

# The Ultimate in Precision Pressure Control

**Equilibar® ZF1**

## ZF1 (Beta Release) "Zero Flow" Precision Back Pressure Regulator

The new ZF1 Series extends Equilibar's low flow performance down to effective zero flow<sup>1</sup> while maintaining a very stable inlet pressure. While such incredibly low flow rates are not required for most laboratory applications, they are useful for reservoir core analysis and other lab reactor applications with microscopic or intermittent flow rates.

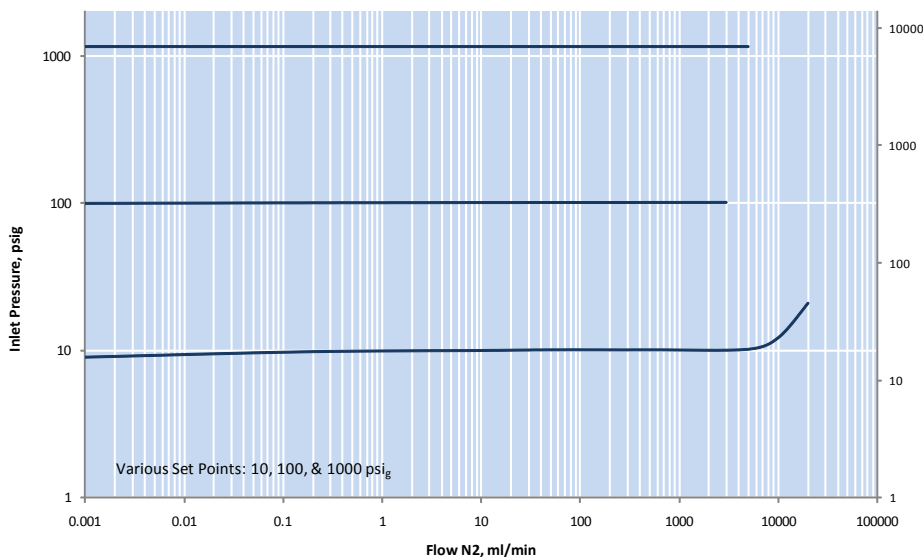


1/8" EB1ZF1 - SS316

### Features of the Equilibar ZF1

- Fluid services: Gases, liquids, two phase
- Connections: 1/8" NPT, 1/16" or 1/8" HPLC (Valco style)
- Body Material: SS316 (std), Hastelloy
- O-ring: Viton or Kalrez (typical)
- Diaphragm: Polyimide (recommended), SS316
- Max pressure: 1500 psig
- Min Pressure: 50 psig recommended
- Max flow: 1 liter/minute
- Max continuous flow: 100 ml/min
- Min flow: Effective zero flow<sup>1</sup> capabilities.

ZF Performance



**"The ZF1 is allowing us to measure samples that were thought impossible to measure with steady flow techniques."**

**Researcher, major energy development company**

#### Unique Diaphragm Regulator Technology:

- 5X more Precise than standard Pressure Regulators
- Dome loaded: for Manual or Automated control
- Elegant friction-less design
- Suitable for ultra-pure, hygienic, and aggressive chemicals

## “Zero Flow” Precision Back Pressure Regulator

### Technical Specifications

Model	Inlet /Outlet Port	Reference Port	Body Materials	Dim A	Dim B	Max. Pressure	Cv Range (precision)		Available End Fittings	
				(inch)			(psig)	Min	Max	Std
EB1ZF1	1/8"	1/8"	SS316 (std) Hastelloy C	2.5	1.45	1500	<<1E-11 <sup>1</sup>	0.01	NPT	BSP, HPLC (Valco style)

### How It Works

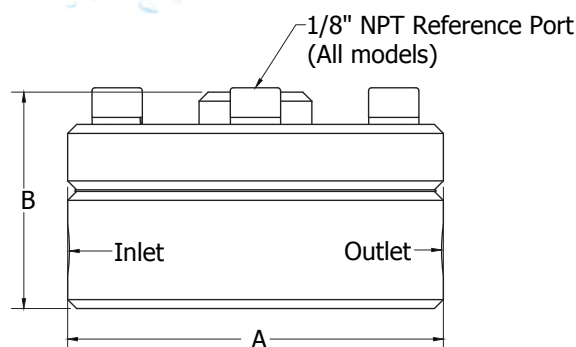
Like the traditional Equilibar back pressure regulators, the ZF1 is a dome-loaded device, meaning that the set-point is communicated through a reference port on the top. Unlike traditional designs, however, the patent-pending ZF1 works by using an elastomeric soft sealing mechanism with a novel support structure.

At 1000 psig set-point (dome loading), for example, the device will typically hold between 1006 and 1008 psig on the inlet through an incredible 10 to 12 orders of flow magnitude. With absolute inlet flow shut-off (static reactor conditions), the regulator retains approximately 1002 psig.

While able to process higher flows, the ZF1 is primarily intended for very low flow rates below 100 ml/min. The o-ring (typically Viton or Kalrez) may be eroded by extended durations of higher flow rates, especially at elevated temperatures. The initial release of the ZF1 is being targeted for pressure ranges from 50 psig to 1500 psig, though wider pressure ranges are anticipated in the future.

### What is Zero Flow? (Note 1)

Our internal testing has shown that at most pressures, the inlet pressure is maintained while the supply gas is totally valved off. Our capillary measurement methods can't document well below about 1E-5 ml/min (gas). Initial customer feedback suggests excellent bubble-tight performance.



### Steady State Flow

Many laboratory analyses require not only stable inlet pressure, but also stable reactor outflows through the back pressure regulator. The ZF1 has been tested for highly stable flow rates throughout the vast majority of its target operating range from 0 to 100 ml/min. However, actual system flow stability can depend on a number of factors, including the gas volume between the flow regulating device and the BPR and many other factors.

Consult with our engineers to arrange for a trial of the ZF1 in your laboratory process.

### No-Risk Trial

During this Beta release of the ZF1, Equilibar will refund your purchase price if our product does not meet your challenging requirements. We depend on customer feedback to improve our product performance.