

Triple Offset Metal Seated  
Butterfly Valve



 A GFT COMPANY

## Extreme 6000 Series



Sizes  
3" - 72"

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## Principle of Triple Offset Valve Design

### 1st Offset

The axis of the shaft is placed behind the centerline of the sealing point.

Purpose: To provide positive sealing and increased sealing capacity

### 2nd Offset

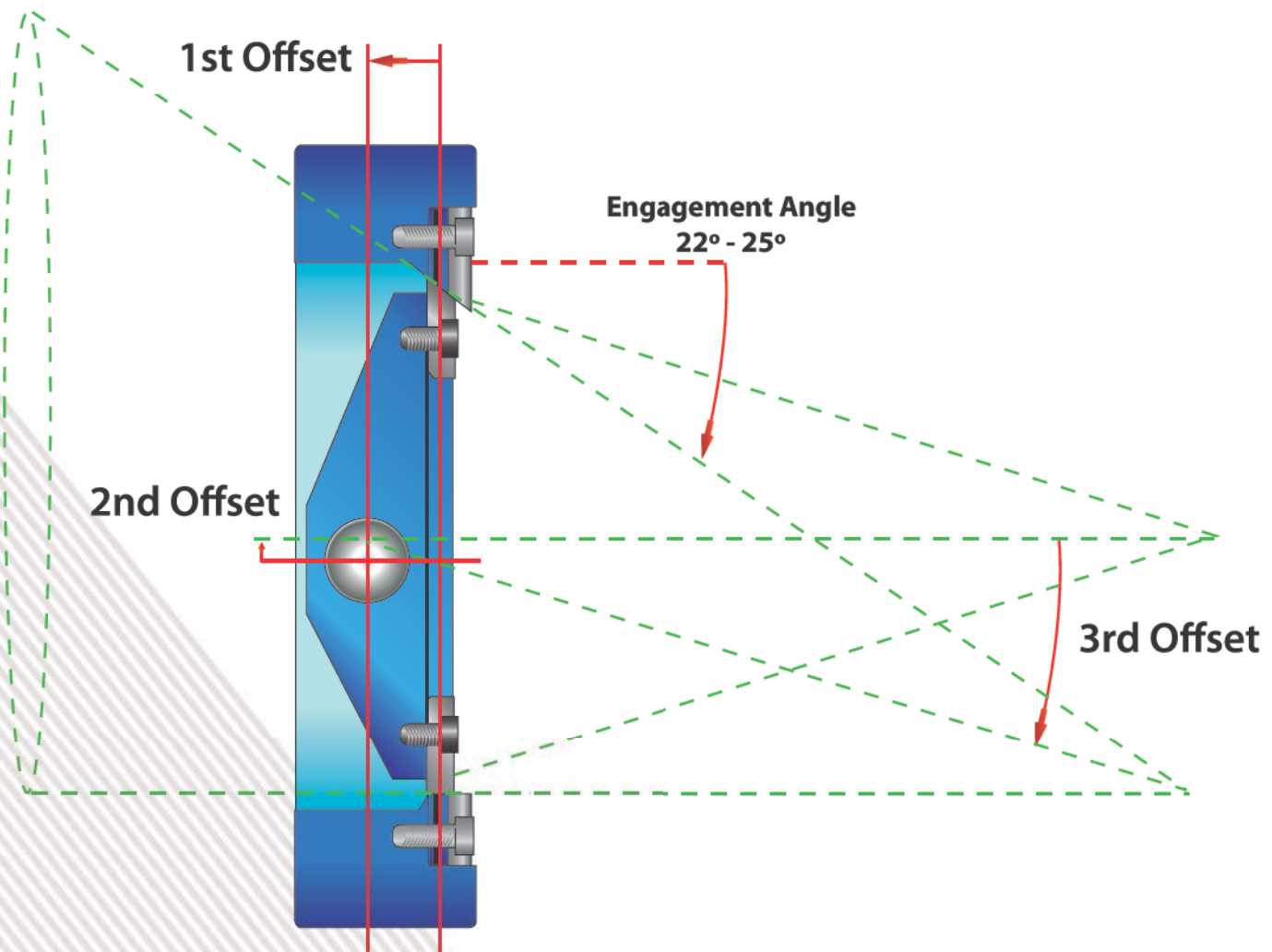
The axis of the shaft is eccentric to the center of the valve and the pipe line.

Purpose: To reduce the running torque and the friction between the disc and seat

### 3rd Offset

The seat cone axis is off set from the shaft centerline to eliminate friction during closing and opening.

Purpose: To achieve uniform compressive sealing around the entire seat.

