ACRIS
ISORIA
MAMMOUTH

Butterfly Valves for High Corrosion, Ultra High Purity and General Industrial Applications.

amri

KSB

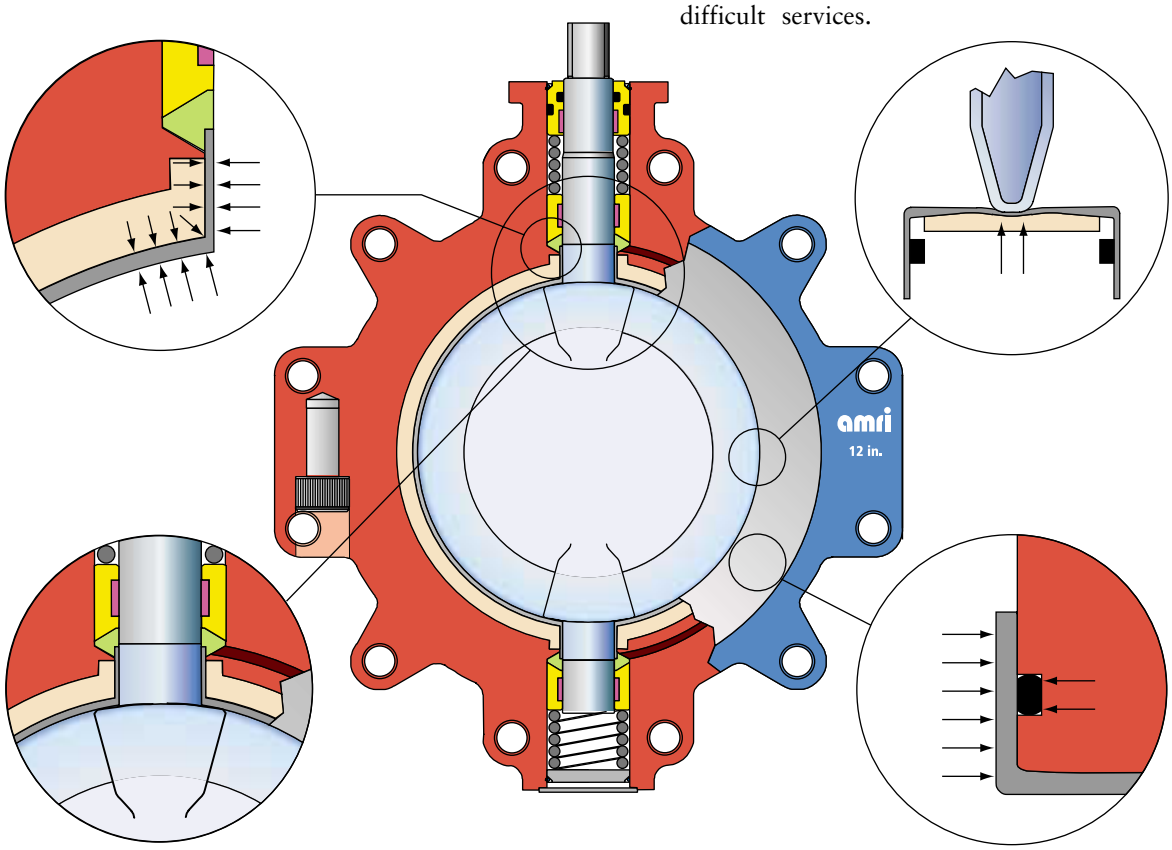
SEALING PRINCIPLES

- **Primary and Secondary Shaft Sealing.**

The primary seal is formed by the flexible, spherically molded liner, sealing against the matching spherically machined disc hub when compressed by the resilient elastomer backup liner. The PFA-Teflon® liner as well as the PFA-Teflon® shaft over-molding extends into the valve body itself. Tight compression is maintained at the hub area and around the shaft by the resilient back-up liner combined with the flexible PFA-Teflon® liner, forming an independent secondary seal.

- **Upstream/Downstream Sealing.**

The dense PFA-Teflon® body liner is flexible, and allows the resilient elastomer back-up liner to compress the spherically molded PFA-Teflon® liner into the spherically machined shaft-disc with enough force to create a tight seal. This is in contrast to PTFE liners which are usually thick sinterings resulting in a stiff liner unable to give tight shut-off over a long period of time. The wide elastomer backup liner in the ACRIS rests in a machined body groove which is essential in providing tight shut-off for end of line service at full pressure. This has enabled the ACRIS to be used for pump and vessel isolation as well as other difficult services.



