

# Bellows-Sealed Metering Valves



## BM Series

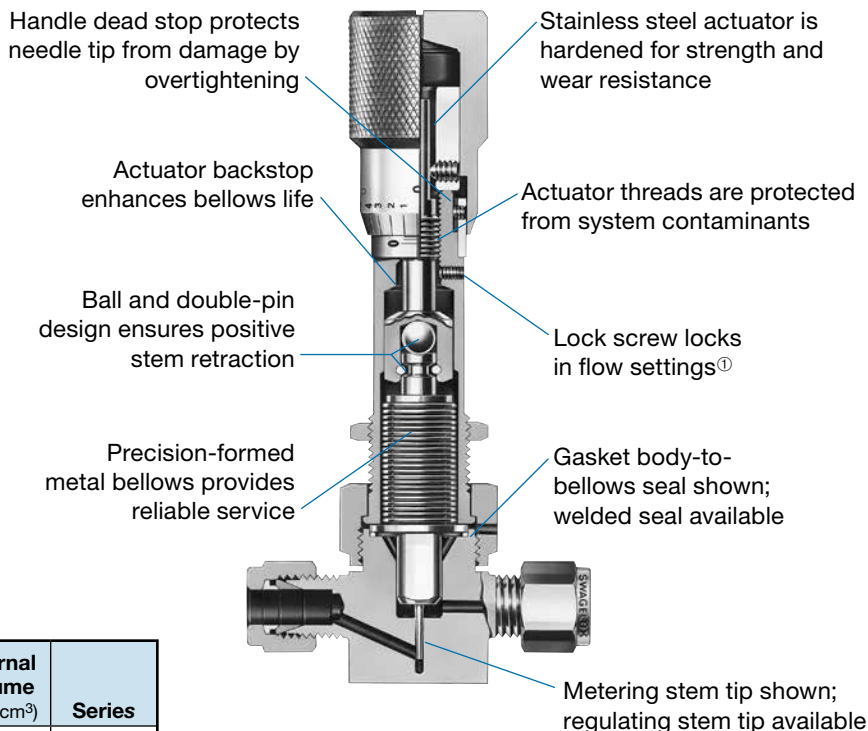
- Micrometer handle for precise, repeatable flow settings
- Working pressures up to 700 psig (48.2 bar)
- Temperatures up to 900°F (482°C)
- 316 stainless steel construction

## Features

- Flow coefficients:
  - 0.019 with metering stem tip
  - 0.30 with regulating stem tip
- Micrometer handles measure stem position in 0.001 in. (0.025 mm) increments.
- Valves open to maximum flow in six turns.
- Slotted handle tops enable adjustments with a screwdriver.
- Panel and bottom mounting are standard.
- Swagelok® tube fitting, tube socket weld, tube butt weld, and Swagelok VCR® fitting end connections are available.

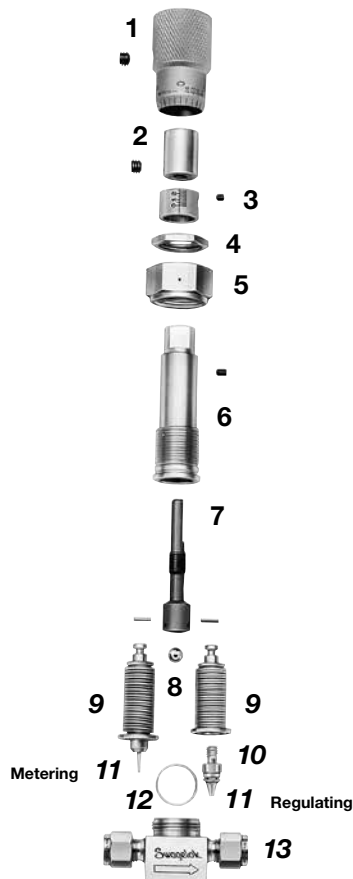
## Technical Data

Body-to-Bellows Seal	Stem Tip	Stem Taper	C <sub>v</sub>	Internal Volume in. <sup>3</sup> (cm <sup>3</sup> )	Series
Gasket	Metering	3°	0.019	0.07 (1.1)	BMG
	Regulating	20°	0.30	0.11 (1.6)	BMRG
Welded	Metering	3°	0.019	0.07 (1.1)	BMW
	Regulating	20°	0.30	0.11 (1.6)	BMRW



① Multiple adjustments may be required for desired flow rate when the lock feature is used.

