

# Victaulic Installation-Ready™ Rubber-Lined Butterfly Valve for Carbon Steel Pipe



08.21

## Series 121



Series 121

### 1.0 PRODUCT DESCRIPTION

#### Available Sizes

- 2 – 8"/DN50 – DN200

#### Pipe Material

- Designed for use on carbon steel pipe which features ends formed with the Victaulic Original Groove System (OGS) groove profile (see section 7.0 for Reference Materials)

#### End Preparation

- Victaulic Original Groove System (OGS)

#### Maximum Working Pressure

- 232 psi/1600 kPa/16 bar
- Full working pressure for bi-directional service

#### Operating Temperature

- Dependent on seat selection from section 3.0

#### Application

- Installation-Ready™ rubber-lined butterfly valve typically for use in commercial and industrial water applications
  - HVAC (Hot and cold water)
  - Process water

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.



## 1.0 PRODUCT DESCRIPTION (CONTINUED)

---

### Actuation Options

- Standard ISO 5211 mounting flange
  - 10-position lever lock handle, padlockable
  - Gear operator
  - Accommodates 2"/50 mm of insulation
- 

## 2.0 CERTIFICATION/LISTINGS

---



Compliant with Closure/Seat Leakage Rate A per EN 12266-1, EN 1074-1, EN 1074-2 and ISO 5208

Product designed and manufactured under the Victaulic Quality Management System, as certified by LPCB in accordance with ISO-9001.

---

## 3.0 SPECIFICATIONS – MATERIAL

---

**Housing:** Ductile iron conforming to ASTM A536 Grade 65-45-12.

**Housing Coating: (specify choice)**

Standard: Orange enamel.

Optional: Hot dipped galvanized.

Optional: Sherardized diffused zinc coating conforming to ISO 17668.

**Body: Ductile iron conforming to ASTM A536 Grade 65-45-12.**

**Body Coating: (specify choice)**

Standard: Black enamel.

Optional: Hot dipped galvanized.

Optional: Sherardized diffused zinc coating conforming to ISO 17668.

**Seat: Victaulic EPDM**

EPDM. (Light green stripe color code.) Temperature range -30°F to +194°F/-34°C to +90°C. NOT RECOMMENDED FOR PETROLEUM SERVICES OR STEAM SERVICES.

**NOTE**

- Low temperature use is dependent upon system operating characteristics. Contact Victaulic for additional information on low temperature applications.

**Bolts/Nuts:** Carbon steel oval neck track bolts meeting the mechanical property requirements of ISO 898-1 Class 9.8 (M10-M16) Class 8.8 (M20 and greater). Carbon steel hex nuts meeting the mechanical property requirements of ASTM A563M Class 9 (metric - hex nuts). Track bolts and hex nuts are zinc electroplated per ASTM B633 FE/ZN5, finish Type II (metric).

### 3.0 SPECIFICATIONS – MATERIAL (CONTINUED)

---

**Disc:** Ductile iron conforming to ASTM A536, Grade 65-45-12, with electroless nickel coating conforming to ASTM B733.

**Shaft:** AISI 416 stainless steel.

**10-Position Lever Lock Handle:**

Ductile iron conforming to ASTM A536, Grade 65-45-12, with zinc-plated carbon steel latch plate and zinc-plated carbon steel fasteners.

**Handle Coating: (specify choice)**

Standard: Black enamel.

Optional: Hot dipped galvanized.

Optional: Sherardized diffused zinc coating conforming to ISO 17668.

**Gear Operator (with options below):**

Handwheel.