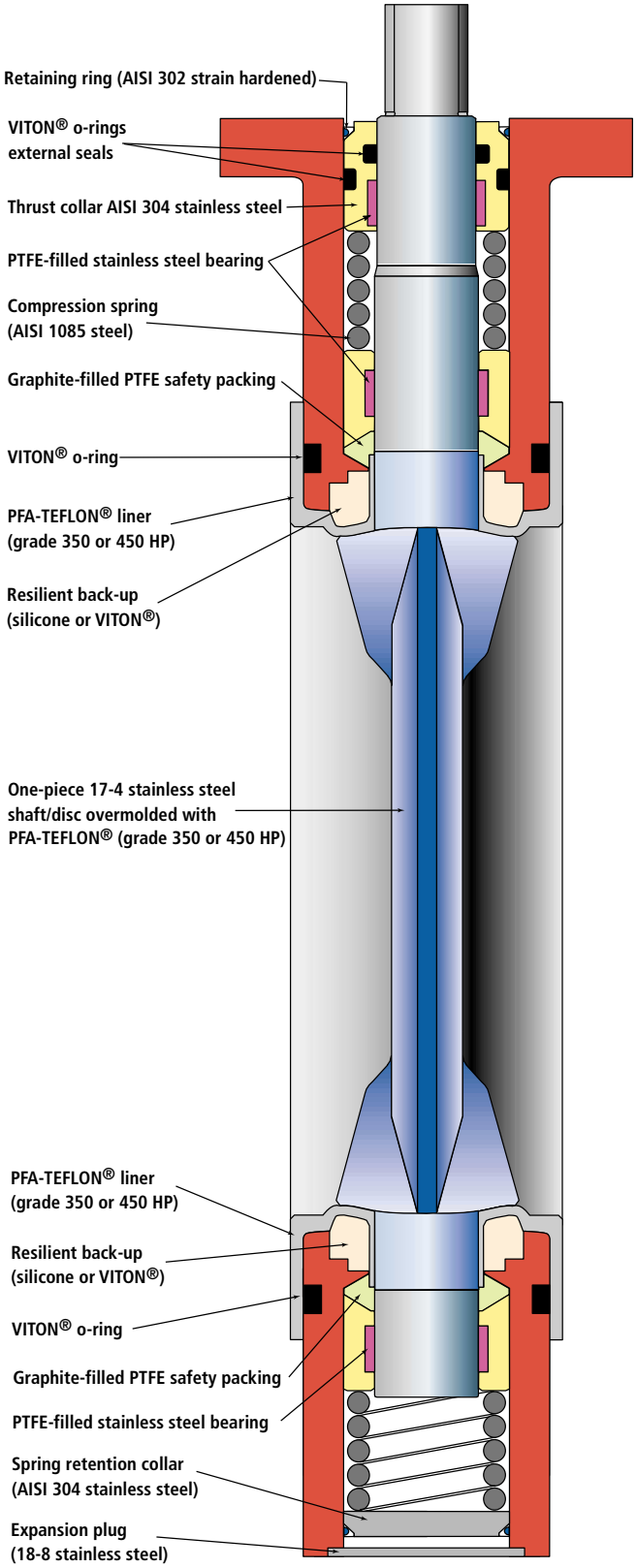
- **Safety Sealing.**

A third seal is provided by a graphite-filled PTFE safety seal, which provides force against the junction of the PFA-Teflon® liner and PFA-Teflon® over-molded shaft. This seal is constantly energized by a coil spring, and self compensates for temperature changes and wear.

- **Flange Sealing.**

Provided by compression of the liner between the valve body and the flanges. An elastomer o-ring, fitted underneath the PFA-Teflon® liner, allows proper flange sealing with warped flange faces or in vacuum applications.

® Teflon and Viton are registered trademarks of E.I.DuPont Company.



APPLICATIONS

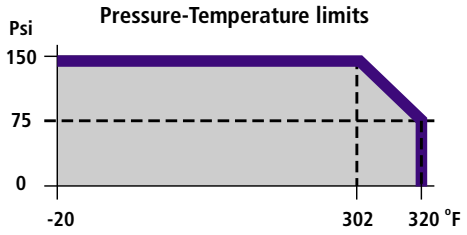
ACRIS butterfly valves often replace other types of valves such as plug, ball and knife gates in non-traditional butterfly valve applications. The ACRIS can be used for end of line service and provide tight shut-off at the full rated pressure of the valve.

ACRIS valves withstand the effects of all known corrosive fluids, and offer the purity required for ultra high purity applications. The superior pressure/temperature operating parameters are conservatively stated for reliable, full-term operation of the valve. Operated within these parameters, the ACRIS has a long, indefinite life in most applications.

ACRIS PFA-Teflon® lined butterfly valves can be used for pressures up to 150 psi and for industrial vacuum to (0.0002 PSIA). The ACRIS is also suitable on steam service (up to 280°F) alternating with the flowing media.

ACRIS PERFORMANCE CHARACTERISTICS

Sizes: 1" to 24" Wafer body
1" to 24" Lug body
Pressure: Full industrial vacuum (.0002 psia) to 150 psi
Temperature: – 20°F to 320°F
Downstream Dismantling:
All Lug body valves are rated for full working pressure, with the downstream piping removed.
Flange Adaptability: ASME B16.5 Class 150, ASME B16.1 Class 125. Other flange drillings are available on request.



CONSTRUCTION FEATURES

The ISORIA elastomer-lined butterfly valve is part of a series of valves designed for the multitude of moderately corrosive applications throughout industry. Included in this series is the MAMMOUTH for large diameter (up to 120") and high pressure (up to 375 psi) applications.

The ISORIA valve uses a spherically machined disc and a one-piece body that is totally isolated from the flowing media by means of the inner lining. A strong shaft-disc connection is provided by an exclusive splined shaft/parallel key arrangement for precise positioning and reliable operation. This connection method also allows for easy disassembly of the valve.

