

# Single Use Back Pressure Regulator

The Equilibar® back pressure control valve is now available in a Single Use Design to accommodate the rapidly expanding requirements of BioPharma industry. Single use processes require lower cost components that can be sterilized through irradiation and disposed of after use. The Equilibar Single Use Design (SD Series) offers USP Class VI polymers that can be sterilized as an assembly. The image to the right shows a model where only the wetted components and diaphragm are disposable and are inserted into a permanent stainless steel support housing with sanitary clamp connection for quick and easy assembly. [Contact us](#) for more information.



Fig. 1 1/2" SDT4 single use design with SS316 cap

## Key Features

### EASE OF USE

The Equilibar is a dome-loaded pressure regulator with pilot operation. Gas or air is fed into the top (dome) area of the regulator to provide the pressure setpoint for the process. The pressure of the gas in the dome is set by a secondary standard regulator called a pilot regulator. The pilot regulator can be manual or electronic, depending on the application's requirements.

### EXCELLENT STABILITY

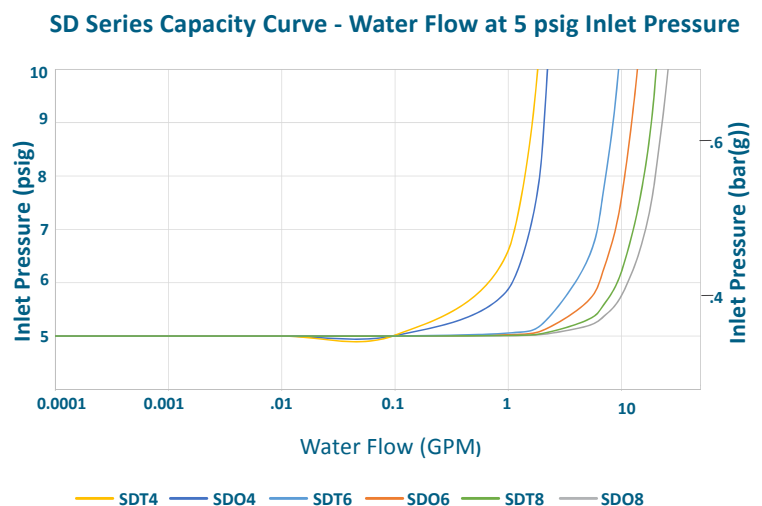
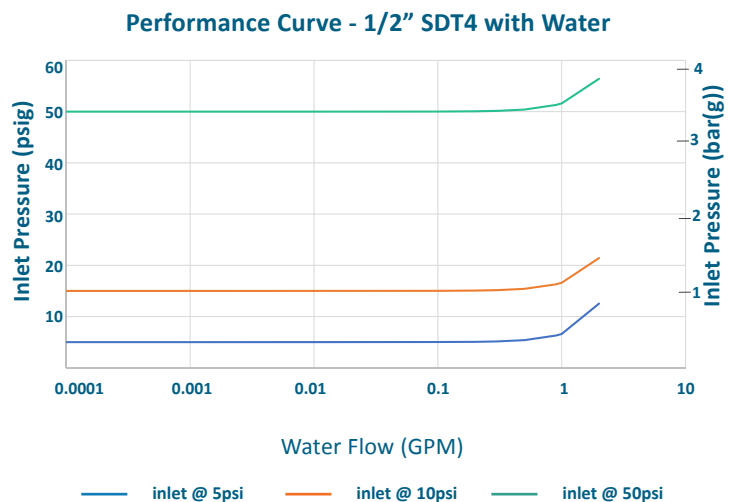
Equilibar regulators feature ultra sensitive diaphragm-operated back pressure technology capable of controlling pressure with high precision over a wide range of flows. It fully opens in less than 1% overpressure in most applications. The stability of the Equilibar regulator is unmatched in the industry. The graph at right shows the performance of a 1/2" single use regulator (SDT model) with water.

### SMOOTH COMPUTER AUTOMATION

Equilibar regulators respond instantaneously to changes in flow or setpoint to maintain the desired inlet pressure. Because of this lightning fast control capability, the SD Series is a perfect match for computer automated control. Set the SD regulator up with an electronic pilot regulator, connect it to the process control system, and it is ready for automation.

