



## Features / Design

1.- **TFV 9HI Series** is a high performance double offset design butterfly valve. The double offset - shaft and disc, ensures bidirectional sealing throughout the full pressure range of the valve. Due to this offset, disc moves as cam action movement, which limits contact of the disc with the seat - the disc is lifted off the seat during valve initial opening, reducing seat wear and eliminating seat deformation at the top and bottom. When the disc is in open position, there is no contact between it and the seat; operating torques are reduced and seat life extended<sup>(1)</sup>.

2.- Design & Manufacture Standard: API 609.

3.- **General Features**<sup>(2)</sup>:

**Flow way direction & Blow Out Stem Proof.**

**ISO 5211 Top Flange** for direct mounting.

The **Extra Long Neck** provides path for heat dissipation and allows space for insulation.

The easy access **Packing Gland** provides means for packing adjustment, even when direct mount actuation and insulation are utilized.

**Retainer Cover** maintains seat integrity prior to installation - interchangeable with any seat option. An **O-Ring** prevents leakage between it and body.

**Bottom Flange Cover** equalizes pressure under shaft, eliminating "piston" effect at higher pressure.

**Shaft Retainers** provide positive stem retention.

**Bottom Packing** prevents external leakage & simplify valve maintenance.

**Over Travel Stop** integrally cased into body, prevents disc from rotating in wrong quadrant and damaging seat.

**Sealing: (1) O-Ring** as first line of defense for stem leakage; **(2) Stem Seal**, self lubricating PTFE V-rings prevents leakage to atmosphere.

**Top & Bottom Bearings** (PTFE/SS self lubricating) provide excellent stem support and shaft alignment.

**Seats are one-piece solid** - seals at both high and low pressure. Different materials available.

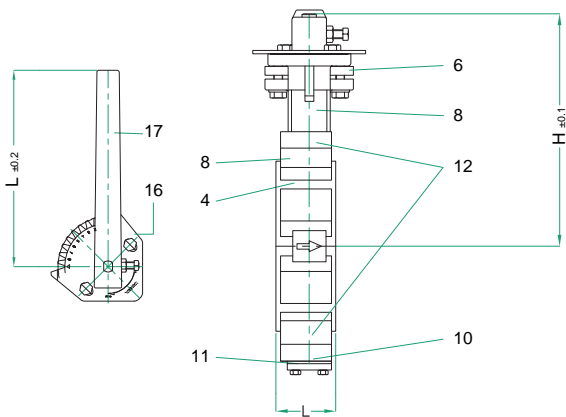
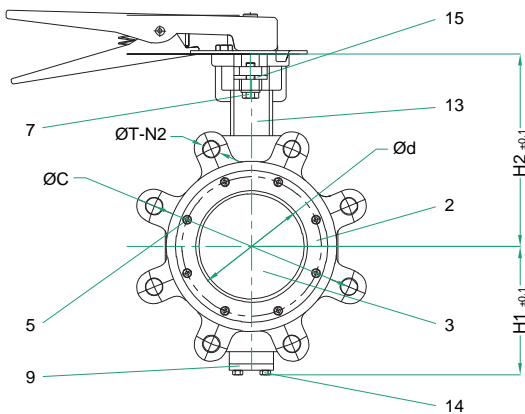
4.- Ends: Wafer and lug options (ASME B16.5) - Class ANSI 150# & 300#. Face to face acc. to API 609.

5.- Pressure & temp. rating acc. to ASME B16.34.

6.- Inspection and Test Standard: API 598.

7.- Used in many industries as: Chemical & petrochemical, power, fiber, pulp & paper, food, oil refinery, coal & mining, steel & iron, etc.

