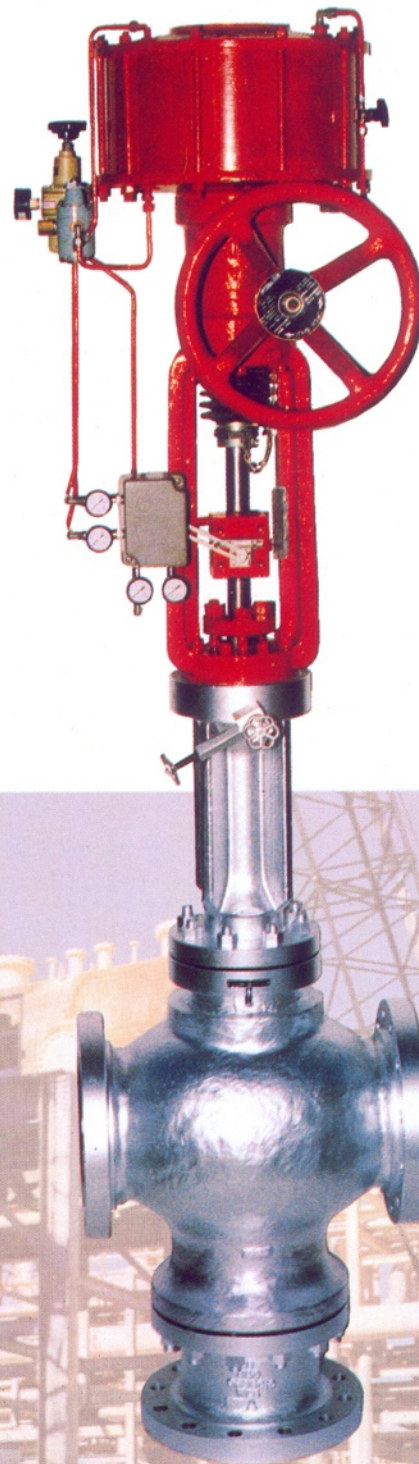




INSTRUMENTATION LTD., PALAKKAD

The most economical and appropriate selection of mixing or diverting three-way valves is called for in applications involving two streams mixing into one or a single stream getting divided into two proportionately. The flexibility of mixing valve being used in diverting service exists under certain operating conditions.



