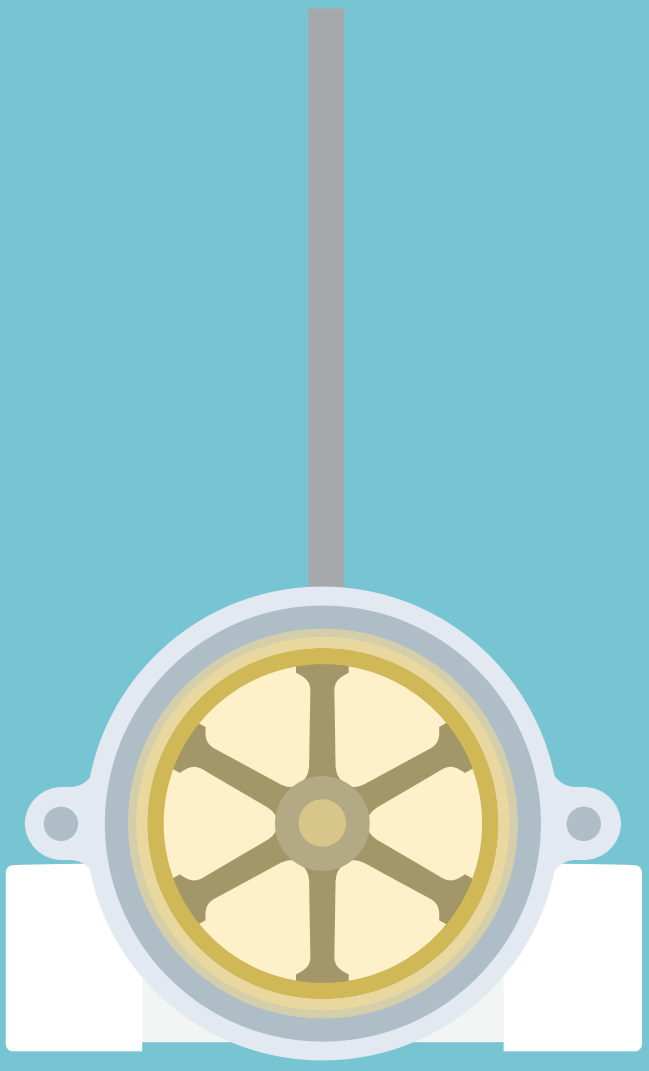
Atlas Scientific™
Environmental Robotics
V 3.0

1/2"
Flow Meter

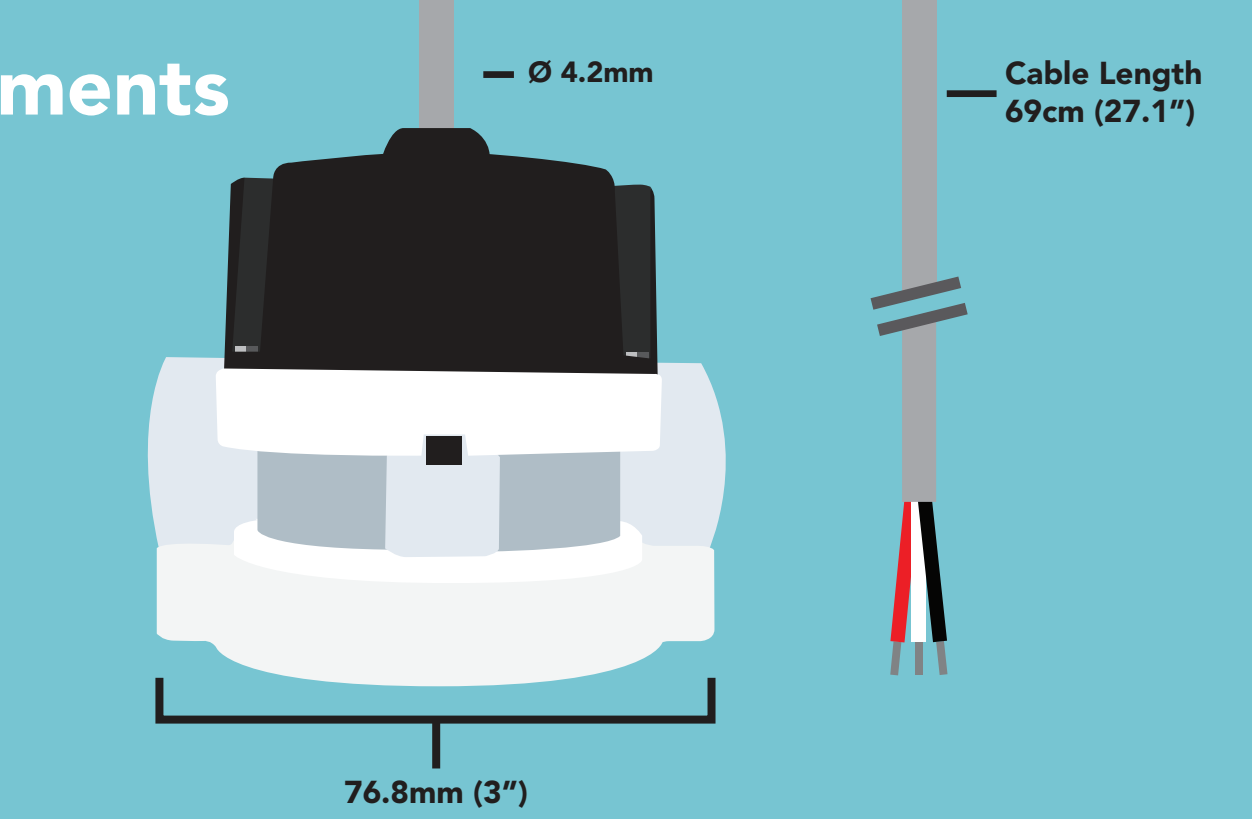
Reads	**Total flow and flow rate**
Range	**5.7 L/min – 75.70 L/min**
Accuracy	**+/– 10%**
Connector	**Tinned leads**
Thread	**1/2" Female NPT**
Max pressure	**100 PSI**
Temperature range °C	**-29 – 82 °C**
Max viscosity	**200 SSU**
Cable length	**69cm (27.1")**
Voltage	**4.0V – 24 VDC**
Life expectancy	**~10 years**