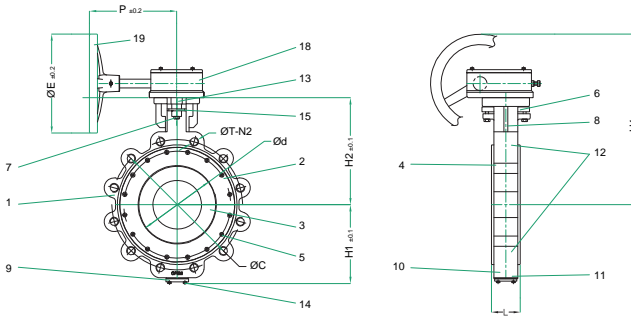
### LUG Design for 2" to 6" valves



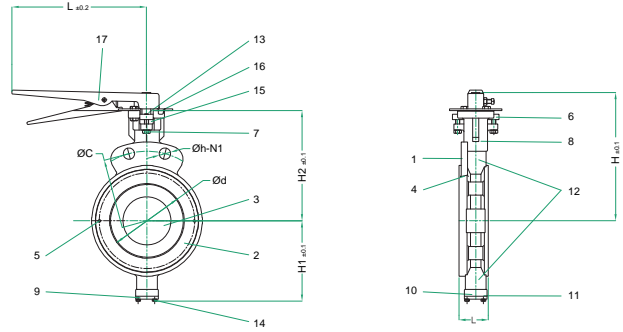
NOTES: (1) Please see page 5, Fig. 1, Eccentric Double Offset Design; (2) Fire Safe and NACE MR 0175 option available upon request.



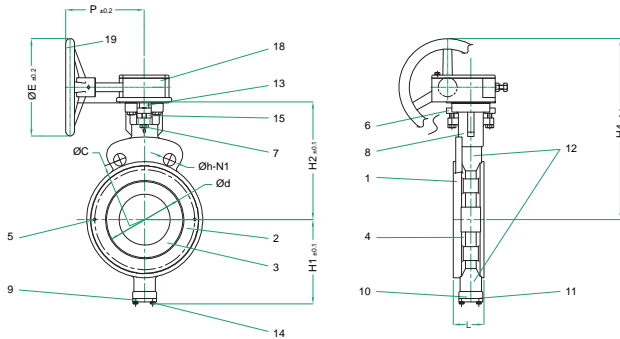
### LUG Design for 8" to 24" valves



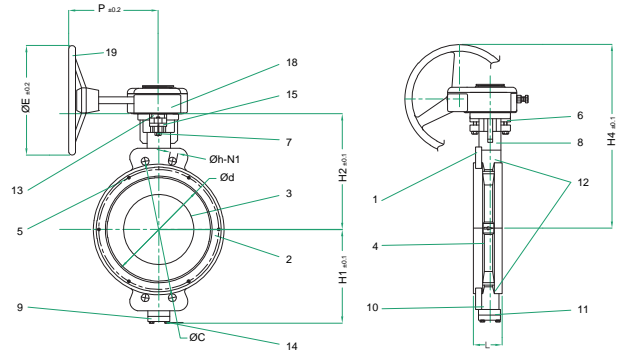
### WAFER Design for 2" to 6" valves



### WAFER Design for 8" valves

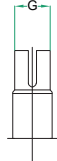
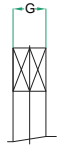
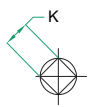


### WAFER Design for 10" to 24" valves

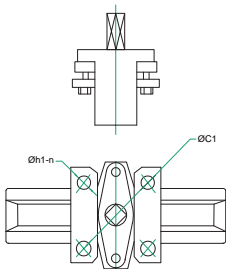


#### Stem Design for Valve Size 2" to 16" - Class 150 2" to 14" - Class 300

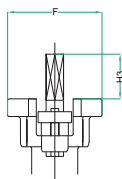
#### Stem Design for Valve Size 18" to 24" - Class 150 16" to 24" - Class 300



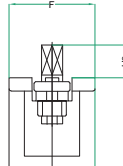
#### ISO 5211 MOUNTING BASE



#### Stem Design for Wafer Connection



#### Stem Design for Lug Connection



## Material List

POS	DESCRIPTION	MATERIAL
1	BODY	A216 WCB / A351 CF8M
2	SEAT RETAINER	SS316
3	DISC	A351 CF8M
4	SEAT	PTFE
5	RETAINER BOLT	SS316
6	GLAND	A3511 CF8M
7	GLAND BOLT	SS304
8	PACKING	PTFE
9	BOTTOM COVER	SS304
10	S. RING	SS316
11	GASKET	PTFE
12	STEM BEARING	STAINLESS STEEL & RTFE
13	STEM	17-4PH
14	BOTTOM BOLT	SS304
15	PACKING FOLLOWER	A351 CF8
16	POSITION PLATE	SS430
17	LEVER	SS400
18	GEAR BOX	DUCTILE IRON
19	HAND WHEEL	DUCTILE IRON