THREE WAY VALVES
VTM • VTD





I. FEATURES

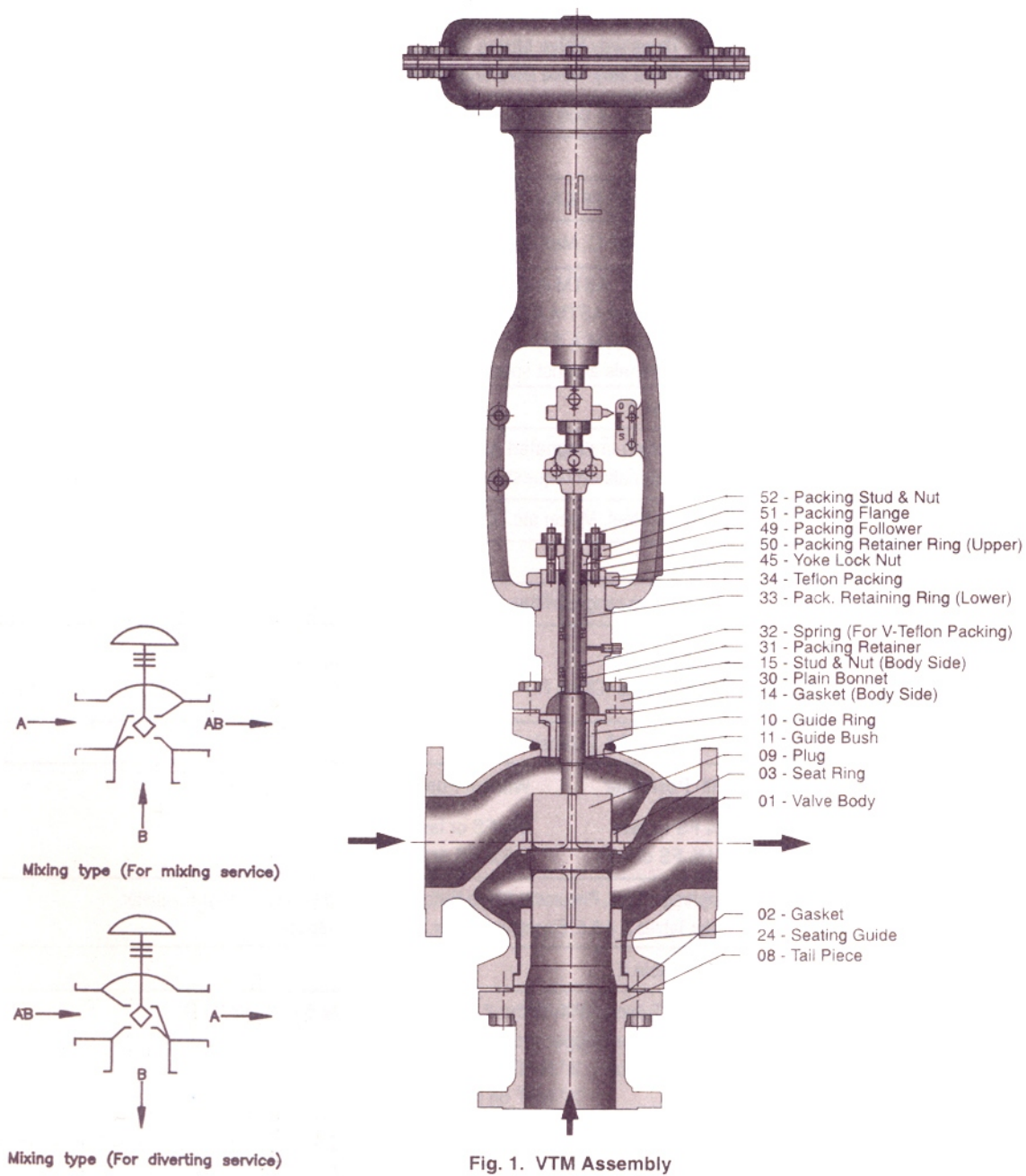
- Used for mixing and diverting services.
- Regulating and on off services.
- Flexibility of using mixing valve for diverting services upto 10".

