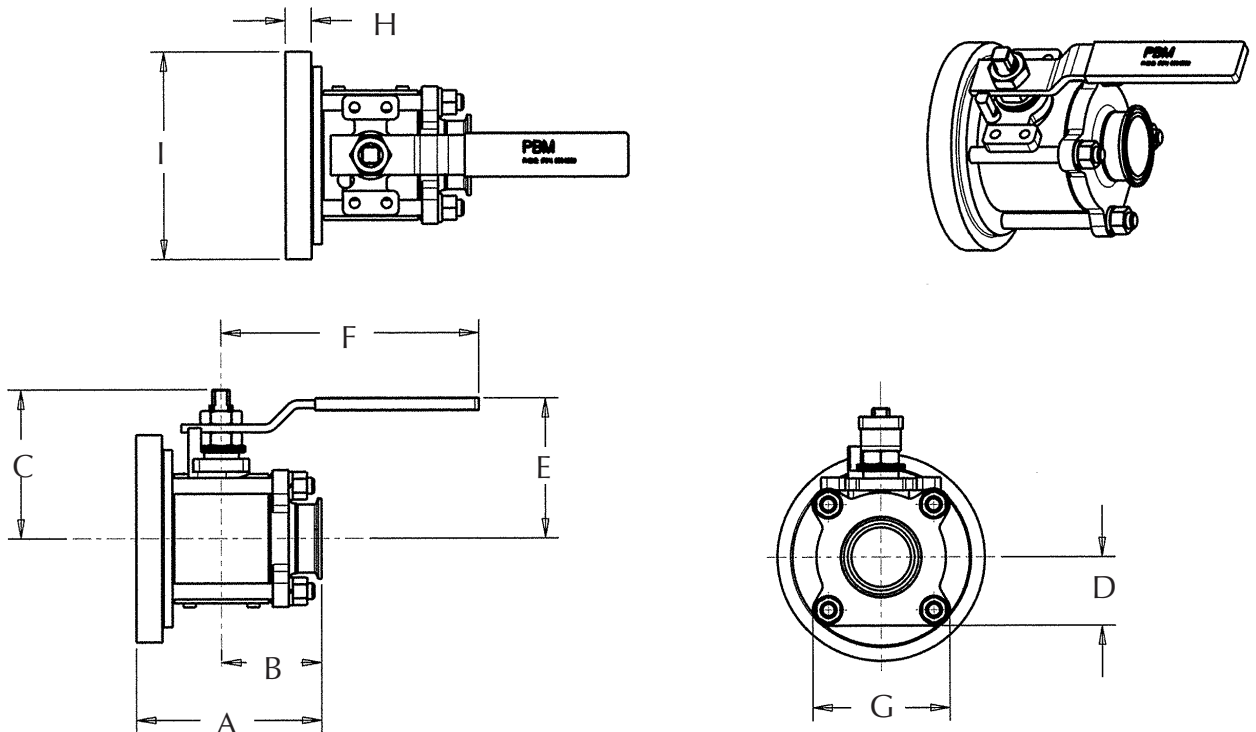




## Igenix® Flush Tank Cast Series 9 or Forged Series 8

Valve Size	Size Code	Units	I.D. Port	A	B	C	D	E	F	G	H	I	Approx. Weight
1/2"*** DN 15	C	inches	0.37	2.83	1.75	1.70	0.75	2.05	4.00	1.50	0.30	2.75	1.6 lbs.
		mm	9	72	44	43	19	52	102	38	8	70	.73 kg.
3/4"*** DN 20	D	inches	0.62	3.16	2.00	1.86	0.85	2.23	4.00	1.68	0.30	3.00	2 lbs.
		mm	16	80	51	47	22	57	102	43	8	76	.91 kg.
1"*** DN 25	E	inches	0.87	3.70	2.25	2.38	1.09	3.01	4.15	2.18	0.31	3.75	3.6 lbs.
		mm	22	94	57	60	28	76	105	55	8	95	1.63 kg.
1-1/2"*** DN 40	G	inches	1.37	4.98	2.75	3.89	1.68	5.07	8.81	3.31	0.68	5.50	12 lbs.
		mm	35	126	70	99	43	129	224	84	17	140	5.44 kg.
2"*** DN 50	H	inches	1.87	5.79	3.12	4.67	2.15	4.51	8.03	4.30	0.49	6.50	22 lbs.
		mm	47	147	79	119	55	115	204	109	12	165	9.88 kg.
3"*** DN 80	K	inches	2.87	7.52	4.00	6.76	2.77	6.76	12.06	5.54	0.85	9.00	33 lbs.
		mm	73	191	102	172	70	172	306	141	22	229	15 kg.
4"*** DN 100	L	inches	3.84	9.59	5.00	7.53	3.66	7.53	12.06	7.33	1.18	11.50	94 lbs.
		mm	98	244	127	191	93	191	306	186	30	292	42.64 kg.
6"*** DN 150	M	inches	5.78	12.78	6.50	12.14	6.18	N/A	N/A	12.36	1.34	17.00	164 lbs.
		mm	147	325	165	308	157	N/A	N/A	314	34	432	74.39 kg.