## Dimensions (inches)

### CLASS 150#

WAFER CONNECTION																								
SIZE	Ød (in)	ØL (in)	H (in)	H1 (in)	H2 (in)	H3 (in)	F (in)	G (in)	K (in)	ØC (in)	Øh (in)	ØT (in)	N1 (in)	N2 (in)	ØC1 (in)	n (in)	Øh1 (in)	ISO5211	ØC (in)	P (in)	WT <sup>(3)</sup> (lb)	Torque <sup>(4)</sup> (Lbf*in) Metal Seat (Lbf*in) Soft Seat		CV (USgpm)
2"	1.929	1.693	6.220	3.307	4.843	1.378	2.756	0.512	0.433	4.752	0.787	5/8" - 11 unc	2	4	2.756	4	0.394	F07	/	/	5.952	496.0	270.0	93.0
2 1/2"	2.441	1.811	7.047	3.661	5.669	1.378	2.756	0.512	0.433	5.500	0.787	5/8" - 11 unc	2	4	2.756	4	0.394	F07	/	/	8.598	735.0	400.0	152.0
3"	2.874	1.890	7.441	4.134	6.063	1.378	2.756	0.630	0.433	6.000	0.787	5/8" - 11 unc	2	4	2.756	4	0.394	F07	/	/	10.582	927.0	525.0	263.0
4"	3.740	2.126	8.228	4.646	6.850	1.378	2.756	0.630	0.433	7.500	0.787	5/8" - 11 unc	2	8	2.756	4	0.394	F07	/	/	14.330	1193.0	720.0	465.0
5"	4.724	2.205	9.055	5.394	7.677	1.378	2.756	0.748	0.551	8.500	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	*	2067.0	1250.0	768.0
6"	5.551	2.244	9.882	6.142	8.504	1.378	2.756	0.866	0.669	9.500	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	27.558	2262.0	1535.0	1162.0
8"	7.638	2.520	16.181	7.244	9.843	1.969	4.528	1.102	0.866	11.752	0.906	3/4" - 10 unc	2	8	4.016	4	0.472	F10	9.843	8.661	43.431	3417.0	2270.0	2121.0
10"	9.409	2.835	17.992	9.173	11.220	1.969	4.528	1.181	0.866	14.252	1.024	7/8" - 9 unc	2	12	4.921	4	0.591	F12	9.843	8.268	72.312	5549.0	3700.0	3232.0
12"	11.299	3.189	21.496	10.197	12.756	1.969	5.118	1.378	1.063	17.000	1.024	7/8" - 9 unc	4	12	4.921	4	0.591	F12	13.780	8.268	106.924	8375.0	5635.0	4747.0
14"	13.031	3.622	23.307	11.772	14.567	1.969	5.118	1.575	1.063	18.752	1.142	1" - 8 unc	4	12	4.921	4	0.591	F12	13.780	8.268	131.175	13813.0	9100.0	5858.0
16"	15.079	4.016	25.276	13.346	16.535	2.165	6.102	1.772	1.417	21.252	1.142	1" - 8 unc	4	16	5.512	4	0.748	F14	13.780	11.417	*	21523.0	12775.0	8080.0
18"	17.087	4.488	28.543	14.291	17.520	2.559	6.496	1.969	*	22.752	1.142	1 1/8" - 8 unc	4	16	6.496	4	0.906	F16	17.717	11.417	*	25062.0	17350.0	10605.0
20"	18.976	5.000	31.102	16.457	19.685	3.150	6.496	2.165	*	25.000	1 1/8" - unc	1 1/8" - 8 unc	4	20	6.496	4	0.906	F16	17.717	13.976	*	37028.0	24000.0	14140.0
22"	20.472	6.063	33.661	17.047	20.866	3.150	11.811	2.362	*	27.252	1 1/4" - unc	1 1/4" - 8 unc	4	20	10.000	8	0.748	F25	17.717	13.976	*	*	*	*
24"	22.835	6.063	35.433	18.425	22.638	4.331	11.811	3.559	*	29.500	1 1/4" - unc	1 1/4" - 8 unc	6	20	10.000	8	0.748	F25	17.717	13.976	*	47009.0	31340.0	21210.0

