CAMERON

GENERAL VALVE Twin Seal Valves

Provable zero-leakage, double block-and-bleed plug valve
for oil and gas applications

TECHNOLOGY

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GENERAL VALVE TWIN SEAL VALVES

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Little Rock,
Ark.,
USA

Cameron is a leading provider of valve, valve automation, and measurement systems to the oil and gas industry. Our products are primarily used to control, direct, and measure the flow of oil and gas as it is moved from individual wellheads through flowlines, gathering lines, and transmission systems to refineries, petrochemical plants, and industrial centers for processing.

Cameron provides a wide range of valves for use in natural gas, LNG, crude oil, and refined products transmission lines. The traditional CAMERON® fully welded ball valve product line has been combined with the GROVE®, RING-O®, TOM WHEATLEY®, ENTECH™, and TK® product lines. This broad offering has strengthened Cameron's ability to serve as a single source for a wide scope of customer requirements. We also provide critical service valves for refinery, chemical, and petrochemical processing businesses and for associated storage terminal applications, particularly through the ORBIT® and GENERAL VALVE® lines. These brands are complimented by WKM® and TBV™ valve products.

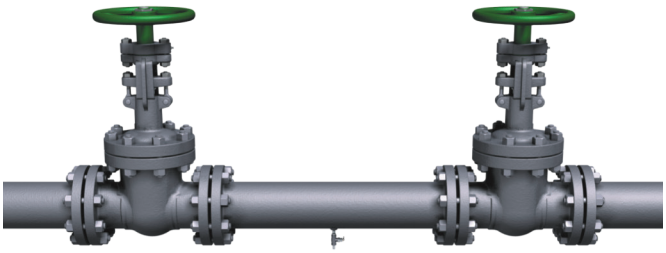
Cameron is the world's leading manufacturer of high-integrity, positive shut-off, double block-and-bleed valves, which serve the pipeline, liquid bulk terminals, aviation fueling, refining, oil and gas production, and custody transfer markets for the petroleum and oil and gas industries.

THE EVOLUTION OF DOUBLE BLOCK-AND-BLEED

Introduced in 1941, Cameron's GENERAL VALVE® Twin Seal™ valves were the first to meet the rigid requirements of double block-and-bleed service more than 68 years ago.

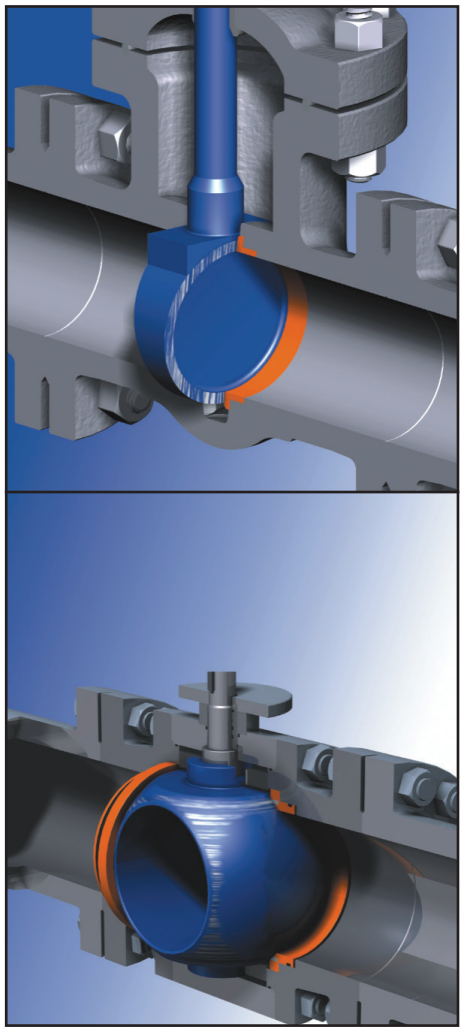
In the years since, subtle yet significant design refinements have been made to improve the valve's performance. Superior design innovations, pride in manufacturing workmanship and selection of the best materials, support Cameron's commitment to excellence and complete customer satisfaction.

The Twin Seal valve is an alternative to the original two-valve system with just one double-seated bubble-tight valve. The upstream and downstream seals provide the same function as the two block valves. The body (serving as a spool piece) bleed verifies seal integrity.



The double block-and-bleed system (as shown above) required the use of two valves and a spool piece. A bleed valve was used to drain the spool and verify seal integrity.

The Twin Seal valve's completely retracted slip design minimizes leakage risk, reduces wear and maintenance and saves money.



Scored Seating Segments

Seal abrasion is inherent in the design of most ball and gate valves. In most instances, the seats are ground or wedged against metal every time the valve cycles. Any foreign material lodged between the seats and ball or gate will score the seating surfaces. Once the seating segment is scored, product loss and contamination results. The Twin Seal valve avoids abrasion by having both independent slips completely retracted from the body bore during cycling.

THE PROVABLE ZERO-LEAKAGE DOUBLE BLOCK-AND-BLEED PLUG VALVE WITH RETRACTING SEALS

Twin Seal Valve Advantages

In meter block service, the differential pressure across each closed valve is very low. There is no assistance required from the line pressure to energize or compress floating seals to make them hold tight. Unless the body cavity in a ball valve is vented, the seals typically rely on springs to press them against the ball. The ball valve may be leaking until the user opens the bleed. Then, the reduction of the body pressure introduces a hydraulic force on the seat that may stop the leak. The user can form a false impression that the ball valve is holding tight, when in reality, it leaks.

In contrast, the mechanical wedge-action of the Twin Seal plug compresses both the upstream and the downstream seals firmly against the valve body, needing no help from the line pressure.

Twin Seal valves hold with consistent and provable zero-leakage.

Meter Stations

Flow meters require calibration to verify their accuracy. During meter calibration (proving), every closed valve in the meter system must seal drop tight. Even a small leak will cause errors in the meter calibration. The incorrect meter factor will persist until the next proving operation, and incorrect flow measurement can cost huge sums of money.

Every Twin Seal valve in the meter station can be quickly and easily shown to be holding leak-tight. That means correct calibration every time.

Contamination is avoided in multi-product manifolds.

Multi-Product Manifolds

The Twin Seal positive shut-off, double block-and-bleed valve was developed for multiproduct fuel manifolds. Busy manifolds must be operated frequently, switching from product to product, often with power actuators and sometimes without supervision. Valves that can be trusted to seal drop tight every time will prevent the expensive consequences of contaminated fuel. Liquid fuels that move through pipeline manifolds are reliably segregated by provable, zero-leakage, Twin Seal valves.

Every Twin Seal valve in the manifold has assured double block-and-bleed shutoff that proves total isolation of each product. By using Twin Seal valves, gasoline, diesel, kerosene, jet fuel, heating oil and LPG, as well as crude oil and natural gas, are protected from contamination.

Tank Storage Isolation

Fuel in storage tanks is exposed to the risk of contamination and loss of volume unless the tank isolation valves can be checked for zero-leakage. Tank-side valves are operated frequently, but ensuring tank integrity without Twin Seal valves can be troublesome and expensive. Using line blinds (or skillet plates) for segregation involves a long, costly and perhaps hazardous operation of draindown, lockout and tagout. Traditional gate valve double block-and-bleed may produce loss of fuel from the open bleed. Twin Seal valves offer simple, provable, tank-side isolation, ensuring valve integrity.

Hydrant Isolation

Fuel hydrants at busy airports must be pressure tested regularly to check the integrity of the pipes, flanges and gaskets. But, the only time this inspection can be performed is in the few hours each night when the airport is closed.

On some occasions, sections of the hydrant must be isolated for extension, modification or repair. Or, it may become necessary to isolate section by section to find the location of a leak. Generally speaking, airports don't have the time to drain fuel from the lines or to swing line blinds for traditional line block, but the entire hydrant must be isolated and pressurized to prove that it is safe.

Twin Seal valves are the recognized hydrant valves for airport service because:

- They close quickly and easily
- They require very little maintenance
- They hold with zero-leakage
- They hold a verifiable bubble-tight seal

The hydrant pressure test can begin as soon as the valves are closed, since the Twin Seal valves ensure that the hydrant is isolated.

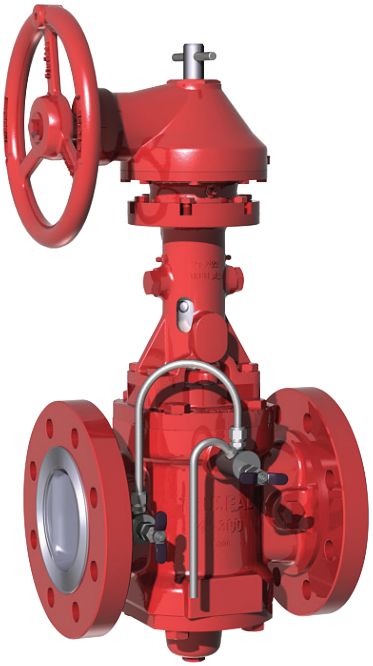
Loading/Unloading

Fuel loading/unloading may require hundreds of open/closed strokes of the connection valves every day. The valves typically operate against full pump pressure on every stroke, and they must close without leakage.

