

Flowmeter Selection Guide

Digital Flowmeters

For those who prefer data acquisition and logging with completely electronic, multifunction devices. For noncorrosive gas streams.

| Description | Low Flow mL/min | High Flow mL/min | Accuracy | Flow through design | Gases measured (non-corrosive) | Volumetric ¹ or mass ² flowmeter | RS232 capability | Power supply |
|-------------------------------------|-----------------|------------------|----------|---------------------|--|--|---------------------------|---|
| FlowTracker 2000 plus Leak Detector | 0 ³ | 500 | ±2% | Yes | N ₂ , H ₂ , He Air, CO ₂ , CH ₄ , 95% AR/CH ₄ | Both | RS232 output | 6AA batteries or 110V/220V AC |
| FlowTracker 1000 | 0 ³ | 500 | ±2% | Yes | N ₂ , H ₂ , He Air, CO ₂ , CH ₄ , 95% AR/CH ₄ | Both | RS232 output | 6AA batteries or 110V/220V AC |
| ADM2000 | 0.5 | 1000 | ±3% | No | All | Both | RS232 output | 9v battery or 110V/220V AC |
| ADM1000 | 0.5 | 1000 | ±3% | No | All | Volumetric | none | 9v battery |
| Veri-Flow 500 | 5 | 500 | ±3% | Yes | N ₂ , H ₂ , He Air, 95% AR/CH ₄ | Mass | RS232 input and output | Rechargeable battery or 110V/220V AC |

Digital Bubble Flowmeters

For those who prefer classic bubblemeter technology combined with digital readout. Durable, for all gases, including mildly corrosive and humid gas streams.

| Description | Low Flow mL/min | High Flow mL/min | Accuracy | Flow through design | Gases measured (non-corrosive) | Volumetric ¹ or mass ² flowmeter | RS232 capability | Power supply |
|--------------|-----------------|------------------|----------|---------------------|--------------------------------|--|------------------|--------------|
| Optiflow 420 | 0.1 | 50 | ±3% | No | All | Volumetric | none | 9v battery |
| Optiflow 570 | 0.5 | 700 | ±3% | No | All | Volumetric | none | 9v battery |
| Optiflow 650 | 5 | 5000 | ±2% | No | All | Volumetric | none | 9v battery |

Digital Liquid Flowmeters

For those who need to verify and set HPLC column flow rates.

| Description | Low Flow mL/min | High Flow mL/min | Accuracy | Flow through design | Liquid measured | Volumetric ¹ or mass ² flowmeter | RS232 capability | Power supply |
|---------------|-----------------|------------------|----------|---------------------|-----------------------|--|------------------|--------------|
| Optiflow 1000 | 1 | 30 | ±2% | No | HPLC Mobile Phases | Volumetric | none | 110V/220V AC |

1 Volumetric measurements are accurate and are independent of the gas that is being measured, thus allowing measurements of mixed gases commonly found in chromatography.

2 Mass flow measurements are very accurate for specific gases and are not affected by temperature and pressure fluctuations

3 FlowTrackers measure flow rates very accurately down to 5mL/min; from 0-5mL/min, the standard deviation increases to approximately ± 5%

Volumetric vs. Mass Measurement

Chrom Tech offers two types of volumetric flowmeters—bubble (Optiflow) and acoustic displacement (ADM and FlowTracker series)—and one mass flowmeter (VeriFlow 500). Volumetric measurements rely upon the volume of gas passing through the flow meter but not the composition. Additionally, volumetric flowmeters accurately measure from a mixed or multi-component gas stream. Mass flowmeters are calibrated to specific gas compositions and determine the flow rate for those calibrated gases. Mass measurements are independent of temperature and pressure.

With volumetric flowmeters, no adjustments are needed when switching from one gas stream to a different composition stream. So an analyst can immediately change from measuring nitrogen from a GC detector to helium split rate from an injection port, to methane from an anaerobic digestion vessel. If a mass flowmeter is used, the analyst must change instrument settings and purge the flowmeter of the initial gas before accurate readings can be taken.



GC Supplies

Agilent Flowmeters



ADM Flowmeter

Want to use the simplest flowmeter for gas chromatographic analysis? ADM flowmeters allow most gas measurements with the touch of only one button — turn it on, and the instrument provides continuous, hands-free flow readings. You can measure column, detector, and carrier gas flows without any adjustments. ADM flowmeters are ideal for measuring gas streams with a changing gas composition. For example, if you measure the gas flow from a digestion system, concentration changes in methane, carbon dioxide, and oxygen will not affect accuracy.

All ADM flowmeters are battery powered and field portable. Agilent calibrates each instrument to 5-point, NIST-traceable standards to ensure the highest available accuracy. The ADM family measures flow volumetrically, so you don't have to make any adjustments when changing from one gas to another.

If you need rapid, real-time measurements of a gas stream, ADM flowmeters are perfect for you. These flowmeters are designed for basic gas chromatography laboratories.