### CLASS 300#

WAFER CONNECTION																									
SIZE	Ød (in)	ØL (in)	H (in)	H1 (in)	H2 (in)	H3 (in)	F (in)	G (in)	K (in)	ØC (in)	Øh (in)	ØT (in)	N1 (in)	N2 (in)	ØC1 (in)	n (in)	Øh1 (in)	ISO5211	ØC (in)	P (in)	WT <sup>(3)</sup> (lb)	Torque <sup>(4)</sup> (Lbf*in) Metal Seat (Lbf*in) Soft Seat		CV (USgpm)	
2"	1.929	1.693	6.220	3.307	4.843	1.378	2.756	0.512	0.433	5.000	0.787	5/8" - 11 unc	2	8	2.756	4	0.394	F07	/	/	5.952	784.0	478.0	93.0	
2 1/2"	2.441	1.811	7.047	3.661	5.669	1.378	2.756	0.512	0.433	5.882	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	8.598	1025.0	610.0	152.0	
3"	2.874	1.890	7.441	4.134	6.063	1.378	2.756	0.630	0.433	6.618	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	10.494	1160.0	685.0	263.0	
4"	3.740	2.126	8.228	4.646	6.850	1.378	2.756	0.630	0.433	7.882	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	13.933	2007.0	1180.0	465.0	
5"	4.724	2.205	9.055	5.394	7.677	1.378	2.756	0.748	0.551	9.252	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	*	2725.0	1800.0	768.0	
6"	5.551	2.323	9.882	6.142	8.504	1.378	2.756	0.866	0.669	10.626	0.906	3/4" - 10 unc	2	12	2.756	4	0.394	F07	/	/	*	2999.0	1965.0	1162.0	
8"	7.638	2.874	17.402	7.835	10.630	1.969	4.528	1.181	0.866	13.000	1.024	7/8" - 9 unc	2	12	4.921	4	0.591	F12	9.843	11.417	58.863	5511.0	3538.0	1919.0	
10"	9.409	3.268	21.024	9.488	12.283	1.969	5.118	1.378	1.063	15.252	1" - 8unc	1" - 8 unc	4	16	4.921	4	0.591	F12	13.780	11.417	110.230	8489.0	5892.0	2828.0	
12"	11.299	3.622	23.346	10.827	14.291	1.969	6.496	1.772	1.417	17.752	1 1/8" - 8unc	1 1/8" - 8 unc	4	16	5.512	4	0.748	F14	13.780	11.417	*	17856.0	8627.0	4141.0	
14"	13.031	4.606	26.575	12.717	15.551	1.969	6.693	1.969	*	20.252	1 1/8" - 8unc	1 1/8" - 8 unc	4	20	6.496	4	0.906	F16	17.717	11.417	*	24119.0	15925.0	5555.0	
16"	15.079	5.236	28.740	13.858	17.323	3.150	6.496	2.165	*	22.500	1 1/4" - 8unc	1 1/4" - 8 unc	4	20	6.496	4	0.906	F16	17.717	11.417	*	35566.0	22356.0	7676.0	
18"	17.087	5.866	30.512	15.315	19.094	3.150	7.087	2.559	*	24.752	1 1/4" - 8unc	1 1/4" - 8 unc	4	24	6.496	4	0.906	F16	17.717	13.976	*	52874.0	29904.0	9999.0	
20"	18.976	6.260	35.039	16.457	21.260	3.150	11.811	2.756	*	27.000	1 1/4" - 8unc	1 1/4" - 8 unc	4	24	10.000	4	0.748	F25	19.685	14.961	*	79336.0	42152.0	13130.0	
22"	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	8	/	/	/	/	/	*	/	/	*
24"	22.835	7.126	41.142	19.016	24.606	4.331	11.811	3.346	*	32.000	1 1/2" - 8unc	1 1/2" - 8 unc	4	24	10.000	8	0.748	F25	27.559	16.535	*	98970.0	54845.0	19695.0	

