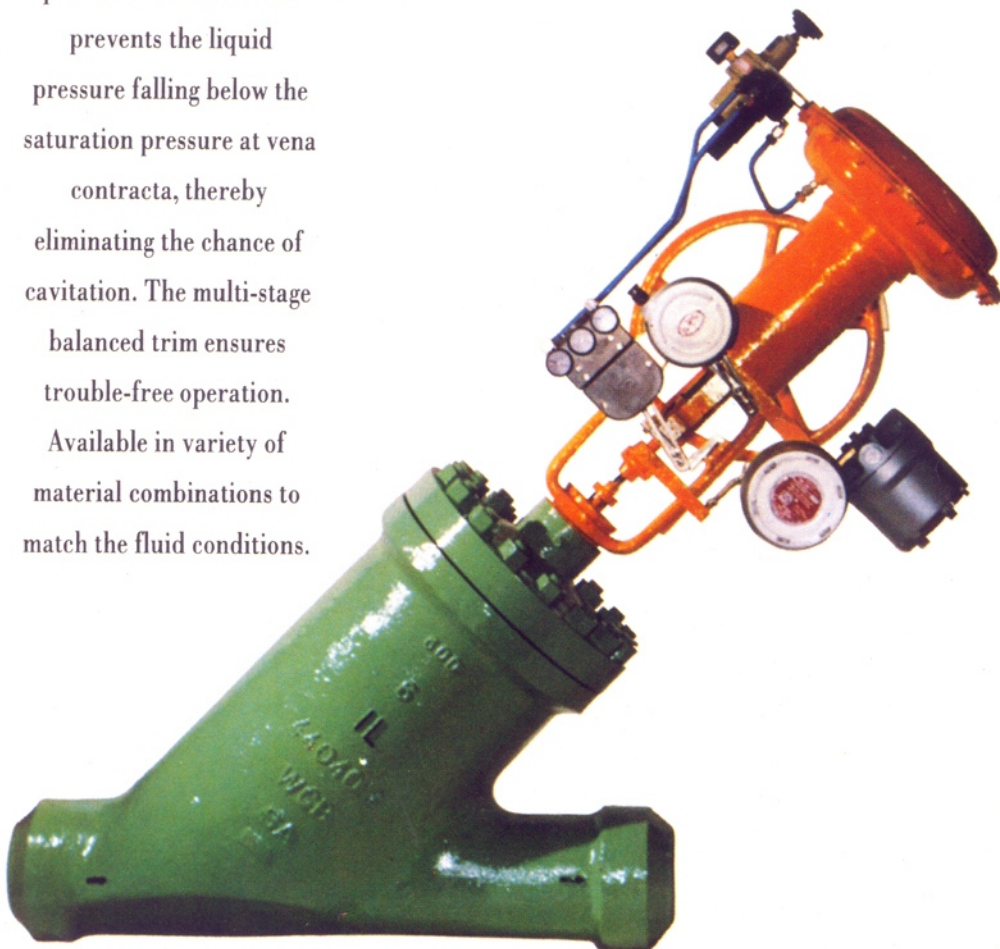




**INSTRUMENTATION LTD.,
PALAKKAD**

Designed and manufactured to meet the most exacting operating conditions of liquids. Even in very high pressure drop applications the multi stage pressure reduction trim prevents the liquid pressure falling below the saturation pressure at vena contracta, thereby eliminating the chance of cavitation. The multi-stage balanced trim ensures trouble-free operation. Available in variety of material combinations to match the fluid conditions.



**HIGH PRESSURE
DROP VALVES**

VHD



I. FEATURES

- Best suited for cavitation services.
- Control of High pressure fluids especially water.
- Multiple step plug and Cage design.
- Four stage Pressure reduction.
- Balanced Trim with a wide range of allowable pressure drops.
- Standard Angle Body and in-line body styles offered to accommodate various piping requirements.
- Reduced Erosion and noise level compared to conventional control valves.

