FLOWSERVE

TECHNICAL BULLETIN

Durco® G4 Sleeveline® Valves for HF Alkylation Service

Models G4BZ-HF Marathon™,
FRG4BCZ-HF and others

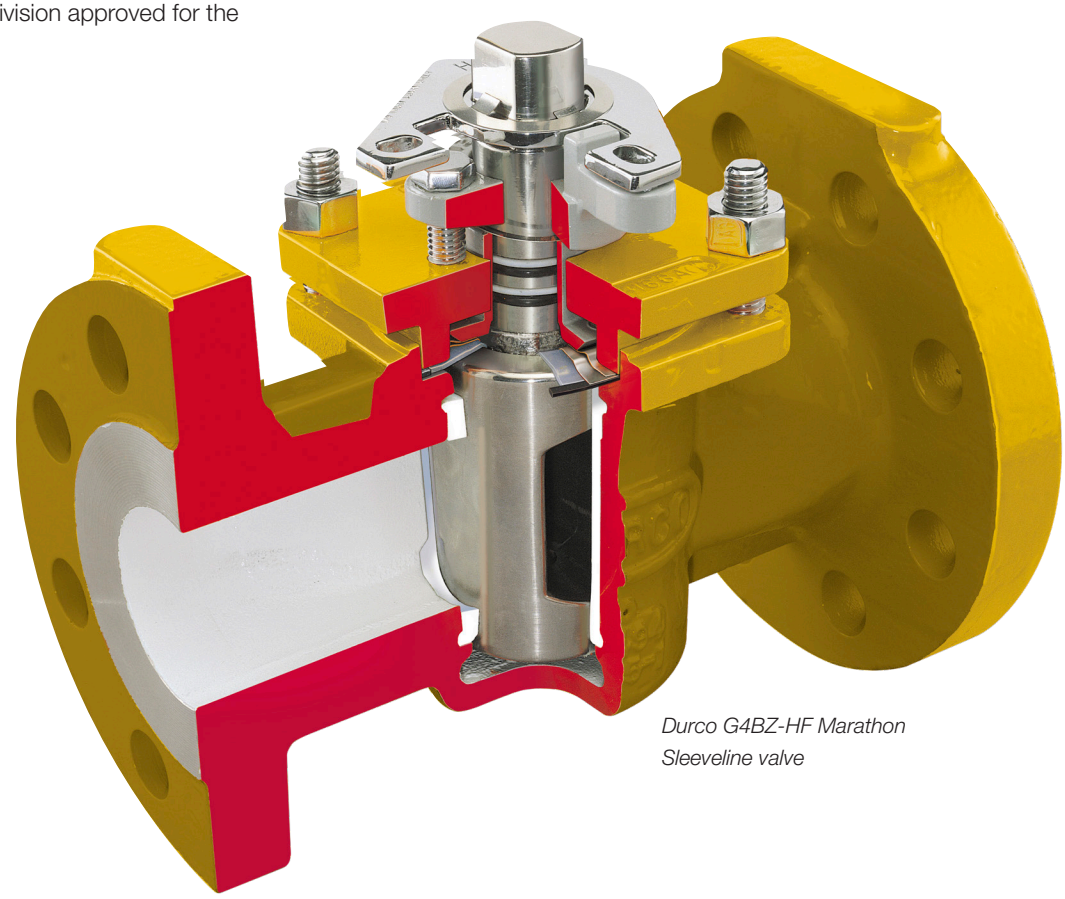
Experience In Motion

Durco G4BZ-HF Marathon valve— proven drop-tight shutoff

Flowserve has supplied thousands of Durco G4BZ-HF Marathon Sleeveline HF alkylation valves to refineries throughout the world. Engineered for high-cycle, low-emissions service, this non-lubricated plug valve offers an extra measure of positive stem sealing reliability. It can be used with confidence in applications where tight shutoff and emissions containment are unconditional requirements to ensure safety.