NOTE:  
 \* Please consult with manufacturer.  
 (3) Weight value is without lever / gear operator.  
 (4) Max. possible torque, the value may vary depending on the fluid flow pressure.  
 \*\* Some diameters can be operated by lever and gear operator. Gear operator is recommended to use above 8" size.



## Dimensions (inches)

### CLASS 150#

LUG CONNECTION																									
SIZE	Ød (in)	ØL (in)	H (in)	H1 (in)	H2 (in)	H3 (in)	F (in)	G (in)	K (in)	ØC (in)	Øh (in)	ØT (in)	N1 (in)	N2 (in)	ØC1 (in)	n (in)	Øh1 (in)	ISO5211	ØC (in)	P (in)	WT <sup>(3)</sup> (lb)	Torque <sup>(4)</sup> (Lbf*in)		CV (USgpm)	
																							Metal Seat	Soft Seat	
2"	1.929	1.693	6.220	3.307	4.843	1.378	2.756	0.512	0.433	4.752	0.787	5/8" - 11 unc	2	4	2.756	4	0.394	F07	/	/	8.157	496.0	270.0	93.0	
2 1/2"	2.441	1.811	7.047	3.661	5.669	1.378	2.756	0.512	0.433	5.500	0.787	5/8" - 11 unc	2	4	2.756	4	0.394	F07	/	/	10.803	735.0	400.0	152.0	
3"	2.874	1.890	7.441	4.134	6.063	1.378	2.756	0.630	0.433	6.000	0.787	5/8" - 11 unc	2	4	2.756	4	0.394	F07	/	/	13.007	927.0	525.0	263.0	
4"	3.740	2.126	8.228	4.646	6.850	1.378	2.756	0.630	0.433	7.500	0.787	5/8" - 11 unc	2	8	2.756	4	0.394	F07	/	/	20.503	1193.0	720.0	465.0	
5"	4.724	2.205	8.740	5.709	7.362	1.378	2.756	0.748	0.551	8.500	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	31.747	2067.0	1250.0	768.0	
6"	5.551	2.244	10.039	5.984	8.661	1.378	2.756	0.866	0.669	9.500	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	39.242	2262.0	1535.0	1162.0	
8"	7.638	2.520	*	6.969	10.039	1.969	4.528	1.102	0.866	11.752	0.906	3/4" - 10 unc	2	8	4.016	4	0.472	F10	9.843	8.661	61.950	3417.0	2270.0	2121.0	
10"	9.409	2.835	*	9.173	11.142	1.969	4.528	1.181	0.866	14.252	1.024	7/8" - 9 unc	2	12	4.921	4	0.591	F12	9.843	8.268	100.310	5549.0	3700.0	3232.0	
12"	11.299	3.189	*	10.118	12.795	1.969	5.118	1.378	1.063	17.000	1.024	7/8" - 9 unc	4	12	4.921	4	0.591	F12	13.780	8.268	158.733	8375.0	5635.0	4747.0	
14"	13.031	3.622	*	12.047	14.567	1.969	5.118	1.575	1.063	18.752	1.142	1" - 8 unc	4	12	4.921	4	0.591	F12	13.780	8.268	*	13813.0	9100.0	5858.0	
16"	15.079	4.016	*	13.346	16.535	2.165	6.102	1.772	1.417	21.252	1.142	1" - 8 unc	4	16	5.512	4	0.748	F14	13.780	11.417	*	21523.0	12775.0	8080.0	
18"	17.087	4.488	*	14.291	17.520	2.559	6.496	1.969	*	22.752	1.142	1 1/8" - 8 unc	4	16	6.496	4	0.906	F16	17.717	11.417	*	25062.0	17350.0	10605.0	
20"	18.976	5.000	*	16.457	19.291	3.150	6.496	2.165	*	25.000	1 1/8" - unc	1 1/8" - 8 unc	4	20	6.496	4	0.906	F16	17.717	13.976	*	37028.0	24000.0	14140.0	
22"	20.472	6.063	*	17.047	20.866	3.150	11.811	2.362	*	27.252	1 1/4" - unc	1 1/4" - 8 unc	4	20	10.000	8	0.748	F25	17.717	13.976	*	*	*	*	
24"	22.835	6.063	*	18.425	22.638	4.331	11.811	3.559	*	29.500	1 1/4" - unc	1 1/4" - 8 unc	6	20	10.000	8	0.748	F25	17.717	13.976	*	47009.0	31340.0	21210.0	