### PACKAGING AND STERILIZATION

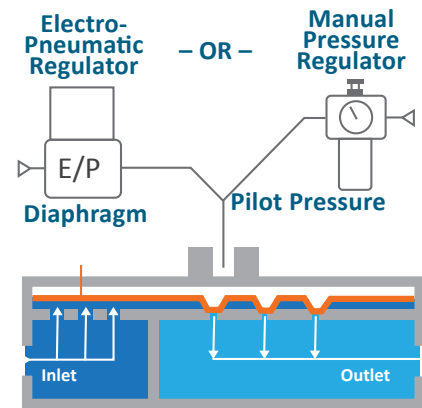
The Equilibar Single Use Design back pressure regulator is manufactured and assembled in a class 7 clean room. It is shipped in two hermetically sealed plastic bags. While typically provided unsterilized so that it can be cleaned as part of a larger assembly, the SD series is optionally available sterilized by Gamma radiation.



# Design Highlights

## HOW IT WORKS

Simply load the dome of the Equilibar® back pressure valve (BPV) with a pilot pressure equal to the desired back pressure setpoint and the BPV does the rest. This pilot pressure forces the flexible diaphragm down onto a plate of orifices. A rise in inlet pressure lifts the diaphragm up to allow excess pressure to be relieved through the outlet orifices. Similarly, a loss of pressure at the inlet causes the diaphragm to be pushed closer to the orifices, restricting flow and rebuilding pressure upstream.



## PORT OPTIONS

The Equilibar SD back pressure valve is available in several port orientations and designs to meet your application needs. The SDO style valves have in-line inlet/outlet ports. SDT style valves have inlet/outlet ports perpendicular to one another. Additionally, the SDT style valve is available in single-inlet design or flow-through, double-inlet design. See images and descriptions below.

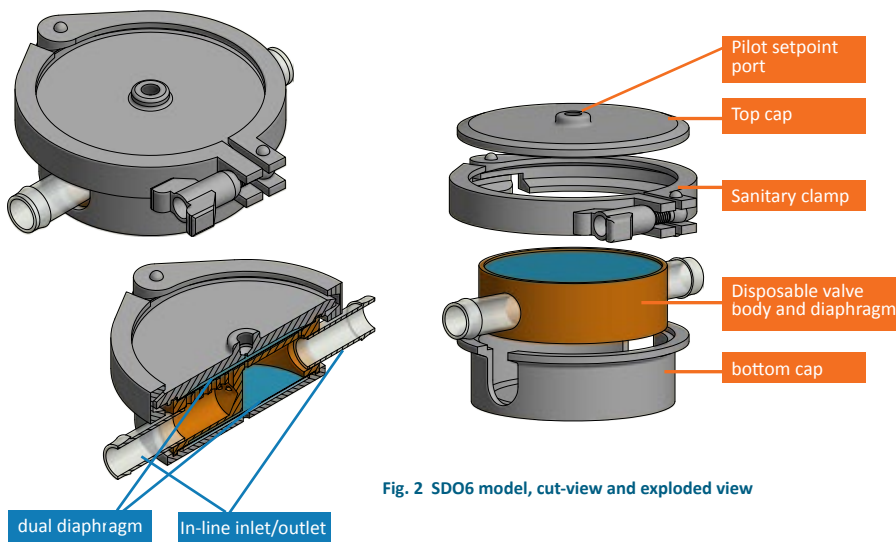


Fig. 2 SDO6 model, cut-view and exploded view

The Equilibar SDO model back pressure valve is designed with in-line inlet and outlet ports. The inlet/outlet ports, valve body and attached diaphragms are disposable and are enclosed in a 316 stainless steel permanent enclosure with a sanitary clamp fitting. This model has a dual-diaphragm design similar to our **FDO Sanitary back pressure valve**. The top diaphragm is the regulating diaphragm which regulates the pressure, and the bottom diaphragm is a sealing diaphragm which helps with pulsation dampening.