Durco G4BZ-HF Marathon valves are Phillips Licensing listed and UOP Process Division approved for the following applications:

- Isomerization
- Blending
- Light ends
- Gas plants
- Sulfur plants
- Crude desalting



Durco G4BZ-HF Marathon Sleeveline valve

Cost-effective, quarter-turn operation

Full open to full close in 90° turn, unlike multi-turn rising stem valves. May be cost-effectively operated with rotary actuators.

Non-lubricated design

No grease is required for valve operation or sealing. This eliminates the possibility of fouling flow meters and other instrumentation with lubricant.

Positive shutoff

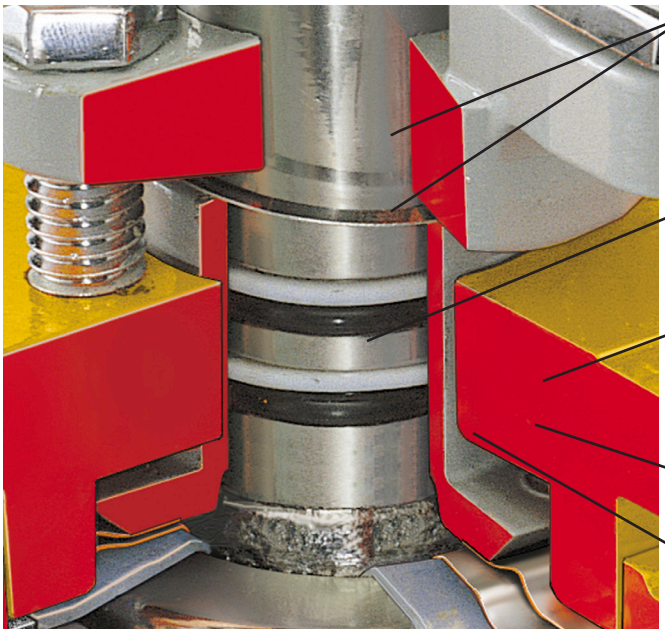
PTFE sleeve (seats/seals) has a large sealing area for positive shutoff — 360° sealing at the top and bottom of the plug and around both ports. Grooves and ribs in the body prevent the sleeve from pistoning or rotating.

In-line adjustment

Rocker arm adjuster enables in-line adjustment of plug sleeve. No need for seat relapping.

High-cycle positive stem sealing — *guaranteed*

The unique full-pressure stem sealing design of the Durco G4BZ-HF Marathon valve provides fugitive emissions containment that is often equal to more expensive severe or toxic services valves. In fact, it's guaranteed: if the G4BZ-HF Marathon stem seal fails within five years after installation, it will be repaired or replaced free of charge.(1)



Viton® O-rings and PTFE backup rings prevent stem leakage while containing full line pressure. They also protect the thrust collar from atmospheric corrosion. Backup rings help prevent extrusion of O-rings under pressure. (Other elastomers are available.)

Grafoil® packing and gasket reduce atmospheric leakage to a negligible amount should fire destroy the PTFE sleeve and PFA diaphragm.

Dynamic integral thrust collar assembly is self-sealing and moves with the plug during adjustment to eliminate potential leak paths. Made from a Hastelloy® C-276 diaphragm welded to a CD4MCuN thrust collar.

Monel® secondary diaphragm keeps the Grafoil packing in place if the top seal is destroyed.

PFA diaphragm serves as a secondary external seal if any media passes beyond the plug and sleeve.

Long-lasting Monel construction

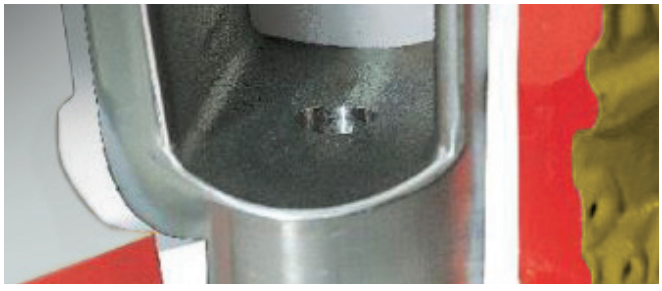
Solid M35-1 grade Monel body and plug ensure long valve life and unit operation. Plugs are highly polished to minimize wear and enhance seal integrity.

