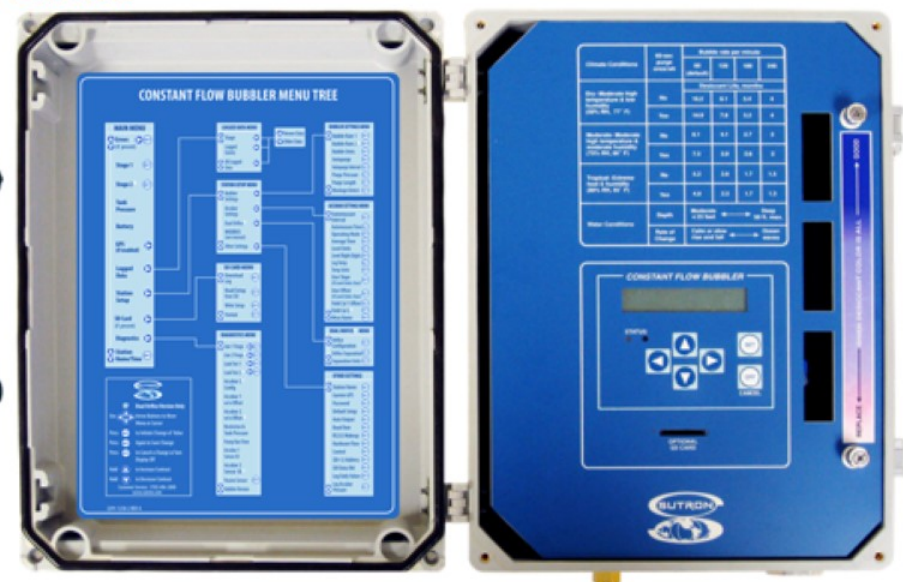


# Constant Flow Bubblers (CFB)



# Overview



Sutron's Constant Flow Bubbler is a self-contained unit that measures water level. This product line has a variety of options to fit your needs.

- ▶ Water temperature measurement capability
- ▶ Density measurement
- ▶ Suspended sediment measurements
- ▶ Flexible packaging

The latest design is more compact than ever!



*Compact CF Bubbler*



# Bubbler Variations



- **Single Orifice**
  - 25 PSI (up to 57ft depth)
  - 50 PSI (up to 115ft depth)
  - Compact 25 PSI
- **Dual Orifice**
  - 25 PSI
  - 50 PSI
- **Density**
  - 25 PSI (Designed to measure water Density)
- **Water Temperature**
  - Optional add-on capability



# Applications



- Replaces Out-Dated Nitrogen Gas Purge Systems
- Surface Water
- Tidal and Oceanic



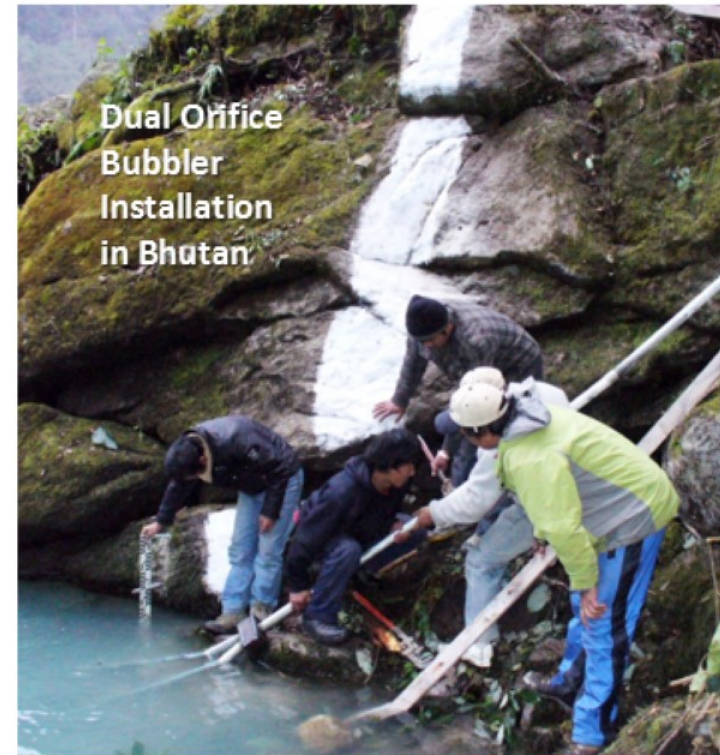
- ▶ Both Hot and Cold Climates
- ▶ Lock & Canal Monitoring
- ▶ Flood Monitoring
- ▶ Shaft Encoder w/Stilling well Replacement