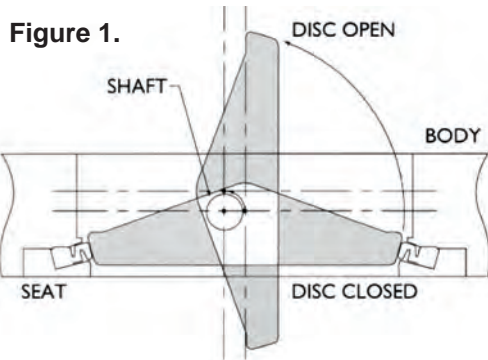
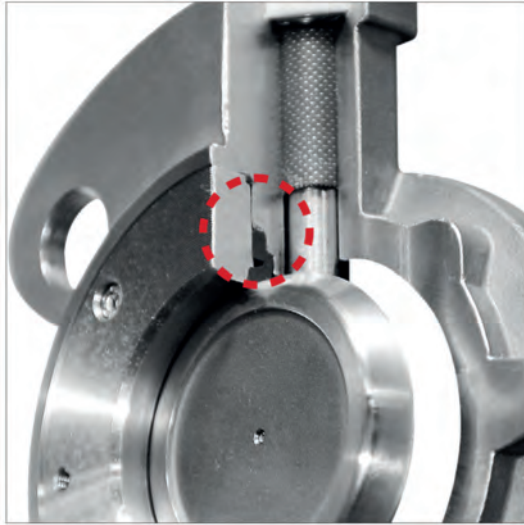
### CLASS 300#