Many years of superior service have proven the advantages of the ISORIA butterfly valve:

- Reliable, absolute tight sealing at all critical points (upstream/downstream, shaft and flanges).
- "Locked-In" liner design provides for tight shut-off at full differential pressure with the downstream flange removed.
- No required maintenance (no adjustable packing gland, permanently lubricated).
- Low pressure drop (smooth profile liner and disc).
- Minimal required torque (PTFE-filled stainless steel shaft bearings).
- Strong internal shaft-disc connection (splined shafts 24in., parallel keys>24in.).
- Blowout proof shafts.
- Economical use of body materials (valve body is totally encapsulated by the inner lining).
- Minimal overall dimensions and weight.
- Bi-directional flow and tight shut-off characteristics.
- Sanitary construction (no fluid or particulate material traps).
- Complete compatibility with a wide range of AMRI manual, pneumatic, hydraulic and electric actuators.

PERFORMANCE CHARACTERISTICS

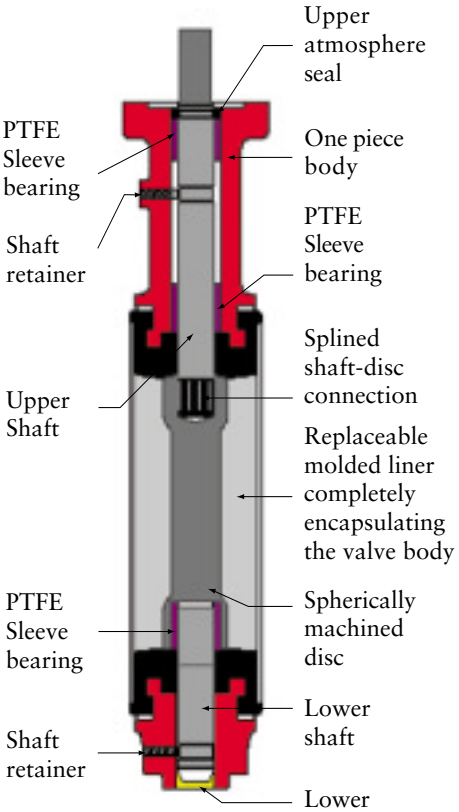
	ISORIA	MAMMOUTH
Sizes:	1½" to 24" Wafer 26" to 60" Wafer and flanged 1½" to 24" Lug body 14" to 24" Semi-lug body	44" to 120" Flanged
Pressure:	ISORIA - Industrial vacuum (.01 PSIA) to 375 psi* MAMMOUTH - Industrial vacuum (.01 PSIA) to 375 psi*	
Temperature:	-40°F to 392°F (Depending on materials used)	
Flange Adaptability:	ASME B16.5 Class 150 ASME B16.1 Class 125 ASME B16.47 Class 150 series A PN 10, 16, 20, 25 AWWA C207 Class B, D & E	

* Upper pressure limit varies on different models.

TYPICAL APPLICATIONS

The ISORIA butterfly valve is suitable for a great variety of applications, depending on the selection of materials:

- **Water:**
  Lining - EPDM or Nitrile
  Disc - Ductile iron, 316 Stainless or Aluminum bronze
- **Brine**
  Lining - EPDM or Hypalon
  Disc - 316 Stainless or Alloy 20
- **Pulp Stock**
  Lining - EPDM or Hypalon
  Disc - 316 Stainless
- **Weak Acids**
  Lining - EPDM or Hypalon
  Disc - 316 Stainless or Alloy 20



8" valve shown

HOW TO ORDER VALVES

SIZE	TYPE VALVE	BODY STYLE	BODY MATERIAL	SHAFT	DISC	LINER	OPTIONS	CODE
1½" to 60"	ISORIA 10 (150 psig)	T1 – Wafer (1½"- 24") T4 - Lug (1½" - 24") T2 – Semi-lug (14" - 24") T5 - Flat face flanged (6" - 60") T6 - Raised face flanged (26" - 60")	3t = Cast iron (T1 & T6) 3g = Ductile iron (T2, T4, T5 & T6)	6k = 420 Stainless (Standard for 1½" - 44"& 60") 6e = 17-4 Stainless (Standard for 48" to 56")	2 = Aluminum bronze 3a = Halar ECTFE coated ductile iron 3g = Ductile iron 3p = Hard rubber coated ductile iron 5c = Norichlor 5d= Noridur 6 = 316 Stainless 6i = Polished 316 stainless 6u = Alloy 20	XA = EPDM XV = High temperature EPDM K=Nitrile CB = Carboxylated nitrile CC = White carboxylated nitrile Y = Hypalon® VA = Acid Viton® VC = High temperature Viton®		
1½" to 40"	ISORIA 16 (240 psig)	T1 – Wafer (1½"- 24)" T4 - Lug (1½" - 24") T2 - Semi-lug (14" - 24") T5 - Flat face flanged (6" - 40") T6 - Raised face flanged (26" - 40")	3t = Cast iron (T1 & T6) 3g = Ductile iron (T2, T4, T5 & T6)	6k = 420 Stainless (Standard for 1½" - 24") 6e = 17-4 Stainless (Standard for 26" to 40")	2 = Aluminum bronze 3g = Ductile iron 6 = 316 Stainless 6i = Polished 316 stainless	XA = EPDM XV = High temperature EPDM K = Nitrile		
	ISORIA 20 (300 psig) ISORIA 25 (375 psig)	Please consult AMRI						
66" to 120" 66" to 120" 44" to 84" 44" to 78" 44" to 72"	MAMMOUTH 6 (90 psig) MAMMOUTH 10 (150 psig) MAMMOUTH 16 (240 psig) MAMMOUTH 20 (300 psig) MAMMOUTH 25 (375 psig)	T5 - Flat faced flanged (44" - 120")	3g = Ductile iron	6k = 420 Stainless	2 = Aluminum bronze 3g = Ductile iron 3p = Hard rubber coated ductile iron 6 = 316 Stainless	XC = EPDM K = Nitrile		
1" to 24"	ACRIS	IW–ISO Wafer (1" to 24") IL–ISO Lug (1" to 24")	3 = Ductile iron wafer 3 = Ductile iron lug	(One-piece shaft/disc) 1k = 17-4 Stainless over molded with PFA Grade 350 Teflon® 1h = 17-4 Stainless over molded with PFA Grade 450 Teflon® (1" to 14") 1s = Carbon steel over molded with PFA Grade 350 Teflon® (2" to 12")		F = PFA Grade 350 Teflon® H = PFA Grade 450 Teflon®	Silicone back-up liner Viton® back-up liner Viton® back-up liner; ASTM A193 Grade B7 bolts, cleaned, tested & packaged for chlorine gas service Silicone back-up liner; assembled, cleaned, tested & packaged for ULTRA PURE service ASTM A193 Grade B7 body bolts (in lieu of standard A193 Grade B8)	Standard- No extra code S9 S9C SC1 SB7