The Equilibar SDT model back pressure valve is designed with perpendicular inlet and outlet ports. The inlet/outlet ports, valve body and attached diaphragm are disposable and are secured in a 316 stainless steel permanent enclosure with a sanitary clamp fitting. This model has a single diaphragm on the top which regulates the pressure. The SDT regulator can be ordered with single inlet as in the photo in Fig. 1, or with flow-through design as shown in Fig. 3.

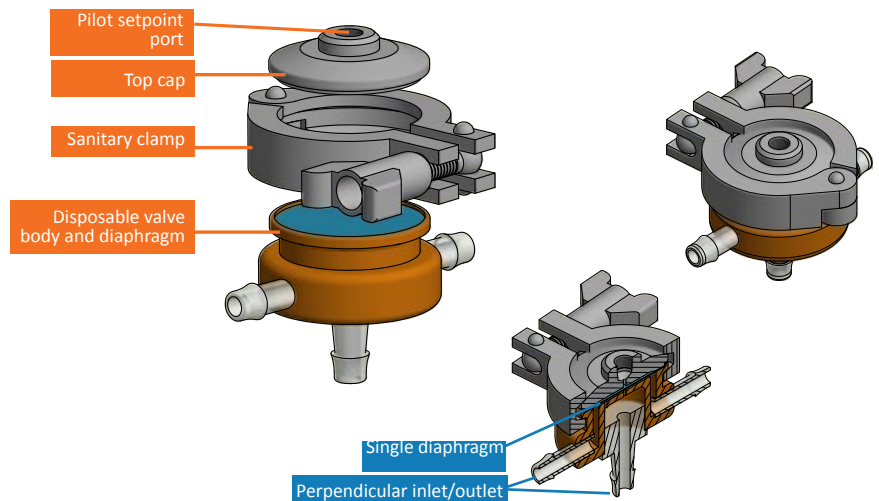


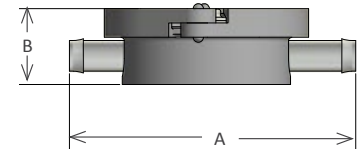
Fig. 3 SDT4 model, cut-view and exploded view; Flow-through option

# Specifications

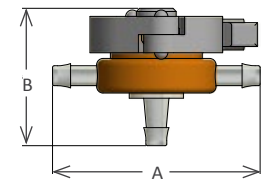
SD Series single use valves are available in two inlet/outlet port orientations. SDO style valves have in-line inlet/outlet ports. SDT style valves have inlet/outlet ports perpendicular to one another. Additionally, the SDT style valve is available in flow-through inlet (2 inlets) as shown below, or in single inlet design. Equilibar application engineers are available to discuss these options with you.

MODEL	INLET / OUTLET PORT	PILOT PORT	BODY MATERIALS <sup>1</sup>	MAX PRESSURE	CV RANGE (PRECISION)		DIMENSION (IN)		SANITARY CLAMP SIZE
					MIN	MAX	A	B	
SDO4	1/2" (12.5mm)	1/8" NPT	USP Class VI materials such as Tritan Copolyester and HDPE	60 psig 4 bar(g)	1E-03	0.8	5.9	1.7	3
SDT4					1E-03	0.57	3.9	2.6	1.5
SDO6	3/4" (19mm)				1E-03	4.7	7.3	1.9	4
SDT6					1E-03	3	6.8	3.5	3
SDO8	1" (25mm)				1E-02	8.6	9.8	2.4	6
SDT8					1E-02	6.5	6.9	4.4	4

<sup>1</sup>BPA/TSE Free



SDO Style Dimensions



SDT Style Dimensions

# Ordering Information

EXAMPLE						
SD	O	6	M	A	1	X
						X
1	2	3	4	5	6	7

<b>1</b>	<b>MODEL</b>	<b>4</b>	<b>BODY MATERIAL<sup>1</sup></b>
SD	Single Use - Sanitary Disposable	M	Tritan Copolyester
<b>2</b>	<b>PORT CONFIGURATION</b>	N	HDPE
O	in-line	O	Other USP Class VI Material
T	perpendicular	<b>5</b>	<b>PORT CONNECTION STYLE</b>
<b>3</b>	<b>INLET/OUTLET PORT SIZE</b>	A	Hose Barb (STD)
4	1/2"	H	Tri-Clamp Fittings
6	3/4"	<b>6</b>	<b>INLET OPTION FOR SDT MODEL</b>
8	1"	1	Single Inlet
		2	Flow-Through Inlet (2 inlets)
		<b>7</b>	<b>BODY REVISION #</b>
		X	Factory Selected