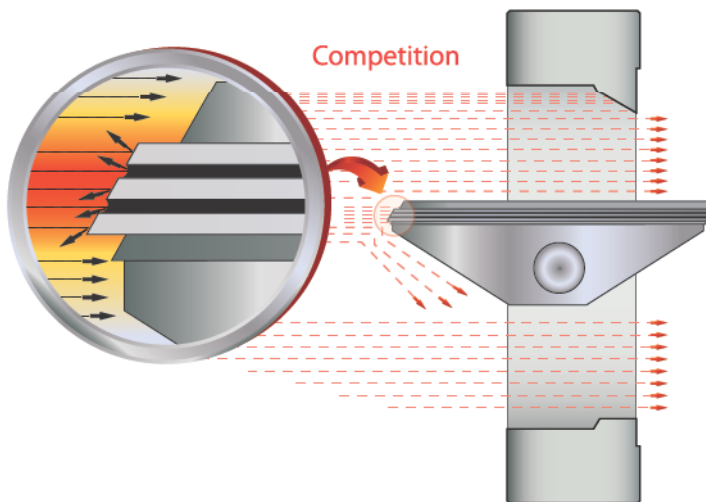


## Principle of Sealing

The basic sealing principle of a Triple off valve is to utilize a conical seating system. Many valve designs have an integral seat to the valve body and a laminated disc seat located directly in the path of the flow media. The ABZ "body seat design" the laminated seat is located in the body and the solid seal is secured to the disc. Direct exposure to flow is reduced to any laminate surfaces. This unique ABZ design allows for field replaceable body seal and disc seat without special tools.

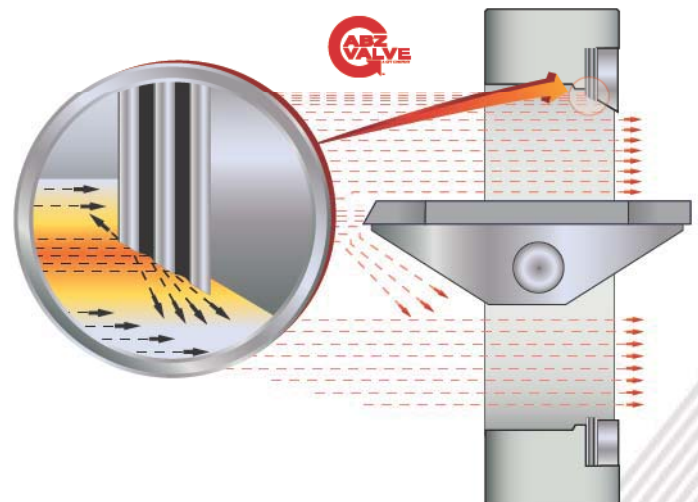
### Competitors Disc Seat Design

- Laminated disc seat are susceptible to flow erosion. (Replaceable)
- Solid seal is integral to the body. (Non-replaceable)



### ABZ Body Seat Design

- Laminated body seat are indirect to flow and less susceptible to erosion. (Replaceable)
- Solid disc seal (Replaceable)