## Materials of Construction



Component	Series	Material Grade/ASTM Specification	
1 Handle	All	Silver-mist chrome-plated 303 SS/A582	
		Set screw	Alloy steel/ANSI 18.3
2 Bushing	All	303 SS/A582	
		Set screw	Alloy steel/ANSI 18.3
3 Barrel	All	Silver-mist chrome-plated 303 SS/A582	
		Set screw	Alloy steel/ANSI 18.3
4 Panel mount nut	All	316 SS/B783	
5 Bonnet nut	All	Silver-plated 316 SS/A479	
6 Bonnet	All	316 SS/A479	
		Lock screw	Alloy steel/ANSI 18.3
7 Actuator	All	416 SS/A582	
		Actuator pins	420 SS/A276
8 Bearing	All	420C SS	
9 Stem	All	316 SS/A479	
		Bellows	321 SS/A269
		Weld ring	316 SS/A479
10 Stem adapter	BMRG, BMRW	316 SS/A479	
11 Stem tip	All	Hard chrome-plated 316 SS/A479	
12 Gasket	BMG, BMRG	Silver-plated 316 SS/A580	
13 Body	All	316 SS/A479	
		Lubricants	Molybdenum disulfide-based dry film and paste

Wetted components listed in *italics*.

## Pressure-Temperature Ratings

Material	316 SS	
	Series	BMW, BMRW
Temperature, °F (°C)	Working Pressure, psig (bar)	
-20 (-28) to 100 (37)	700 (48.2)	700 (48.2)
200 (93)	610 (42.0)	610 (42.0)
300 (148)	530 (36.5)	530 (36.5)
400 (204)	450 (31.0)	450 (31.0)
500 (260)	375 (25.8)	375 (25.8)
600 (315)	300 (20.6)	300 (20.6)
650 (343)	260 (17.9)	—
700 (371)	230 (15.8)	—
750 (398)	200 (13.7)	—
800 (426)	160 (11.0)	—
850 (454)	130 (8.9)	—
900 (482)	100 (6.8)	—

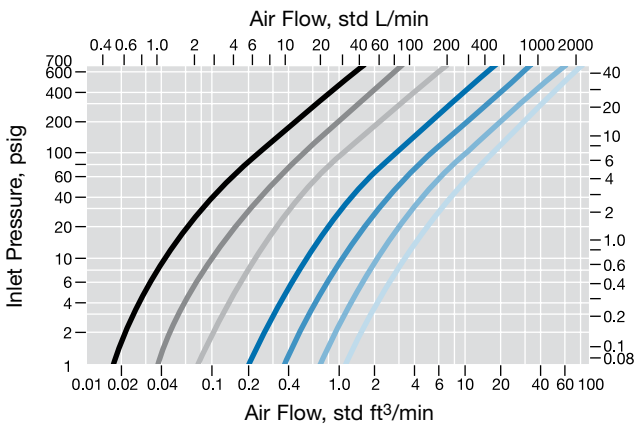
## Handle Temperature Gradient

When Valve Seat Is	Valve Handle Is
600°F (315°C)	250°F (121°C)
900°F (482°C)	325°F (162°C)

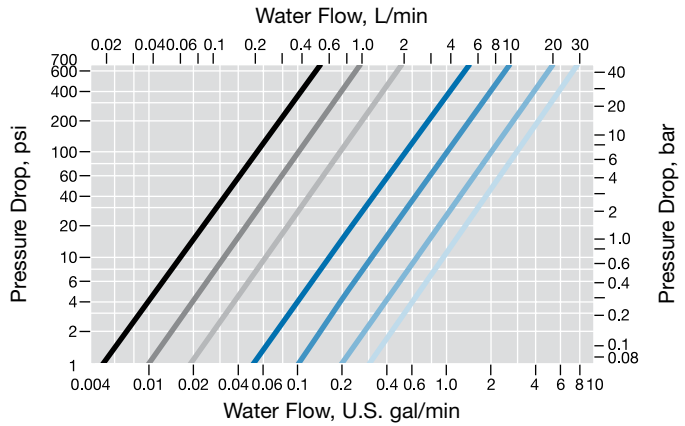
## Flow Data at 70°F (20°C)