\*Cast Only  
\*\*Wrought Material or Cast





## Materials

### 316L Stainless Steel

Castings comply with A351, Alloy CF3M.

Forgings (Series 8) comply with A182, Alloy F316L and 1.4404.

Bar product complies with A479, Alloy S31603.

Cast weld pads comply with SA 351, Alloy CF3M and wrought weld pads comply with SA 479, Alloy S31603.

- Has a low (<0.03%) carbon level to reduce carbide precipitation.
- Is extremely corrosion resistant to acidic and basic environments and does not pit easily.
- Can be mechanically polished to a near-mirror finish for easy cleanability (electro polishing also available).
- Is preferred for sanitary and biotechnological uses.
- Extended butt weld ends have a sulfur content of 0.005 to 0.017% to support orbital welding.
- Low ferrite cast product is available for all product lines. Standard ferrite level of Series 8 forgings is less than 1% and standard ferrite level of Series 9 castings is less than 2%.

### Other

- Additional materials available include AL6XN<sup>®</sup>, duplex stainless, Hastelloy<sup>®</sup> alloys, Alloy 20, titanium alloys, and Inconel<sup>®</sup> alloys.

## Seat and Seal Materials

Designation	Description	Color	Purpose
TFM <sup>™</sup>	Chemically Modified PTFE  PBM Standard for Series 6, 7, 8, 9	White	Suitable for applications up to 400°F. This chemically modified PTFE material is PBM's standard seat and seal material. It combines the ruggedness of a filled PTFE with the low coefficient of friction of virgin PTFE. TFM <sup>™</sup> also has much improved porosity control and deformation under load when compared to PTFE grades. FDA and USP Class VI compliant. Meets bubbletight seat leakage.
VTFE	Virgin PTFE	White	Suitable for applications up to 350°F. A low stem torque material ideal for sanitary use. FDA and USP Class VI compliant. Meets bubbletight seat leakage.
S-TEF <sup>®</sup>	Stainless Steel Reinforced PTFE	Charcoal Gray	Suitable for applications up to 450°F. A suitable material for higher pressure/temperature applications. Higher stem torque than virgin grades and TFM <sup>™</sup> . USP Class VI compliant. Meets bubble-tight seat leakage.
UHMWPE	Ultra High Molecular Weight Polyethylene	Off White	Suitable for applications under 200°F. An extremely wear resistant material having a wear rate about 1/10th that of PTFE. FDA compliant and is used in high cycle applications where possible. Meets bubbletight seat leakage.
PEEK <sup>®</sup>	Poly Ether Ether Ketone	Putty	For applications up to 500°F. PEEK <sup>®</sup> is a rugged, high strength material having fairly high stem torque. FDA compliant. PBM's PEEK <sup>®</sup> is 10 weight percent PTFE to reduce the hardness of virgin PEEK <sup>®</sup> . FDA compliant and meets Class V seat leakage.
KYNAR <sup>®</sup>	Polyvinylidene Fluoride	Slightly Transparent White	Suitable for applications under 250°F. Kynar <sup>®</sup> has been used successfully in abrasive service and is suitable for radiation environments where gamma levels accumulate to 1,000 megarads. FDA and USP Class VI compliant. Meets bubbletight seat leakage.