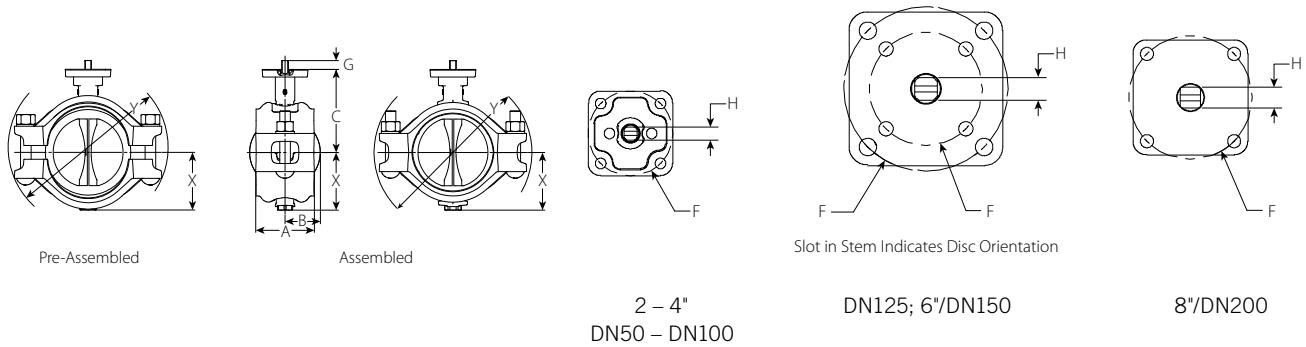
Handwheel with chainwheel.

**NOTE**

- A padlockable valve refers to those valves which can be padlocked to lockout equipment for preventing inadvertent valve operation. When used in conjunction with an appropriate lockout/tagout system, multiple padlocks may be used. The valve may be padlocked either fully open or fully closed.

## 4.0 DIMENSIONS

### Series 121 Installation-Ready™ Butterfly Valve – Bare Valve



2 – 4"  
DN50 – DN100

DN125; 6"/DN150

8"/DN200

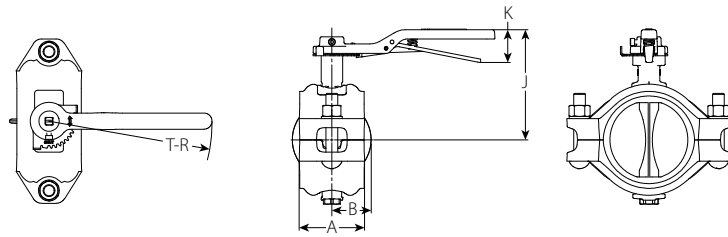
Size					Dimensions										Weight
Nominal inches DN	Actual Outside Diameter inches mm	Pipe End Separation	Bolt/Nut		Pre-Assembled (Installation- Ready™ Condition)		Joint Assembled		A inches mm	B inches mm	C <sup>1</sup> inches mm	F ISO 5211 Flange Designation	G inches mm	H (sq) inches mm	Approx. (Each) lb kg
		Allowable inches mm	Qty.	Coupling Bolt Size mm	X inches mm	Y inches mm	X inches mm	Y inches mm							
2 DN50	2.375 60.3	1.99 51	2	M12 x 76	2.38 60	6.58 167	2.38 60	6.48 165	3.91 99	–	4.55 116	F07	0.64 16	0.35 9	7.4 3.4
DN65	3.000 76.1	1.99 51	2	M12 x 76	2.64 67	7.29 185	2.64 67	7.18 182	3.91 99	–	4.81 122	F07	0.64 16	0.35 9	9.8 4.4
3 DN80	3.500 88.9	2.41 61	2	M16 x 83	3.06 78	9.07 230	3.06 78	8.91 226	4.31 109	2.18 55	5.17 131	F07	0.64 16	0.43 11	12.9 5.9
4 DN100	4.500 114.3	2.41 61	2	M16 x 83	3.54 90	10.23 260	3.54 90	10.10 257	4.35 110	2.20 56	5.67 144	F07	0.64 16	0.43 11	16.6 7.5
DN125	5.500 139.7	2.80 71	2	M20 x 108	4.27 109	11.97 304	4.27 109	11.71 297	4.73 120	2.46 63	6.37 162	F07 F10	0.79 20	0.55 14	26.6 12.1
6 DN150	6.625 168.3	2.82 72	2	M20 x 127	4.74 120	13.17 335	4.74 120	12.99 330	4.76 121	2.90 74	6.83 174	F07 F10	0.79 20	0.55 14	30.7 13.9
8 DN200	8.625 291.1	3.36 85	2	M22 x 140	6.23 158	15.51 394	6.23 158	15.44 392	5.73 146	3.76 96	7.93 201	F10	0.83 21	0.67 17	54.1 24.6