**BMG, BMW C<sub>v</sub>** — 0.005 — 0.010 — 0.019  
**BMRG, BMRW C<sub>v</sub>** — 0.05 — 0.10 — 0.20 — 0.30

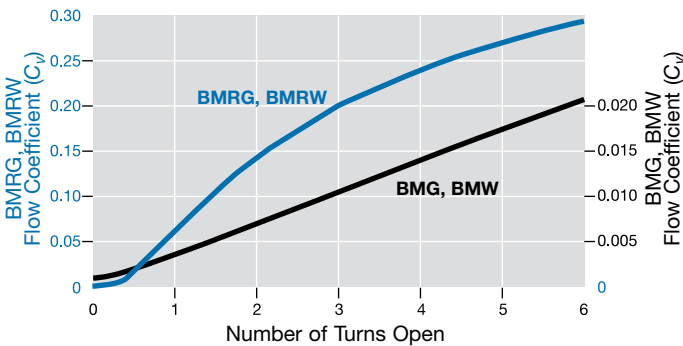
### Air



### Water



## Flow Coefficient at Turns Open



## Factory Flow Settings

### BMG and BMW Series

With 10 psig (0.68 bar) inlet pressure and the flow rate from 10 to 15 cm<sup>3</sup>/min, the handle is set at 0. BMG and BMW series valves are not intended for shutoff service.

### BMRG and BMRW Series

Following a helium leak test of the valve seat to a maximum leak rate of 7 × 10<sup>-7</sup> std cm<sup>3</sup>/s, the handle is set at 0. BMRW series valves are not recommended for shutoff above 600°F (315°C).

**⚠ To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff in valves rated for shutoff service.**

## Testing

Every BM series metering valve is helium leak tested to a maximum leak rate of 4 × 10<sup>-9</sup> std cm<sup>3</sup>/s at the envelope and body seal.

## Cleaning and Packaging

Swagelok BM series metering valves with VCR end connections are processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)* catalog, [MS-06-63](#), to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

Swagelok BM series metering valves with other end connections are processed in accordance with Swagelok *Standard Cleaning and Packaging (SC-10)* catalog, MS-06-62; special cleaning and packaging are available as an option.

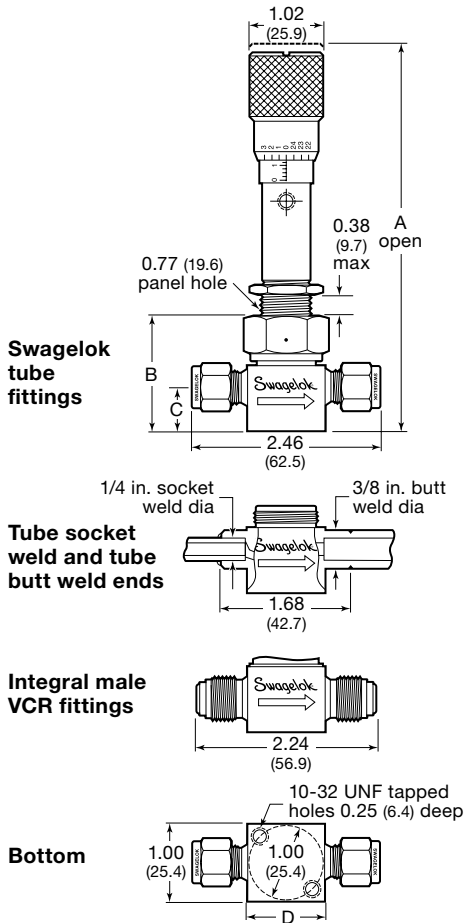
## Oxygen Service Hazards

For more information about hazards and risks of oxygen-enriched systems, refer to *Oxygen System Safety* technical report, [MS-06-13](#).

## Ordering Information and Dimensions

Select an ordering number.

Dimensions, in inches (millimeters), are for reference only and are subject to change.