# Specifications



- ▶ **Accuracy**
  - 0.01 ft for readings 0-20 ft
  - 0.05% reading over 20-ft
- ▶ **Purge Rate - User Defined**
- ▶ **Power - 8-16VDC Current**
- ▶ **Power Consumption**
  - Quiescent <1mA
  - Average 100mW for 3 sec. measurement every 15 min.
- ▶ **Environmental**
  - Temp -25°C to 60°C
  - Optional -40°C to 60°C
  - 0-95% non-condensing
- ▶ **Enclosure**
  - NEMA-4 Fiberglass
  - Dimensions: 12" x 15" x 7.5"
  - Pressure Outlet 3/8" Tube Fitting



- ▶ **Outputs**
  - SDI-12, RS232, Modbus
- ▶ **Pressure Range**
  - 0-25PSI (0-57.5ft water or 17.5m)
  - 0-50PSI (0-115ft water)



# 2013 Additional Specifications



## WATER TEMPERATURE

<b>Types Supported</b>	Platinum 385, Platinum 392, Thermistor, Custom
<b>Operational Range</b>	-40°C to +60°C
<b>Accuracy</b>	±0.1°C (-5°C to +45°C)
<b>Resolution</b>	0.01°C
<b>NIST Traceable Calibration</b>	

## SUSPENDED SEDIMENT

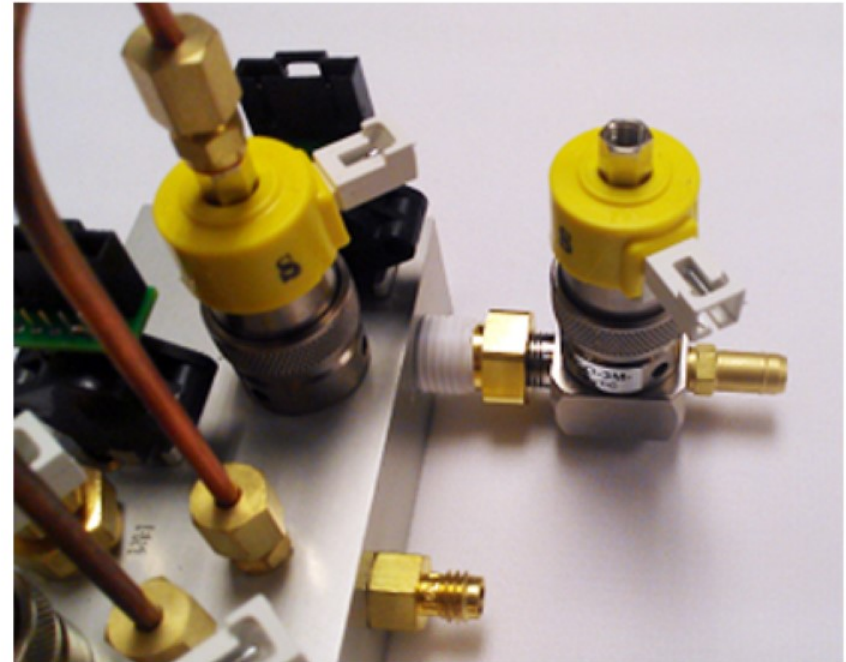
<b>Operational Range</b>	0 to 1,000,000 mg/L
<b>Effective Range</b>	10,000 to 1,000,000 mg/L
<b>Accuracy</b>	±520 mg/L (Best for heavily loaded water systems)  >10,000 mg/L = 5.2% accuracy  >50,000 mg/L = 1.0% accuracy  >100,000 mg/L = 0.5%
<b>Measurement Resolution</b>	100mg/L
<b>Display Resolution</b>	1mg/L



# 2013 Improvements



- ▶ **Check Valve replaced with Solenoid**  
**No more check valve seating problems!**
- ▶ **Fast track capability**  
**Quickly respond to changes in Stage**
- ▶ **Improved Restrictor filter**
- ▶ **Restrictor bypass**  
**In the event it does get clogged,**  
**Bubbler continues to operate**