<sup>1</sup> For assemblies with the insulation extension kit (I-120.EXT):

- Add 2 ½"/63 mm to the "C" dimension.
- Add additional weight as follows:
  - 2" – 76.1 mm = 1.0 lb/0.5 kg
  - 3 – 4" = 1.3 lb/0.6 kg
  - 139.7 mm – 6" = 1.7 lb/0.8 kg
  - 8" = 2.0 lb/0.9 kg

## 4.1 DIMENSIONS

### Series 121 Installation-Ready™ Butterfly Valve – With Handle



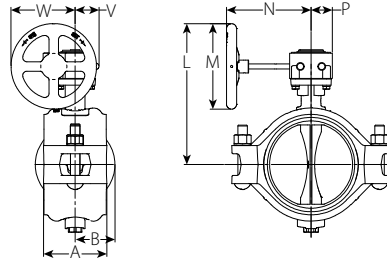
Size		Pipe End Separation	Bolt/Nut		Dimensions									Weight
Nominal inches DN	Actual Outside Diameter inches mm	Allowable inches mm	Qty.	Coupling Bolt Size mm	Pre-Assembled (Installation-Ready™ Condition)		Joint Assembled		A inches mm	B inches mm	T-R inches mm	J <sup>2</sup> inches mm	K inches mm	Approx. (Each) lb kg
					X inches mm	Y inches mm	X inches mm	Y inches mm						
2 DN50	2.375 60.3	1.99 51	2	M12 x 76	2.38 60	6.58 167	2.38 60	6.48 165	3.91 99	–	7.00 178	6.00 152	1.93 49	8.1 3.7
DN65	3.000 76.1	1.99 51	2	M12 x 76	2.64 67	7.29 185	2.64 67	7.18 182	3.91 99	–	7.00 178	6.26 159	1.93 49	10.5 4.8
3 DN80	3.500 88.9	2.41 61	2	M16 x 83	3.06 78	9.07 230	3.06 78	8.91 226	4.31 109	2.18 55	9.00 229	6.37 162	2.22 56	14.3 6.5
4 DN100	4.500 114.3	2.41 61	2	M16 x 83	3.54 90	10.23 260	3.54 90	10.10 257	4.35 110	2.20 56	9.00 229	6.87 174	2.22 56	18.0 8.2
DN125	5.500 139.7	2.80 71	2	M20 x 108	4.27 109	11.97 304	4.27 109	11.71 297	4.73 120	2.46 63	12.00 305	7.72 196	2.42 61	28.1 12.8
6 DN150	6.625 168.3	2.82 72	2	M20 x 127	4.74 120	13.17 335	4.74 120	12.99 330	4.76 121	2.90 74	12.00 305	8.18 208	2.42 61	32.2 14.6
8 DN200	8.625 291.1	3.36 85	2	M22 x 140	6.23 158	15.51 394	6.23 158	15.44 392	5.73 146	3.76 96	14.00 356	9.53 242	2.72 69	55.9 25.4

<sup>2</sup> For assemblies with the insulation extension kit (I-120.EXT):

- Add 2 ½"/63 mm to the "J" dimension.
- Add additional weight as follows:
  - 2" – 76.1 mm = 1.0 lb/0.5 kg
  - 3 – 4" = 1.3 lb/0.6 kg
  - 139.7 mm – 6" = 1.7 lb/0.8 kg
  - 8" = 2.0 lb/0.9 kg