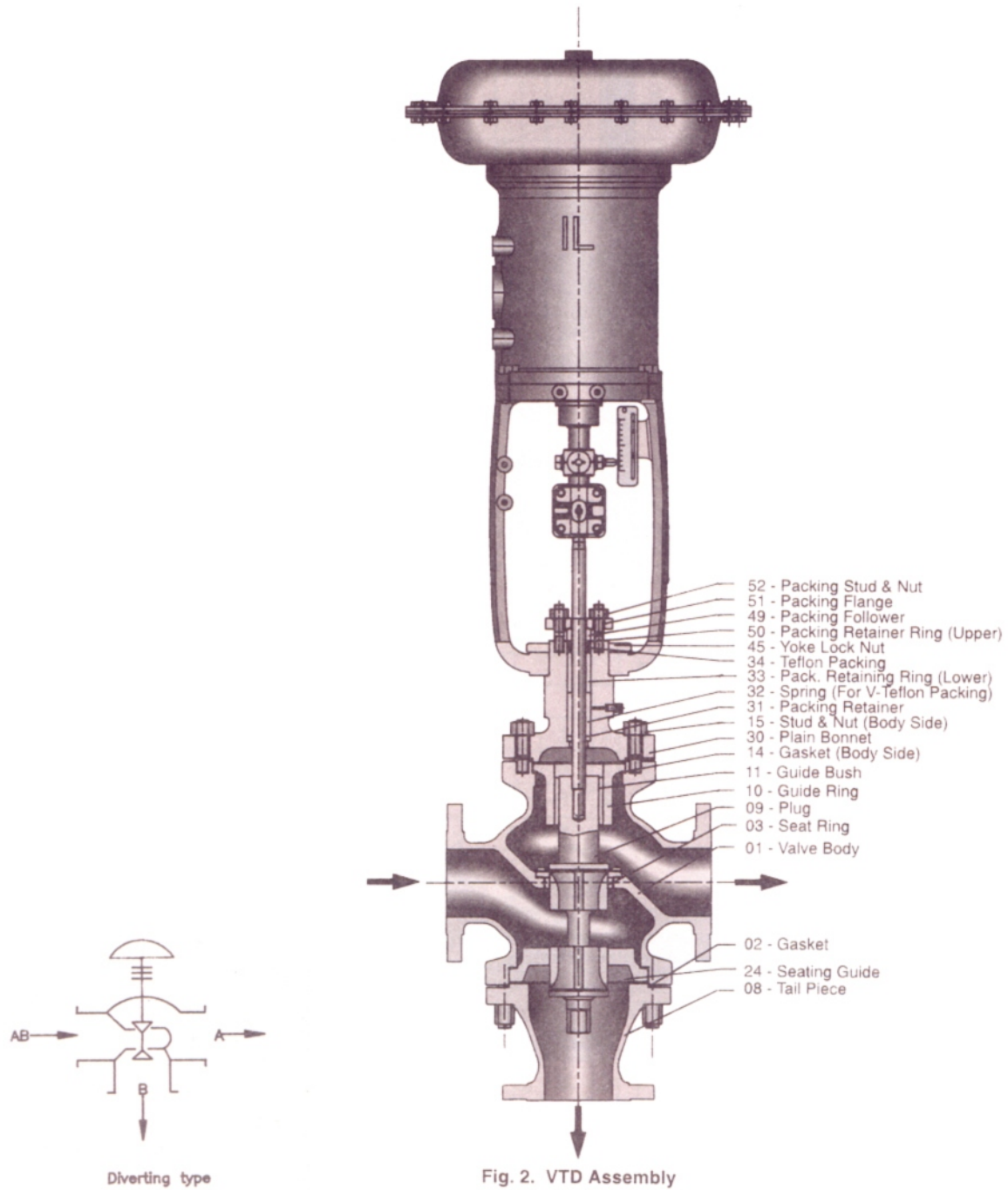
* SPECIFICATIONS	TYPE OF VALVE ASSEMBLIES	VTM - Three way Valve Mixing Service. VTD - Three way Valve Diverting Service	
	PRESSURE RATING	ANSI 150, 300 & 600 (Higher ratings on request)	
	NOMINAL SIZE (Inches)	1 to 20	
	END CONNECTION	Flanged End (RF, FF & RJ)	
	SERVICE TEMP. RANGE	-195° C to 425° C. Max. 200°C for soft seated valves	
STANDARD MATERIALS	VALVE BODY	Carbon Steel ASTM A 216 WCB Stainless Steel ASTM A 351 CF8, CF8M Alloy Steel ASTM A 217 WC6, WC9 Other materials against specific request.	
	TRIM	Refer table 1.	
	PACKING	Teflon, Teflon Impregnated Asbestos, Graphited Asbestos, Graphoil etc. Other materials on request	
	GASKET	Stainless Steel, Monel etc. Other materials on request.	
	FLOW CHARACTERISTICS	Linear	
PERFORMANCE	RANGEABILITY	30:1 (Higher rangeabilities are available against specific request)	
	LEAKAGE AT FULL CLOSURE (% OF Cv) AS PER ANSI B16.104	<u>Metallic seated</u> 0.01% or less (Class IV)	<u>Soft seated</u> 0.00001% or less (Class VI)
	BONNET	Plain, Finned & Extension	
	ACTION	With Positioner	Without Positioner
	HYSTERESIS	1% FS or less	3% FS or less
	LINEARITY	± 1% FS or less	± 5% FS or less
	MAX. ALLOWABLE PRESSURE DROP	Diaphragm Type, Pneumatic Single Piston or Double piston cylinder type actuator. Refer Tables 3, 4 & 5. Electrical actuator available on request.	
	Cv VALUE	Refer Table 2	
TUBING	Copper Tubing (With/Without PVC Coating) size 6 or 8 mm. O.D. SS Tubing for Copper prohibition. Air Connection : ¼" NPT as standard. ½" NPT on request.		
OPTIONS	Valves with Steam Jacketing with a max. rating of ANSI 300 for the steam jacket can be provided. Manual Actuators. Side or Top Mounted Handwheel. Pneumatic & Electro-Pneumatic Positioner, I/P Converter, Solenoid valve, Air Filter Regulator, Air lock relay, Position Transmitter, Limit Switches, Volume Boosters etc.		