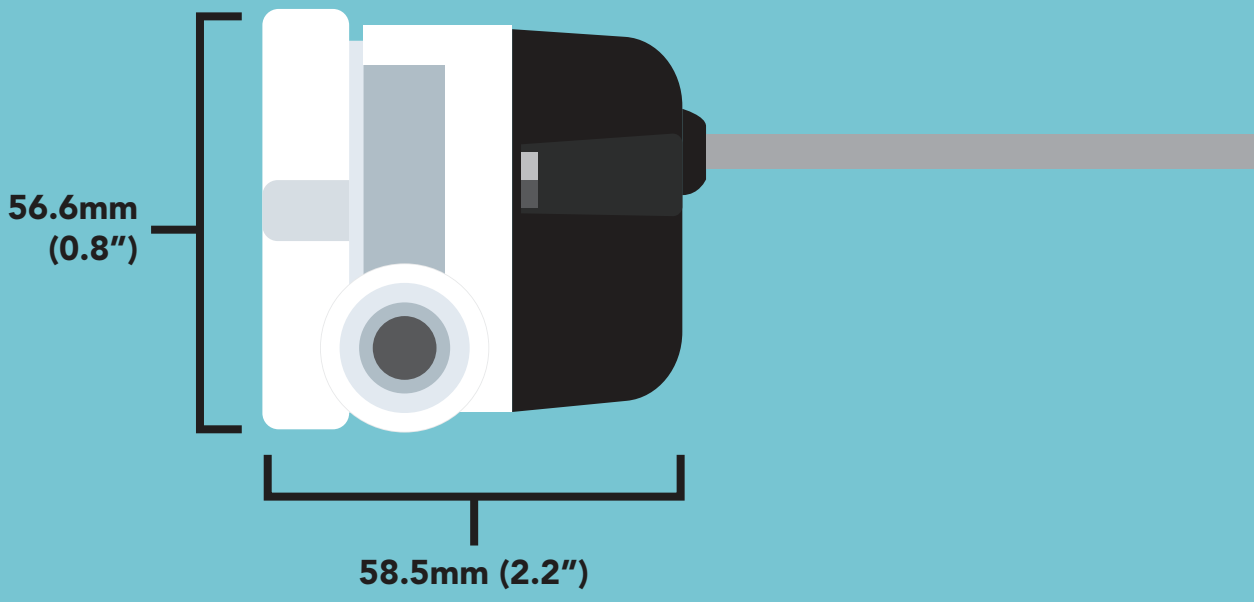


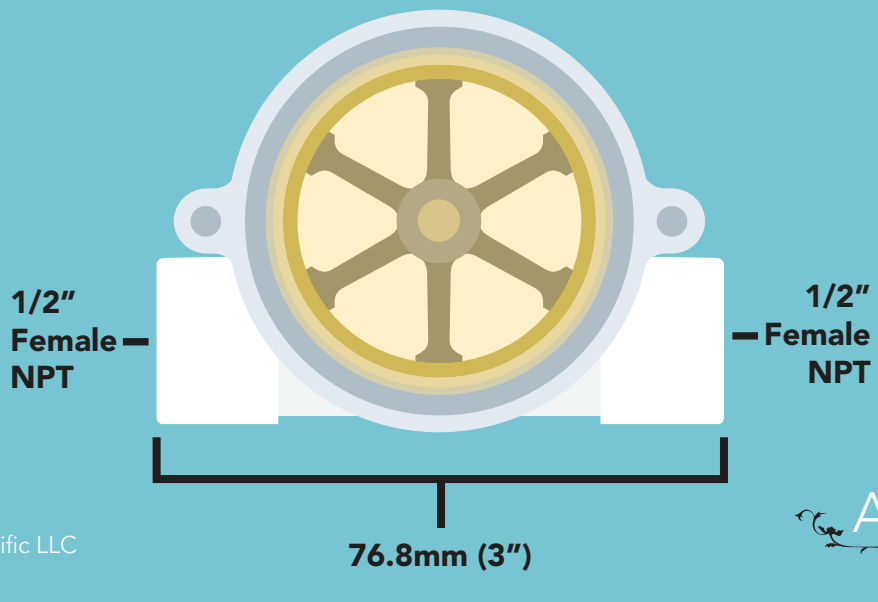
RoHS COMPLIANT

Written by Jordan Press
Designed by Noah Press

Measurements







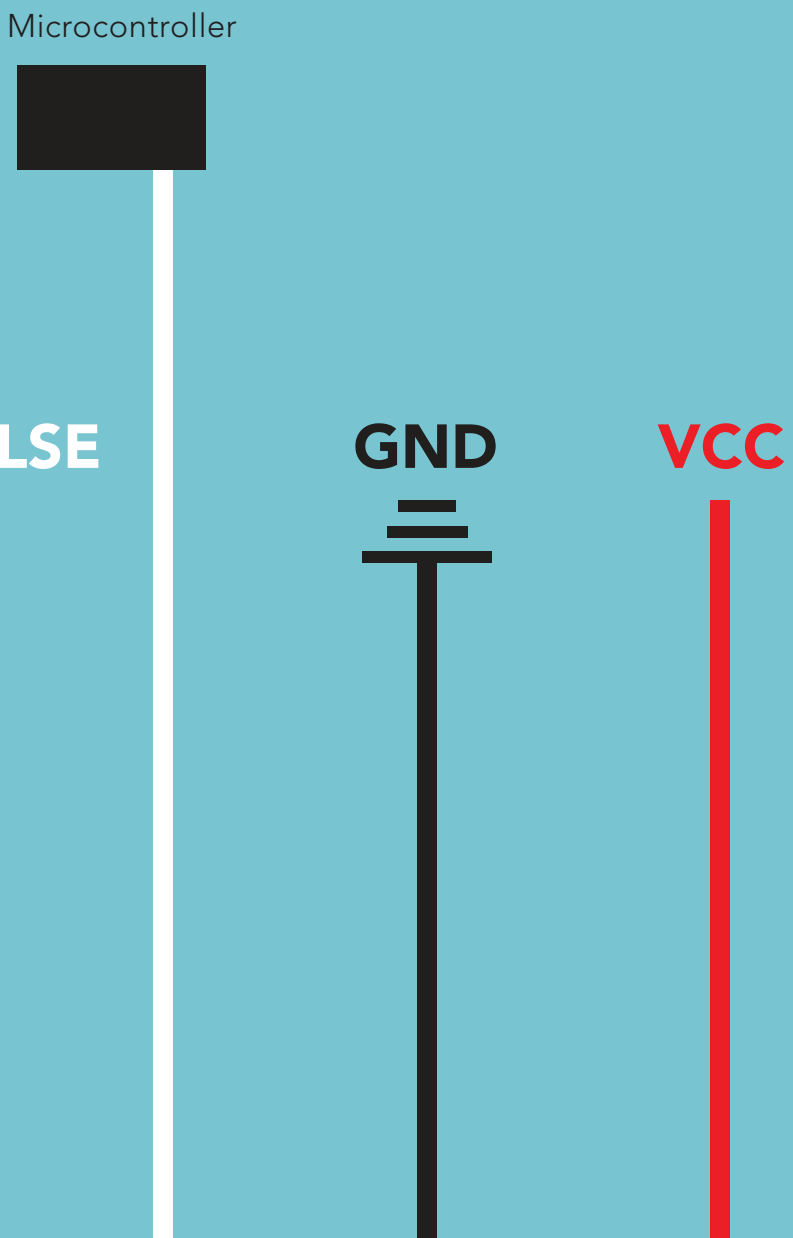
AtlasScientific™
Environmental Robotics

Wiring

The Atlas Scientific 1/2" Flow Meter has a 69cm (27.1") cable that terminates with three tinned leads; Red (VCC), White (Pulse), and Black (Ground).