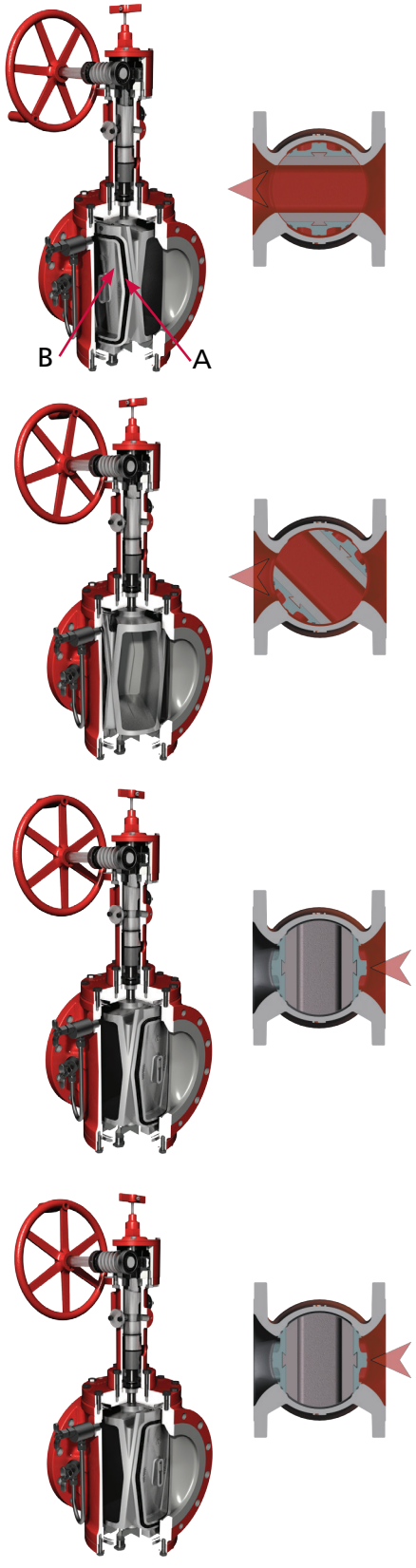
Safety and environmental concerns demand that the fuel is absolutely and totally contained within the pipe, yet the valves must operate quickly and easily. Twin Seal valves have two resilient seals that fully retract from their seated position without any seal rubbing, even at full differential pressure, reducing the effort required to operate the valve and making it slam-proof.

Fuel Loading Hazards are Reduced

Countless loading facilities depend on Twin Seal valves for safe, reliable, zero-leakage shutoff at rail, truck and ship load manifolds. From Alaska to Argentina, from Sidney to Sicily, from New York to New Zealand, fuel movement managers have discovered Twin Seal valves are the valves they can trust to deliver real dependability at their loading manifolds.



HOW THE TWIN SEAL VALVE WORKS



1. The internal design is very simple. Seals (A) are permanently bonded into the slips (B), which are mounted on a central plug. In the open position, the slip seals are completely out of the flow.

2. Turning the operator handwheel clockwise rotates the plug assembly 90 degrees to block flow. During rotation, clearance is maintained between the seal and the valve body, allowing free movement and avoiding abrasion.

3. When the operator is turned further clockwise, the tapered plug begins to lower, forcing the slips against the body, initiating the verifiable seal. Because the seals never drag in well-maintained valves, the valve requires less torque to cycle.

4. In the closed position, the slip seals are expanded, compressing the slip seals until metal-to-metal seating is affected. Because it is mechanical, the Twin Seal valve doesn't rely on line pressure differential to help make it seal. It even seals in vacuum service.

Simple, In-Line Field Maintenance Keeps Costs Down

A big advantage of the Twin Seal valve's design is that it permits in-line servicing. By simply removing the valve bonnet or lower plate (after the line is depressurized and drained), all models may be repaired from top or bottom without removing the valve from the line. Cameron offers a slip exchange program. Contact us for details.

WARNING: Do not attempt any repairs on Twin Seal valves unless you are certain the line pressure has been removed and the line contents have been drained from the valve, the line and the body cavity.

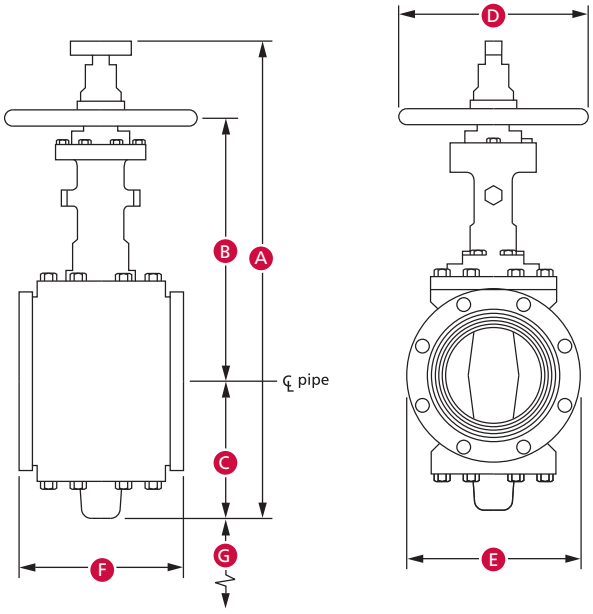
Failure to follow these instructions could result in injury to personnel, or cause hazardous products to be vented from the valve.

For complete instructions on installation and repair, request a copy of the Twin Seal valve installation manual from your local Cameron sales office.

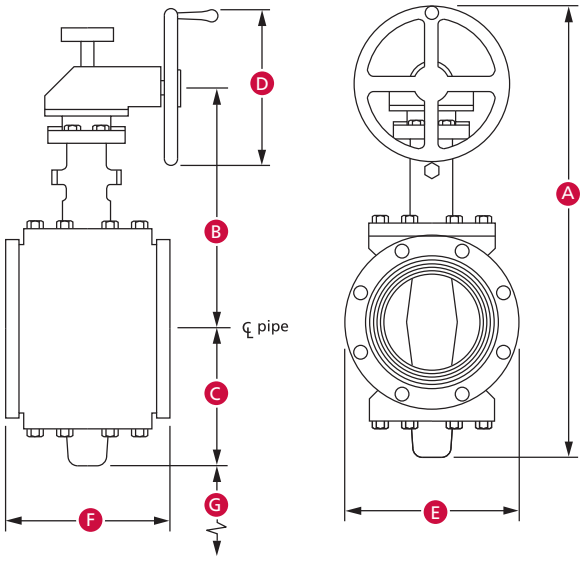
Dimensional Tables

MODEL 200

Handwheel Operated



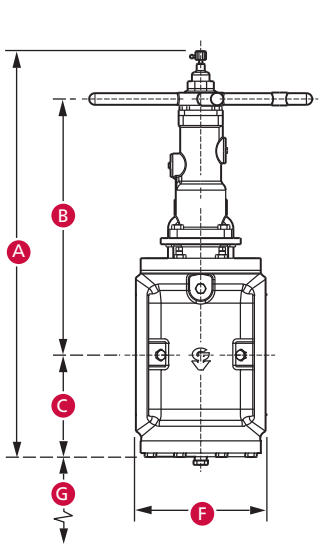
Gear Operated

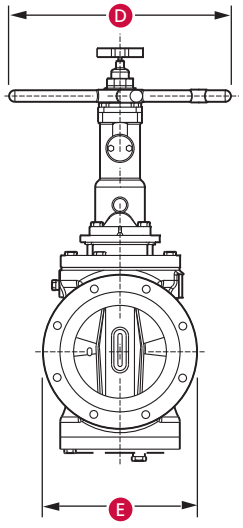


	Dimensions in. (mm)			Maximum Overall Height	Centerline of Valve to Centerline of Handwheel	Centerline of Valve to Lowest Point	Handwheel Diameter	Flange Diameter	Face -to- Face	Minimum Clearance to Remove Slip from Bottom	Approx. Weight	Flow Coefficient
Class	Size	Model	Oper.	A	B	C	D	E	F	G	lb (kg)	C_V in gal/ min
ASME 150 Hand Operated	2 (50)	211	201	21-1/4 (540)	11-7/8 (302)	5 (127)	10 (254)	6 (152)	7 (178)	3 (76)	60 (27)	200
	3 (80)	211	201	21-1/4 (540)	11-7/8 (302)	5 (127)	10 (254)	7-1/2 (191)	8 (203)	3 (76)	75 (34)	205
	4 (100)	211	201	23-1/2 (597)	12-5/8 (321)	6-3/8 (162)	10 (254)	9 (229)	9 (229)	5 (127)	95 (43)	590
	6 (150)	211	202	31-1/8 (790)	16-3/4 (426)	8-5/8 (219)	14 (356)	11 (279)	10-1/2 (266)	8 (203)	195 (88)	1254
ASME 300 Hand Operated	2 (50)	221	201	21-1/4 (540)	11-7/8 (302)	5 (127)	10 (254)	6-1/2 (165)	8-1/2 (216)	3 (76)	65 (29)	210
	3 (80)	221	201	21-1/4 (540)	11-7/8 (302)	5 (127)	10 (254)	8-1/4 (210)	11-1/8 (283)	3 (76)	90 (41)	220
	4 (100)	221	202	25-7/8 (657)	15 (381)	5-1/8 (130)	14 (356)	10 (254)	12 (305)	6 (152)	145 (66)	620
ASME 600 Hand Operated	2 (50)	241	202	24-3/4 (629)	13-7/8 (353)	5-1/8 (130)	14 (356)	6-1/2 (165)	11-1/2 (292)	3 (76)	115 (52)	290
	3 (80)	241	202	24-3/4 (629)	13-7/8 (353)	5-1/8 (130)	14 (356)	8-1/4 (210)	14 (356)	3 (76)	135 (61)	300
	4 (100)	241	203	31-7/8 (810)	18 (457)	7-3/8 (187)	16 (406)	10-3/4 (273)	17 (432)	4 (102)	240 (109)	850
ASME 150 Gear Operated	6 (150)	211	202G	31-7/8 (810)	18-1/4 (464)	8-5/8 (219)	10 (254)	11 (279)	10-1/2 (267)	8 (203)	200 (91)	1254
ASME 300 Gear Operated	4 (100)	221	202G	26-5/8 (676)	16-1/2 (419)	5-1/8 (130)	10 (254)	10 (254)	12 (305)	6 (152)	155 (70)	620
ASME 600 Gear Operated	2 (50)	241	202G	25-1/2 (648)	15-3/8 (391)	5-1/8 (130)	10 (254)	6-1/2 (165)	11-1/2 (292)	3 (76)	120 (54)	290
	3 (80)	241	202G	25-1/2 (648)	15-3/8 (391)	5-1/8 (130)	10 (254)	8-1/4 (210)	14 (356)	3 (76)	140 (64)	300
	4 (100)	241	203G	33-7/8 (861)	19-1/2 (495)	7-3/8 (187)	14 (356)	10-3/4 (273)	17 (432)	4 (102)	265 (120)	850