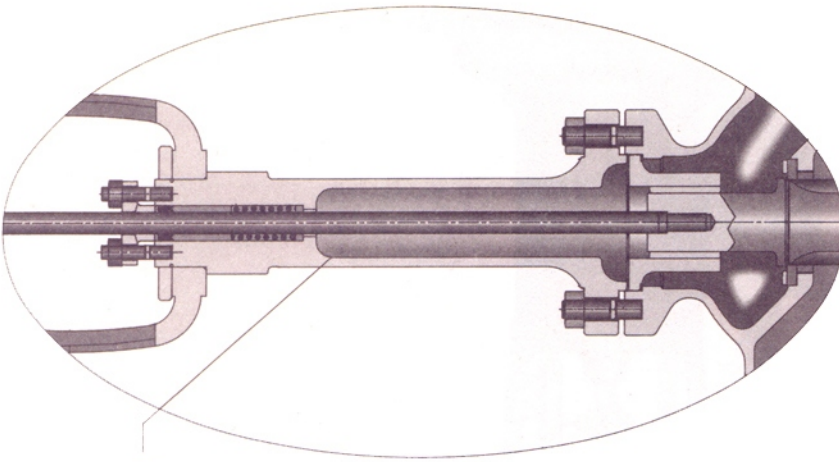
* For exact Product range refer Cv Table



VALVE ASSEMBLY

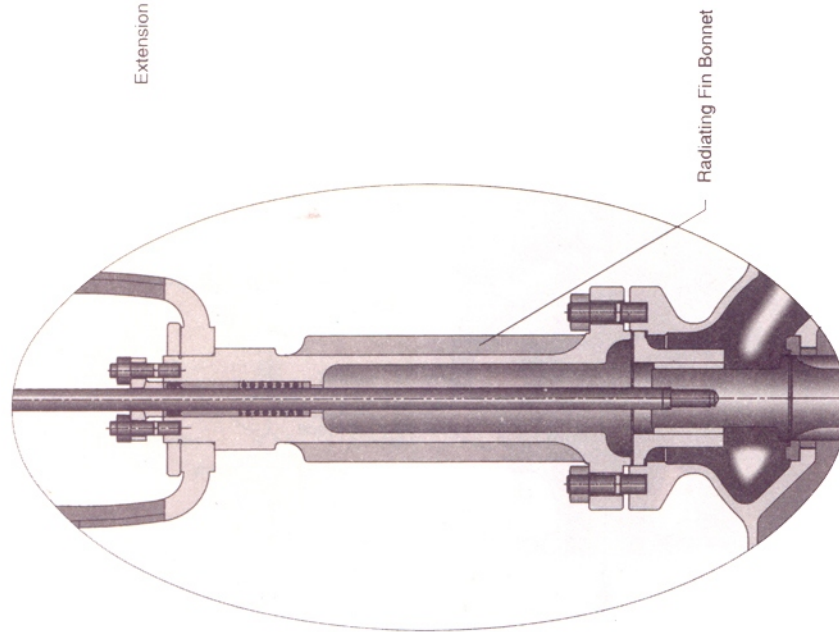






Valve Assembly with Extension Column Bonnet
(For 0° to -195°C)