- **2013 Models Support Water Temperature & Density Measurements.**
- **Self-contained *precision* Water Level Bubble Gauge: *Sensor, Compressor, DataLogger & Desiccant in One Enclosure***
- **Constant Flow Adjustable Bubble Rate for Low Maintenance Water Level Monitoring**
- **Built-in Data Logger, stores >300,000 Readings**
- **RS232 & SDI-12 for Data & Maintenance**
- **Supports Modbus**
- **High Silt Immunity**
- **Auto-Blockage Detection (auto purges orifice blockage)**
- **Low Power**



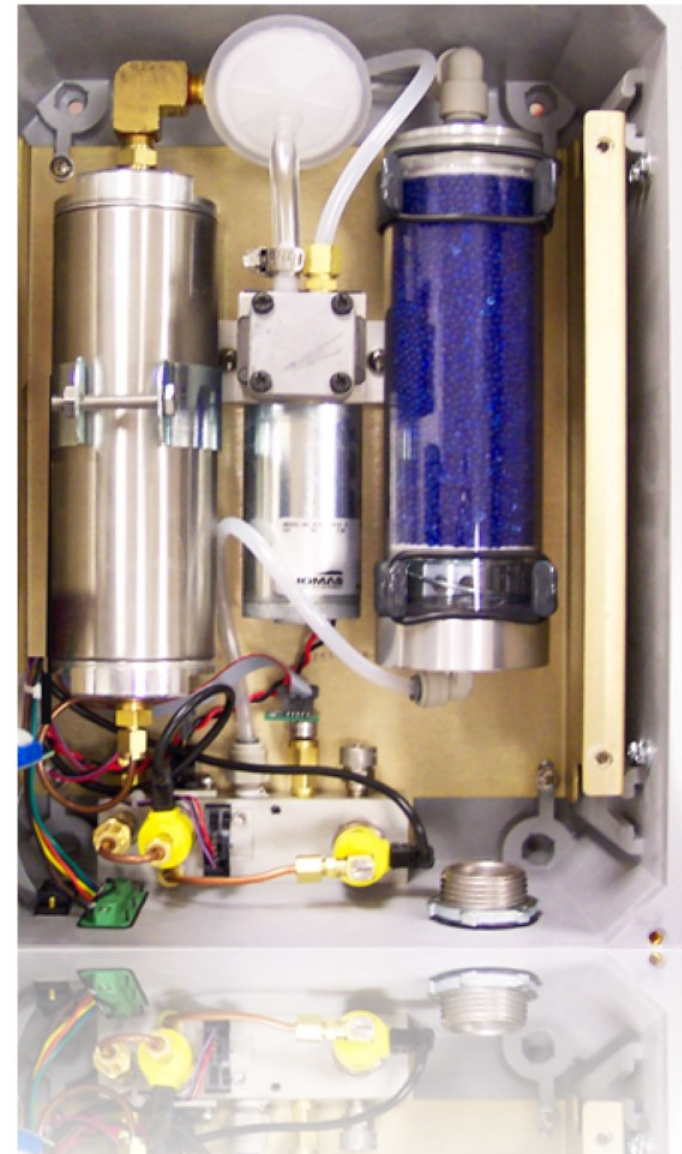
*Bubbler Station,  
New Mexico*



# Technology



- The CFB system includes a Compressor, Air Tank, and Internal Tank Pressure Sensors that allow for constant air flow through orifice and regeneration of tank pressure as required to maintain consistent air flow.
- The internal Accubar pressure sensor brings the proven, reliable technology from the popular Sutron Accubar Pressure Gauge Sensor. Sutron Accubar customers have come to rely on the reliability and accuracy of the Accubar for 20 years.
- The Sutron CFB includes a built in data logger capable of storing over 300,000 readings. Averaging times are user settable to provide accurate water level measurements by averaging out small ripples or tidal surge.