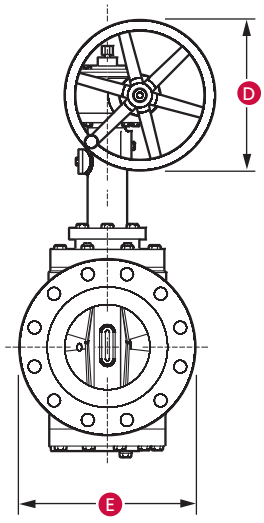
MODEL 8800

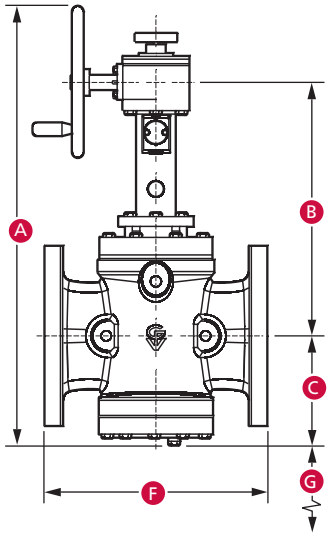
Handwheel Operated





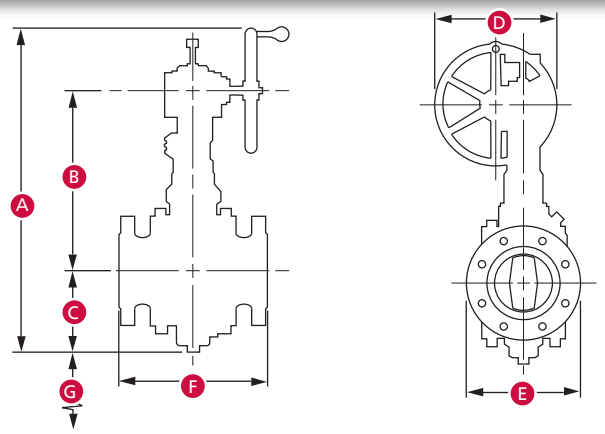
Gear Operated





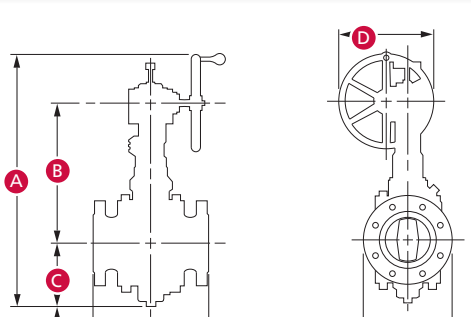
	Dimensions in. (mm)			Maximum Overall Height	Centerline of Valve to Centerline of Handwheel	Centerline of Valve to Lowest Point	Handwheel Diameter	Flange Diameter	Face-to-Face	Minimum Clearance to Remove Slip from Bottom	Approx. Weight	Flow Coefficient
Class	Size	Model	Oper.	A	B	C	D	E	F	G	lb. (kg)	C_v in gal/min
ASME 150 Hand Operated	8 (200)	8811	625H	36 (914)	23 (584)	9 (229)	20 (508)	13-1/2 (343)	11-1/2 (292)	12-1/2 (318)	385 (175)	2420
ASME 300 Hand Operated	6 (150)	8821	625H	32-1/2 (826)	21 (533)	7-1/2 (191)	20 (508)	12-1/2 (318)	15-7/8 (403)	9 (229)	250 (113)	1770
ASME 150 Gear Operated	8 (200)	8811	625G	39-3/4 (1010)	23 (584)	9-3/4 (248)	14 (356)	13-1/2 (343)	11-1/2 (292)	12-1/2 (318)	405 (184)	2420
	10 (250)	8811	625G	42 (1067)	24 (610)	11 (279)	14 (356)	16 (406)	13 (330)	15 (381)	518 (235)	3578
	12 (300)	8811	751G	53 (1346)	30-1/2 (775)	13 (330)	20 (508)	19 (483)	14 (356)	17 (432)	790 (358)	4000
	14 (350)	8811	751G	56-1/4 (1429)	31-3/4 (806)	14-3/4 (375)	20 (508)	21 (533)	15 (381)	19 (483)	995 (451)	5500
	16 (400)	8811	1261G	64 (1626)	38 (965)	16-1/4 (413)	20 (508)	23-1/2 (597)	16 (406)	22 (559)	1340 (608)	7000
	18 (450)	8811	1261G	64-1/4 (1632)	38 (965)	16-1/4 (413)	20 (508)	25 (635)	17 (432)	23 (584)	1407 (638)	7000
	20 (500)	8811	1261G	68 (1727)	39-3/4 (1010)	16-1/4 (413)	20 (508)	27-1/2 (699)	32 (813)	26 (660)	2860 (1297)	15,700
	24 (600)	8811	1261G	72-3/4 (1848)	41-1/2 (1054)	21-1/2 (546)	20 (508)	32 (813)	36 (914)	28 (711)	3830 (1737)	24,000
ASME 300 Gear Operated	6 (150)	8821	625G	36 (914)	21-1/4 (540)	7-3/4 (197)	14 (356)	12-1/2 (318)	15-7/8 (403)	9 (229)	312 (142)	1770
	8 (200)	8821	751G	43 (1092)	27 (686)	9 (229)	20 (508)	15 (381)	16-1/2 (419)	11 (279)	587 (266)	3000