Fig. 4



Valve Assembly with Radiating Fin Bonnet
(For -30° to 425°C)

Fig. 3

II. TRIM MATERIAL SELECTION

Table 1

Trim Combination No.	Trim Designation	Plug	Seat Ring	Applicable Temp. Range (°C)	VTM	WLM
07	SS 316 St. Seat	SS 316 St. Seat	SS 316 St. Seat	- 195 to 425	•	•
10	SS 316 Teflon Ins.	SS 316 Teflon Ins.	SS 316	- 70 to 200	•	•

III. FLOW COEFFICIENT Cv WITH STEM TRAVEL

Table 2

VALVE SIZE (Inch)	¾	1	1½	2	2½	3	4	5	6	8	10	12	16	20
VTM	6.3	10	23	40	63	90	160	250	360	580	900	1300	-	-
VTD	-	-	-	-	-	70	130	200	270	480	750	1080	1970	3000
STEM TRAVEL (mm)	14.3													

IV. MAXIMUM PRESSURE DIFFERENTIAL

IV.1. Three way Diverting Type

Table 3

Actuator Model	Air to Diaphragm (Kg/Cmf)	Spring Range (Kg/Cmf)	Positioner	Pressure Differential (Kg/Cmf) at Port size (Inch)											
				3	4	5	6	8	10	12					
VA2/D/R	1.2	0.2-1.0	X												
	1.4		O	1.1											
	2.6		O	3.5											
VA3/D/R	1.2	0.2-1.0	X	1.8	1.2	0.74	0.5								
	1.4		O												
	2.6		O	5.5	3.6	2.2	1.4								
VA4/D/R	1.2	0.2-1.0	X	2.5	1.8	1.0	0.6	0.4							
	1.4		O												
	2.6		O	8.3	5.4	3.0	2.0	1.1							
VA5/D/R	1.2	0.2-1.0	X	2.1	1.4	0.9	0.5	0.3	0.2						
	1.4		O												
	2.6		O	7.2	4.2	2.8	1.6	0.9	0.7						
VA6/R	3.0	0.8-2.4	O									21	14.5		

X - Without Positioner O - With Positioner

IV.2. Piston Cylinder Actuators

Table 4

Actuator Model	Air to Diaphragm (Kg/Cmf)	Pressure Differential (Kg/Cmf) at Port size (Inch)											
		Mixing Type (Mixing & Diverting service)											
		6	8	10	12	16	20	Diverting Type (Diverting service)					
SPA2	5	-	16	9.7	6.4	-	-						
SPA1	5	-	26	16.3	11	-	-						
DPA1	5	-	52	32	22	-	-						
		Diverting Type (Diverting service)											
SPA2	5	30	16	19.7	6.4	3.1	1.7						
SPA1	5	48	26	16.3	11	5.7	3.4						
DPA1	5	96	52	32	22	11	6						