## 4.2 DIMENSIONS

### Series 121 Installation-Ready™ Butterfly Valve – With Gear Operator



Size		Pipe End Separation	Bolt/Nut		Dimensions												Weight
Nominal inches DN	Actual Outside Diameter inches mm	Allowable inches mm	Qty.	Coupling Bolt Size mm	Pre-Assembled (Installation- Ready™ Condition)		Joint Assembled		A inches mm	B inches mm	L <sup>3</sup> inches mm	M inches mm	N inches mm	P inches mm	V inches mm	W inches mm	Approx. (Each) lb kg
					X inches mm	Y inches mm	X inches mm	Y inches mm									
2 DN50	2.375 60.3	1.99 51	2	M12 x 76	2.38 60	6.58 167	2.38 60	6.48 165	3.91 99	-	7.52 191	3.94 100	5.16 131	1.65 42	1.89 48	3.68 93	9.9 4.5
DN65	3.000 76.1	1.99 51	2	M12 x 76	2.64 67	7.29 185	2.64 67	7.18 182	3.91 99	-	7.80 198	3.94 100	5.16 131	1.65 42	1.89 48	3.68 93	12.3 5.6
3 DN80	3.500 88.9	2.41 61	2	M16 x 83	3.06 78	9.07 230	3.06 78	8.91 226	4.31 109	2.18 55	8.14 207	3.94 100	5.16 131	1.65 42	1.89 48	3.68 93	15.2 6.9
4 DN100	4.500 114.3	2.41 61	2	M16 x 83	3.54 90	10.23 260	3.54 90	10.10 257	4.35 110	2.20 56	8.64 219	3.94 100	5.16 131	1.65 42	1.89 48	3.68 93	18.9 8.6
DN125	5.500 139.7	2.80 71	2	M20 x 108	4.27 109	11.97 304	4.27 109	11.71 297	4.73 120	2.46 63	10.00 254	4.92 125	6.89 175	2.20 56	2.24 57	4.53 115	29.9 13.6
6 DN150	6.625 168.3	2.82 72	2	M20 x 127	4.74 120	13.17 335	4.74 120	12.99 330	4.76 121	2.90 74	10.47 266	4.95 125	6.89 175	2.20 56	2.24 57	4.53 115	34.0 15.4
8 DN200	8.625 291.1	3.36 85	2	M22 x 140	6.23 158	15.51 394	6.23 158	15.44 392	5.73 146	3.76 96	12.26 311	6.30 160	7.17 182	2.20 56	2.24 57	5.22 133	61.1 27.7

<sup>3</sup> For assemblies with the insulation extension kit (I-120.EXT):

- Add 2 ½"/63 mm to the "L" dimension.
- Add additional weight as follows:
  - 2" – 76.1 mm = 1.0 lb/0.5 kg
  - 3 – 4" = 1.3 lb/0.6 kg
  - 139.7 mm – 6" = 1.7 lb/0.8 kg
  - 8" = 2.0 lb/0.9 kg

### 4.3 DIMENSIONS

#### Accessories

##### Chainwheels

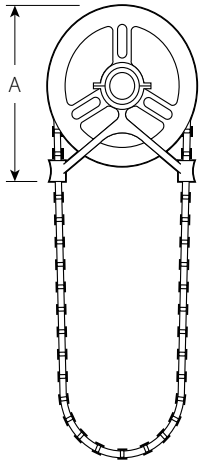
Chainwheels are mounted to the gear operator handwheels. Sprocket rim and guide arms are made of cast aluminum. Chain is galvanized steel weldless lock link chain.

##### HOW TO ORDER:

Specify type valve and operator by valve numbering system shown on page 10.

Always specify length of chain required.

For insulation and locking device, contact Victaulic for details. Handwheel input shaft extensions are not for use with chainwheels.



Chainwheel and Guide  
with Safety Cable Kit

Size		Sprocket Size	Chain Trade Size	Chainwheel Size (Diameter)	Dimensions	Weight
Nominal inches DN	Actual Outside Diameter inches mm				A inches mm	Approximate (Each) lb kg
2 – 4 DN50 – DN100	2.375 – 4.500 60.3 – 114.3	0	2	4.00 102	4.63 118	2.00 0.9
DN125 – DN150	5.500 – 6.625 139.7 – 168.3	1	1/0	5.75 146	6.38 162	4.00 1.8
8 DN200	8.625 291.1	1½	1/0	7.50 190	7.75 197	5.00 2.3

## 5.0 PERFORMANCE

### Series 121 Installation-Ready™ Butterfly Valve

#### Flow Characteristics

C<sub>v</sub>/K<sub>v</sub> values for flow of water at +60°F/+16°C with various disc positions are shown in the table below.