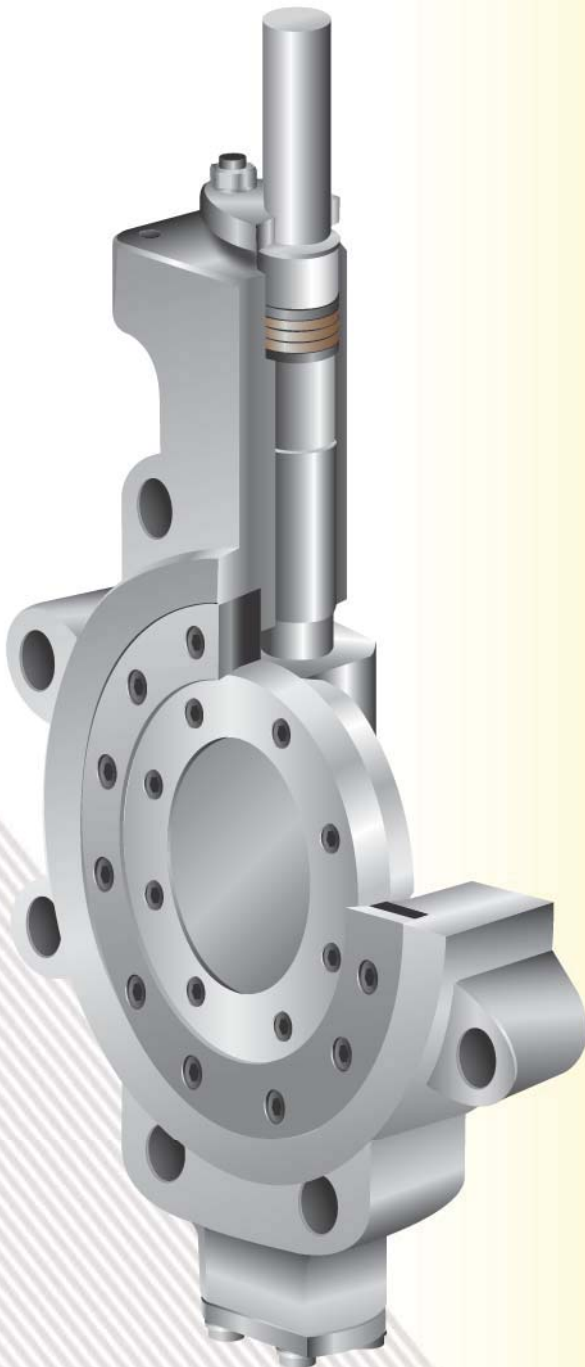


	Disc Seat Deign (Competition)	Body Seat Design(ABZ)
Body Seat	Integral welded	Laminate Metal+Graphite
Disc Seat	Laminate Metal+Graphite	Solid Metal
Seat Replacement	Disc Seat only	Both Disc & Body Seat
Friction of Laminate Seat	High	Low



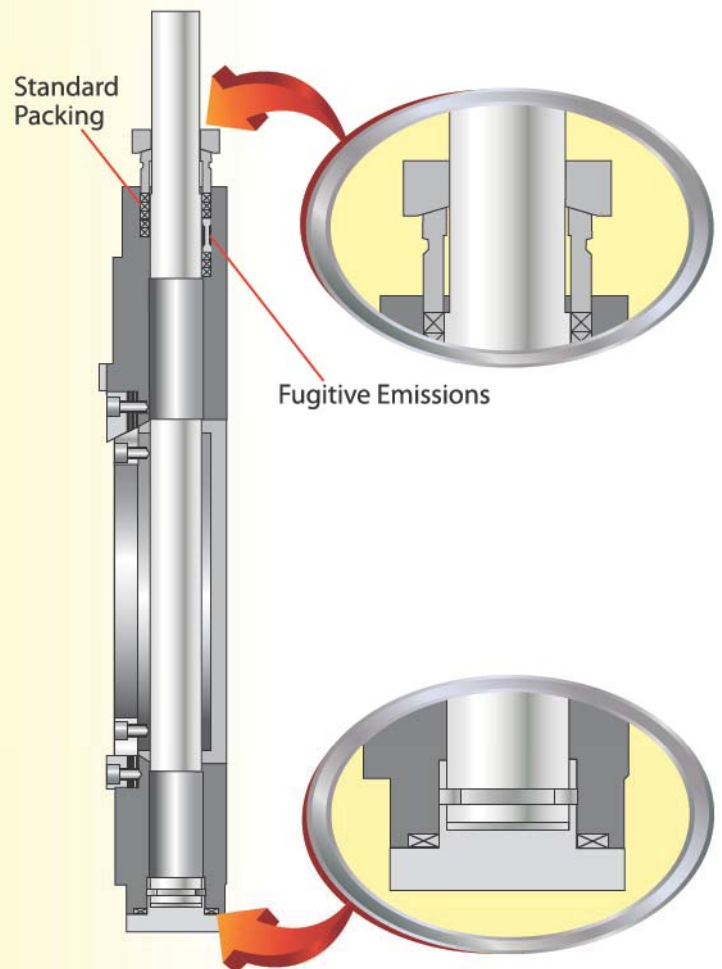
## Sealing System

All sealing parts (disc seat, body seat and retainer plate) are machined geometrically to reduce friction on the sealing surface and to provide a tight shut off for long term service without interference of the metal - to - metal sealing mechanism.



## Stem and Packing

- The high temperature graphite stem packing provides constant compression for a positive seal around the stem preventing fugitive emissions and providing fire safe protection.
- One piece shaft enables the valve to withstand full bi-directional pressure and vacuum service. All 6000 series valves are design per API 609 standards, including shaft retention system. This insures our customer a safe and reliable product.
- Internal keyed and pinned connection aligns the disc seal to the body seat.



## Comparison with other type of Valves

Features	Triple offset valve	Globe valve	Gate valve	Ball valve
End Connection	Wafer, Lugged, Flanged, Butt weld End	Flanged, Screwed, Welded	Flanged, Welded	Flanged, Welded
Weight	Light	Heavy	Heavy	Heavy
Face-to-Face	Short	Long	Long	Long
Working Temperature	High	High	High	High
Sealing Performance	Tight shut off	Tight shut off or Class IV	Tight shut off or Class IV	Tight shut off or Class IV
Seat Friction	Low	High	High	High
Bi-Directional	Yes	No	Yes	Yes
Fire Safe	Yes	Yes	Yes	Yes
Torque	Low	High	High	High
Maintenance in field	Easy	Difficult	Difficult	Difficult

## Alternative for Gate and Globe valve

With its sealing capacity at high temperature, Extreme 6000 Series valves are popular among the plant engineers and is considered as an ideal valve to replace or substitute the globe and gate valve.