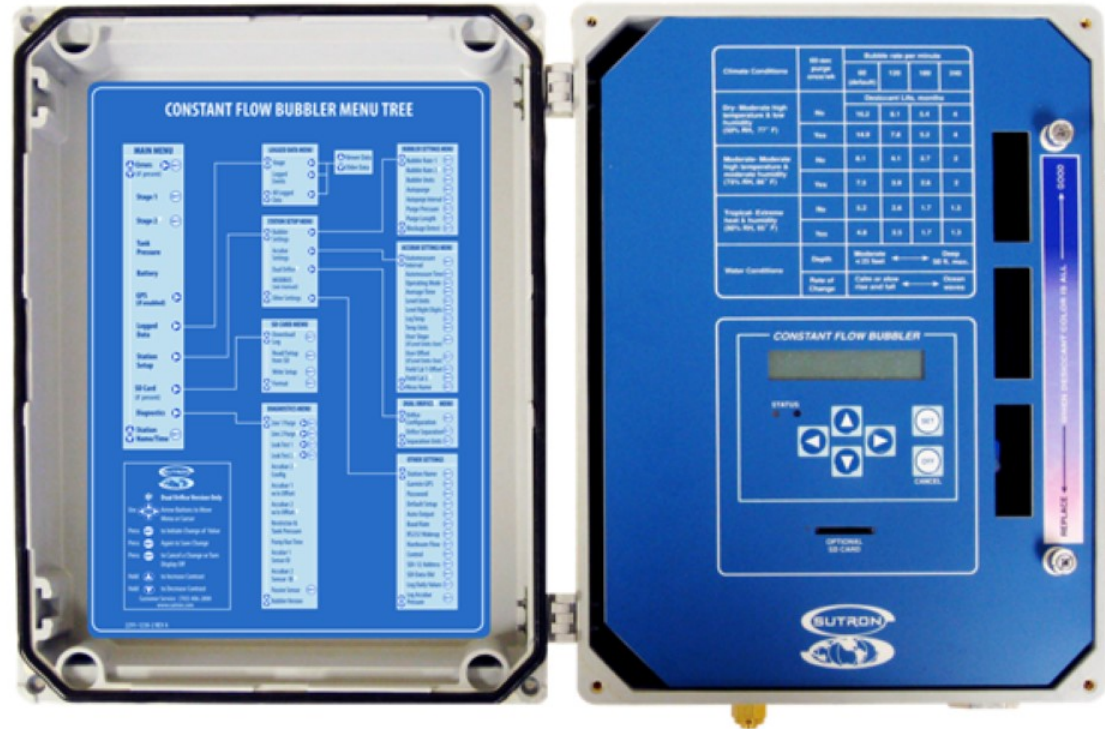
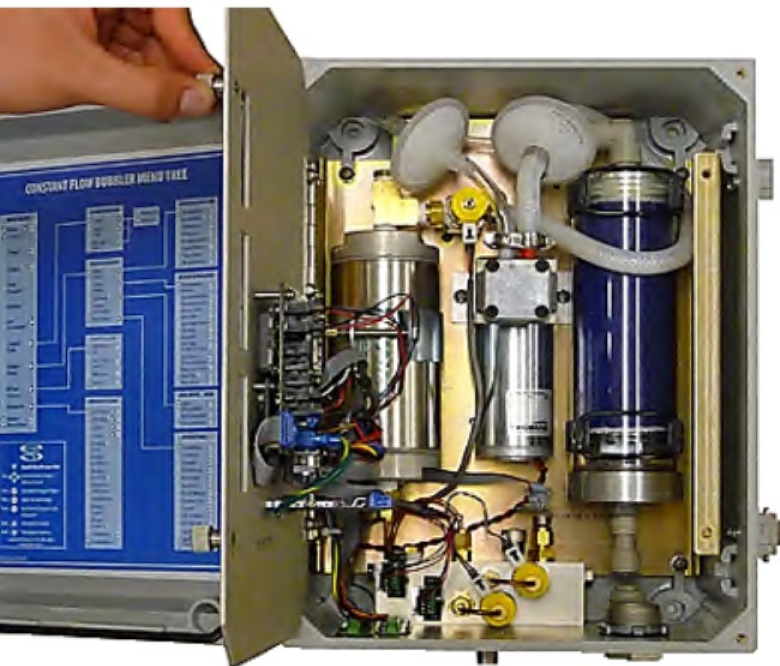
# How It Works



- ▶ Sutron's Constant Flow Bubbler uses a sophisticated manifold system with switchable apertures controlled by internal tank pressure sensors. Software algorithms maintain internal tank pressure while supplying the user-settable bubbler rate to the orifice tube.
- ▶ Water column weight above the orifice tube creates pressure on the tube. The Accubar quantifies this pressure into a water level that's calibrated to measure throughout the 25psi pressure range while stepping through the  $-40^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  temperature range. A unique set of calibration data is programmed into the Accubar in each Bubbler.