IV.3. Three way Mixing Type

Table 5

Actuator Model	Air to Diaphragm (Kg/Cmf)	Spring Range (Kg/Cmf)	Positioner	Pressure Differential (Kg/Cmf) at Port size (Inch)											
				¾	1	1½	2	2½	3	4	5	6	8	10	
FOR MIXING SERVICE															
VA1 D/R	1.2	0.2-1.0	X	7.5	4.6	3.1	1.8								
	1.4		O												
	2.6		O	22	13.5	9.3	5.6								
VA2 D/R	3.0	0.8-2.4	X	37	23	15.5	9.2								
	1.2		X	10.5	6.6	4.5	2.7	1.6	1.2	0.65					
	1.4		O												
VA3 D/R	2.6	0.4-2.0	O	32	21	13	8.1	4.9	3.6	2					
	3.0		X	54	33	22.5	13.4	8.3	6	3.3					
	1.2		X	17	11	7.4	4.4	2.7	1.9	1.1	0.7	0.4			
VA5 D/R	1.4	0.2-1.0	O												
	2.6		O	53	33	22	14	8.2	5.9	3.3	2.1	1.4			
	3.0		X	89	55	37	22	13.5	9.9	5.5	3.5	2.4			
VA4 D/R	1.2	0.2-1.0	X												
	1.4		O												
	2.6		O												
VA5 D/R	3.0	0.8-2.4	X												
	1.2		X												
	1.4		O												
VA6 R	2.6	0.4-2.0	O												
	3.0		X												
	3.0		X												
FOR DIVERTING SERVICE															
VA1 D/R	1.2	0.2-1.0	X	7.5	4.6	3.1	1.8								
	1.4		O												
	2.6		O	15	9.2	6.2	3.7								
VA2 D/R	1.2	0.2-1.0	X	10.5	6.6	4.5	2.7	1.6	1.2	0.65					
	1.4		O												
	2.6		O	21	13	9	5.4	3.3	2.4	1.3					
VA3 D/R	1.2	0.2-1.0	X	17	11	7.4	4.4	2.7	1.9	1.1	0.7	0.4			
	1.4		O												
	2.6		O	35	22	14.5	8.9	5.5	3.9	2.2	1.4	0.9			
VA4 D/R	1.2	0.2-1.0	X												
	1.4		O												
	2.6		O												
VA5 D/R	1.2	0.2-1.0	X												
	1.4		O												
	2.6		O												
VA6 R	3.0	0.8-2.4	O												
	3.0		O												
	3.0		O												

X - Without Positioner O - With Positioner



V. FACE TO FACE DIMENSIONS

Table 6

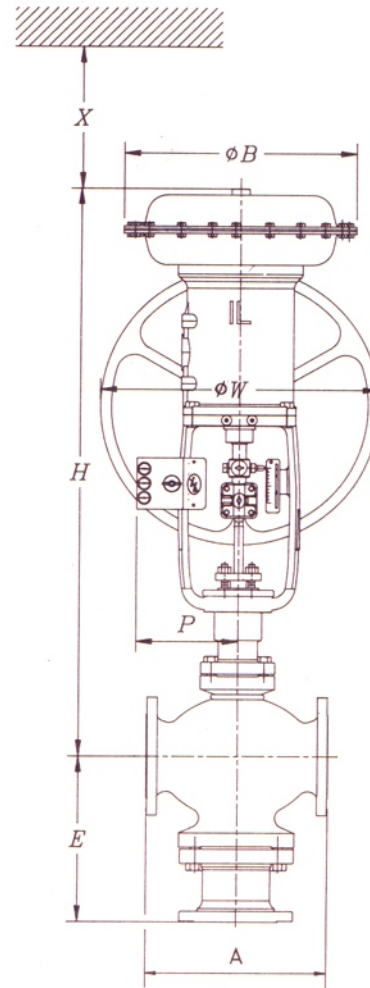
Valve size (Inch)	A (mm)					
	VALVE TYPE : MIXING			VALVE TYPE : DIVERTING		
	ANSI 150	ANSI 300	ANSI 600	ANSI 150	ANSI 300	ANSI 600
1	197	197	210			
1½	222	235	256			
2	254	267	286			
2½	276	292	311			
3	298	318	337	370	420	-
4	352	368	394	400	460	488
5	403	435	-	460	-	-
6	451	473	508	530	570	770
8	543	568	610	568	568	610
10	673	708	-	-	708	752
12	-	791	-	-	920	-
16	-	-	-	-	-	1270
20	-	-	-	-	1485	-

VI. EXTERNAL DIMENSIONS

VI.1. For Mixing & diverting type

Table 7

ACTUATOR Model	øW	P			X
		HTP	HEP	VPP	
VA 1 D/R	280	216	300		230
VA 2 D/R	355	220	310		245
VA 3 D/R	450	240	335		245
VA 4 D/R	570	262	360		360
VA 5 D/R	570	270	375		420
VA 6 R	380		350	295	190
SPA 1	400		360	295	330
SPA 2	380		350	300	305
DPA 1	550		400	350	305