North American-sourced valve bodies with lifetime warranty

All valve bodies are sourced in North America and radiographed to ensure casting quality. U.S.-sourced valve bodies are available upon request. Body castings carry a lifetime replacement warranty in the event of a casting defect that results in through wall leakage when used within defined operating parameters.

Vented plug for safety

A vented plug reduces the possibility of pressure build-up under the plug caused by heating and expansion.



(1) Performance warranty applies, provided the valve is used in accordance with approved process information provided at time of order. Flowserve standard warranty terms and conditions apply. Failure to provide process conditions at time of order voids this performance warranty. Leakage rates below 100 ppm shall not be considered a failure or defect under this warranty.

Related configurations

Durco EG4Z-HF V-port control valves

Durco G4BZ-HF Marathon alkylation valves may be fitted with V-port plugs for precise modulating control services. They are available in a variety of trim configurations to satisfy your exact flow control needs.

- Specially trimmed EG4Z-HF V-port SoundTrim™ control valves reduce noise, cavitation and flashing while improving flow and pressure performance.
- Unique self-cleaning design prevents particulate build-up and clogging.

EG4Z-HF V-port Cv values

Size (in.)	1	1	1	1	1.5	2	3	4	6
Cv	3.0	4.0	8.0	30	31	54	121	190	400

Durco FRG4BCZ-HF full round port valve

The full-port design of the Durco FRG4BCZ-HF valve makes it ideal for safety relief or pump isolation as well as RATS/RADS systems.

The FRG4BCZ-HF valve incorporates many proven features of the Durco G4BZ-HF valve, including the O-ring stem seal design, to ensure emissions protection. A new vertically loaded, radial fire-safe seal provides predictable compression and API 607-qualified performance for external leakage.

Available in sizes 25 to 200 mm (1 to 12 in.).

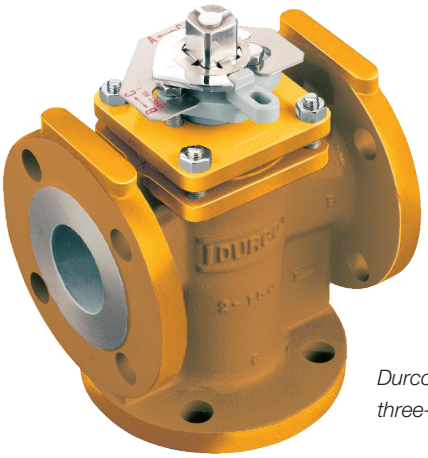
Durco G4BZ-HFT Try-Cock valve[2]

This sampling valve consists of a 20 mm (¾ in.) valve with screwed end connections. The plug utilizes a characterized or V-port with a Cv of 3.8. The valve is built and tested in accordance with the same specifications and procedures as our standard Durco G4BZ-HF Marathon Sleeveline alkylation valves.

Durco G4BZ-HFT Try-Cock valve

End connections

In addition to ASME and DIN flanged designs, G4BZ-HF Sleeveline valves are available with screwed, screwed/socket and buttweld end connections.



Durco MG4BZ-HF three-way valve

Special HF alkylation valves[2]

Upon request, Flowserve can provide special valves, such as three-way (transflow) mixing valves, relief valve isolation valves, and either fire-sealed BX 2001 high-performance or metal/graphite seated, fire-safe Durco TX3 triple-offset butterfly valves.