Long Pattern Triple



Globe valve Face-to-face

## Tight Shut-off at full rating

Extreme 6000 Series valves provide zero leakage in both directions at full pressure rating with Air/Gas/Liquid applications. They are widely used for the application that requires tight shut-off.



High Temp. Vacuum service-1



High Temp. Vacuum Service-2

## Construction of Extreme 6000 Series

### Construction

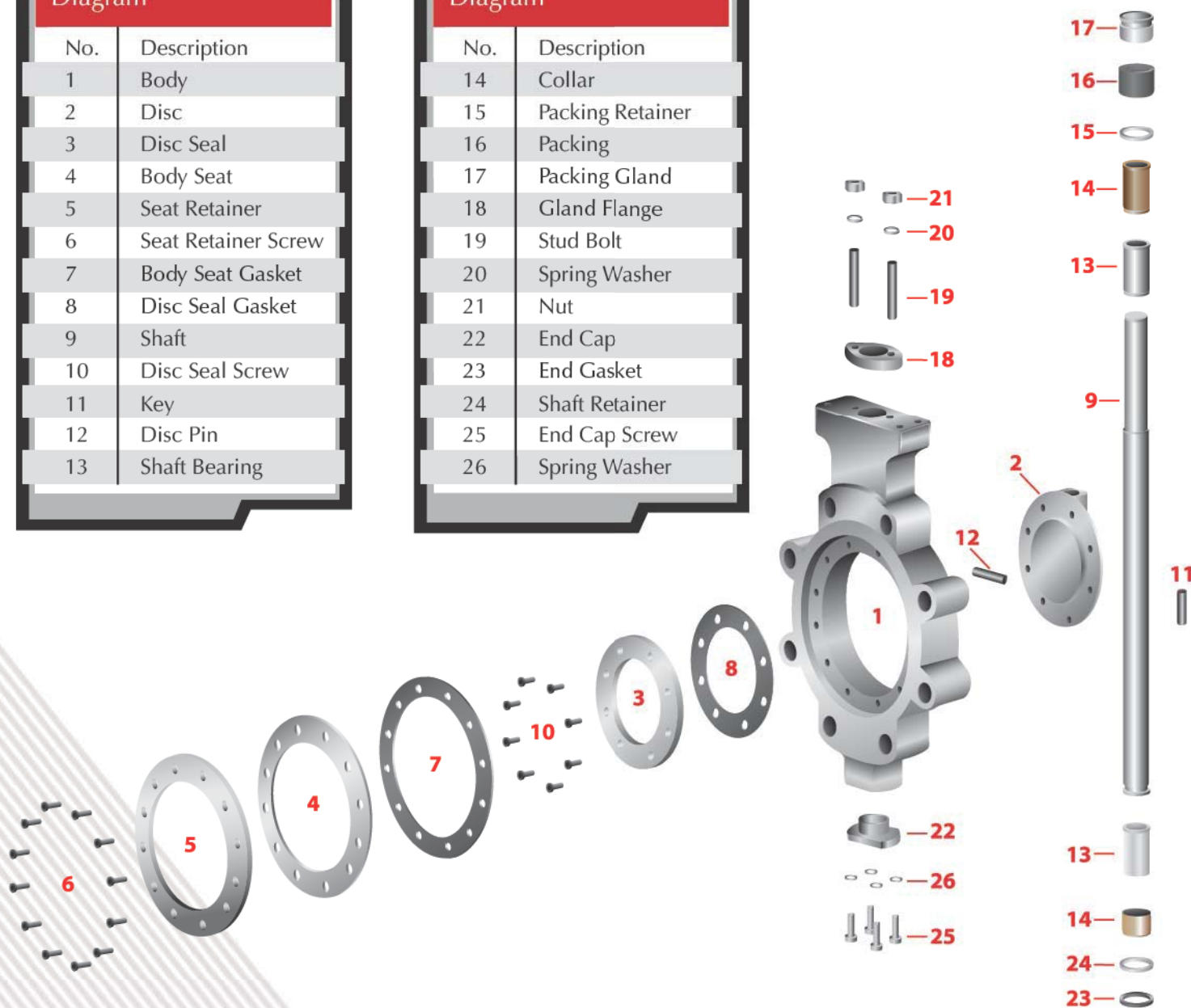
#### Diagram

No.	Description
1	Body
2	Disc
3	Disc Seal
4	Body Seat
5	Seat Retainer
6	Seat Retainer Screw
7	Body Seat Gasket
8	Disc Seal Gasket
9	Shaft
10	Disc Seal Screw
11	Key
12	Disc Pin
13	Shaft Bearing