MODEL 800



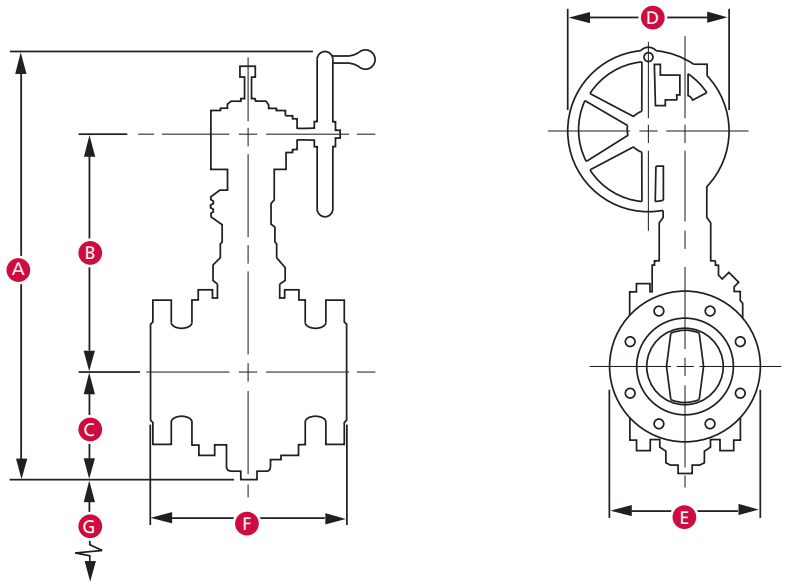
	Dimensions in. (mm)			Maximum Overall Height	Centerline of Valve to Centerline of Handwheel	Centerline of Valve to Lowest Point	Handwheel Diameter	Flange Diameter	Face-to-Face	Minimum Clearance to Remove Slip from Bottom	Approx. Weight	Flow Coefficient
Class	Size	Model	Oper.	A	B	C	D	E	F	G	lb (kg)	C_v in gal/min
ASME 150 Gear Operated	28 (700)	C811	1276G	108-1/2 (2756)	60-1/2 (1537)	32 (813)	32 (813)	36-1/2 (927)	60 (1524)	30 (762)	13,000 (5897)	31,000
	30 (750)	CC811	1276G	108-1/2 (2756)	60-1/2 (1537)	32 (813)	32 (813)	38-3/4 (984)	60 (1524)	30 (762)	13,900 (6305)	33,000
	36 (900)	C811	1500G	121 (3073)	76 (1930)	34 (864)	32 (813)	46 (1168)	78 (1981)	30 (762)	20,600 (9344)	48,000
ASME 300 Gear Operated	10 (250)	C821	751G	52 (1321)	29 (737)	12-1/2 (318)	20 (508)	17-1/2 (445)	18 (457)	13 (330)	888 (403)	3540
	12 (300)	C821	1261G	63-1/2 (1613)	36-1/2 (927)	16-1/2 (419)	20 (508)	20-1/2 (521)	19-3/4 (502)	16 (406)	1414 (641)	4700
	14 (350)	C821	1261G	58-1/2 (1486)	34-1/2 (876)	14-1/2 (368)	20 (508)	23 (584)	30 (762)	15 (381)	1990 (903)	6000
	16 (400)	CA821	1261-7G	61 (1549)	36-1/2 (927)	14 (356)	20 (508)	25-1/2 (648)	33 (838)	19 (483)	2662 (1207)	9400
	18 (450)	CA821	1261-7G	71 (1803)	40-1/2 (1029)	20-1/2 (521)	20 (508)	28 (711)	36 (914)	13 (330)	3550 (1610)	11,500
	20 (500)	CA821	1276G	88-1/2 (2248)	48 (1219)	24-1/2 (622)	32 (813)	30-1/2 (775)	39 (991)	14 (356)	4155 (1885)	16,300
	24 (600)	CA821	1276G	92 (2337)	50-1/2 (1283)	25-1/2 (648)	32 (813)	36 (914)	52 (1321)	17 (432)	8150 (3697)	27,000
	28 (700)	CA821	1500G	114 (2896)	70 (1778)	28 (711)	32 (813)	36-1/4 (921)	65 (1651)	12 (305)	12,800 (5806)	32,000
	30 (750)	CA821	1500G	120 (3048)	71 (1803)	32-1/2 (826)	32 (813)	43 (1092)	65 (1651)	28 (711)	15,300 (6940)	33,500
ASME 600 Gear Operated	6 (150)	C841	751G	45 (1143)	26 (660)	9 (229)	20 (508)	14 (356)	22 (559)	10 (254)	696 (316)	2265
	8 (200)	CA841	755G	48 (1219)	27 (686)	11 (279)	20 (508)	16-1/2 (419)	26 (660)	12 (305)	1102 (500)	3600
	10 (250)	CB841	1261-7G	62-1/2 (1588)	36-1/2 (927)	16 (406)	20 (508)	20 (508)	31 (787)	8 (203)	1974 (895)	5100
	12 (300)	CB841	1261-7G	64-1/2 (1638)	38 (965)	17 (432)	20 (508)	22 (559)	33 (838)	10 (254)	2532 (1148)	9300
	14 (350)	C841	1276G	82-1/2 (2096)	47 (1194)	19-1/2 (495)	32 (813)	23-3/4 (603)	35 (889)	10 (254)	4100 (1860)	9500
	16 (400)	CA841	1276G	83 (2108)	47 (1194)	19-1/2 (495)	32 (813)	27 (686)	39 (991)	14 (356)	4300 (1950)	11,000
	20 (500)	C841	1500G	106 (2692)	66 (1676)	23-1/2 (597)	32 (813)	32 (813)	47 (1194)	14 (356)	9500 (4309)	16,500
	24 (600)	C841	1500G	114 (2896)	72 (1829)	26 (660)	32 (813)	37 (940)	55 (1397)	12 (305)	15,000 (680)	27,000
ASME 900 Gear Operated	2 (50)	C851	625G	33 (838)	19 (483)	7 (178)	14 (356)	8-1/2 (216)	14-1/2 (368)	3-1/2 (89)	180 (82)	160
	3 (80)	C851	625G	34 (864)	19 (483)	8 (203)	14 (356)	9-1/2 (241)	15 (381)	4 (102)	230 (127)	250
	4 (100)	C851	625G	37-1/2 (953)	20 (508)	10 (254)	14 (356)	11-1/2 (292)	18 (457)	6 (152)	397 (180)	650
	6 (150)	C851	755G	47-1/2 (1207)	26 (660)	11-1/2 (292)	20 (508)	15 (381)	24 (610)	7-1/2 (191)	975 (442)	2400
	8 (200)	C851	1261-7G	63-1/2 (1613)	37 (940)	16-1/2 (419)	20 (508)	18-1/2 (470)	29 (737)	10 (254)	1440 (653)	4200
	10 (250)	C851	1276G	88-1/2 (2248)	51-1/2 (1308)	21 (533)	32 (813)	21-1/2 (546)	33 (838)	10 (254)	3600 (1633)	5500
ASME 1500 Gear Operated	2 (50)	C861	625G	33 (838)	19 (483)	7 (178)	14 (356)	8-1/2 (216)	14-1/2 (368)	3-1/2 (89)	180 (82)	160
	3 (80)	C861	625G	34 (864)	19 (483)	8 (203)	14 (356)	10-1/2 (267)	18-1/2 (470)	4 (102)	280 (127)	250

MODEL 900 FULL BORE PIGGABLE



	Dimensions in. (mm)			Maximum Overall Height	Centerline of Valve to Centerline of Handwheel	Centerline of Valve to Lowest Point	Handwheel Diameter	Flange Diameter	Face-to-Face	Minimum Clearance to Remove Slip from Bottom	Approx. Weight
Class	Size	Model	Oper.	A	B	C	D	E	F	G	lb (kg)
ASME 150	2 (50)	C911	501 TS	26 (660)	15 (381)	6 (152)	10 (254)	6 (152)	10-1/2 (267)	5 (127)	216 (98)
	3 (80)	C911	501 TS	28 (711)	16 (406)	7 (178)	10 (254)	7-1/2 (191)	13-1/2 (343)	5 (127)	320 (145)
	4 (100)	C911	501 TS	32 (813)	17-1/2 (445)	7 (178)	10 (254)	9 (229)	17 (432)	5 (127)	401 (182)
	6 (150)	C911	625 TS	37 (940)	21 (533)	9 (229)	14 (356)	11 (279)	21 (533)	7-1/2 (191)	522 (237)
	8 (200)	C911	751 TS	48 (1219)	27-1/2 (699)	10-1/2 (267)	20 (508)	13-1/2 (343)	25 (635)	9 (229)	861 (390)
	10 (250)	C911	751 TS	52-1/2 (1334)	29 (737)	13-1/2 (343)	20 (508)	16 (406)	31 (787)	11 (279)	1275 (578)
	12 (300)	A1911	1261 TS	60 (1524)	35 (889)	15 (381)	20 (508)	19 (483)	36 (914)	14 (356)	1670 (757)
	14 (350)	C911	1261 TS	61-1/2 (1562)	36 (914)	15-1/2 (394)	20 (508)	21 (533)	34 (864)	15 (381)	2406 (1091)
	16 (400)	C911	1261 TS	64 (1626)	37 (940)	17 (432)	20 (508)	23-1/2 (597)	35 (889)	17 (432)	3006 (1363)
	18 (450)	C911	1261.7 TS	78 (1981)	44-1/2 (1130)	23-1/2 (597)	20 (508)	25 (635)	48 (1219)	18 (457)	5700 (2585)
	20 (500)	C911	1261.7 TS	78-1/2 (1994)	44-1/2 (1130)	24-1/2 (622)	20 (508)	27-1/2 (699)	48 (1219)	17 (432)	6165 (2796)
	24 (600)	C911	1276 TS	108-1/2 (2756)	60-1/2 (1537)	32 (813)	32 (813)	32 (813)	60 (1524)	30 (762)	12,800 (5806)
ASME 300	2 (50)	C921	501 TS	26 (660)	15 (381)	6 (152)	10 (254)	6 (152)	11-1/8 (283)	5 (127)	350 (159)
	4 (100)	C921	501 TS	29-1/2 (749)	16-1/2 (419)	7-1/2 (191)	10 (254)	10 (254)	18 (457)	6 (152)	365 (165)
	6 (150)	C921	625 TS	38 (965)	21 (533)	10 (254)	14 (356)	12-1/2 (318)	22 (559)	8 (203)	615 (279)
	8 (200)	C921	1261 TS	55 (1397)	33 (838)	12 (305)	20 (508)	15 (381)	27 (686)	9 (229)	1255 (569)
	10 (250)	CA921	1261 TS	58-1/2 (1486)	34-1/2 (876)	14 (356)	20 (508)	17-1/2 (445)	32-1/2 (826)	12 (305)	1800 (816)
	12 (300)	CA921	1261.7 TS	59 (1499)	35 (889)	14 (356)	20 (508)	20-1/2 (521)	38 (965)	16 (406)	2500 (1134)
	16 (400)	C921	1276 TS	83 (2108)	48 (1219)	19 (483)	32 (813)	25-1/2 (648)	35 (889)	16 (406)	4000 (1814)
	18 (450)	C921	1276 TS	106-1/2 (2705)	67 (1702)	23-1/2 (597)	32 (813)	28 (711)	48 (1219)	15-1/2 (394)	6400 (2903)
	20 (500)	CA921	1276 TS	89-1/2 (2273)	50-1/2 (1283)	23 (584)	32 (813)	30-1/2 (775)	48 (1219)	19 (483)	7000 (3175)
ASME 600	2 (50)	C941	625 TS	32-1/2 (826)	19 (483)	6-1/2 (165)	14 (356)	6-1/2 (165)	13 (330)	6 (152)	400 (181)
	4 (100)	C941	625 TS	34 (864)	19-1/2 (495)	8 (203)	14 (356)	10-3/4 (273)	17 (432)	6 (152)	610 (277)
	6 (150)	C941	751 TS	47 (1194)	27 (686)	10-1/2 (267)	20 (508)	14 (356)	22 (559)	8 (203)	1100 (499)
	8 (200)	C941	1261 TS	63 (1600)	37 (940)	16 (406)	20 (508)	16-1/2 (419)	26 (660)	10 (254)	2150 (975)
	10 (250)	C941	1261 TS	64-1/2 (1638)	38-1/2 (978)	16 (406)	20 (508)	20 (508)	31 (787)	12 (305)	3100 (1406)
	12 (300)	C941	1276 TS	83 (2108)	47 (1194)	19-1/2 (495)	32 (813)	22 (559)	33 (838)	10 (254)	4200 (1905)
	14 (350)	C941	1500 TS	106 (2108)	66 (1676)	26 (660)	32 (813)	27 (686)	39 (991)	15 (381)	9500 (4309)
	16 (400)	C941	1500 TS	106 (2692)	66 (1676)	24 (610)	32 (813)	27 (686)	39 (991)	16 (406)	9500 (4309)
	20 (500)	C941	1500 TS	114 (2896)	72 (1829)	29-1/2 (749)	32 (813)	32 (813)	55 (1397)	20 (508)	14,000 (6350)