LUG CONNECTION																									
SIZE	Ød (in)	ØL (in)	H (in)	H1 (in)	H2 (in)	H3 (in)	F (in)	G (in)	K (in)	ØC (in)	Øh (in)	ØT (in)	N1 (in)	N2 (in)	ØC1 (in)	n (in)	Øh1 (in)	ISO5211	ØC (in)	P (in)	WT <sup>(3)</sup> (lb)	Torque <sup>(4)</sup> (Lbf*in)		CV (USgpm)	
																							Metal Seat	Soft Seat	
2"	1.929	1.693	6.063	3.465	4.685	1.378	2.756	0.512	0.433	5.000	0.787	5/8" - 11 unc	2	8	2.756	4	0.394	F07	/	/	5.877	784.0	478.0	93.0	
2 1/2"	2.441	1.811	6.772	3.937	5.394	1.378	2.756	0.512	0.433	5.882	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	12.831	1025.0	610.0	152.0	
3"	2.874	1.890	7.441	4.134	6.063	1.378	2.756	0.630	0.433	6.618	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	16.050	1160.0	685.0	263.0	
4"	3.740	2.126	8.228	4.646	6.850	1.378	2.756	0.630	0.433	7.882	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	22.311	2007.0	1180.0	465.0	
5"	4.724	2.205	8.740	5.709	7.362	1.378	2.756	0.748	0.551	9.252	0.906	3/4" - 10 unc	2	8	2.756	4	0.394	F07	/	/	*	2725.0	1800.0	768.0	
6"	5.551	2.323	10.433	6.772	9.055	1.378	2.756	0.866	0.669	10.626	0.906	3/4" - 10 unc	2	12	2.756	4	0.394	F07	/	/	*	2999.0	1965.0	1162.0	
8"	7.638	2.874	17.402	7.835	10.630	1.969	4.528	1.181	0.866	13.000	1.024	7/8" - 9 unc	2	12	4.921	4	0.591	F12	9.843	11.417	*	5511.0	3538.0	1919.0	
10"	9.409	3.268	21.024	9.606	12.283	1.969	5.118	1.378	1.063	15.252	1" - 8unc	1" - 8 unc	4	16	4.921	4	0.591	F12	13.780	11.417	*	8489.0	5892.0	2828.0	
12"	11.299	3.622	23.346	10.827	14.291	1.969	6.496	1.772	1.417	17.752	1 1/8" - 8unc	1 1/8" - 8 unc	4	16	5.512	4	0.748	F14	13.780	11.417	*	17856.0	8627.0	4141.0	
14"	13.031	4.606	26.575	12.717	15.551	1.969	6.693	1.969	*	20.252	1 1/8" - 8unc	1 1/8" - 8 unc	4	20	6.496	4	0.906	F16	17.717	11.417	*	24119.0	15925.0	5555.0	
16"	15.079	5.236	28.740	13.858	17.323	3.150	6.496	2.165	*	22.500	1 1/4" - 8unc	1 1/4" - 8 unc	4	20	6.496	4	0.906	F16	17.717	11.417	*	35566.0	22356.0	7676.0	
18"	17.087	5.866	30.512	15.315	19.094	3.150	7.087	2.559	*	24.752	1 1/4" - 8unc	1 1/4" - 8 unc	4	24	6.496	4	0.906	F16	17.717	13.976	*	52874.0	29904.0	9999.0	
20"	18.976	6.260	35.039	16.457	21.260	3.150	11.811	2.756	*	27.000	1 1/4" - 8unc	1 1/4" - 8 unc	4	24	10.000	4	0.748	F25	19.685	14.961	*	79336.0	42152.0	13130.0	
22"	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	8	/	/	/	/	/	*	/	/	*
24"	22.835	7.126	41.142	19.173	24.806	4.331	11.811	3.346	*	32.000	1 1/2" - 8unc	1 1/2" - 8 unc	4	24	10.000	8	0.748	F25	27.559	16.535	*	98970.0	54845.0	19695.0	

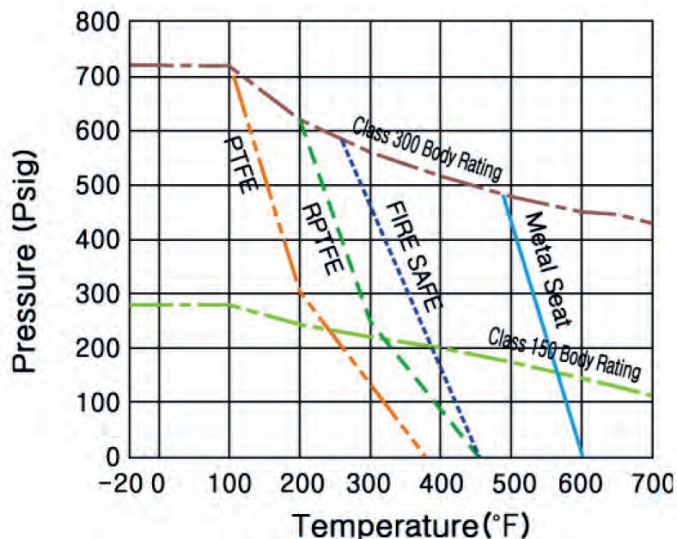
NOTE:  
 \* Please consult with manufacturer.  
 (3) Weight value is without lever / gear operator.  
 (4) Max. possible torque, the value may vary depending on the fluid flow pressure.  
 \*\* Some diameters can be operated by lever and gear operator. Gear operator is recommended to use above 8" size.