### Construction

#### Diagram

No.	Description
14	Collar
15	Packing Retainer
16	Packing
17	Packing Gland
18	Gland Flange
19	Stud Bolt
20	Spring Washer
21	Nut
22	End Cap
23	End Gasket
24	Shaft Retainer
25	End Cap Screw
26	Spring Washer





## Design Standards

Design	API Std 609, ANSI/ASME B16.34
Classes	Class 150 - Class 600
Size	3"(80mm) - 48"(1200mm)
Body Style	Lugged, Wafer, Flanged
Flange Drilling	ANSI/ASME B16.5, ANSI/ASME B16.47, ISO 7005, DIN2501
Face to Face Dimensions	ANSI/ASME B16.10, API 609, ISO5752, BS5155
Applicable Temperature Range	~ + 1000°F(538°C) for Standard*
Pressure Tests	API Std 598, ISO 5208
Operator	Manual, Electric, Pneumatic, Hydraulic

\*1. Applicable temperatures varies with material.  
2. 750°F(400°C) or less in an oxidized atmosphere.

## Material & Specifications

Part #	Description	Material	Material
1	Body	A216-WCB	A351-CF8M
2	Disc	A216-WCB	A351-CF8M
3	Disc Seal	Stainless Steel 316	Stainless Steel 316
4	Body Seat	Laminated Stainless Steel 316/ Graphite	Laminated Stainless Steel 316/ Graphite
5	Seat Retainer	Steel	Stainless Steel 316
6	Seat Retainer Screw	Stainless Steel 304	Stainless Steel 316
7	Body Seat Gasket	Graphite	Graphite
8	Disc Seal Gasket	Graphite	Graphite
9	Shaft	A564-630 H1100	A564-630 H1100
10	Disc Seal Screw	Stainless Steel 304	Stainless Steel 316
11	Key	630 SS	630 SS
12	Disc Pin	Stainless Steel 316	Stainless Steel 316
13	Shaft Bearing	Stainless Steel 304 + Nitr. or Hcr.	Stainless Steel 316 + Nitr. Or Hcr.
14	Collar	Stainless Steel 304	Stainless Steel 316
15	Packing Retainer	Stainless Steel 316	Stainless Steel 316
16	Packing	Graphite	Graphite
17	Packing Gland	Stainless Steel 304	Stainless Steel 316
18	Gland Flange	Stainless Steel 304	Stainless Steel 316
19	Stud Bolt	Stainless Steel 304	Stainless Steel 316
20	Spring Washer	Stainless Steel 304	Stainless Steel 316
21	Nut	Stainless Steel 304	Stainless Steel 316
22	End Cap	Steel	Stainless Steel 316
23	End Gasket	Graphite	Graphite
24	Shaft Retainer	Stainless Steel 316	Stainless Steel 316
25	End Cap Screw	Stainless Steel 304	Stainless Steel 316
26	Spring Washer	Stainless Steel 304	Stainless Steel 316

### Option

Body Seat	Laminated Duplex Stainles Steel/Graphite, Laminated Inconel/Graphite, Lanimated Monel/Graphite, Laminated Hastelloy/Graphite
Disc Seal Surface	Stellite

\*\* Other materials are available on request.

## Available Materials

- Hastelloy
- Duplex 2205
- ALX6N
- SMO 254/255
- Monel

Other materials are available on request.

## Low Temperature/Cryogenic:

The Extreme 6000 series provides a surplus of options for applications that were not offered before to customers. Ultimate low temperature service (Cryogenic service) is one of many industries that can use Extreme 6000 Series Valves.