MODEL 400 SHORT PATTERN



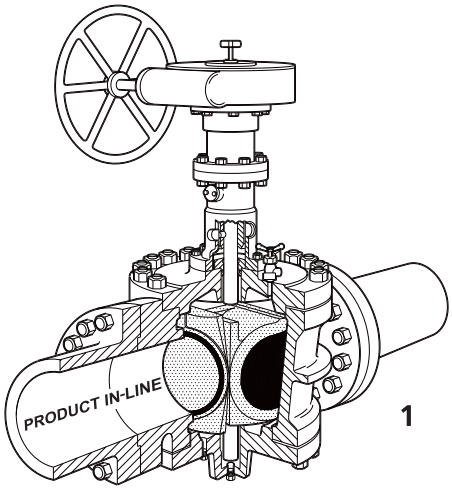
	Dimensions in. (mm)			Maximum Overall Height	Centerline of Valve to Centerline of Handwheel	Centerline of Valve to Lowest Point	Handwheel Diameter	Flange Diameter	Face-to-Face	Minimum Clearance to Remove Slip from Bottom	Approx. Weight	Flow Coefficient
Class	Size	Model	Oper.	A	B	C	D	E	F	G	lb (kg)	C_V in gal/min
ASME 150	18 (450)	C411	1261 TS	67 (1702)	38-1/2 (978)	18 (457)	20 (508)	25 (635)	17 (432)	17 (432)	1488 (675)	7000
	20 (500)	C411	1261 TS	70 (1778)	40 (1016)	20 (508)	20 (508)	27-1/2 (699)	18 (457)	22 (559)	2658 (1206)	8500
	24 (600)	C411	1261 TS	74-1/2 (1892)	42-1/2 (1080)	22 (559)	20 (508)	32 (813)	20 (508)	28 (711)	3326 (1509)	11,250
ASME 600	18 (450)	C441	1276 TS	82-1/2 (2096)	47 (1194)	19-1/2 (495)	32 (813)	29-1/4 (743)	39 (991)	10 (254)	4300 (1950)	10,200

SEAT AND RESEAT VALVE LETS YOU CHANGE SEALS IN MINUTES, WITHOUT DRAINING THE LINE

Twin Seal Seat and Reseat Valves Reduce Line Draining, Line Flushing, Vacuum Trucks, and Product Losses.

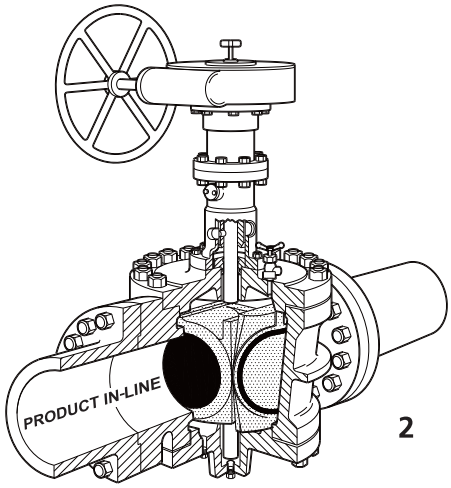
1 - Valve in Closed Position

Resilient seals form bubble-tight shutoff on upstream and downstream ports, and secondary metal-to-metal seats provide sufficient shutoff to meet fire safety requirements. The bonnet-mounted manual or automatic bleed valve verifies zero-leakage shutoff.



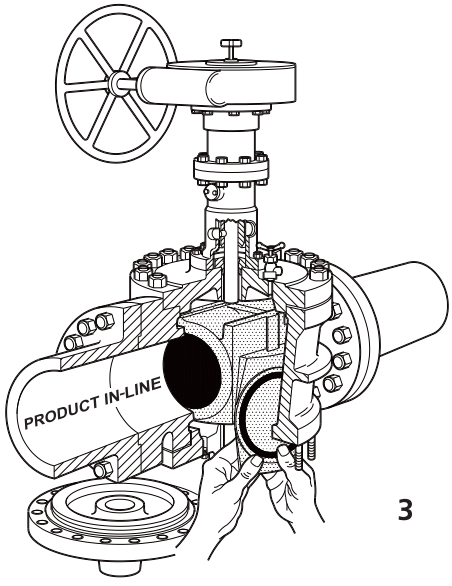
2 - Valve in Open Position, Product In-Line

After seating segments are mechanically retracted from the ports, the plug is rotated 90 degrees and reseated into tapered body seats in the open position, forming a metal-to-metal seat. Line rouge (sediment) from pigging is prevented from settling in the body cavity.



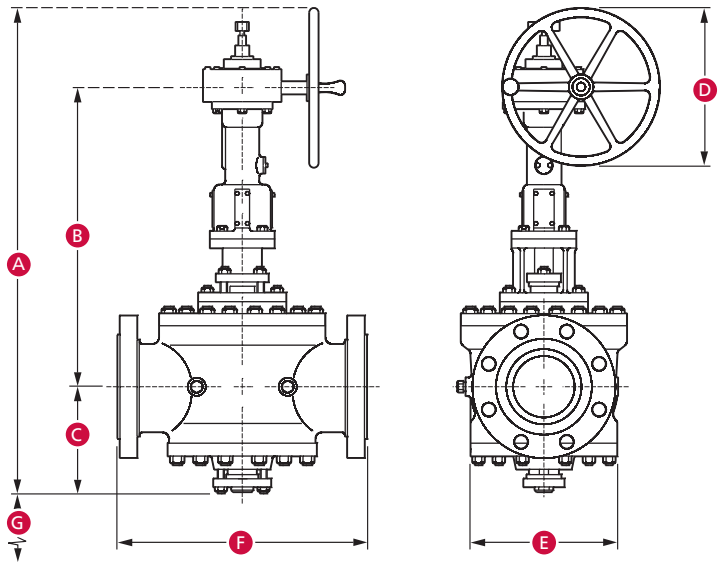
3 - Valve Still in Open Position, Product In-Line

The body bleed feature verifies there is no pressure in the body cavity, therefore, the line does not need to be drained. The bottom plate now can be removed safely and new seating segments can be slipped into position. Only commonly used hand tools are needed for the entire procedure.