Formulas for C<sub>v</sub>/K<sub>v</sub> values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

**Where:**

Q = Flow (GPM)  
 ΔP = Pressure Drop (psi)  
 C<sub>v</sub> = Flow Coefficient

$$\Delta P = \frac{Q^2}{K_v^2}$$







$$Q = K_v \times \sqrt{\Delta P}$$

**Where:**

Q = Flow (m<sup>3</sup>/hr)  
 ΔP = Pressure Drop (Bar)  
 K<sub>v</sub> = Flow Coefficient

Size		Full Open C <sub>v</sub> K <sub>v</sub>
Nominal Size inches DN	Actual Outside Diameter inches mm	
2 DN50	2.375	149
	60.3	128
DN65	3.000	273
	76.1	235
3 DN80	3.500	298
	88.9	256
4 DN100	4.500	653
	114.3	562
DN125	5.500	858
	139.7	738
6 DN150	6.625	1667
	168.3	1434
8 DN200	8.625	2695
	219.1	2318

#### Flow Coefficients

Size		Flow Coefficients					
Nominal Size inches DN	Actual Outside Diameter inches mm	Degrees From Closed					
		90 	70 	60 	50 	40 	30 
		C <sub>v</sub> K <sub>v</sub>	C <sub>v</sub> K <sub>v</sub>	C <sub>v</sub> K <sub>v</sub>	C <sub>v</sub> K <sub>v</sub>	C <sub>v</sub> K <sub>v</sub>	C <sub>v</sub> K <sub>v</sub>
2 DN50	2.375	149	114	74	42	24	11
	60.3	128	98	64	36	21	10
DN65	3.000	273	216	138	76	43	22
	76.1	235	186	118	65	37	19
3 DN80	3.500	298	183	112	64	36	23
	88.9	256	158	97	55	31	20
4 DN100	4.500	653	383	238	134	69	32
	114.3	562	329	204	116	59	28
DN125	5.500	858	585	366	216	117	53
	139.7	738	503	314	186	101	45
6 DN150	6.625	1667	1122	659	406	235	111
	168.3	1434	965	567	350	202	95
8 DN200	8.625	2695	2007	1349	854	517	269
	219.1	2318	1726	1160	734	444	231



## 5.1 PERFORMANCE

### Series 121 Installation-Ready™ Butterfly Valve

#### Torque Requirements

Size		Torque - Inch Pounds/Newton Meters				
Nominal inches DN	Actual Outside Diameter inches mm	Differential Pressure – psi/bar				
		50/3	100/7	150/10	200/14	232/16
2	2.375	52	64	75	87	94
DN50	60.3	6	7	8	10	11
DN65	3.000	86	100	114	128	137
	76.1	10	11	13	14	15
3	3.500	137	176	204	237	251
DN80	88.9	15	20	23	27	28
4	4.500	190	229	269	309	334
DN100	114.3	21	26	30	35	38
DN125	5.500	409	544	680	815	901
	139.7	46	62	77	92	102
6	6.625	542	663	782	904	982
DN150	168.3	61	75	88	102	111
8	8.625	862	982	1103	1224	1307
DN200	291.1	97	111	125	138	148

#### Source

These torque values were derived from test data with valves in water at ambient temperatures with EPDM seals. For other material and service conditions, apply a suitable service factor.

#### Torque Factors

All torque values are for normal conditions (i.e., the valve is operated at least once a quarter, disc corrosion is expected to be minor, the media is clean and nonabrasive, and the chemical effects upon the elastomer are minor).

#### Typical Fluid Torque Factors Commonly Used in the Industry

Water: 1.0; Lubricated service: 0.8.

#### Material Torque Factors

EPDM = 1.0

#### Cycling Factor

Valve torque will typically increase and actuator output decrease as the valve is cycled. A factor of 1.5 should be applied for when total valve cycles are expected to exceed 5,000.

#### Actuation Factor

A factor should be added to account for potential drift in the output of the actuator due to actuator performance, misalignment or external inputs (i.e., air or power supply). For this, a factor of up to 1.25 may be used.

#### Combining Torque Factors

When multiple torque factors apply, they are combined by multiplying them. Example: For an EPDM seal and a 5,000-cycle factor, the combined factor would be 1.0 X (1.5) = 1.5.