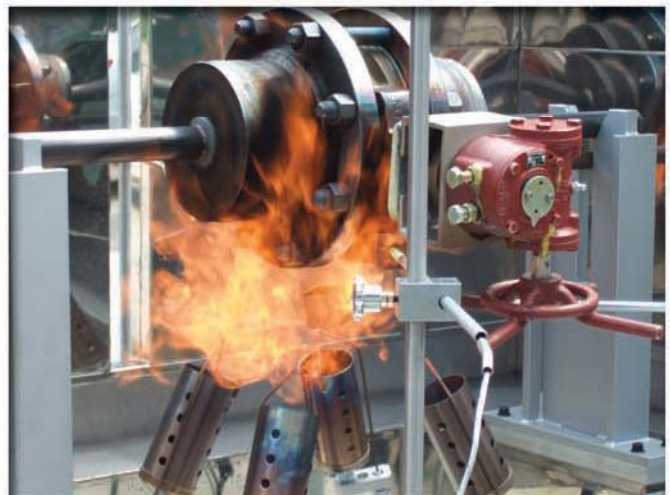
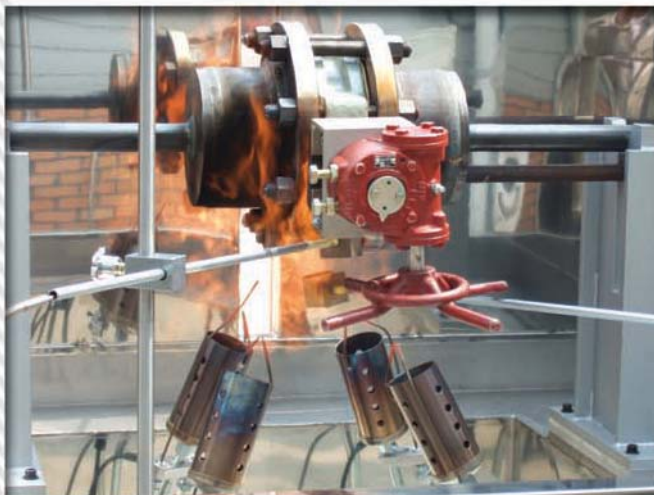
The Cryogenic valves meet the requirements for BS6364 and EN12567. All parts and materials are under strict quality management and go through Cryogenic treatment before being machined.

Valves are placed in liquid nitrogen and cooled to -196C (-320 F). The shell and seat are tested with helium gas in both directions.



## Fire Safe Design

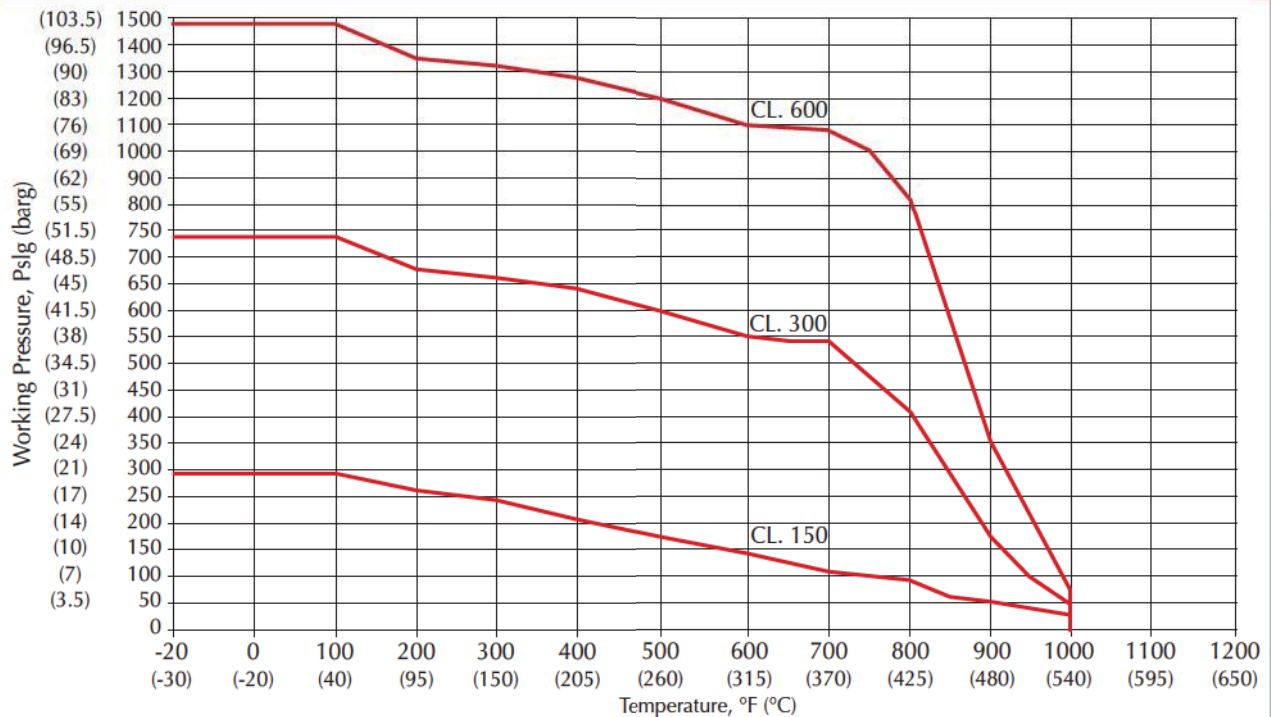
Our Extreme 6000 Valve is certified to API 607 and API 6FA. Valves provide zero leakage before, during and after fire.