VALVE ASSEMBLY

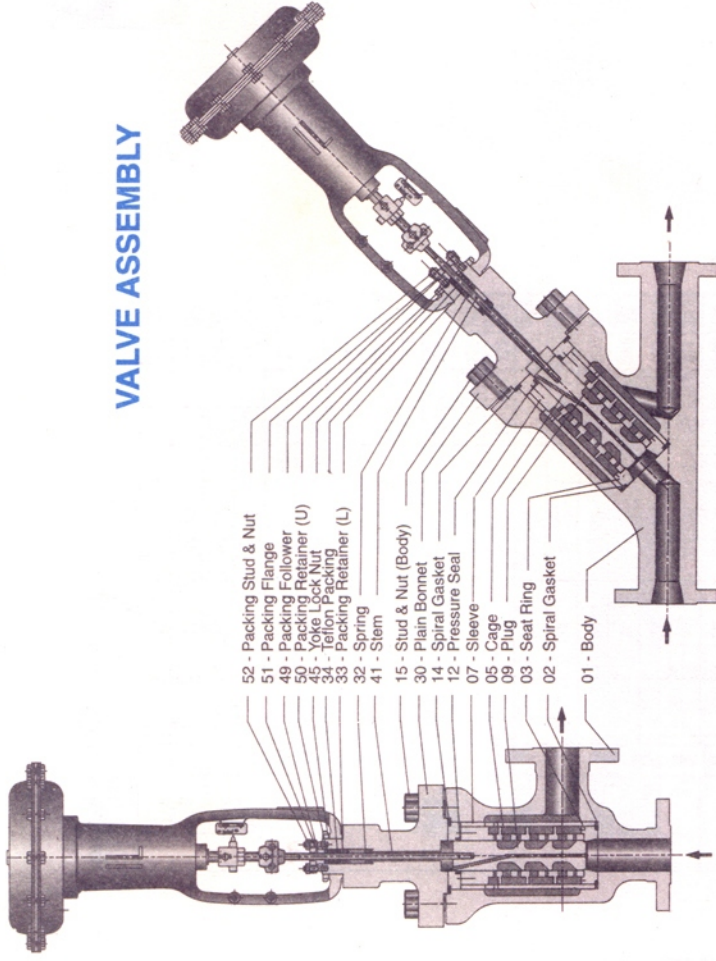


Fig. 1

VHD (Angle Body) Assembly

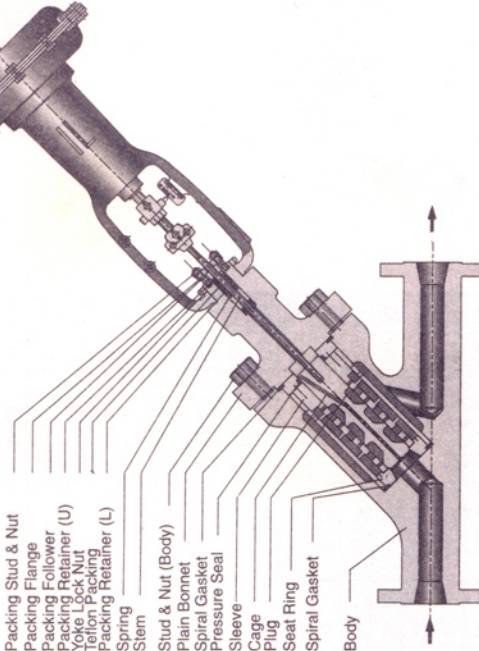


Fig. 2

VHD ('Y' Type Body) Assembly

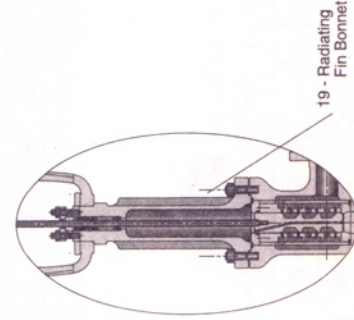


Fig. 3

Angle Type Body with Radiating Fin Bonnet (For -30° to 280°C)