## Eccentric Double Offset Design

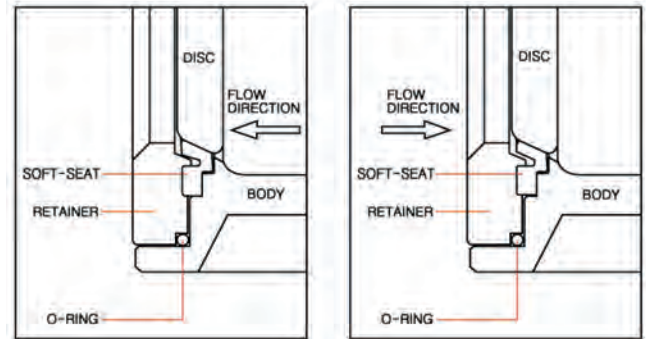


## Pressure - Temperature Chart



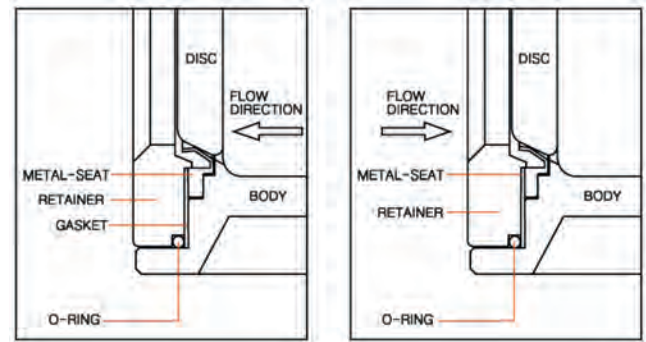
## Seat Material - Max. Working Temp.

### SOFT SEAT - High Performance Butterfly Valve



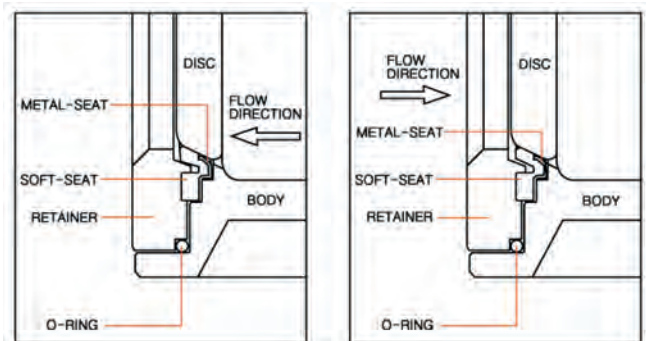
PTFE - 190°C (375°F) | TFM - 246°C (475°F)  
 RTFE - 230°C (446°F) | PEEK - 270°C (529°F)

### METAL SEAT - High Performance Butterfly Valve



METAL Seat - 315°C (600°F).  
 Class V of ANSI / FCI 70-2 C Class V Leakage Rate

### METAL SEAT - High Performance Butterfly Valve



SS316L\*RTFE - 230°C (446°F).  
 Fire Safe acc. to API 607 5th Edition  
 Seat Leakage - Leakage of soft seated option is ZERO



## How to Order

DESIGN (SERIES)	SPECIAL FEATURES	MATERIAL			ENDS	CLASS	SIZE <sup>(7)</sup>	OPERATION
		BODY <sup>(5)</sup>	TRIM <sup>(6)</sup>	SEAT				
9HI Direct Mounted High Performance Butterfly Valve	None None	2 WCB	3 316SS	P PTFE	L Lug	0 ANSI 150#	02 2"	L Manual Lever Operator
	F Fire Safe 607	3 CF8M	4 304SS	R PTFE	W Wafer	3 ANSI 300#	02.5 2 1/2"	B Bare Shaft
	N NACE			K PEEK			03 3"	P Pneumatic Actuator
	G Fire Safe & NACE			W 316 SS + RPTFE			04 4"	E Electric Actuator
	Y Cryogenic			X 316SS			05 5"	
	O Oxigen			U UHMWPE			06 6"	
							08 8"	
							10 10"	
							12 12"	
							14 14"	
							16 16"	
							18 18"	
							20 20"	
						22 22"		
						24 24"		

### Example:

Direct Mounted High Performance Butterfly Valve, Body CF8M, Trim 316SS, Seat RPTFE, Wafer 300#, Size 12" with Gear Operator.

**9HI33RW312G**

NOTES:

- (5) Please contact for more available materials.
- (6) Please contact for more available materials.
- (7) Please contact for more available sizes.