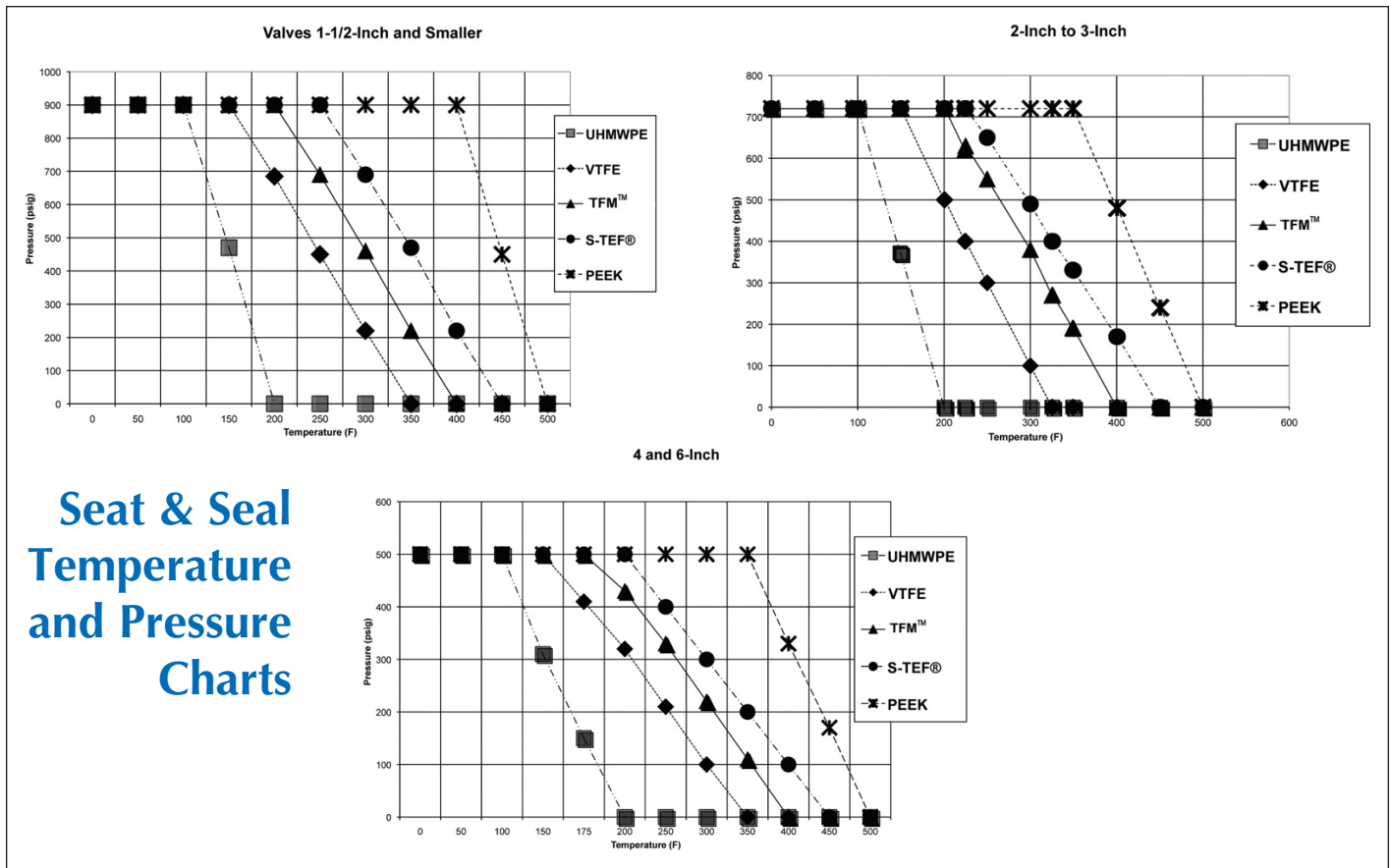
### NOTES:

1. PTFE is Polytetrafluorethylene.
2. Seat and seal materials may be mixed in a valve in order to provide media-compatibility and the appropriate torque, temperature and pressure ratings.
3. Temperature ratings based on 0 psi. See Pressure & Temperature Charts on page 8.