Actuation[2]

Flowserve engineers can help select and size an automation system — including actuators, positioners, limit switches, engineered special control circuits and related accessories — to meet your specific application requirements

(2) Not listed by Phillips or UOP

Technical data

Durco G4BZ-HF dimensions and flow rates[3]

Valve No.	End Connection	Size		Face-to-Face		Weight		Cv
		mm	in.	mm	in.	kg	lb	
G4BZ32	300 lb screwed end	15	½	89	3½	1.7	3¾	7.4
G4BZ32		20	¾	89	3½	1.6	3½	19.6
G4BZ32		25	1	117	4⅝	3.2	7	48.8
G4BZ32		50	2	152	6	7.1	15¾	153
G4BZ31	300 lb flanged end	15	½	140	5½	3.5	7¾	7.4
G4BZ31		20	¾	152	6	4.5	10	19.6
G4BZ31		25	1	165	6½	7.8	17¾	48.8
G4BZ31		50	2	216	8½	13	29½	153
G4BZ31		80	3	283	11⅛	31	69	322
G4BZ31		100	4	305	12	74	164½	555
G4BZ31		150	6	403	15⅞	104	231½	955
G4BZ31		200	8	419	16½	148	328	1,859
G4BZ31		250	10	457	18	205	455	2,361
G4BZ31		300	12	502	19¾	331	736	3,400[4]
G4BZ31		350	14	762	30	412	916	3,430[4]
G4BZ31		400	16	838	33	951	2,097	7,000[4]
G4BZ31		450	18	914	36	990	2,183	7,000[4]
G4BZ31		500	20	990	39	1,180	2,602	7,000[4]
G4BZ31		600	24	1,143	45	1,233	2,718	7,000[4]
G4BZ35	300 lb screwed/ socket end	15	½	89	3½	1.7	3¾	7.4
G4BZ35		20	¾	89	3½	1.6	3½	19.6
G4BZ35		25	1	117	4⅝	3.2	7	48.8
G4BZ35		50	2	152	6	7.1	15¾	153
G4BZ61	300 lb (600 lb flanges and face-to-face)	50	2	292	11½	18	39	153

(3) For complete dimension information, refer to Durco bulletin DVENBR0024. (4) Calculated value

Durco FRG4BCZ-HF dimensions and flow rates

Valve No.	End Connection	Size		Face-to-Face		Weight [5]		Port Area		Cv[6]
		mm	in.	mm	in.	kg	lb	sq cm	sq in.	
FRG4BCZ31	300 lb flanged end	25	1	165	6.5	10	22	5.1	0.8	76
FRG4BCZ31		40	1.5	191	7.5	19	41	11.4	1.8	202
FRG4BCZ31		50	2	216	8.5	30	67	20.3	3.1	392
FRG4BCZ31		80	3	283	11.13	71	157	45.6	7.1	986
FRG4BCZ31		100	4	305	12	105	231	81.1	12.6	2,018
FRG4BCZ31		150	6	403	15.88	186	409	182.4	28.3	4,750
FRG4BCZ31		200	8	502	19.75	430	947	324.3	50.3	9,028
FRG4BCZ31		250	10	568.5	22 ⅜	587	1293	506.5	78.5	15,000
FRG4BCZ31		300	12	711.2	28	905	1995	729.7	113.1	23,000

(5) Weights are bare stem valve.

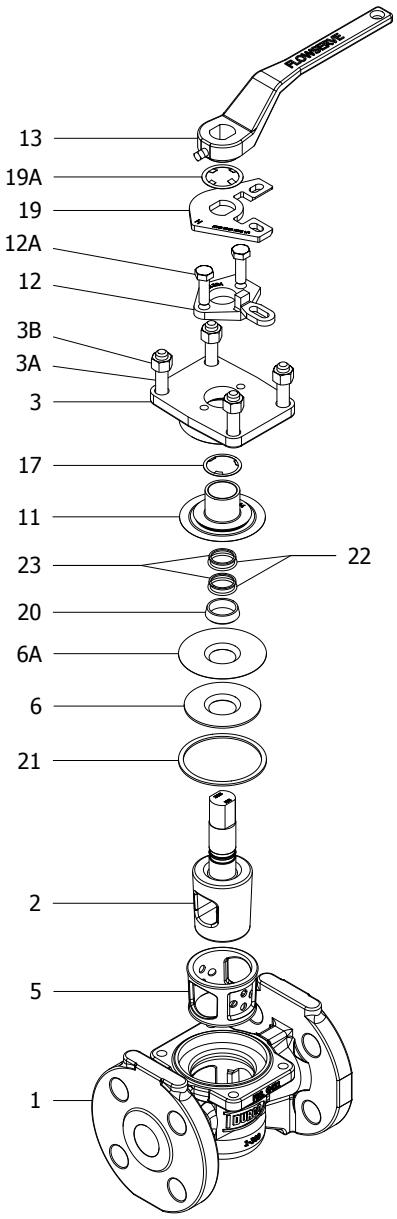
(6) Cv are calculated based on CFD analysis.

