where more than one flow rate signal is required, such as would be the case with a billing application, the PFS-SM can be combined with a suitable magnetic flow meter which will provide discrete signals from two independent measurement devices. Venturi meter becomes the calibration lab on the field installation for regular calibration of the magnetic flow meter.
5. With laboratory flow calibration, HVT-SM accuracy is +/-0.25% of actual rate of flow.
7. Can be coupled with a plug valve for highly accurate and reliable sewage rate of flow control.
8. Short upstream straight pipe requirements and no downstream requirements for standard accuracy.

| HVT-CI | Chemicals, filtered effluent to river, clear liquids | 1”-180” | With DP transmitter 8.1 system accuracy of better than +/-1.0% of Rate. Accuracy is +/-0.25% with lab calibration | Depending on materials, 100 year life expectancy and 25 year warranty | Pipe to pipe pressurized conditions: low headloss | Medium |

**Special Design Feature of HVT-CI, HVT-DI and HVT-FV:**
1. Short upstream straight pipe requirements and no downstream straight pipe required for standard accuracy.
2. Meter is sized for the application to provide optimum performance.
3. Can be direct coupled to a modulating control valve to form a highly accuracy and reliable rate of flow control device.
### C. Pressurized Flow Applications (with High level of Contamination)

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<tbody>
<tr>
<td>PFS-WM</td>
<td>Sludge, RAS, WAS, abrasive &amp; contaminated flow</td>
<td>2”-96”</td>
<td>+/-3 to 4%: 0.5% with lab calibration</td>
<td>Depending on materials 100 years and 15 year warranty</td>
<td>Pipe to pipe flow; headloss is approximately 30% higher than HVT-SM, CI &amp; DI</td>
<td>Low</td>
</tr>
</tbody>
</table>

**PFS-WM special features:**
1. Utilizes 2” or 3” sealed diaphragm so no concern for plugging.
2. Can handle highly abrasive material.
3. Very long life expectancy with the lowest cost base of any differential device.

### D. Flow Meters for use on the Aeration System: (Main header air, drop leg air)

<table>
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<th>System Configuration &amp; Accuracy</th>
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<th>Installation Limitations &amp; Requirements</th>
<th>Cost Range</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Horizontal, vertical or any orientation</td>
<td>Low</td>
</tr>
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</table>

| HVT-PI | Header air: drop leg loops and air balancing applications | 1”-120” | +/-0.5% or better | 50 year life with 25 year warranty |

**Special Features of HVT-PI & HVT-PS:**
1. Meter is sized to suit application conditions.
2. Temperatures up to 300F.
3. Condensation and dust do not affect measurement accuracy.

### E. Flow Meters for use on Digester Gas, Bio Gas and Dirty Gas Applications:

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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Any orientation conditions: flow up or down</td>
<td>Low</td>
</tr>
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| HVT-DG | Wet and Dirty Gas | 2”-72” | +/-0.5% basic accuracy: +/- 0.25% with lab calibration | Depending on materials, 75 year life expectancy with 25 year warranty |

**Special Design Features of HVT-DG:**
1. Built-in tap cleanout rods to eliminate concern for plugged sensing ports.
2. Standard materials can accommodate line temperatures up to 300F; for applications where line temp is higher than 300F, the HVT-FI is an ideal alternative.
Other Primary Flow Signal Products of Interest:

**PFS-Flow Master**
*Fully integrated secondary Metering System.*
Assembled, Calibrated and Tested by Primary Flow Signal, Inc. engineers prior to shipment into the field.
*Includes:*
- NEMA 4X enclosure
- Flow Transmitter
- Power Supply w/Fuse
- Three Valve Manifold
- Surge Suppressor
- Locking Access Door
- Indicator/Totalizer
- & Other options

Headquarters Location
800 Wellington Avenue
Cranston RI 02910
Ph: 877-737-3569
Fax: 401-461-4450

http://www.primaryflowsignal.com