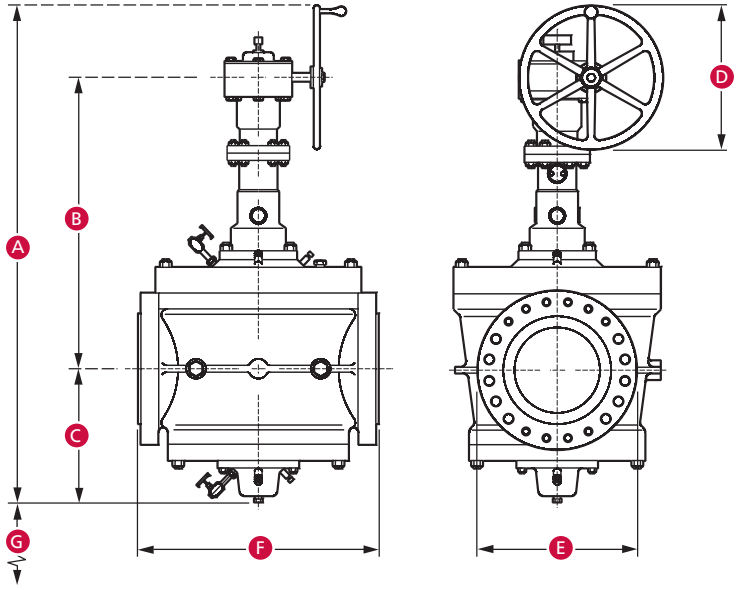
Seat and Reseat

MODEL 1600 REDUCED BORE



	Dimensions in. (mm)		Maximum Overall Height	Centerline of Valve to Centerline of Handwheel	Centerline of Valve to Lowest Point	Handwheel Diameter	Flange Diameter	Face-to-Face	Minimum Clearance to Remove Slip from Bottom
Class	Size	Model	A	B	C	D	E	F	G
ASME 150	8 (200)	C1611	47-1/2 (1207)	27 (686)	10-1/2 (267)	20 (508)	13-1/2 (343)	16-1/2 (419)	7-1/2 (191)
	12 (300)	C1611	58-1/2 (1486)	36 (914)	13 (330)	20 (508)	19 (483)	32-1/2 (826)	11-1/2 (292)
ASME 300	6 (150)	C1621	37 (940)	22 (559)	8 (203)	14 (356)	12-1/2 (318)	15-7/8 (403)	5 (127)
	8 (200)	C1621	47-1/2 (1207)	27 (686)	10-1/2 (267)	20 (508)	15 (381)	16-1/2 (419)	7-1/2 (191)
	10 (250)	C1621	51 (1295)	29-1/2 (749)	11-1/2 (292)	20 (508)	17-1/2 (445)	18 (457)	12 (305)
	12 (300)	C1621	58-1/2 (1486)	36 (914)	13 (330)	20 (508)	20-1/2 (521)	32-1/2 (826)	11-1/2 (292)
	14 (350)	C1621	54-1/2 (1384)	32 (813)	13 (330)	20 (508)	23 (584)	30 (762)	12 (305)
	20 (500)	C1621	95-1/2 (2426)	57 (1448)	22-1/2 (572)	32 (813)	30-1/2 (775)	46 (1168)	12 (305)
ASME 600	6 (150)	C1641	37 (940)	22 (559)	8-1/2 (216)	14 (356)	14 (356)	22 (559)	5 (127)
	8 (200)	C1641	47 (1194)	27-1/2 (699)	9-1/2 (241)	20 (508)	16-1/2 (419)	26 (660)	7-1/2 (191)
	10 (250)	C1641	64-1/2 (1638)	38 (965)	16-1/2 (419)	20 (508)	20 (508)	31 (787)	11-1/2 (292)
ASME 900	6 (150)	C1651	57-1/2 (1461)	35-1/2 (902)	12 (305)	20 (508)	15 (381)	24 (610)	5 (127)
	8 (200)	C1651	71 (1803)	44-1/2 (1130)	17 (432)	20 (508)	18-1/2 (470)	29 (737)	5 (127)
	10 (250)	C1651	87 (2210)	53-1/2 (1359)	18 (457)	32 (813)	21-1/2 (546)	33 (838)	8 (203)
	14 (350)	C1651	106 (2692)	70 (1778)	20 (508)	32 (8130)	29-1/2 (749)	- -	15 (381)
ASME 1500	3 (80)	CA1661	46 (1168)	33-1/2 (851)	5-1/2 (140)	14 (356)	10-1/2 (2670)	18-1/2 (470)	3-1/2 (89)
	4 (100)	CA1661	57-1/2 (1461)	36 (914)	11-1/2 (292)	20 (508)	12-1/4 (311)	21-1/2 (546)	4-1/2 (114)
	6 (150)	CA1661	56 (1422)	34 (864)	12-1/2 (318)	20 (508)	15-1/2 (394)	27-3/4 (705)	5 (127)

MODEL 1500 FULL BORE PIGGABLE



	Dimensions in. (mm)		Maximum Overall Height	Centerline of Valve to Centerline of Handwheel	Centerline of Valve to Lowest Point	Handwheel Diameter	Flange Diameter	Face-to-Face	Minimum Clearance to Remove Slip from Bottom
Class	Size	Model	A	B	C	D	E	F	G
ASME 150	18 (450)	C1511	95-1/2 (2426)	56 (1422)	23-1/2 (597)	32 (813)	25 (635)	48 (1219)	16-1/2 (419)
	20 (500)	C1511	105 (2667)	65-1/2 (1664)	23-1/2 (597)	32 (813)	27-1/2 (699)	48 (1219)	16 (406)
	24 (600)	C1511	92 (2337)	51-1/2 (1308)	32 (813)	32 (813)	32 (813)	60 (1524)	30 (7620)
ASME 300	6 (150)	C1521	48 (1219)	28 (711)	10 (254)	20 (508)	12-1/2 (318)	15-7/8 (403)	9-1/2 (241)
	10 (250)	C1521	66-1/2 (1689)	44 (1118)	13 (330)	20 (508)	17-1/2 (445)	32-1/2 (826)	10-1/2 (267)
	18 (450)	C1521	106-1/2 (2705)	67 (1702)	23-1/2 (597)	32 (813)	28 (711)	48 (1219)	15-1/2 (394)
	24 (600)	C1521	122-1/2 (3112)	77-1/2 (1969)	29 (737)	32 (813)	36 (914)	60 (1524)	19 (483)
ASME 600	6 (150)	C1541	49-1/2 (1257)	29 (737)	10-1/2 (267)	20 (508)	14 (356)	22 (559)	8 (203)
	8 (200)	C1541	63 (1600)	37 (940)	16 (406)	20 (508)	16-1/2 (419)	26 (660)	10 (254)
	10 (250)	C1541	64-1/2 (1638)	38-1/2 (978)	16 (406)	20 (508)	20 (508)	31 (787)	12 (305)
	12 (300)	C1541	82 (2083)	47 (1194)	19 (483)	32 (813)	22 (559)	33 (838)	14 (356)
	16 (400)	C1541	107 (2718)	66 (1676)	25 (635)	32 (813)	27 (686)	44-1/2 (1130)	15 (381)
ASME 900	6 (150)	C1551	67-1/2 (1715)	42-1/2 (1080)	15 (381)	20 (508)	15 (381)	24 (610)	4 (102)
	8 (200)	C1551	72-1/2 (1842)	45 (1143)	18 (457)	20 (508)	18-1/4 (464)	29 (737)	4-1/2 (114)
	10 (250)	C1551	80 (2032)	46 (1168)	18 (457)	32 (813)	21-1/2 (546)	33 (838)	7 (178)
	12 (300)	C1551	108 (2743)	70 (1778)	22-1/2 (572)	32 (813)	24 (610)	38 (965)	7-1/2 (191)
ASME 1500	6 (150)	C1561	66 (1676)	41 (1041)	15 (381)	20 (508)	15-1/2 (394)	27-3/4 (705)	2-1/2 (64)
	8 (200)	C1561	84-1/2 (2146)	50-1/2 (1283)	18 (457)	32 (813)	19 (483)	32-3/4 (832)	4-1/2 (114)
	10 (250)	C1561	108-1/2 (2756)	71-1/2 (1816)	21-1/2 (546)	32 (813)	23 (584)	39 (991)	5 (127)
	12 (300)	C1561	108-1/2 (2756)	71-1/2 (1816)	22 (559)	32 (813)	26-1/2 (673)	44-1/2 (1130)	6-1/2 (165)

ELECTRIC ACTUATORS

Twin Seal valves accept most commercially available multi-turn electric motor operators.

All automated Twin Seal valves require some form of body pressure relief because of thermal expansion (see pages 15 and 16) (MBV/DTR/ABV/etc.); otherwise, the valve can be difficult to open or may stick in the closed position.

Choice of Motor Size

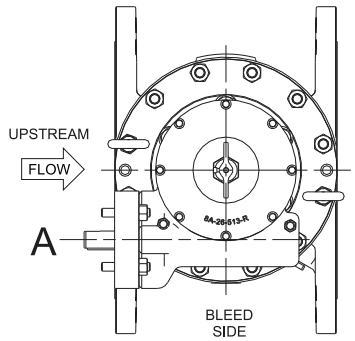
The best selection of valve, gearing, and motor operator will depend on a number of factors, including:

- Pipeline pressure
- Operating speed
- Environmental conditions
- Handwheel accessibility
- Available power

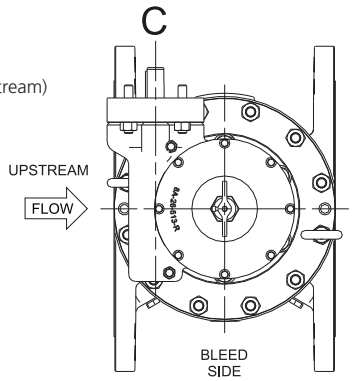
Selecting the correct motor is a specialist's task. Consult Cameron for free technical advice.

Typical Mounting Configurations

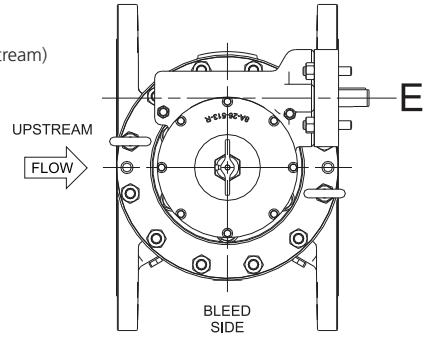
Orientation "A"
(Upstream)
Standard



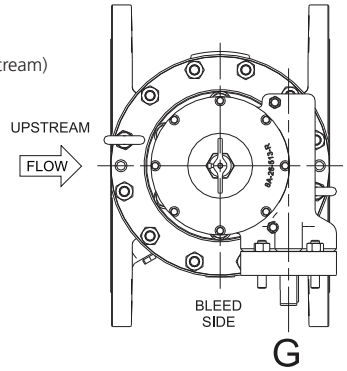
Orientation "C"
(90 Degrees from Upstream)



Orientation "E"
(180 Degrees from Upstream)



Orientation "G"
(270 Degrees from Upstream)



PNEUMATIC ACTUATORS

Cameron builds pneumatic actuators that can be fitted to its valves for reliable, economic power operation. When you specify a complete actuated valve package, the entire system is built, tested, and guaranteed. Only a few of the available power operation choices are shown on this page. For complete information, contact the Cameron office nearest you for alternative packages, or visit www.c-a-m.com/ValveAutomation.