*NOTE: Valve face-to-face is per ISO 5752 and API-609 dimensions except for 14" and 18" ACRIS.

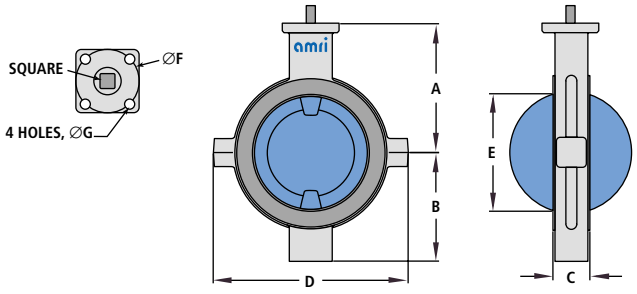
For Example:

6" ACRIS IL-31KF/S9 =

IL	ISO Lug
3	Ductile iron body
1k	17-4 Stainless shaft disc over molded with PFA Grade 350 Teflon®
F	PFA Grade 350 Teflon® liner
/S9	Viton® back-up liner

ISORIA 16 T1-3t6k6XA =

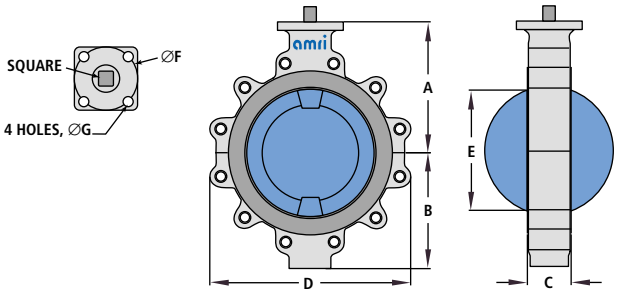
16	16 bar (240 psig)
T1	Wafer
3t	Cast iron body
6k	420 Stainless shaft
6	316 Stainless disc
XA	EPDM liner



ACRIS (I SERIES) 1" TO 24" Wafer Body

SIZE		A	B	C	D	E	SHAFT		ISO TOP FLANGE MOUNTING			WEIGHT
IN	MM	IN	IN	IN	IN	Disc Chord Length	Square	Height	ØF (Bolt Circle)	ØG (Hole Size)	ISO Pattern	LBS.
1	25	3.74	1.69	1.29	3.38	0.000	.630	1.02	1.969	0.312	F05	4.4
1¼	30	3.74	1.69	1.29	3.38	0.000	.630	1.02	1.969	0.312	F05	4.4
1½	40	3.93	1.88	1.29	3.74	0.835	.630	1.02	1.969	0.312	F05	5.6
2	50	4.25	2.24	1.69	3.97	1.207	.630	1.02	1.969	0.312	F05	5.1
3	80	4.88	4.05	1.81	5.23	2.286	.630	1.02	2.756	0.375	F07	9.2
4	100	5.62	4.80	2.06	6.73	3.271	.630	1.02	2.756	0.375	F07	12.3
6	150	6.88	6.25	2.19	8.62	5.439	.630	1.02	2.756	0.375	F07	22.7
8	200	8.85	7.75	2.38	10.86	7.382	.748	1.22	4.016	0.437	F10	63.8
10	250	10.03	8.93	2.69	13.22	9.432	.984	1.22	4.921	0.562	F12	88
12	300	11.41	10.43	3.06	15.98	11.252	1.181	1.61	4.921	0.562	F12	117
*14	350	13.54	13.11	4.00	20.98	13.148	1.181	1.61	5.511	0.708	F14	172
16	400	14.48	14.13	4.00	23.50	15.1991	1.417	1.45	5.511	0.708	F14	231
*18	450	16.49	16.81	5.00	25.00	16.972	1.417	1.85	5.511	0.708	F14	336
20	500	17.48	17.12	5.00	27.48	19.011	1.575	1.85	6.496	0.866	F16	440
24	600	19.68	19.92	6.00	32.67	22.094	1.968	2.20	6.496	0.866	F16	565