<sup>1</sup>diaphragm material is TPU (USP Class VI certified)

## OPTIONAL CERTIFICATION PACKAGE

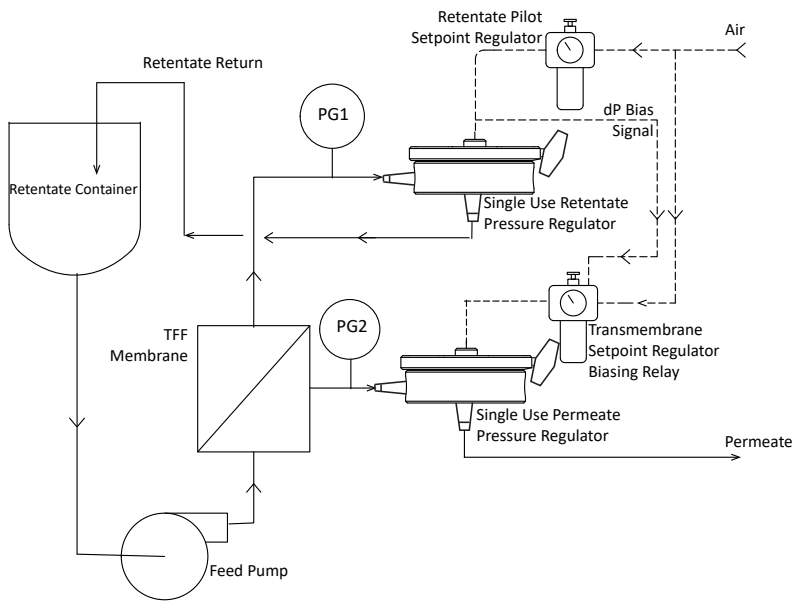
SD Series regulators have been designed for biopharmaceutical industries with materials that are USP Class VI tested and BPA/BSE free. A *Sanitary Certification Package* is available upon request.

## PATENTS

These regulators are subject to one or more of these patents: US6,886,591, US7,080,660, US7,673,650, US8,215,336, DE60322443D1, GB1639282, FR1639282, CH1639282. Other patents pending. [www.equiblar.com/support/patents/](http://www.equiblar.com/support/patents/)

# Application Highlight

## TANGENTIAL FLOW FILTRATION



Tangential flow filtration (TFF) is used in the biopharmaceutical industry as an efficient ultrafiltration method for purifying biomolecules. During the process, the differential pressure across the TFF membrane must be maintained within a narrow range, in some cases as low as 1 psi. The Equilibar back pressure regulator delivers superior precision and can accurately control transmembrane pressure in a wide range of flow rates.

In the Figure at left, an Equilibar single use back pressure regulator is used in both the retentate and permeate lines. A setpoint is established in the retentate pilot regulator to the dome of the retentate pressure regulator. A bias signal equal to the desired TFF transmembrane pressure differential is then set to establish the setpoint pressure to the dome of the permeate pressure regulator. This setup maintains stable target pressure differential for effective TFF process control.

The SD regulator may also be used in other downstream ultrafiltration processes where precise pressure regulation improves process performance.

## About Equilibar

Equilibar provides innovative and robust pressure control technology for researchers and engineers worldwide. We are proud to design, manufacture, and test our patented back pressure regulators in our factory overlooking the Blue Ridge Mountains near Asheville, NC.

### APPLICATION ENGINEERING – WHAT SETS US APART

Unlike mass-market regulator distributors, we focus on working with you, the scientist or engineer with a complex pressure control scenario.

Our application engineers work collaboratively with clients to identify the optimal model, trim, and diaphragm for each application's unique challenges. No matter where you are on the globe, you can stay in close contact with your engineer by email, telephone, videoconferencing, or fax.

After installation, your application engineer will support you with start-up information and fine-tuning as needed.



Made in the  
USA

Equilibar's quality system is  
ISO 9001:2015 certified.

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