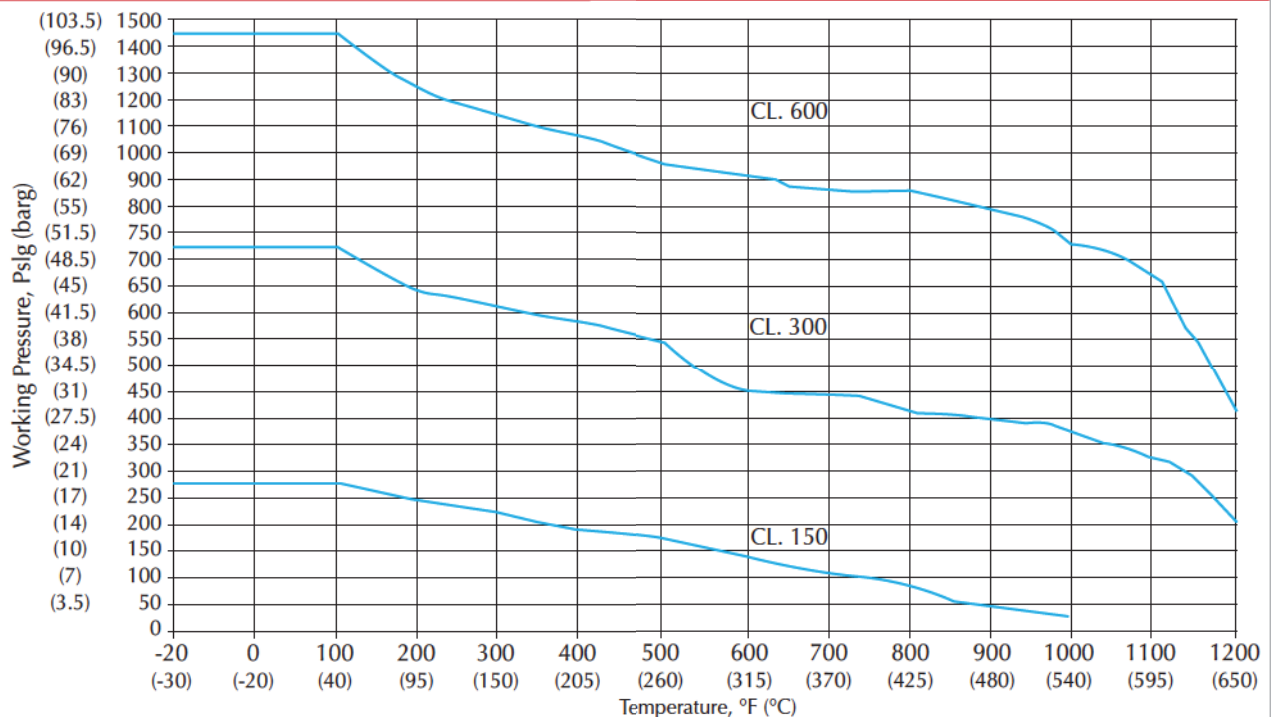
**A126 Gr. WCB**

**Pressure - Temp. Rating**

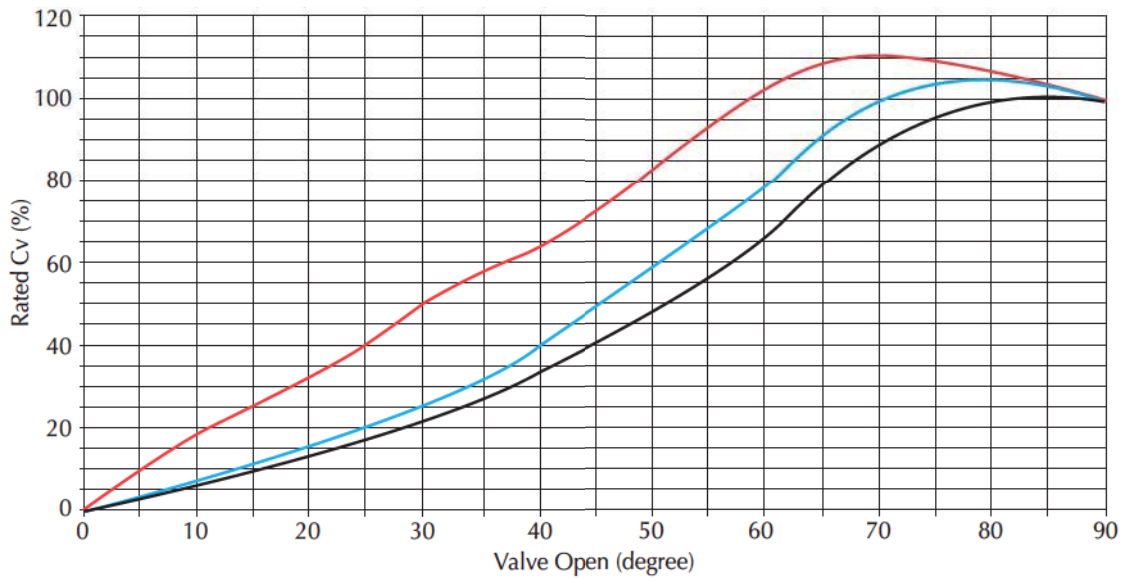


**A351 Gr. CF8M**

**Pressure - Temp. Rating**



Extreme SERIES 6000 Cv Curve



Cv Value SERIES 6000 Triple Offset Valve - Class 150

Size		Valve Opening (degree)								
inch	mm	10	20	30	40	50	60	70	80	90
3	80	16	29	45	62	79	95	102	99	92
4	100	30	55	86	118	151	180	194	189	175
6	150	51	108	182	276	394	536	654	719	695
8	200	79	170	303	488	715	980	1236	1422	1444
10	250	128	275	489	787	1152	1580	1992	2292	2327
12	300	210	451	803	1293	1893	2597	3274	3768	3825
14	350	271	581	1034	1665	2438	3344	4216	4851	4925
16	400	367	787	1401	2255	3303	4530	5711	6572	6672
18	450	494	1061	1888	3039	4450	6104	7695	8855	8990
20	500	605	1298	2310	3718	5445	7469	9416	10835	11000
24	600	822	1763	3137	5049	7394	10143	12787	14714	14938
26	650	1064	2283	4062	6539	9576	13135	16559	19055	19345
28	700	1331	2856	5082	8180	11979	16432	20715	23837	24200
30	750	1579	3388	6030	9706	14214	19498	24581	28285	28716
32	800	1861	3993	7107	11439	16752	22979	28970	33335	33843
34	850	2081	4456	7945	12788	18728	25690	32387	37267	37835
36	900	2309	4954	8816	14189	20780	28504	35935	41350	41980
40	1000	3003	6443	11466	18455	27027	37073	46738	53781	54600
42	1050	3201	6868	12222	19672	28809	39518	49819	57327	58200
46	1150	4100	8796	15653	25195	36897	50613	63806	73422	74540
48	1200	4279	9180	16338	26296	38511	52826	66597	76633	77800

**Cv Value SERIES 6000 Triple Offset Valve - Class 300**

Size		Valve Opening (degree)								
inch	mm	10	20	30	40	50	60	70	80	90
3	80	16	29	45	62	79	95	102	99	92
4	100	30	55	86	118	151	180	194	189	175
6	150	44	93	157	238	340	463	565	620	600