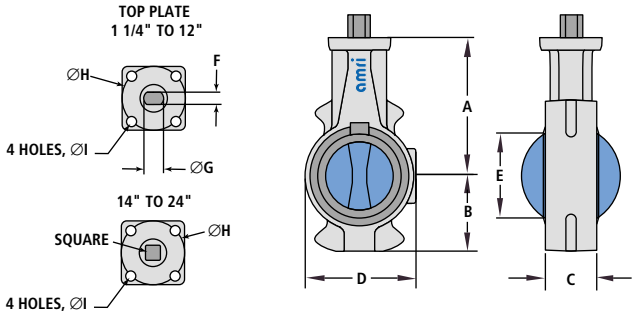
* 1 to 1½ inch valves are wafer with alignment holes.



ACRIS (I SERIES) 1" TO 24" Lug Body

SIZE		A	B	C	D	E	SHAFT		ISO TOP FLANGE MOUNTING			WEIGHT
IN	MM	IN	IN	IN	IN	Disc Chord Length	Square	Height	ØF (Bolt Circle)	ØG (Hole Size)	ISO Pattern	LBS.
1	25	3.74	1.69	1.29	3.38	0.000`	.630	1.02	1.969	0.312	F05	4.4
1¼	30	3.74	1.69	1.29	3.38	0.000	.630	1.02	1.969	0.312	F05	4.4
1½	40	3.93	1.88	1.29	3.74	0.835	.630	1.02	1.969	0.312	F05	5.6
2	50	4.25	2.24	1.69	4.56	1.207	.630	1.02	1.969	0.312	F05	7.6
3	80	4.88	4.05	1.81	5.55	2.286	.630	1.02	2.756	0.375	F07	12.6
4	100	5.62	4.80	2.06	7.99	3.271	.630	1.02	2.756	0.375	F07	19.2
6	150	6.88	6.25	2.19	10.11	5.439	.630	1.02	2.756	0.375	F07	33.0
8	200	8.85	7.75	2.38	12.24	7.382	.748	1.22	4.016	0.437	F10	55
10	250	10.03	8.93	2.69	15.431	9.432	.984	1.22	4.921	0.562	F12	93
12	300	11.41	10.43	3.06	18.03	11.252	1.181	1.61	4.921	0.562	F12	130
*14	350	13.54	13.11	4.00	20.35	13.148	1.181	1.61	5.511	0.708	F14	191
16	400	14.48	14.13	4.00	23.62	15.199	1.417	1.45	5.511	0.708	F14	260
*18	450	16.49	16.81	5.00	24.40	16.972	1.417	1.85	5.511	0.708	F14	375
20	500	17.48	17.12	5.00	28.74	19.011	1.575	1.85	6.496	0.866	F16	490
24	600	19.68	19.92	6.00	32.99	22.094	1.968	2.20	6.496	0.866	F16	629

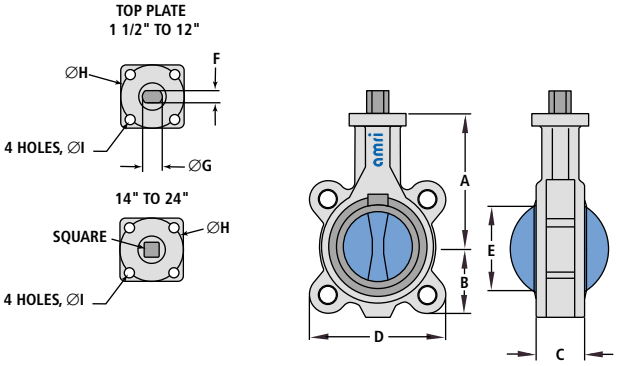
* 14 and 18 inch ACRIS valves do not conform to ISO 5752 face-to-face dimensions.