Lead Color	Function
RED	VCC 4.0V – 24V
White	PULSE
BLACK	GND

Current consumption no load 8mA
Max current consumption 70mA



Specifications

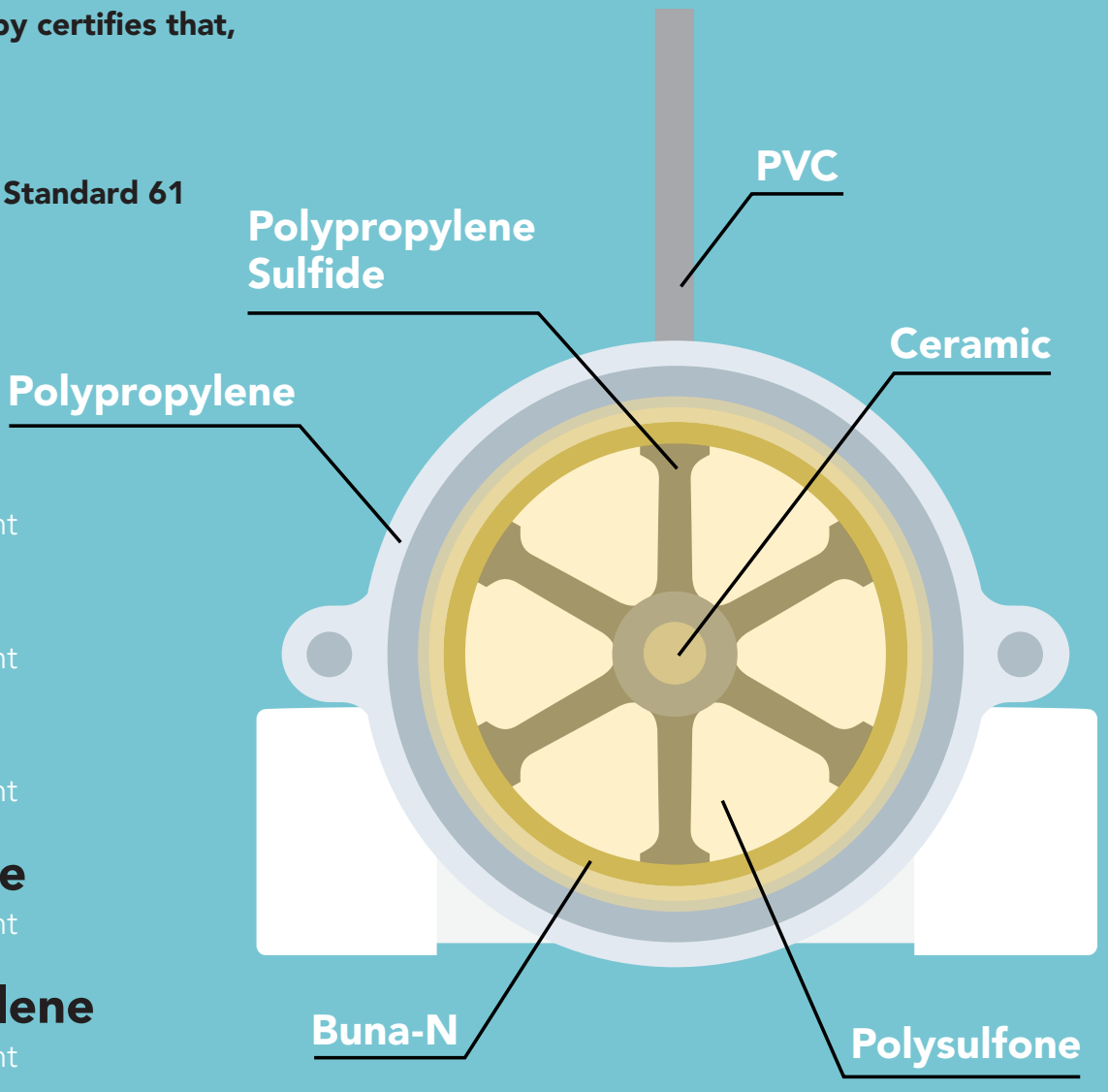
Data output	**Square wave**
Max pressure	**100 PSI**
Max viscosity	**200 SSU**
Cable length	**69 cm**
Weight	**104.3 grams**
Food Safe	**Yes**
Gasoline Safe	**Yes**
Diesel Safe	**Yes**
Kerosene Safe	**Yes**

NSF/ANSI 61 Compliant

Atlas Scientific LLC, hereby certifies that,

1/2" Flow Meter
Part # Sen-204F

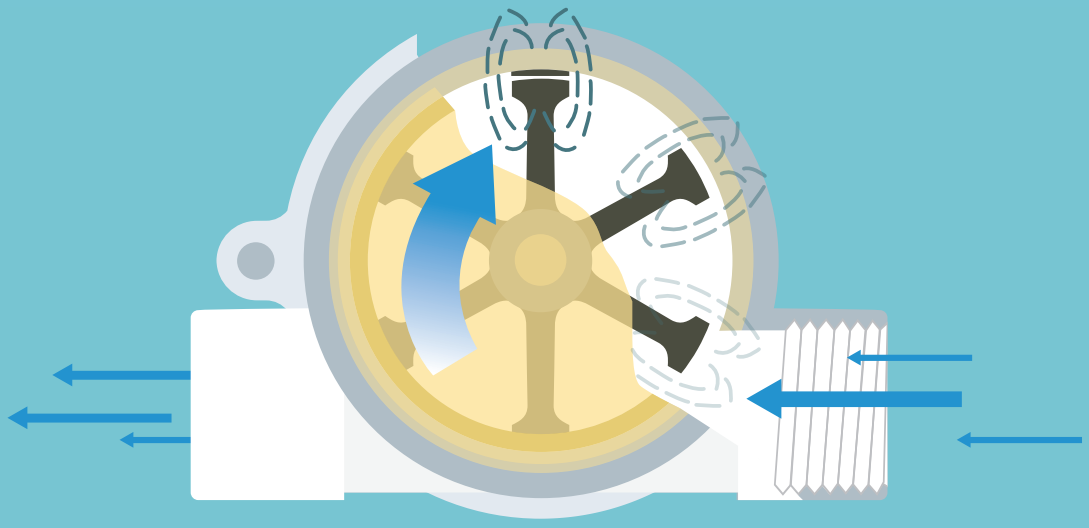
Complies with NSF/ANSI Standard 61



- **PVC** NSF-61 Compliant
- **Buna-N** NSF-61 Compliant
- **Ceramic** NSF-61 Compliant
- **Polysulfone** NSF-61 Compliant
- **Polypropylene** NSF-61 Compliant
- **Polypropylene Sulfide** NSF-61 Compliant