## Allowable Working Pressures (psig, barg)

Non-Flanged Valve Style/Series	Material	Size	-20°F to 100°F/ -28.9°C to 37.8°C		300°F/148.9°C		450°F/232.2°C	
			psig	barg	psig	barg	psig	barg
SI, FI Series 6	316 SS/316L	3" (DN80) and under	720	49.6	620	42.7	540	37.2
SI, CS, DI, DC Series 8	316 SS/316L	All	600	41.4	455	31.4	397	27.4
		C-276	740	51.0	655	45.2	620	42.7
SI, CS, DI, DC Series 9	316 SS/316L	1-1/2" (DN40) and smaller	900	62.1	770	53.1	680	46.9
		2" (DN50) thru 4" (DN100)	720	49.6	620	42.7	540	37.2
		6" (DN150)	375	25.9	320	22.1	280	19.3
	C-276	4" (DN100) and smaller	600	4.14	510	35.2	450	31.0
		6" (DN150)	375	25.9	320	22.1	280	19.3
MI Series 5	316 SS/316L	All	275	19.0	205	14.1	195	13.4
AF Series 1	316 SS/316L	1-1/2" (DN40) and smaller	900	62.1	770	53.1	680	46.9
		2" (DN50), 4" (DN100)	550	37.9	540	37.2	525	36.2
	316 SS/316L	3" (DN80)	625	43.1	610	42.1	600	41.4
	316 SS/316L	6" (DN150)	375	25.9	365	25.2	360	24.8
	C-276	1-1/2" (DN40) and smaller	600	41.4	520	35.9	475	32.8
		2" (DN50), 4" (DN100)	550	37.9	540	37.2	525	36.2
		3" (DN80)	600	41.4	520	35.9	475	32.8
		6" (DN150)	375	25.9	320	22.1	280	19.3
AF Series 3	316 SS/316L	1-1/2" (DN40) and smaller	720	49.6	620	42.7	540	37.2
		2" (DN50), 4" (DN100)	550	37.9	540	37.2	525	36.2
	316 SS/316L	3" (DN80)	625	43.1	610	42.1	600	41.4
	316 SS/316L	6" (DN150)	375	25.9	365	25.2	360	24.8
FI, FC Series 8 & 9	316 SS/316L	4" (DN100) and smaller	600	4.14	510	35.2	440	30.3
		6" (DN150)	375	25.9	320	22.1	280	19.3
	C-276	4" (DN100) and smaller	600	4.14	510	35.2	440	30.3
		6" (DN150)	375	25.9	320	22.1	280	19.3

- Notes:
1. 316 SS and C-276 retain their CWP below minus 20°F.
  2. All valves rated for full vacuum.
  3. Sanitary clamps and gaskets may limit pressure ratings to less than shown above.



## Seat & Seal Temperature and Pressure Charts



## Cv Values (gpm)

Cv is defined as the number in U.S. gallons of water per minute, at ambient temperature, that will flow through a valve at 1 psi pressure drop.

VALVE SIZE	2-WAY SI, CS				FLUSH TANK FI SERIES 8 & 9 AF SERIES 1			DIVERTER PORT SERIES 8 & 9			MULTI-PORT SERIES 5		CT Valves	
	SERIES 8 & 9		FIRESAFE SI		AF	FI	FIRESAFE FI	DI SERIES, X-ENDS			MI SERIES 5, X-ENDS		Trap Position	
	End Connection				End Connection			L-PORT	T-PORT		T-PORT		L-PORT	Series
	F-	X-	F-	X-	X-	X-	X-		Straight	Branch	Straight	Branch		8 & 9
1/2"	6.5	8	7	8		8.9	8.9	4.0	4.7	3.0	3.8	2.5	3.8	0.41
3/4"	23	28	24	28		34	34	12	15	9.0	12	7	12	0.72
1"	55	65	55	60	63	62	62	25	29	18	25	15	25	0.96
1 1/2"	160	193	160	190	150	175	175	68	81	49	66	40	66	2.8
2"	365	420	370	420	280	480	480	133	160	92	129	78	129	2.7
2 1/2"	700	800	700	800										
3"	900	1,040	850	1000	505	870	870	324	390	233	310	185	310	5.4
4"	1,800	2,080	1600	1900	690	1,550	1,550	590	715	430	570	340	570	15
6"	4,200	5,000	4200	5000	1,430	3,750	3,750	1,450	1,750	1,040				

\* F- (extended butt weld) end  
\* X- (Sanitary) end

## ID Surface Finish. Ra Readings for Valves per ASME BPE (Bioprocessing Equipment)

PBM's IGENIX® forged valves have a standard internal polish of 20 Ra Max/0.50 µm or better.

Surface Description	PBM Polish Code	Ra max.	
		µ-in.	µm
		Mechanical Polish	
SF 1	A	20	0.51
SF 2	A	25	0.64
SF 3	-	30	0.76
		Mechanical polish and electropolish	
SF 4	G	15	0.38
SF 5	F	20	0.51
SF 6	F	25	0.64

Default Polish:  
Series 8 - 20 Ra (SF-1)  
Series 9 - 30 Ra (SF-3)

**Polish Notes:**  
- On ID polished valves, the body, ball, seat retainer (if applicable) and end fittings are polished.  
- On ID/OD polished valves, the body, ball, seat retainer (if applicable) and end fittings are polished.  
- On ID+EP polished valves, the body, ball, seat retainer (if applicable), end fittings are polished. Stem is EP'd.  
- PBM achieves surface finishes without the use of ADIs (Animal Derived Ingredients).

## O-Ring and Seat Compliancy

Material		Compliancy	
		FDA	USP Class VI
EPR O-ring*	E3609-70	Yes	Yes
Seat	Virgin TFM™	Yes	Yes

\*O-rings used in "Clean Steam" Series CS, CT, FC, DC and SI, FI, AF Firesafe.