VI.2. Mixing Type

Table 8

Valve size (Inch)	Rating ANSI	H ± 10 (mm)																E (mm)															
		VA 1 D,R		VA 2 D,R		VA 3 D,R		VA 4 D		VA 4 R		VA 5 D		VA 5 R		VA 6 R			VA 6 RS		SPA 1		SPA 1M		SPA 2		SPA 2M		DPA 1		DPA 1M		
		P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF		P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	
1	150 - 600	670	745	815	865																											145	
1½	150 - 600	690	765	830	885																											205	
2	150 - 300	705	780	850	900																											230	
	600	705	780	850	900																											255	
2½	150 - 600			860	1010	1025	1175																									260	
	600			880	1030	1050	1200																									280	
3	150 - 300			880	1030	1050	1200																										290
	600			880	1030	1050	1200																										330
4	150 - 300			900	1050	1065	1215																										385
	600			910	1060	1075	1225																										370
5	150 - 300					1110	1260	1270	1420	1395	1550	1320	-	1430	-	1170	-	1370	-													410	
6	150 - 300					1135	1285	1300	1450	1425	1575	1345	-	1455	-	1200	-	1400	-														440
	600					1170	1320	1330	1480	1455	1605	1380	-	1490	-	1230	-	1430	-														540
8	150 - 300							1370	1520	1490	1640	1635	1570	1530	1680						1490	1685	1750	1945	1415	-	1655	-	1650	1845	1900	2095	570
	600							1370	1520	1490	1640	1635	1570	1530	1680																		690
10	150 - 300												1620	1770	1750	1900					-	1700	-	1960	1420	1615	1660	1855	-	1860	-	2110	715
12	300																				-	1550	-	1810				-	1710	-	1960		
Dimension øB (mm)		300		350		450		520		620		445		545		445		485															

VI.3. Diverting Type

Table 9

Valve size (Inch)	Rating ANSI	H ± 10 (mm)																								E (mm)					
		VA 2 D,R		VA 3 D,R		VA 4 D		VA 4 R		VA 5 D		VA 5 R		VA 6R		VA 6 RS		SPA 1		SPA 1M		SPA 2		SPA 2M			DPA 1		DPA 1M		
		P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF		P	RF	P	RF	
3	150 - 600	900	1050	1065	1215	1225	1375	1350	1500																					300	
4	1500 - 300			1050	1200	1215	1365	1340	1490	1275	1410	1385	1520																350		
	600			1100	1250	1260	1410	1385	1535	1320	1460	1435	1570																440		
5	150 - 300			1130	1280	1295	1445	1420	1575	1345	1495	1455	1555	1200	1300	1400	1500												370		
6	150 - 300			1120	1270	1290	1430	1420	1555	1330	1480	1440	1590	1185	1335	1385	1535	1305	1570	1565	1830	1230	1495	1470	1735	1465	1730	1715	1980	450	
	600			1120	1270	1290	1430	1420	1555	1330	1480	1440	1590	1185	1335	1385	1535	1305	1570	1565	1830	1230	1495	1470	1735	1465	1730	1715	1980	570	
8	150																	1430	1555	1690	1815					1590	1715	1840	1965	510	
	300					-	1575	-	1700	1480	-	1590	-					1430	1555	1690	1815	1355	-	1595	-	1590	1715	1840	1965	510	
	600																	1430	1555	1690	1815					1590	1715	1840	1965	620	
10	150 - 300									1565	1725	1675	1835					1525	1680	1785	1940	1415	-	1655	-	1685	1840	1935	2090	655	
12	300									1525	1680	1630	1790					1455	1625	1715	1885					1615	1785	1865	2035	850	
16	600																	1800	-	2060	-					1960	-	2210	-	1195	
20	300																	-	1785	-	2045	-					-	1945	-	2195	1235
Dimension ϕ B (mm)		350		450		520				620				445				545				445				485					