Operating principle

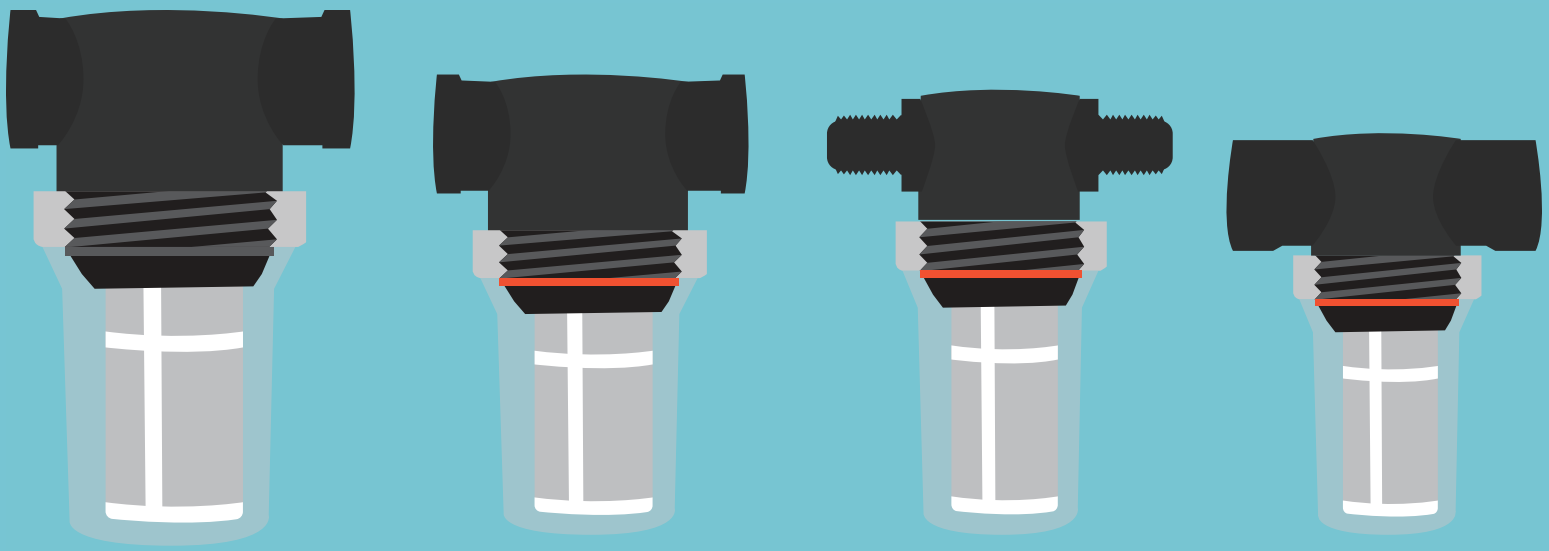
Paddle wheel flow meters like the Atlas Scientific 1/2" Flow Meter use frequency to calculate water flow. As water passes through the flow meter, the magnetic rotor spins at a rate proportional to the flow, producing a frequency. The relationship between water frequency and volume is not linear; an equation to convert the frequency to volume is found at the end of this document.



This flow meter is intended for medium-to-high flow ranges from 5.7 L/min (1.5GPM) up to 75.70 L/min (20 GPM).

Pre-filter requirements

If water with particulate matter will be passing through the flow meter, a pre-filter of at least ***80 microns*** must be used. Without the use of a pre-filter, the turbine blades can become jammed. Jammed turbine blades will not damage the flow meter; however, it will not be possible to get accurate flow readings until the blockage has been cleared.