End Connections		Series	Ordering Number	Dimensions, in. (mm)				
Type	Size			Orifice	A	B	C	D
Fractional Swagelok tube fitting	1/4 in.	BMG	SS-4BMG	0.057 (1.4)	5.24 (133)	1.45 (36.8)	0.56 (14.2)	1.06 (26.9)
		BMRG	SS-4BMRG	0.166 (4.2)	5.22 (133)			
		BMW	SS-4BMW	0.057 (1.4)	5.17 (131)	1.42 (36.1)		
		BMRW	SS-4BMRW	0.166 (4.2)	5.15 (131)			
Metric Swagelok tube fitting	6 mm	BMG	SS-6BMG-MM	0.057 (1.4)	5.24 (133)	1.45 (36.8)	0.56 (14.2)	1.06 (26.9)
		BMRG	SS-6BMRG-MM	0.166 (4.2)	5.22 (133)			
		BMW	SS-6BMW-MM	0.057 (1.4)	5.17 (131)	1.42 (36.1)		
		BMRW	SS-6BMRW-MM	0.166 (4.2)	5.15 (131)			
Tube socket and tube butt weld	1/4 in. and 3/8 in.	BMG	SS-4BMG-TW	0.057 (1.4)	5.24 (133)	1.45 (36.8)	0.56 (14.2)	1.00 (25.4)
		BMRG	SS-4BMRG-TW	0.166 (4.2)	5.22 (133)			
		BMW	SS-4BMW-TW	0.057 (1.4)	5.17 (131)	1.42 (36.1)		
		BMRW	SS-4BMRW-TW	0.166 (4.2)	5.15 (131)			
Integral male VCR fitting	1/4 in.	BMG	SS-4BMG-VCR	0.057 (1.4)	5.24 (133)	1.45 (36.8)	0.44 (11.2)	1.00 (25.4)
		BMRG	SS-4BMRG-VCR	0.166 (4.2)	5.22 (133)			
		BMW	SS-4BMW-VCR	0.057 (1.4)	5.17 (131)	1.42 (36.1)		
		BMRW	SS-4BMRW-VCR	0.166 (4.2)	5.15 (131)			

Dimensions shown with Swagelok tube fitting nuts finger-tight.

### Special Cleaning and Packaging (SC-11)

Swagelok BM series metering valves with VCR end connections are processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)* catalog, MS-06-63, to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

To order special cleaning and packaging for BM series valves with other end connections, add **-SC11** to the valve ordering number.

Example: SS-4BMG-**SC11**

### Welded Female VCR Face Seal Fittings

- Factory welded to valves with tube butt weld end connections
  - 316 SS fittings on stainless steel valves
- To order, add a designator to the ordering number for a valve with fractional Swagelok tube fitting end connections.

Fitting Size	Designator	Overall Length in. (mm)
1/4 in.	-V51	2.76 (70.1)
1/2 in.	-V16	4.60 (117)

Example: SS-4BMG-**V51**

### Special Alloys

Many BM series valves are available in brass and alloy 400 materials. BMW and BMRW series valves are not available in brass. Contact your authorized Swagelok sales and service representative for more information.

### Maintenance Kits

Bellows, stem tip/adaptor, and gasket kits are available for BMG and BMRG series valves. See the Swagelok *Bellows-Sealed Valve Maintenance Kits* catalog, [MS-02-66](#).

**⚠ WARNING**  
**Do not mix/interchange Swagelok products or components not governed by industrial design standards, including Swagelok tube fitting end connections, with those of other manufacturers.**

## Introduction

Since 1947, Swagelok has designed, developed, and manufactured high-quality, general-purpose and specialty fluid system products to meet the evolving needs of global industries. Our focus is on understanding our customers' needs, finding timely solutions, and adding value with our products and services.

We are pleased to provide this global edition of the book-bound *Swagelok Product Catalog*, which compiles more than 100 separate product catalogs, technical bulletins, and reference documents into one convenient, easy-to-use volume. Each product catalog is up to date at the time of printing, with its revision number shown on the last page of the individual catalog. Subsequent revisions will supersede the printed version and will be posted on the Swagelok website and in the Swagelok electronic Desktop Technical Reference (eDTR) tool.

For more information, visit your Swagelok website or contact your authorized Swagelok sales and service representative.

## Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit [swagelok.com](http://swagelok.com) or contact your authorized Swagelok representative.

### Safe Product Selection

**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

### WARNING

**Do not mix/interchange Swagelok products or components not governed by industrial design standards, including Swagelok tube fitting end connections, with those of other manufacturers.**

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