# CFB Components (Single Orifice)



Single Orifice





# CFB Components (Compact)

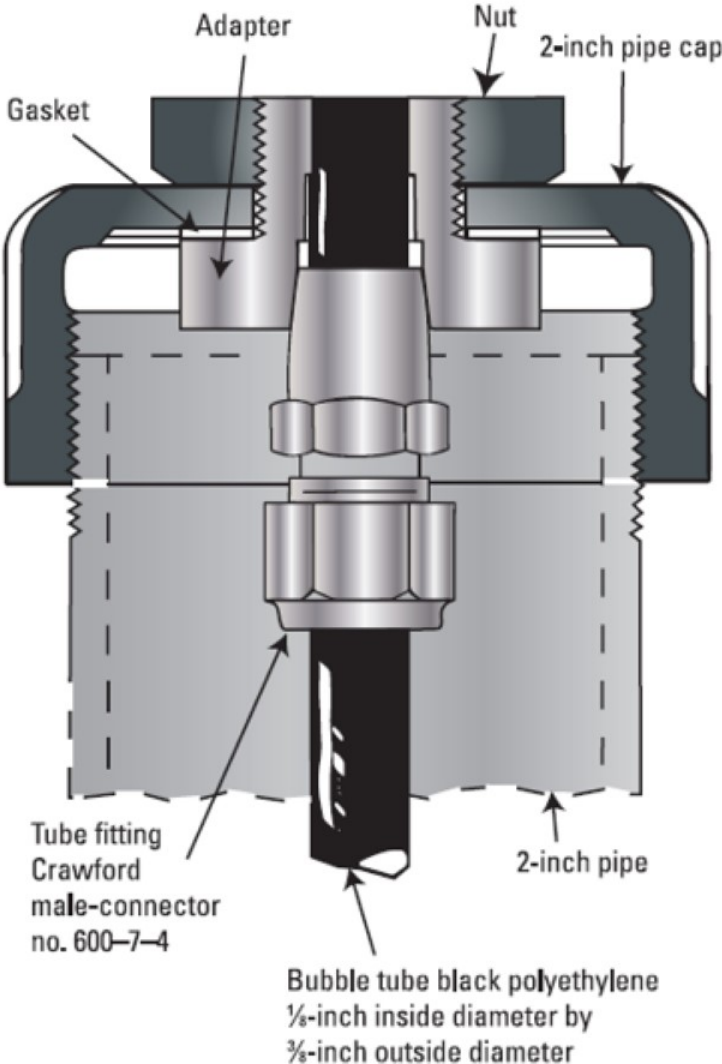


**Compact Bubblers**





# Bubbler Orifice Termination Kit



# Client Portfolio – U.S.A



US Army Corps  
of Engineers®

- USACE



- State of Colorado DWR



- USGS



- Tennessee-Tombigbee  
Waterway Development  
Council



- USBR



- Saint Mary's County,  
Maryland



- NOAA/NOS



- State of New Hampshire



# Client Portfolio – International



- CILA



- Environment Canada



- CVC



- ETESA



- Senamhi



- SERNA



- INETER



- EGEHID



- MDDEP Québec



- INSIVUMEH



- SNET



- Hoskin Scientific



- UPR Mayaguez

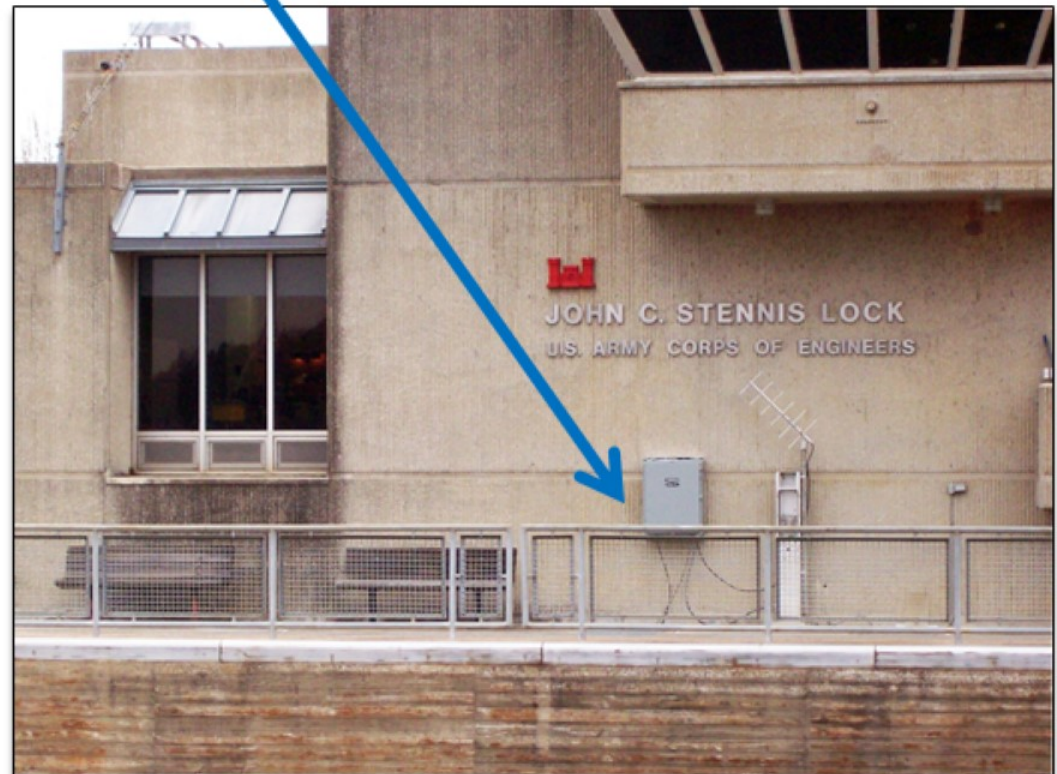


# Installation Examples



Constant Flow Bubblers are currently being used to monitor the Lock on the Tennessee Tombigbee Water Way.

- ▶ Allows them to monitor the CFMs passed downstream per Lock sequence.
- ▶ Monitor up stream and downstream levels when lock is closed.
- ▶ Helps in decision making on when to open gates during flood events.



# Installation Examples



Dual Orifice Bubbler with  
XLite 9210B Datalogger



# Installation Examples



## Bridge Monitoring Station with Rain Gauge



*Orifice Line*



# Installation Examples



Installing the Conduit for the Orifice Line  
– St. Mary's County, Maryland



Tide Gauge and Weather  
Station – St. Mary's County,  
Maryland



# Installation Examples



## Examples of orifice line installations



*Conduit for the orifice*