Applicable standards

- ASME B16.10 — Face-to-face dimension
- ASME B16.34 — Steel valves, flanged and buttweld
- ASME B16.5 — Flange and flange fitting
- ASME B1.20.1 — Screwed ends
- API 607 Edition 8 — Fire-safe valve testing
- API 598 — Valve inspection and testing
- MSS SP-54 — Radiography
- MSS SP-55 — Visual quality
- MSS SP-61 — Hydrostatic testing
- MSS SP-160 – HF alkylation service

Durco G4BZ-HF materials of construction

No.	Component	Material
1	Body	A494 M35-1 Monel
2	Plug	A494 M35-1 Monel
3	Top cap	A995 CD4MCuN
3A	Top cap studs	A193 B7M
3B	Top cap nuts	A194 7M
5	Sleeve	TFE (TM or TMHT optional)
6	Diaphragm	PFA
6A	Diaphragm	B127 Monel 400
11	Thrust collar assembly	A995 CD4MCuN/Hastelloy C-276
12	Adjuster	A995 CD4MCuN
12a	Adjuster bolts	A193 B7M
13	Wrench	Ductile iron
17	Grounding spring	302 stainless steel
19	Stop collar	Zinc plated 1018 carbon steel
19a	Stop collar retainer	302 stainless steel
20	Packing	Grafoil
21	Gasket	Grafoil reinforced with Monel wire cloth
22	O-ring	Viton (Kalrez® optional)
23	Backup ring	PTFE



Order drawing numbers — Phillips listed

Valve No.	Size		Drawing No.(7)
	mm	in.	
G4BZ32-HF-.50	15	½	CY77644A
G4BZ32-HF-.75	20	¾	CY77643A
G4BZ32-HF-1	25	1	CY77646A
G4BZ32-HF-2	50	2	(8)
G4BZ31-HFB-2	50	2	DY77648A
G4BZ31-HFB-3	80	3	DY78272A
G4BZ31-HFA-4	100	4	DY78273A
G4BZ31-HFA-6	150	6	DY78274A
G4BZ31-HFA-8	200	8	DY78275A
G4BZ31-HFA-10	250	10	DY78276A
G4BZ31-HF-12	300	12	DY78277A
G4BZ31-HF-14	350	14	DY79037A
G4BZ31-HF-16	400	16	DY82071A
G4BZ31-HF-18	450	18	DY82072A
G4BZ31-HF-20	500	20	(8)
G4BZ31-HF-24	600	24	(8)
G4BZ35-HF-.50	15	½	(8)
G4BZ35-HF-.75	20	¾	(8)
G4BZ35-HF-1	25	1	(8)
G4BZ35-HF-2	50	2	(8)
G4BZ61-HF (Class 600# flanges and face-to face)	50	2	DY81807A

(7) Refer to Phillips licensing for current revision number.

(8) No Phillips drawing number

Order drawing numbers — UOP listed

Valve No.	Size		Drawing No.(9)
	mm	in.	
G4BZ31-HF	15 to 600	½ to 24	BY82500A
G4BZ32-HF	15 to 50	½ to 2	(10)
G4BZ35-HF	15 to 50	½ to 2	(10)
G4BZ61-HF	50	2	(10)

(9) Refer to UOP licensing for current revision number.

(10) No UOP drawing number

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