Spring-Close Piston Actuators

- For emergency shutdown (ESD) service
- Air-to-open (spring-to-close)
- Fitted with gas/oil speed control snubber system and two-way manual override handwheel
- Valve can be mechanically locked closed or mechanically locked open
- Limit switches can be fitted for remote indication of the valve position

Double-Acting Diaphragm Actuator with Reservoir Tank

- For continued operation in case of air supply failure
- Piston-type grease snubber for speed control
- Position indicator limit switches for local and remote indication of valve position
- Fitted with a complete instrumentation package for:
  - Fail close
  - Fail in last position

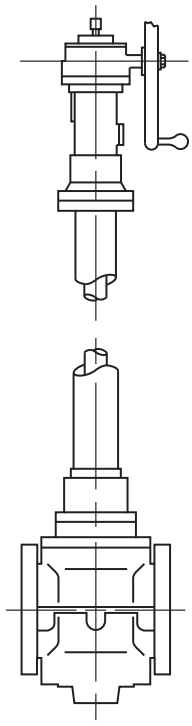
Spring-Close Diaphragm Actuator

- Air-to-open (spring-to-close)
- Fitted with integral gas/oil speed control snubber system
- Position indicator limit switches for local and remote indication of valve position
- Fitted with a complete instrumentation package for:
  - Close on loss of air supply
  - Close on loss of signal
  - Open on command
  - Close on command
- Pressure gauge is included for proof of zero-leakage shutoff

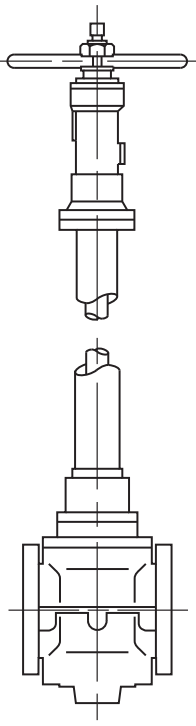
LIMIT SWITCHES

Twin Seal valves can be fitted with switches or sensors to provide open/closed position indication of the valve. The switches or sensors are housed within a proprietary enclosure that meets the latest national and international electrical and explosion-proof standards.

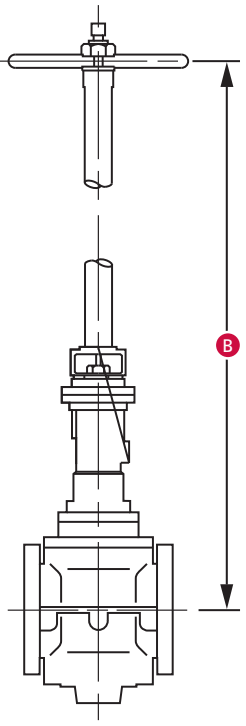
MECHANICAL EXTENSIONS



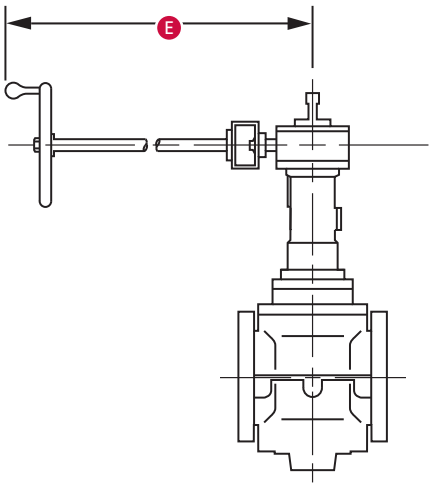
Gear Operator
Extension-Closed Type "A"



Hand Operator
Extension-Closed Type "A"



Hand Operator
Extension-Open
Type "B"



Gear Operator
Extension-lateral
Type "C"

The Twin Seal product line provides both vertical and lateral extensions or combinations of both. When ordering, always specify dimension B or E.

Type A extension is suitable for underground burial. Type C extension should be supported if dimension E is larger than 36" (900 mm).

Twin Seal valves, both hand operated and gear operated, can be supplied with chainwheels to operate elevated valves from below.

The chainwheels have an extra-deep channel in which the chain runs to ensure that the chain will not climb off the track. The chain is supplied fully trimmed to eliminate barbs and is galvanized to withstand corrosive conditions.

When ordering chainwheels, provide the size and series of the valve and the length of chain required.

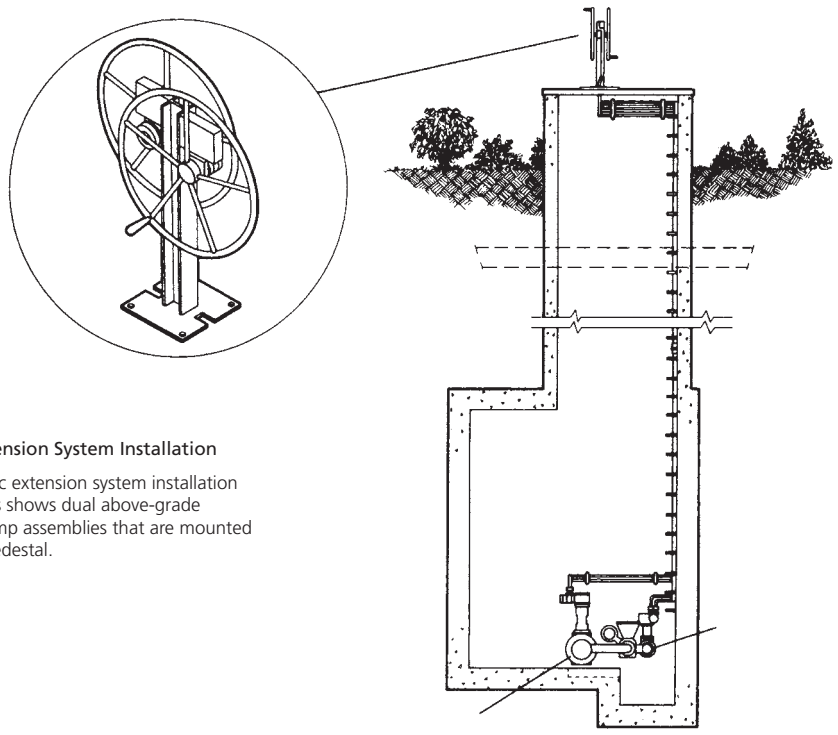
DIRECT BURIAL – UNDERGROUND

Patented Twin Seal extended bonnet valves greatly simplify maintenance in underground applications while providing dependable double block-and-bleed shutoff. Most underground valves are difficult to maintain and service, requiring excavation or a costly access pit. System designers often must compromise valve placement to overcome this maintenance problem. With Twin Seal extended bonnet valves, however, the designer has the freedom to put the valves in their ideal locations. Installation costs are reduced.

Easy, Inexpensive Maintenance

Once extended bonnet valves have been installed, maintenance can be performed from above ground without a pit and without excavating. Unbolting and lifting the bonnet raises the valve plug and slips to ground level. Slip replacement is quick and easy, and downtime is minimal. Once the slips have been replaced, lower the assembly back into position and bolt down the bonnet.

Twin Seal hydraulic extension systems are available for installations where standard Type A, B and C extensions are not practical. Since the self-contained hydraulic extension systems are manually/hydraulically operated, there are virtually no limitations on length and orientation. The hydraulic extension for gear operators essentially is a hydrostatic transmission. The pump is driven by a handwheel, and the pressure created is transmitted to the hydraulic motor mounted on the gear operator. This approach gives the system designer maximum flexibility since the only connections between the handwheel and valve are hydraulic tubes. There is no limitation on the number of corners turned between the valve and handwheel.



Hydraulic Extension System Installation

Typical hydraulic extension system installation with two valves shows dual above-grade handwheel pump assemblies that are mounted on the same pedestal.

PRESSURE-RELIEF SYSTEMS

To satisfy the requirements of API 6D, a pressure-relief device must be provided on all double block-and-bleed valves in liquid service.

When the Twin Seal valve is seated and completely filled with liquid, even a slight increase in temperature due to the sun's rays will result in a significant increase in the body cavity pressure resulting from thermal expansion. Therefore, all Twin Seal valves in liquid service must always be installed with a pressure-relief device.

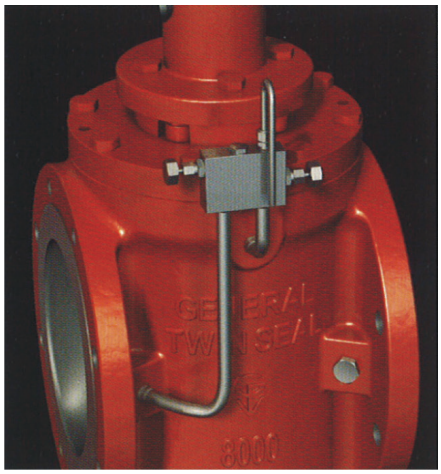
Manual Bleed (MBBV)

A manual body bleed valve is included on this Twin Seal valve. This bleed valve installed in the body cavity is only opened after the Twin Seal valve is closed. Seal effectiveness can be evaluated immediately. This bleed valve must be closed before the Twin Seal valve is reopened.

Safety Bleed/DTR (Standard)

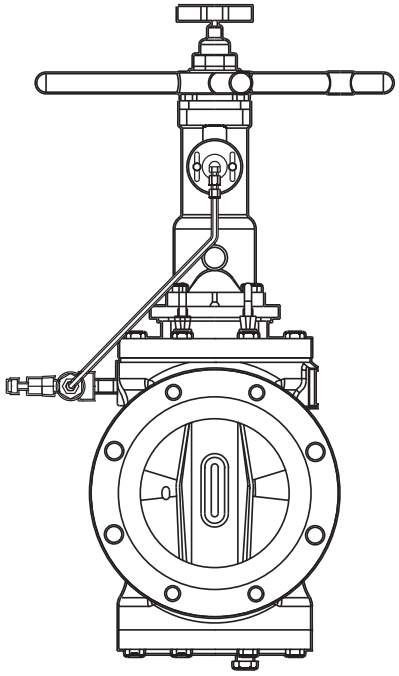
The differential thermal relief system is arranged as shown. The integral relief valve, mounted in the upper relief/vent manifold, routes excess pressure to the upstream throat of the valve. The standard relief valve is set to open at 25 psi above upstream pressure. This system functions only when the valve is closed. A manual body bleed, also integrally mounted in the upper relief/vent manifold, is opened only to vent and to verify seal integrity. An isolation valve installed in the upstream throat tap also is included in this system. It must be left open to permit the relief system to relieve pressure upstream.