ISORIA 1½" TO 24" Wafer Body

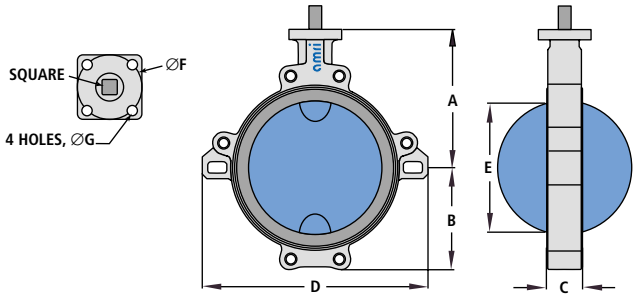
SIZE		A	B	C	D	E	SHAFT				ISO TOP FLANGE MOUNTING			WEIGHT
IN	MM	IN	IN	IN	IN	Disc Chord Length	F	ØG	Square	Height	ØH (Bolt Circle)	ØI (Hole Size)	ISO Pattern	LBS.
1½	40	4.13	2.28	1.29	3.26	0.958	0.433	0.551	-	.945	1.969	0.275	F05	2.4
2	50	4.31	2.51	1.69	3.66	1.116	0.433	0.551	-	.945	1.969	0.275	F05	2.8
3	80	5.59	3.74	1.81	5.66	2.648	0.433	0.551	-	.945	1.969	0.275	F05	5.5
4	100	6.41	4.13	2.04	6.45	3.432	0.551	0.708	-	.945	1.969	0.275	F05	8.5
6	150	7.63	5.55	2.20	8.62	5.494	0.551	0.708	-	1.181	2.756	0.354	F07	15
8	200	8.74	6.33	2.36	10.82	7.408	0.748	0.984	-	1.378	2.756	0.354	F07	23
10	250	10.03	7.51	2.67	12.99	9.492	0.748	0.984	-	1.378	4.016	0.433	F10	36
12	300	11.10	9.25	3.07	14.68	11.267	0.866	1.102	-	1.575	4.921	0.551	F12	66
14	350	13.18	10.51	3.07	16.25	12.693	-	-	0.984	1.771	4.921	0.551	F12	110
16	400	14.96	11.73	4.01	18.11	14.486	-	-	1.417	2.165	5.511	0.708	F14	158
18	450	16.14	12.91	4.48	20.31	16.401	-	-	1.417	2.165	5.511	0.708	F14	211
20	500	17.32	14.09	5.00	22.83	18.305	-	-	1.417	2.165	5.511	0.708	F14	286
24	600	19.48	17.24	6.06	27.32	22.101	-	-	1.968	2.559	6.496	0.866	F16	418

Consult AMRI for 26" to 60" valve dimensions.



ISORIA 1½" TO 24" Lug Body

SIZE		A	B	C	D	E	SHAFT				ISO TOP FLANGE MOUNTING			WEIGHT
IN	MM	IN	IN	IN	IN	Disc Chord Length	F	ØG	Square	Height	ØH (Bolt Circle)	ØI (Hole Size)	ISO Pattern	LBS.
1½	40	4.13	2.28	1.29	4.17	0.958	0.433	0.551	-	.945	1.969	0.275	F05	4.4
2	50	4.31	2.51	1.69	4.60	1.116	0.433	0.551	-	.945	1.969	0.275	F05	5.5
3	80	5.59	3.74	1.81	5.47	2.648	0.433	0.551	-	.945	1.969	0.275	F05	8.8
4	100	6.41	4.13	2.04	8.14	3.432	0.551	0.708	-	.945	1.969	0.275	F05	12
6	150	7.63	5.55	2.20	10.11	5.494	0.551	0.708	-	1.181	2.756	0.354	F07	24
8	200	8.74	6.33	2.36	12.20	7.408	0.748	0.984	-	1.378	2.756	0.354	F07	52
10	250	10.03	7.75	2.67	15.51	9.492	0.748	0.984	-	1.378	4.016	0.433	F10	85
12	300	11.10	9.09	3.07	18.18	11.267	0.866	1.102	-	1.575	4.921	0.551	F12	101
14	350	13.18	10.03	3.07	20.74	12.693	-	-	0.984	1.771	4.921	0.551	F12	136
16	400	14.96	11.69	4.01	23.81	14.486	-	-	1.417	2.165	5.511	0.708	F14	222
18	450	16.14	12.95	4.48	25.03	16.401	-	-	1.417	2.165	5.511	0.708	F14	268
20	500	17.32	14.13	5.00	28.26	18.305	-	-	1.417	2.165	5.511	0.708	F14	394
24	600	19.48	17.28	6.06	32.87	22.101	-	-	1.968	2.559	6.496	0.866	F16	564