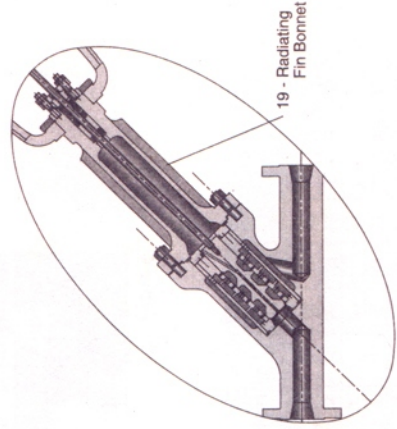


Fig. 4

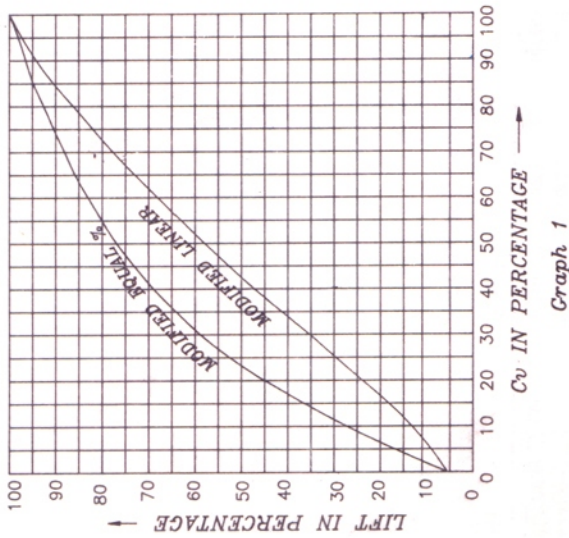
Y-Type Body with Radiating Fin Bonnet (For -30° to 280°C)

SPECIFICATIONS*	VALVE ASSEMBLY	Angle & 'Y' Type Single seated multi stage Cage guided valve.
	PRESSURE RATING	ANSI 150 - 2500
	NOMINAL SIZE (inches)	1" - 6"
	END CONNECTION	Flanged End (RF, FF & RJ), Socket & Buttwelded.
	SERVICE TEMP. RANGE	-20° C to 280° C
	VALVE BODY	Carbon Steel ASTM 216 WCB Alloy Steel A 217 WC 6, S. Steel A 351 CF 8 / CF 8M
	TRIM	17-4-PH, CA6-NM
	PACKING	Teflon, Teflon Impregnated Asbestos, Graphited Asbestos, Graphoil etc. Other materials on request
	GASKETS	Stainless Steel with spiral wound asbestos
	FLOW CHARACTERISTICS	Modified Linear & Modified Equal Percentage
	RANGEABILITY	30:1
	LEAKAGE AT FULL CLOSURE (% OF Cv)	Class IV (0.01% or less) (acc. to ANSI B 16.104) (Class V can be provided as a special case)
	BONNET	Plain, Finned
	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 Actuator Refer Tables 2 to 4.
	Cv VALUE	Refer Table 1
	OPTIONS	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 as option
	ACCESSORIES	Slide 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



II. FLOW CHARACTERISTICS



Graph 1

III. FLOW COEFFICIENT VS STEM TRAVEL

RATED Cv	VALVE SIZE (inch)	1½		2		2½		3		4		6							
		Modified Linear	Modified Equal Percentage	Modified Linear	Modified Equal Percentage	Modified Linear	Modified Equal Percentage	Modified Linear	Modified Equal Percentage	Modified Linear	Modified Equal Percentage	Modified Linear	Modified Equal Percentage						
	Stem Travel (mm)	2.5	4	6.3	10	6.3	10	16	10	14	21	32	40	21	32	40	50	65	90
		2.5	4	6.3	10	6.3	10	10	14	21	32	40	50	21	32	40	50	65	-
		12.5		12.5		25		37.5		37.5		37.5		37.5		37.5		50	

IV. MAXIMUM PRESSURE DIFFERENTIAL

IV.1. Direct Action (Air to Close)

ACTUATOR MODEL	AIR to DIAPHRAGM (Kg/Cm ²)	SPRING RANGE (Kg/Cm ²)	PRESSURE DIFFERENTIAL (Kg/Cm ²) FOR VALVE SIZE (inch)							
			1½	2	2½	3	4	6		
VA 1D	3.0	0.4-2.0	100	100						
	3.0	0.8-2.4	100	68.3						
VA 2D	3.0	0.4-2.0	100	100	60.2	49.5				
	3.0	0.8-2.4	100	100	36.1	29.7				
VA 3D	3.0	0.4-2.0	100	100	75.4					
	3.0	0.8-2.4	100	100	45.2					

Note : 1. DP shown in the table are for class IV leakage.