3/4" Pre-filter

1/2" Pre-filter

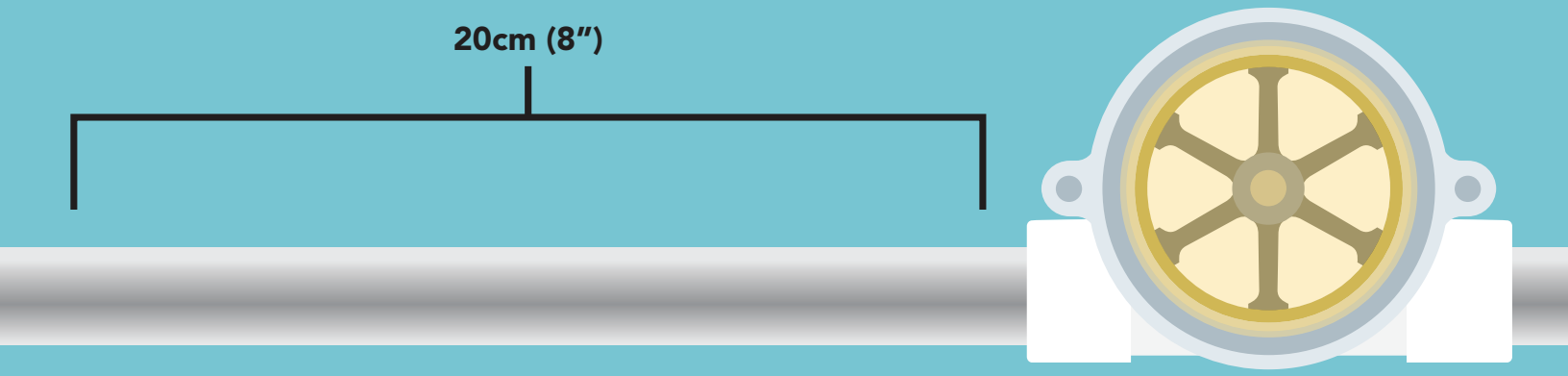
1/4" Pre-filter

3/8" Pre-filter

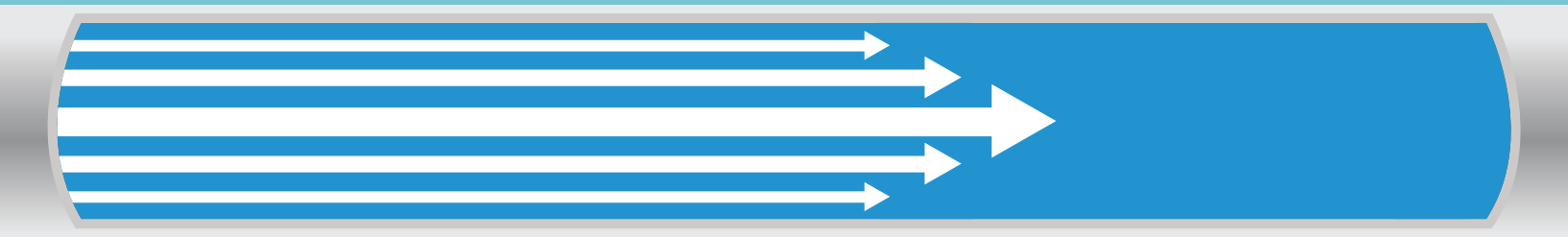
Laminar flow

Laminar flow can be thought of as the opposite of turbulent flow. In order for the flow meter to work properly, the liquid entering the flow meter should have a streamlined laminar flow. Achieving laminar flow is not hard to do; simply allow for 20cm (8”) of straight pipe just before the liquid enters the flow meter.

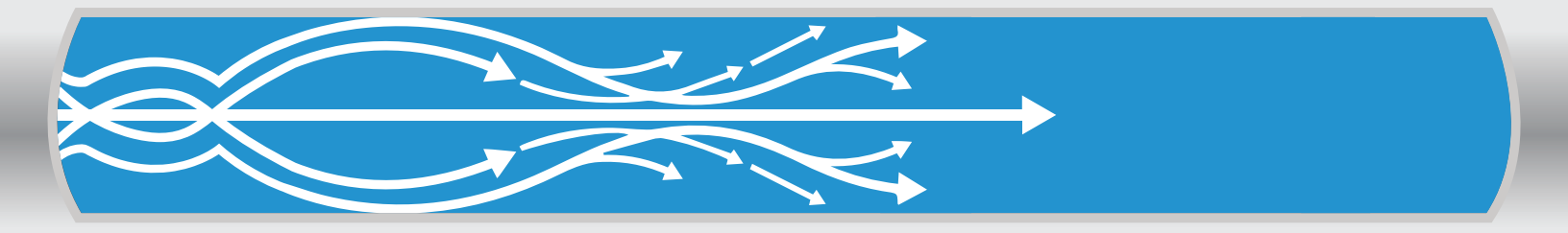
Turbulent fluid entering the flow meter can cause inaccuracies in flow rate monitoring.