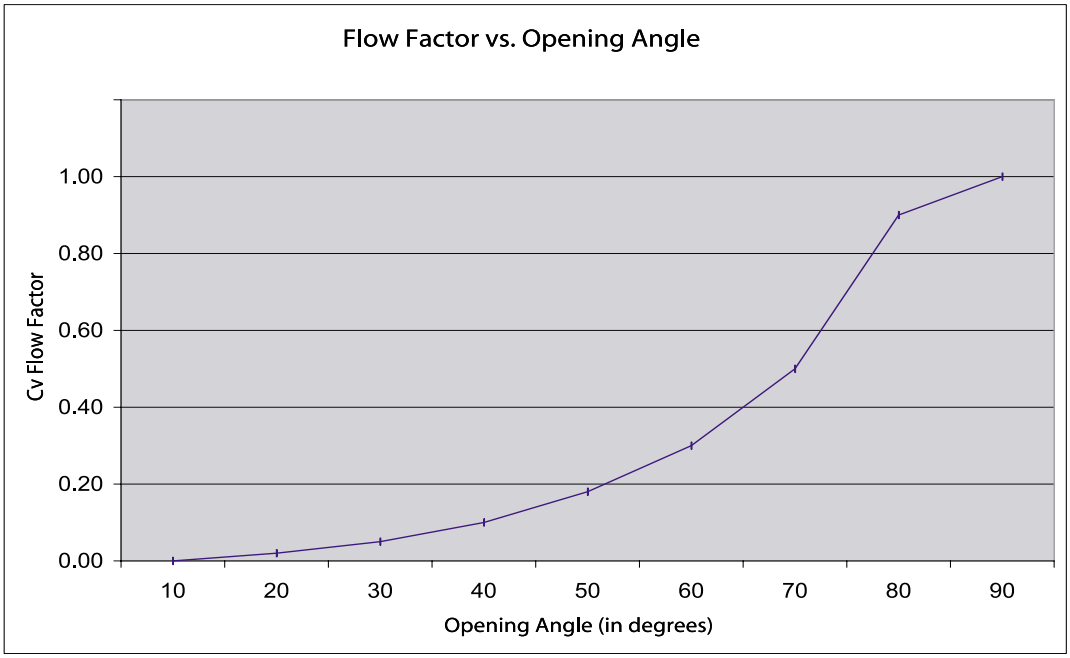


ISORIA 14" TO 24" Semi-Lug Body

SIZE		A	B	C	D	E	SHAFT		ISO TOP FLANGE MOUNTING			WEIGHT
IN	MM	IN	IN	IN	IN	Disc Chord Length	Square	Height	∅F (Bolt Circle)	∅G (Hole Size)	ISO Pattern	LBS.
14	350	13.18	10.03	3.07	23.14	12.693	0.984	1.77	4.921	0.551	F12	135
16	400	14.96	11.69	4.01	25.74	14.486	1.417	2.16	5.511	0.708	F14	180
18	450	16.14	12.95	4.48	28.03	16.401	1.417	2.16	5.511	0.708	F14	247
20	500	17.32	14.13	5.00	29.13	18.305	1.417	2.16	5.511	0.708	F14	326
24	600	19.48	17.28	6.06	33.70	22.101	1.968	2.55	6.496	0.866	F16	496

Flow Coefficient Factors at 10° Increments for ACRIS and ISORIA

Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Cv	0	.02	.05	.10	.18	.30	.50	.90	1.0



ELASTOMERS & PFA-TEFLON®

AMRI butterfly valves offer a long and reliable operational lifetime due primarily to:

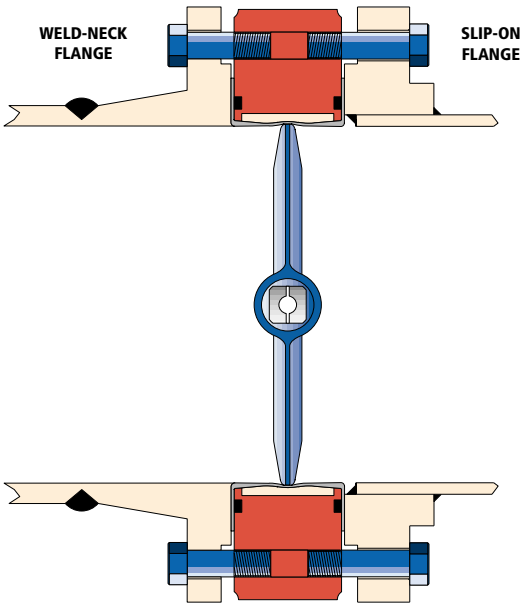
- The superior mechanical design details and manufacturing quality.
- The high quality of the valve's inner lining. In order to maintain high quality standards of the elastomers and PFA-Teflon® parts, AMRI has created its own molding manufacturing division.

This division was created with three specific goals:

- To define and create elastomer formulations best suited for specific applications.
- To produce all elastomers and PFA-Teflon® parts in-house in order to ensure components appropriate for butterfly valve working conditions.
- To exercise complete quality control over the elastomers and PFA-Teflon® parts from verification of the raw materials to testing of the finished product.

As a result, AMRI can recommend the best suited valve for each application.

Cross-sectional view of typical installation options



PARTIAL LIST OF AVAILABLE VALVE LINERS

LINER MATERIAL		TYPICAL APPLICATIONS
EPDM	XA	Water (soft, industrial, sea, warm) amines, ketones, nitrogen derivatives, esters, concentrated bases, weak acids.
High Temperature EPDM	XV	High temperature process applications (Same as XA)
Nitrile Rubber	K	Hydrocarbons, and low aromatic content oils
Carboxylated Nitrile	CB	Abrasive applications: cement, sand, pellets
Hypalon®	Y	Acids, bases, abrasive chemicals, brine, caustic soda
Acid Viton®	VA	Concentrated acids
High Temperature Viton®	VC	Solvents at high temperature, aromatic Hydrocarbons, warm gases
PFA - Teflon®	F	All chemical products

®Teflon, Viton and Hypalon are registered trademarks of E.I. DuPont Company.

FLOW COEFFICIENTS
Cvo = gallons/minute with DP = 1 psi

	MODEL		
SIZE	ACRIS	ISORIA 10	ISORIA 16
1	50	—	—
1¼	50	—	—
1½	100	61.5	61.5
2	209	154	154
2½	376	280	280
3	580	475	475
4	916	760	760
5	1276	1044	1044
6	2320	2090	2090
8	5800	4120	4120
10	9396	8453	8453
12	15892	10465	10465
14	21344	12880	9269
16	26912	17020	12075
18	34104	22655	15295
20	41760	28750	20010
24	60500	41860	28750
≥ 26	Please consult AMRI		

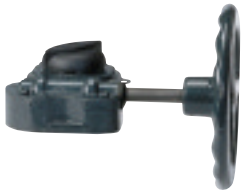
MANUAL

LEVERS:

M - Ductile iron epoxy coated; locks in 10 positions.

SM - Ductile iron epoxy coated; stainless trim; locks in any position.

MANUAL GEAR



MG - Worm gear, cast iron housing, iron bearings, visual indication, epoxy coated.