8	200	67	143	255	410	600	823	1037	1194	1212
10	250	120	257	458	737	1079	1480	1866	2147	2180
12	300	188	402	716	1153	1688	2316	2920	3360	3411
14	350	248	532	947	1524	2232	3062	3861	4442	4510
16	400	327	702	1249	2010	2943	4037	5090	5857	5946
18	450	446	956	1702	2739	4012	5503	6938	7983	8105
20	500	548	1176	2094	3370	4935	6770	8534	9820	9970
24	600	759	1628	2898	4664	6831	9370	11813	13593	13800
26	650	976	2094	3726	5998	8784	12049	15190	17479	17745
28	700	1130	2425	4315	6945	10171	13951	17588	20239	20547
30	750	1332	2857	5084	8183	11984	16439	20725	23848	24211
32	800	1656	3552	6321	10174	14900	20438	25766	29649	30100
34	850	1887	4047	7203	11593	16979	23290	29361	33786	34300
36	900	2140	4590	8169	13148	19256	26413	33298	38317	38900

**Cv Value SERIES 6000 Triple Offset Valve - Class 600**

Size		Valve Opening (degree)								
inch	mm	10	20	30	40	50	60	70	80	90
4	100	25	46	73	100	128	152	164	160	148
6	150	41	87	147	223	318	433	528	580	561
8	200	52	111	197	318	465	638	805	926	940
10	250	88	189	336	540	791	1085	1368	1574	1598
12	300	146	313	557	896	1313	1801	2270	2612	2652
14	350	215	461	820	1320	1933	2651	3343	3846	3905
16	400	285	612	1089	1753	2567	3521	4438	5107	5185
18	450	392	840	1495	2407	3524	4834	6095	7013	7120
20	500	501	1074	1911	3076	4505	6179	7790	8964	9100
24	600	693	1487	2646	4259	6237	8555	10786	12411	12600





A GFT COMPANY

## Common Applications

- Power Plants
- Hydrogen
- Pulp and Paper
- Oxygen Service
- High & Low Temperature Service
- Chemical Plants
- Saturated Steam
- Oil and Gas Processing
- Refinery
- Cryogenic Service
- Temperature Pressure Rating



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