#### NOTES

- Under certain high flow conditions, the hydrodynamic torque can exceed the seating torque. Large butterfly valves are not recommended for use in a free discharge condition, such as filling an empty line with fluid or draining a system at the full-rated pressure.
- Contact Victaulic for other services.

## 5.2 PERFORMANCE

### Series 121 Installation-Ready™ Butterfly Valve

V - 040 - 121 P E - 0

Type	Actual OD in/mm	Size Code	Series	Body	Seat	Operator
V	2.375/60.3	020	121	P - Painted	E - EPDM	0 - Bare
	3.000/76.1	761		G - Galvanized		2 - 10-Position lever lock handle
	3.500/88.9	030		D - Sherardized diffused zinc		3 - Gear operator with hand wheel
	4.500/114.3	040				6 - Gear operator with chain wheel
	5.500/139.7	139				
	6.625/168.3	060				
	8.625/219.1	080				

## 5.3 PERFORMANCE

### Series 121 Installation-Ready™ Butterfly Valve

#### Important Installation Considerations

Always refer to the I-120 Installation and Gear Operator Conversion Manual for complete installation instructions.

When using the Series 121 Installation-Ready™ Butterfly Valve for throttling service, Victaulic recommends positioning the disc no less than 30 degrees open. For best results, the disc should be between 30 and 70 degrees open; this is dependent on the flow requirements/characteristics for the piping system. High pipeline velocities and/or throttling with the disc less than 30 degrees open may result in noise, vibration, cavitation, erosion, and/or loss of control. Contact Victaulic regarding throttling services.

Victaulic recommends limiting the flow velocities for water service to 13.5 feet/second (4 meters/second). Contact Victaulic before installing this valve when higher flow velocities are necessary or specified.

Victaulic recommends good piping practices and installing the valve five pipe diameters downstream of sources of irregular flow, such as pumps, elbows and control valves. If not practical due to space constraints, the system should be designed to locate and orient the valve to minimize the impact of dynamic torque and valve life.



Do not install butterfly valves into the system with the disc in the fully open position. Exposed disc may be damaged and prevent proper function of the valve.

## 6.0 NOTIFICATIONS

### WARNING



- Read and understand all instructions before attempting to install any Victaulic piping products.
- Always depressurize and drain the piping system before attempting to install, remove, adjust, or maintain any Victaulic piping products.
- Wear safety glasses, hardhat, and foot protection.
- **DO NOT USE AN INSTALLATION-READY™ BUTTERFLY VALVE IN DEAD-END SERVICE OR FOR A SYSTEM LEAK TEST IN A DEAD-END SERVICE.**
- **ALWAYS VERIFY THAT MATING COMPONENTS WITH THE CORRECT GROOVE PROFILE ARE BEING USED WITH THE VALVE.**
- **DO NOT LOOSEN OR TIGHTEN HARDWARE WHEN THE VALVE IS PRESSURIZED.**
- The system designer is responsible for verifying suitability of mating component materials with the intended fluid media.
- The effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on mating component materials shall be evaluated to confirm system life will be acceptable for the intended service.

Failure to follow these instructions could result in death or serious personal injury and property damage.

## 7.0 REFERENCE MATERIALS

[24.01: Victaulic Pipe Preparation Tools](#)

[I-120: Victaulic Installation and Operator Conversion Instructions](#)

### User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, and the applicable building codes and related regulations as well as Victaulic performance, maintenance, safety, and warning instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, installation guide, or this disclaimer.

### Intellectual Property Rights

No statement contained herein concerning a possible or suggested use of any material, product, service, or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Victaulic or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product, service, or design in the infringement of any patent or other intellectual property right. The terms "Patented" or "Patent Pending" refer to design or utility patents or patent applications for articles and/or methods of use in the United States and/or other countries.

### Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

### Installation

Reference should always be made to the Victaulic installation handbook or installation instructions of the product you are installing. Handbooks are included with each shipment of Victaulic products, providing complete installation and assembly data, and are available in PDF format on our website at [www.victaulic.com](http://www.victaulic.com).

### Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

### Trademarks

*Victaulic* and all other Victaulic marks are the trademarks or registered trademarks of Victaulic Company, and/or its affiliated entities, in the U.S. and/or other countries.