Laminar flow



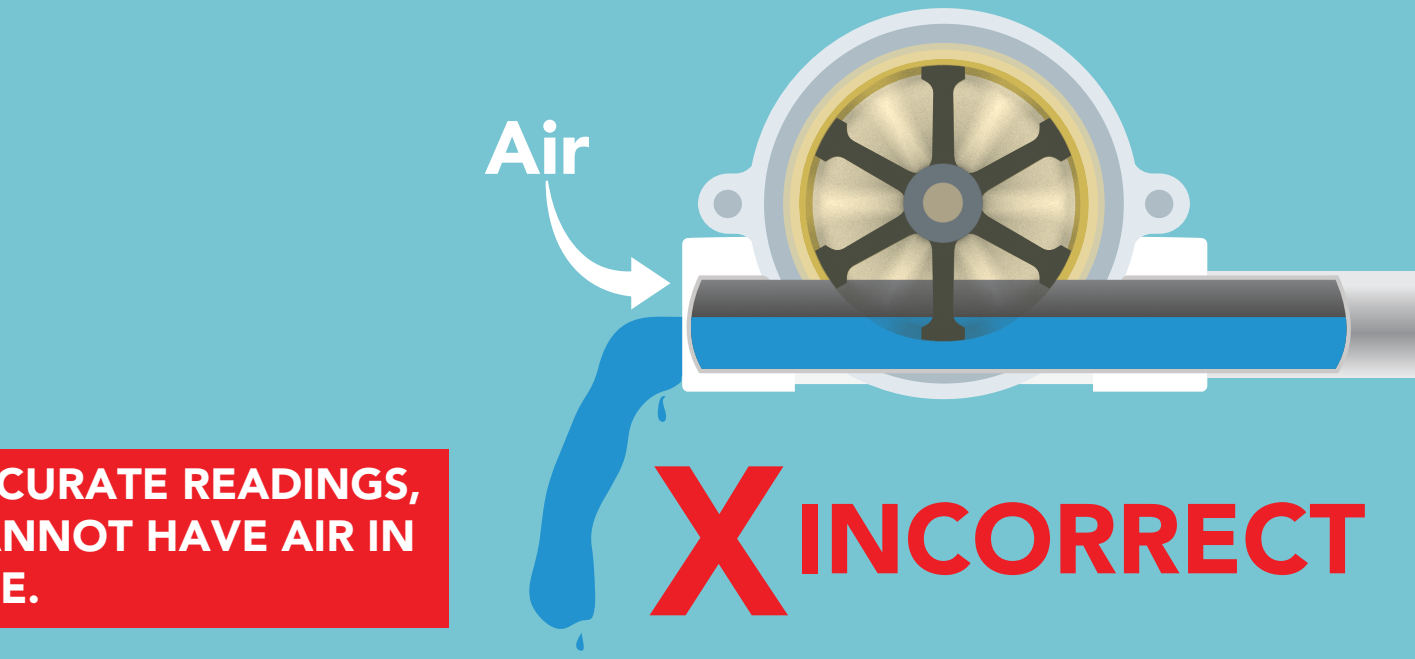
Turbulent flow

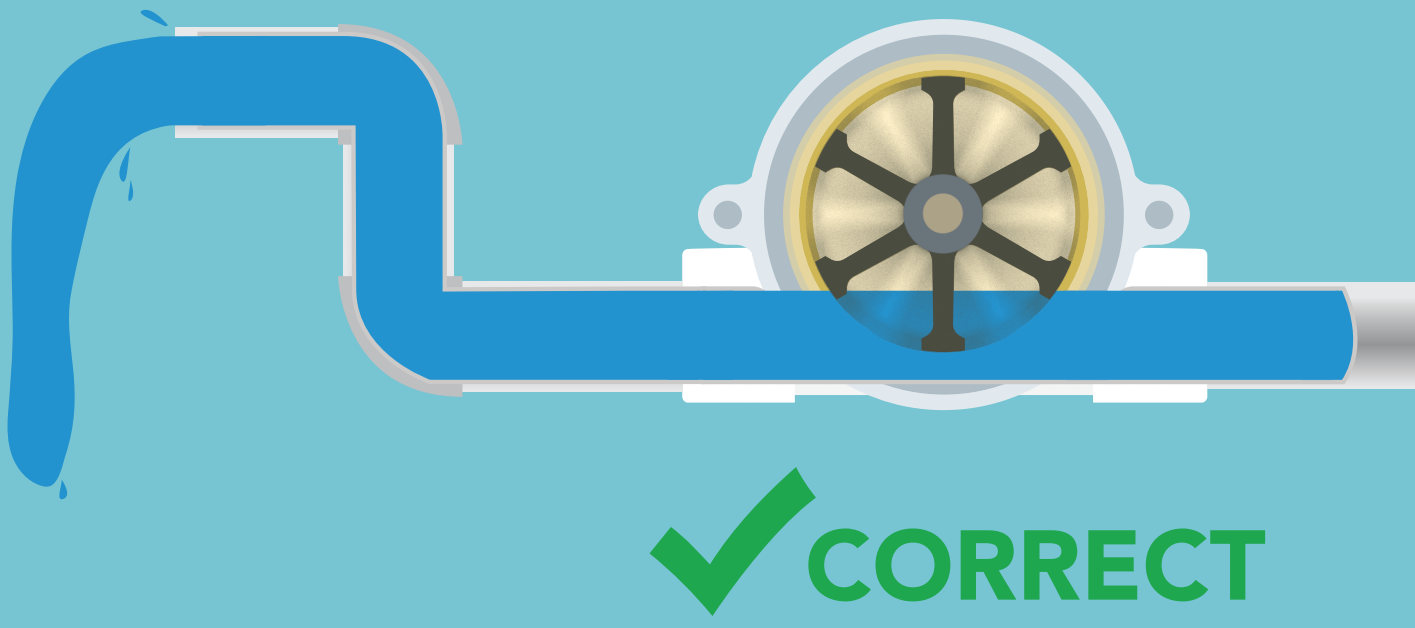


Liquid exiting the flow meter

Liquid should not be permitted to simply fall out of the flow meter. This would let air enter the flow meter and lead to inaccurate readings.