Safety Block/DTR



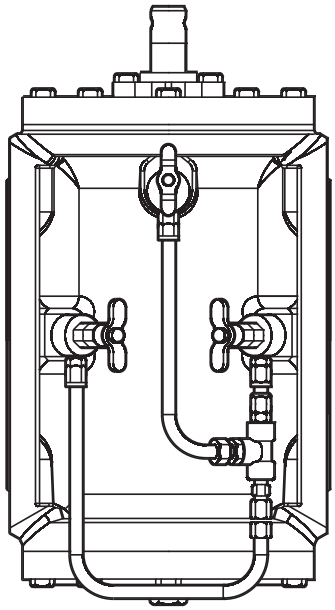
The safety block/DTR functions exactly the same as the basic safety bleed. However, all working components are housed in a virtually indestructible compact carbon steel manifold. The benefits of this incident-control equipment are: fire safety, complete component access for maintenance purposes, all socket-welded joints, heavy wall pipe and incident control.

The automatic body bleed valve (ABBV) provides visual, positive assurance that the Twin Seal valve has sealed completely at each cycling operation and prevents thermal pressure buildups in the body cavity. An automatic bleed valve connected to the body cavity of the main valve is mechanically opened by the valve operator when the Twin Seal valve is seated. Seal integrity is indicated by viewing the discharge of the bleed valve. When the Twin Seal valve is opened, the bleed valve is automatically closed by the combination of line pressure and the spring in the bleed valve.



Line Relieving Safety Bleed/DTR

The line relieving/differential thermal relief (LR/DTR) provides all the same features as a basic DTR, with one additional function: the pressure protects the downstream piping. A relief valve (25 psid standard) is connected to the downstream throat tap via the lower tee. When the Twin Seal valve is seated and the downstream piping is sealed bubble-tight, the piping faces thermal overpressurization. The throat tap accesses this piping and directs any overpressurization upstream. An additional isolation valve is installed downstream for maintenance purposes.



STANDARD MATERIALS OF CONSTRUCTION

Valve Series	200	8800	400/800/900/1500/1600
Body	Cast Carbon Steel ASTM A216 WCC [1]	Cast Carbon Steel ASTM A216 WCC [1]	Cast Carbon Steel ASTM A216 WCB [1]
Bonnet/Lower Plate	Carbon Steel ASTM A216 WCC [2]	Carbon Steel ASTM A36 [2]	Carbon Steel ASTM A36 [2]
Plug	Ductile Iron ASTM A536 Gr. 80-55-06 [3]	Ductile Iron ASTM A395 Gr. 60-40-18 (3) for Valve Sizes 8" to 12" Larger Sizes ASTM A216 WCC [3]	Cast Carbon Steel ASTM A216 WCB [3]
Stem	Ductile Iron ASTM A536 Gr. 80-55-06 [3]	ASTM A564 Type 630 17-4 PH SS for Valve Sizes 8" to 12"	Cast Carbon Steel ASTM A216 WCB [3]
Slips	Manganese Phosphate-Coated Ductile Iron ASTM A536 Gr. 65-45-12	Manganese Phosphate-Coated Ductile Iron ASTM A395 Gr. 60-40-18	Manganese Phosphate-Coated Ductile Iron ASTM A395 Gr. 60-40-18
Gland	ASTM A216 WCC	ASTM A747 17-4 PH SST 6" to 10", 12" to 24" ASTM A36 Plate [2]	ASTM 487
Gland Packing	Graphite	Graphite	Graphite
Body Fire Seals	Graphite	Graphite	Graphite
O-rings and Slip Seals	See Trim Selection	See Trim Selection	See Trim Selection
Fasteners	ASTM A193 Gr. B7/2H	ASTM A193 B7	ASTM A193 Gr. B7/2H

Note: [1] Chrome-Plated Bore [2] Or Industry Equivalent [3] Electroless Nickel-Coated
Materials subject to change without notice.

Proper seal selection includes a number of considerations such as media, pressure class, valve type, differential pressure, low temperature, high temperature, seal type, and more. See below for a selection of slip seal materials and a brief list of considerations.

Fluoro Elastomers Slip Seal Materials			For More Information Ask for GVMPS
V	Viton®	Our Standard Material Since 1958	3037
V9	Viton 90-Durometer	Standard HIDP	3042
VFR	Fiber-Reinforced Viton	Optional HIDP	3033
VGF	Viton GF	Viton with Enhanced Chemical Resistance	3043
VGLT	Viton GFLT	Low-Temp. Viton GF	3044
VGLT9	Viton 90-Durometer GFLT	HIDP Low-Temp. Viton GF	3059
Nitrile Elastomers Slip Seal Materials			
H	Nitrile	Our Original Standard Material	3048
H9	Nitrile 90-Durometer	HIDP Nitrile	3049
LH	Low-Temp. Nitrile	Low-Temp. Nitrile	3050
H5	Modified Nitrile	Reformulate Gasoline Seal Material	3053
Specialty Slip Seal Materials			
C	Epichlorohydrin	Good Low-Temp. Material	3054
E	Ethylenepropylene	Ammonia, but not Hydrocarbon	3057
UHS	Fluorosilicone	Good High and Low Temp.	3032
RZL	Rezilon	HIDP RFG	3034
AFL	AFLAS	Amines, Exp. Decomp., Steam, 450° F (232 °C)	3045
GVX	VTR 6279	Ultra Chemical Resistant	3047
T	Teflon®	Good for Just About Anything	3041

All specifications and materials are subject to change without notice.

HOW TO ORDER

x x	–	x x x x	–	x x x	–	x x x
Valve Bore Size		Model		Operation Type Hand or Gear		Specify Other Options and Trim
in.		200		H – Hand		Locking Devices
mm		8800		G – Gear		Switches – Limit/Indicator
		800		MO – Motor Operated (Specify)		Special Bleed Systems
		900		MA – Motor Adapted (Specify)		Special Trims
		400		HGO – Hydraulic Gear Operator		Special Seal Material
		1600				Stem/Handwheel Extensions
		1500				

Services for Valves and Actuation

WE BUILD IT. WE BACK IT.

Global Network and Local Support

Cameron is well-positioned to deliver total aftermarket support, quickly and efficiently, with unmatched OEM expertise. Our highly skilled engineers and technicians are available around the clock, seven days a week, to respond to customer queries, troubleshoot problems and offer reliable solutions.

Easily Accessible Parts and Spare Valves

- OEM spare valves, actuators and parts (including non-Cameron brands)
- Handling, storage, packaging and delivery
- Dedicated stocking program

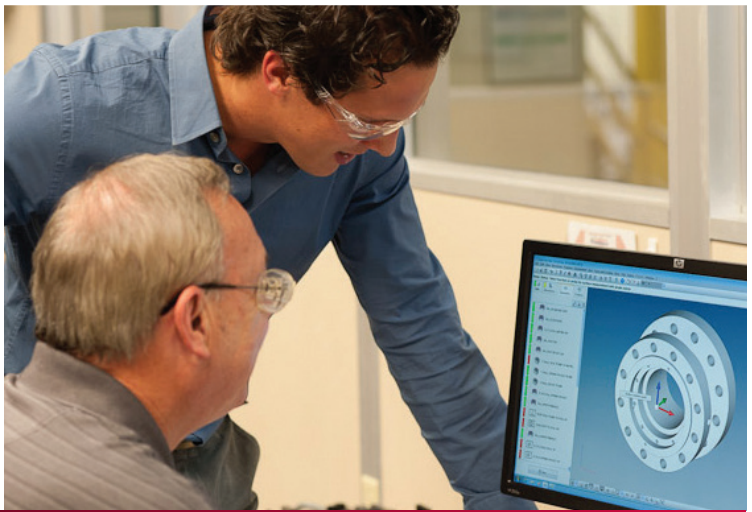
Comprehensive Services Portfolio

- Parts and spare valves
- Repair
- Field services
- Preventative maintenance
- Equipment testing and diagnostics
- Remanufacturing
- Asset preservation
- Customer property management
- Training and recertification services
- Warranty

Customized Total Valve Care℠ (TVC) Programs

Customized asset management plans that optimize uptime, availability and dedicated services.

- Engineering consultancy
- Site management
- Flange management
- Startup and commissioning
- Spare parts and asset management
- Operational support



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Hydrin	Zeon Chemicals USA, Inc.
Hypalon	E.I. DuPont De Nemours & Company
Inconel	INCO Nickel Sales, Inc.
Monel	INCO Alloys International, Inc.
Nordel	E.I. DuPont De Nemours & Company
Stellite	Stoody Deloro Stellite, Inc.
Teflon	E.I. DuPont De Nemours & Company
Viton	E.I. DuPont De Nemours & Company

CAMERON

3250 Briarpark Drive, Suite 300
Houston, TX 77042
USA
Tel 1 281 499 8511

For more information on GENERAL VALVE Twin Seal valves:
www.c-a-m.com/GENERALVALVE
GENERALVALVE@c-a-m.com

HSE Policy Statement
At Cameron, we are committed ethically, financially and personally to a working environment where no one gets hurt and nothing gets harmed.