## Stem Torque

Valve Style/ Series	Valve Size (in.)	As built Torque		TFM™ and VTFE Seats - Differential Pressure across Seats															
				0 psig	0 barg	100 psig	6.9 barg	200 psig	13.8 barg	300 psig	20.7 barg	400 psig	27.6 barg	500 psig	34.5 barg	600 psig	41.4 barg	700 psig	48.3 barg
		in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m	in.-lb.	N-m
Fire-safe Series 6	1/4, 1/2	32	3.6	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2	64	7.2
	3/4	40	4.5	80	9.0	80	9.0	80	9.0	80	9.0	80	9.0	96	10.8	112	10.8	128	12.7
	1	58	6.6	116	13.1	116	13.1	116	13.1	150	16.9	185	20.9	220	24.9	trun.			
	1-1/2	154	17.4	308	34.8	308	34.8	440	49.7	580	65.5	715	80.8	trun.	trun.				
	2	182	20.6	364	41.1	364	41.1	635	71.7	910	102.8	1,180	133.3	trun.	trun.				
	2-1/2	288	32.5	576	65.1	576	65.1	1,200	135.6	1,600	180.8	trun.							
	3	430	48.6	860	97.2	860	97.2	1,560	176.3	trun.	trun.								
	4	787	88.9	1,570	177.4	2,650	299.4	trun.	trun.										
6	1,920	217.0	3,840	433.9	7,100	802.3	Use trunnion above 75 psig.												
All Series 8 & 9 2-Way and 3-Way	1/2	25	2.8	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7	50	5.7
	3/4	30	3.4	60	6.8	60	6.8	60	6.8	60	6.8	60	6.8	60	6.8	60	6.8	80	9.0
	1	50	5.7	100	11.3	100	11.3	100	11.3	130	14.7	160	18.1	220	24.9	trun.	trun.		
	1-1/2	132	14.9	264	29.8	264	29.8	375	42.4	500	56.5	600	67.8	trun.	trun.				
	2	182	20.6	364	41.1	364	41.1	635	71.8	910	102.8	1,180	133.3	trun.	trun.				
	2-1/2	288	32.5	576	65.1	576	65.1	1,200	136	1,600	181	trun.	trun.						
	3	430	49	860	97.2	860	97.2	1,560	176	trun.	trun.								
	4	672	76	1,340	151	2,250	254	trun.	trun.										
6	1,920	217	3,840	434	7,100	802	Use trunnion above 75 psig.												
AF Series 1 and Series 3	1	58	6.6	116	13.1	116	13.1	116	13.1	150	17.0	185	20.9	220	24.9	255	28.8	288	32.5
	1-1/2	132	14.9	264	29.8	264	29.8	375	42.4	500	56.5	600	67.8	725	81.9	850	96.1	950	107
	2	154	17.4	308	34.8	308	34.8	440	49.7	580	65.5	715	80.8	850	96.1				
	3	336	38.0	675	76.3	675	76.3	1,400	158	1,900	215	2,400	271	2,900	328	3,400	384		
	4	432	49	860	97.2	860	97.2	1,560	176	2,050	232	2,540	287	3,030	342				
	6	1,056	119	2,100	237	3,950	446												

Valve Series	Size	As built Torque		0 psig	0 barg	100 psig	6.9 barg	200 psig	13.8 barg	275 psig	19.0 barg
MI Series 5	1/2	67	7.6	135	9.3	142	9.8	149	10.3	154	10.6
	3/4	80	9.0	160	11.0	167	11.5	174	12.0	182	12.5
	1	154	17.4	307	21.2	322	22.2	337	23.2	358	24.7
	1-1/2	313	35.4	627	43.2	670	46.2	759	52.3	843	58.1
	2	491	55.5	981	67.6	1,037	71.5	1,238	85.4	1,388	95.7
	3	840	95.0	1,679	115.8	2,084	143.7	2,761	190.4	3,268	225.3
4	1,539	173.9	3,077	212.2	4,114	283.7	5,580	384.7	6,679	460.5	

Notes:

1. For valves with UHMWPE seats, multiply the above values by 1.25
2. For valves which have S-TEF® or Kynar® seats, multiply the above values by 1.56.
3. For valves with PEEK® seats, multiply the above values by 1.7.
4. Where trunnion is indicated, PBM recommends trunnion mounting the ball to avoid excessive seat loads and stem torques.
5. To convert in.-lbs. torques to N-m, multiply by 0.113.