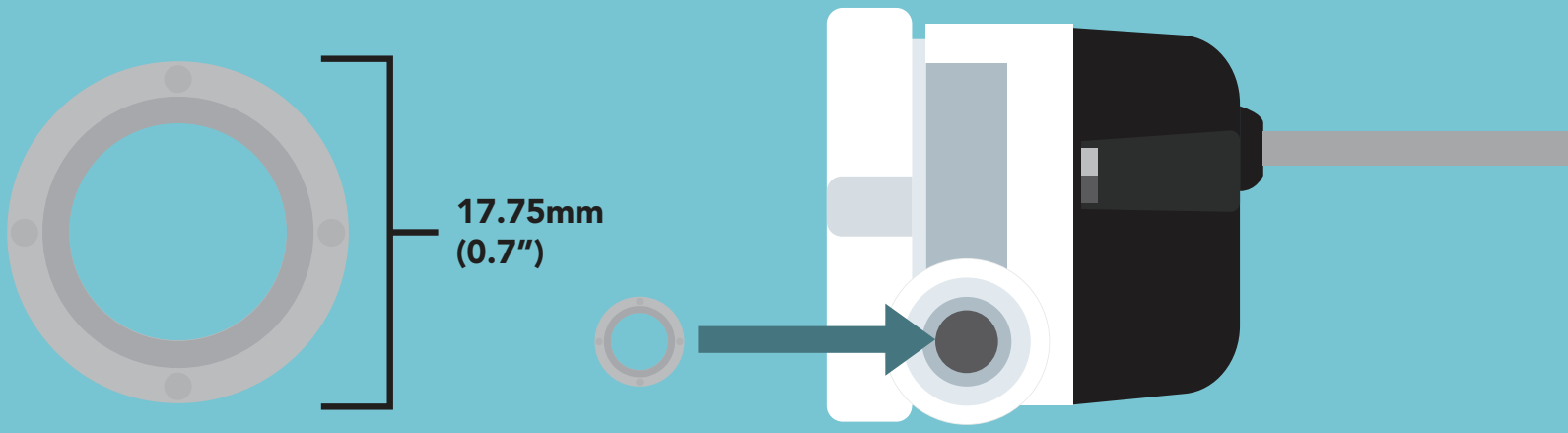
FOR ACCURATE READINGS, YOU CANNOT HAVE AIR IN THE LINE.





Low flow adapter

To monitor flow rates <15L/Min, use the low flow adapter included with the flow meter. Using the low flow adapter will limit your max flow rate to 45L/ min



A low flow adapter is included with the Atlas Scientific 1/2" Flow Meter.

Data output

The white lead from the 1/2" Flow Meter will output a square wave frequency from 0 – 200+ Hz. The amplitude of the frequency will always equal the VCC. A single pulse is a rising edge followed by a falling edge.

The amount of liquid moving through the flow meter is quantified by the frequency that the flow meter outputs. This is known as the flow meters K-factor.

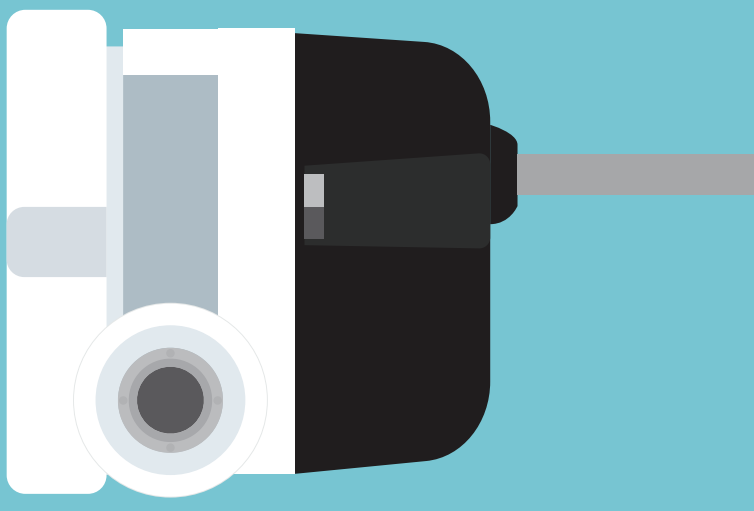
K-factor

As stated earlier, paddle wheel flow meters use frequency to calculate water flow. The relationship between frequency and volume is not linear. Here are the equations needed to calculate the volume.

1/2" Flow Meter with the low flow adapter installed

GPM	LPM	Output Frequency – Hz
1.5	5.7	17
2	7.6	25.9
2.5	9.5	34
3	11.4	43
4	15.2	60
5	19	76.6
6	22.8	94
7	26.6	111
8	30.4	129
9	34.2	147
10	38	165
11	41.8	185
12	45.6	204

LPM = 0.2152 x [Hz] + 2.2928



1/2" Flow Meter *without* the low flow adapter installed

GPM	LPM	Output Frequency – Hz
4	15.2	34
5	19	44.8
6	22.8	55
7	26.6	65.9
8	30.4	76
9	34.2	87.5
10	38	99
11	41.8	110
12	45.6	122
13	49.4	135
14	53.2	147
15	57	158
16	60.8	170
17	64.6	183
18	68.4	195
19	72.2	207
20	76	220

LPM = 0.3256 x [Hz] + 5.2004