MR - Worm gear, ductile iron housing, PTFE sleeve bearings, stainless input shaft, visual indication, epoxy coated.

M31 - Variable torque advantage output for reduced input force, cast iron housing, bronze and steel internals, roller bearings, direct mount limit switch capability, visual indication, epoxy coated.

DOUBLE ACTING ACTUATORS

ACTAIR SERIES

RACK & PINION: 1.5, 3, 6, 12, 25, 50.
DOUBLE SCOTCH-YOKE: 100, 200.
Hard anodized aluminum housing, polyurethane coated end caps, actuator base has multiple ISO valve drilling patterns, NAMUR accessory mounting.

VARIABLE TORQUE OUTPUT: 400, 800.
Cast iron housing, ductile iron cylinder, steel and stainless internals, ISO valve drilling patterns, NAMUR accessory mounting, epoxy coated.

SPRING RETURN ACTUATORS

DYNACTAIR SERIES

RACK & PINION: 1.5, 3, 6, 12, 25.
DOUBLE SCOTCH-YOKE: 50, 100.
Hard anodized aluminum housing, polyurethane coated end caps, actuator base has multiple ISO valve drilling patterns, NAMUR accessory mounting, fail open or fail closed.

VARIABLE TORQUE OUTPUT: 200, 400, 800.
Ductile iron housing, steel cylinder, steel and stainless internals, ISO valve drilling patterns, NAMUR accessory mounting, epoxy coated, fail open or fail closed

ACCESSORIES

POSITIONERS
3-15 psig or 4-20 mA inputs; visual indication; Class I, II, & III, Divisions 1 & 2, Groups A-G; NEMA 4X housing; simple mechanical zero and span adjustments; low, high and max flow spool valves with low air consumption.

LIMIT SWITCHES
Mechanical or proximity; AC/DC current; fully adjustable cams; 1/2" or 3/4" NPT conduit entries; NEMA 4, 4X, 7, and 9; internal terminal strip; visual indication.

SOLENOID VALVES
3 way and 4 way; AC or DC current; NEMA 4, 4x, 7 and 9 standard or direct Namur mount type with manual override; aluminum,brass and stainless steel.

LOCK-OUT/TAG-OUT
Available for all valve actuators. Allows locking of valves in open, closed, or both positions depending on customer requirements.

Upper left: DYNACTAIR spring return actuator with lock-out/tag-out, mounted to a 10" ACRIS isolating a CLO2 tank in a pulp mill. *Upper middle*: Manually operated 8" ACRIS replacing plug valves for pump isolation in EDC and VCM service. Upper right: Manually operated 4" ACRIS for UV light isolation in high purity water.

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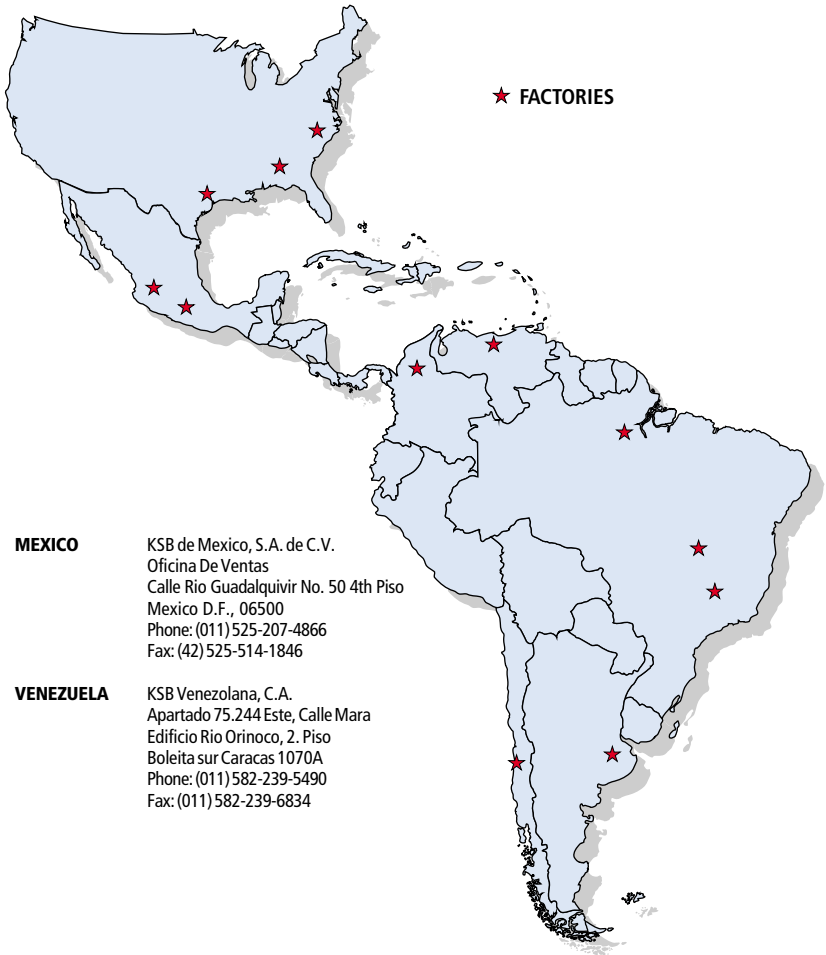

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