ADM 1000 features include:

- Accuracy $\pm 3\%$
- Operating temperature range—0 to 45°C for the instrument, -70 to 135°C for the tubing.
- Calibration— traceable to NIST primary standards
- Real Time, split ratio measurement
- CE mark certified
- Measures flow rates from 0.5 to 1000mL/min
- Split ratios—compare the ratio from one gas measurements to another (i.e., injection port split ratios)

ADM 2000 features include:

In addition to the features of the ADM 1000, the ADM 2000 includes:

- Mass flow measurements—measure flow rate, independent of atmospheric pressure and temperature (calculated)
- Data output through RS-232 port
- 9V battery and AC power adapter (120 or 220 VAC)

| Cat. No. | Description |
|------------|-----------------------------------|
| 220-1170 | ADM1000 flowmeter, 0.5-1000mL/min |
| 220-1171-U | ADM2000 flowmeter, 0.5-1000mL/min |

FlowTrackers

Agilent's FlowTracker Flowmeters are the ultimate gas flowmeters for chromatography applications. These handheld flowmeters incorporate industry leading performance and features in a highly accurate and reliable package.

FlowTracker 1000 features include:

- Two year guaranteed calibration, traceable to NIST standards
- Measures flow (0 - 500mL/min) based on gas viscosity properties with an accuracy of $\pm 2\%$, ($\pm 5\%$ from 0-5mL/min)
- Displays mass flow, volumetric flow, temperature, and pressure readings simultaneously
- Screen displays for flow, linear velocity, and split ratio modes

FlowTracker 2000 features include:

In addition to the features of the FlowTracker 1000, the Flow Tracker 2000 includes an economical Thermal Conductivity Leak Detector in a single handheld design.

- Leak detection at 10^{-3} cc/s
- Visual and audible leak detection signals

| Cat. No. | Description |
|-----------|--|
| 5183-4779 | FlowTracker 1000 flowmeter |
| 5183-4780 | FlowTracker 2000 flowmeter/leak detector |



Veri-Flow 500

Need the ultimate in versatility? The Veri-Flow 500 packs an incredible amount of features into a highly accurate flowmeter. The solid state gas sensor used in the Veri-Flow 500 measures mass flow rates of the common 5 gases from 5 to 500mL/min. Above all, the Veri-Flow 500 has big features for a small, small price.

What does it Measure?

- 5 gases— H₂, He, N₂, Air, Argon/Methane
- In-line flow
- Injection port split flows

What Else?

- Two-way data communication through serial port
- Rechargeable battery pack
- $\pm 3\%$ accuracy
- Calibrated to a NIST primary standard
- CE mark certified

| Cat. No. | Description |
|----------|------------------------------|
| HVF-500 | Veri-Flow 500, 5.0-500mL/min |



Optiflow 420



Optiflow 570



Optiflow 650



Optiflow 1000

Digital Bubble Flowmeters

- Calibrated to NIST primary standards
- 9V Long-lifetime battery

Agilent digital bubble flowmeters have been making flow measurement easy for years. Today, they are still widely used to measure GC flows, calibrate air sampling pumps, and verify various gas flows. The Optiflow series offers the widest range of flow rates and allows you to visually ensure gas flows. This tried and true flowmeter measures volumetrically and therefore can measure any gas composition with the push of one button and the squeeze of a bulb.

Optiflow 420:

The Optiflow 420 is the best bubble flowmeter for measuring low gas flow rates—especially GC columns.

- Flow Range—0.1 to 50mL/min
- $\pm 3\%$ accuracy

Optiflow 570:

Want a bubble flowmeter for measuring carrier, makeup, injection port, and detector gases? The Optiflow 570 handles most of your GC needs. We also manufacture Optiflow 570 in a hard metal case, which makes it portable and field ready.

- Flow Range—0.5 to 700mL/min
- Available in a hard field case
- Split ratio measurement
- $\pm 3\%$ accuracy

Optiflow 650:

If you calibrate air sampling equipment, verify mass flow controller settings, or monitor higher gas flow rates, these Optiflow flowmeters are simple and efficient.

- Flow Range—5.0 to 5000mL/min
- Available in a hard field case
- Measures both positive and negative (vacuum) flow sources
- $\pm 2\%$ accuracy

Optiflow 1000 — Liquid Flowmeter

Optiflow 1000 measures liquids! Verify and set HPLC column flow rates with the Optiflow 1000.

- Flow Range—1 to 30mL/min
- $\pm 2\%$ accuracy

Digital Bubble Flowmeters - Ordering Information

Gas Flowmeters

| Cat. No. | Description |
|------------|--|
| HFM-420 | Optiflow 420, 0.1 to 50mL/min |
| HFM-570 | Optiflow 570, 0.5 to 700mL/min |
| HFM-570-FC | Optiflow 570, 0.5 to 700mL/min, field case |
| HFM-650 | Optiflow 650, 5 to 5,000mL/min |
| HFM-650-FC | Optiflow 650, 5 to 5,000mL/min, field case |

Liquid Flowmeters

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|----------|------------------------------|
| HFM-1000 | Optiflow 1000, 1 to 30mL/min |
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Economy Glass Bubble Flowmeters

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|-----------|------------------------------|
| 0101-0030 | 10mL Glass bubble flowmeter |
| 0101-0113 | 100mL Glass bubble flowmeter |

Accessories for Bubblemeters

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|----------|-------------------|
| HFM-BULB | Replacement bulbs |
|----------|-------------------|



Glass Bubble Flowmeters



Flowmeter Calibration/Repair Services

- ADM Series: 1000 and ADM 2000
- VeriFlow 500
- Optiflow Series: 420, 520, 570, 650, 1000

Calibration and repair services available for the above units. Please contact Chrom Tech for a quote and return authorization number.