*Trench for conduit*



*Conduit for the orifice*



# Installation Examples



**SatLink2 with Constant Flow Bubbler**



# CFB Single Orifice Models



**Speak with your sales rep to help figure out what you need.**

## Single Orifice (Compact enclosure)

56-0133-25-1S	25psi unit with standard 3/8" fitting
56-0133-25-1SC	25psi, 6mm fitting (Canadian customers)
56-0133-25-1ST	25psi, 3/8" fitting, water temperature capability
56-0133-25-1SCT	25psi, 6mm fitting, water temperature capability

## Single Orifice (Standard enclosure)

56-0133-25-1	25psi unit with standard 3/8" fitting
56-0133-25-1C	25psi, 6mm fitting
56-0133-25-1-T	25psi, 3/8" fitting, water temperature capability
56-0133-50-1	50psi, 3/8" fitting
56-0133-50-1-T	50psi, 3/8" fitting, water temperature capability
56-0133-50-1C	50psi, 6mm fitting
56-0133-50-1C-T	50psi, 6mm fitting, water temperature capability



# CFB Dual Orifice Models



## Dual Orifice

56-0134-25-2	25psi unit with standard 3/8" fitting
56-0134-25-2-T	25psi, 3/8" fitting, water temperature capability
56-0134-25-2C	25psi, 6mm fitting (Canadian customers)
56-0134-25-1C-T	25psi, 6mm fitting, water temperature capability
56-0134-25-3-T	25psi, Density sensor, 3/8" fitting (includes water temp capability)
56-0134-50-2	50psi, 3/8" fitting
56-0134-50-2-T	50psi, 3/8" fitting, water temperature capability
56-0134-50-2C	50psi, 6mm fitting
56-0134-50-2C-T	50psi, 6mm fitting, water temperature capability





## Questions?