P - Plain Bonnet

RF - Radiating Fin Bonnet

VII. APPROXIMATE WEIGHTS

VII.1. Mixing Type

Table 10

Valve size (Inch)	Rating ANSI	Weight (Kg)																															
		VA 1 D,R		VA 2 D,R		VA 3 D,R		VA 4 D		VA 4 R		VA 5 D		VA 5 R		VA 6R		VA 6 RS		SPA 1		SPA 1M		SPA 2		SPA 2M		DPA 1		DPA 1M			
		P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF
1	150	38	40	49	51																												
	300	43	45	54	56																												
	600	49	51	60	62																												
1½	150	46	48	57	59																												
	300	50	52	61	63																												
	600	53	55	64	66																												
2	150	50	52	61	63																												
	300	53	58	67	69																												
	600	58	60	69	71																												
2½	150			85	90	113	118																										
	300			94	99	122	127																										
	600			100	105	128	133																										
3	150			96	101	124	129																										
	300			104	109	132	137																										
	600			128	133	156	161																										
4	150			120	125	148	153																										
	300			140	145	188	173																										
	600			179	184	197	202																										
5	150			182	189	257	264	282	289	282	-	342	-	322	-	352	-																
	300			235	242	310	317	335	342	335	-	395	-	375	-	405	-																
6	150			230	237	305	312	330	337	330	-	390	-	370	-	400	-																
	300			264	271	339	346	364	371	364	-	454	-	434	-	464	-																
	600			298	305	373	380	398	405	398	-	458	-	438	-	468	-																
8	150					430	440	455	465	455	465	515	525					495	505	555	565	445	-	495	-	1650	1845	1900	2095				
	300					510	520	535	545	535	545	595	605					575	585	635	645	525	-	575	-	1650	1845	1900	2095				
	600					600	610	625	635	625	635	685	695																				
10	150									595	605	655	665					-	645	-	705	665	675	715	725	-	805	-	845				
	300									695	705	755	765					-	880	-	940	680	690	730	740	-	1040	-	1080				
12	300																	-	1300	-	1360						-	1460	-	1500			

P - Plain Bonnet

RF - Radiating Fin Bonnet



VII.2. Diverting Type

Table 11

Valve size (Inch)	Rating ANSI	H ± 10 (mm)																											
		VA 2 D,R		VA 3 D,R		VA 4 D		VA 4 R		VA 5 D		VA 5 R		VA 6 R		VA 6 RS		SPA 1		SPA 1M		SPA 2		SPA 2M		DPA 1		DPA 1M	
		P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF	P	RF
3	150	110	115	145	150	*	*	*	*																				
	300	125	130	155	160	*	*	*	*																				
4	150			170	175	240	245	275	300	280	285	340	345																
	300			190	195	260	265	285	310	300	305	360	365																
	600			200	205	270	275	295	320	310	315	370	375									380	385	430	435				
5	150			240	245	285	290	310	315	315	320	370	375	345	350	375	380												
	300			255	260	305	310	330	335	345	350	405	410	375	380	405	410												
6	150			275	285	375	380	400	405	395	400	455	460	420	430	450	460	500	510	560	570	395	405	745	455	660	670	700	710
	300			365	375	450	455	475	480	480	485	540	545	505	515	535	545	595	605	655	665	485	495	535	545	755	765	795	805
	600			390	400	475	480	500	505	505	510	565	570	530	540	560	570	620	630	680	690	510	520	560	570	780	790	820	830
8	150																	495	505	555	565					655	665	695	705
	300					-	520	-	545	535	-	595	-					575	585	635	645	605	-	665	-	735	745	775	785
	600																	670	690	720	740					830	850	870	890
10	150									585	605	725	745					690	710	750	770	590	-	640	-	850	870	890	910
	300									645	665	785	805					780	800	840	860	720	-	770	-	940	960	980	1000
12	300									1250	1270	1310	1330					1365	1385	1425	1445					1525	1545	1565	1585
16	600																	1800	-	2080	-					1960	-	2210	-
20	300																	-	1785	-	2045					-	1945	-	2195

P - Plain Bonnet RF - Radiating Fin Bonnet