2. Class V leakage can be obtained by increasing the supply pressure.

IV.2. Reverse Action (Air to Open)

Table 3

ACTUATOR MODEL	AIR TO DIAPHRAGM (Kg/Cm ²)	SPRING RANGE (Kg/Cm ²)	PRESSURE DIFFERENTIAL (Kg/Cm ²) FOR VALVE SIZE (inch)						
			1½	2	2½	3	4	6	
VA 1R	3.0	0.4-2.0	100	45.5					
	3.0	0.8-2.4	100	91.1					
VA 2R	3.0	0.4-2.0	100	94.9	24.1	19.8	37.9		
	3.0	0.8-2.4	100	100	48.1	39.6	75.7		
VA 3R	3.0	0.4-2.0	100	80.9	30				
	3.0	0.8-2.4	100	100	60				

Note : 1. DP shown in the table are for class IV leakage.

2. Class V leakage can be obtained by increasing the spring range.

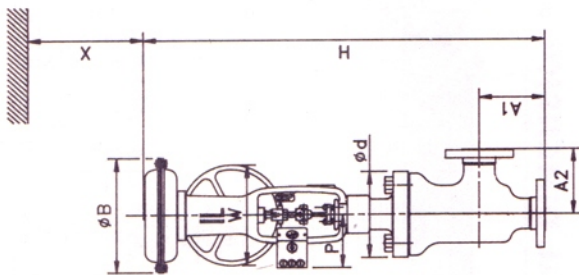
IV.3. Direct & Reverse Action

Table 4

RATING	ACTUATOR MODEL	AIR TO DIAPHRAGM (Kg/Cm ²)	SPRING RANGE (Kg/Cm ²)	PRESSURE DIFFERENTIAL (Kg/Cm ²) FOR VALVE SIZE (inch)							
				1½	2	2½	3	4			
ANSI 900 & 1500	Direct Action (Air to Close)	VA 3D	3.0	0.4-2.0	187.3	250	116.4	93.1	202.6		
			3.0	0.8-2.4	112.4	250	69.8	55.8	121.5		
			3.0	0.4-2.0	250				166.8	250	
	Reverse Action (Air to Open)	VA 5D	3.0	0.4-2.0					250	250	
			3.0	0.8-2.4						246.2	250
			3.0	0.4-2.0	187.3 (176.6)	116.4	93.1	202.6			
ANSI 2500	Direct Action (Air to Close)	VA 3D	3.0	0.8-2.4	112.4 (107.6)	69.8	55.8	121.5			
			3.0	0.4-2.0	450 (338.5)				166.8 (138.5)	450	
			3.0	0.8-2.4	450 (338.5)				100.2 (326.1)	450	
	Reverse Action (Air to Open)	VA 5D	3.0	0.4-2.0					410.4 (296.5)	450	
			3.0	0.8-2.4					246.2 (236.5)	450	
			3.0	0.4-2.0	74.6	250	46.6	37.2	80.9		
ANSI 900 & 1500	Direct Action (Air to Close)	VA 3R	3.0	0.8-2.4	149.5	250	93.9	73.2	161.7		
			3.0	0.4-2.0	250				66.8	218.8	
			3.0	0.8-2.4	250				133.6	250	
	Reverse Action (Air to Open)	VA 5R	3.0	0.4-2.0					164.2	250	
			3.0	0.8-2.4						250	
			3.0	0.4-2.0	74.8	360.5	46.6	37.2	80.9		
ANSI 2500	Direct Action (Air to Close)	VA 3R	3.0	0.8-2.4	149.5 (142.6)	93.1	73.2	161.7			
			3.0	0.4-2.0	450 (338.5)				66.8	218.8	
			3.0	0.8-2.4	450 (338.5)				133.6 (138.5)	450	
	Reverse Action (Air to Open)	VA 5R	3.0	0.4-2.0					164.2 (166.5)	450	
			3.0	0.8-2.4					246.2 (246.5)	450	
			3.0	0.4-2.0	74.6	360.5	46.6	37.2	80.9		

Note : Values given within brackets shows DP open.

VHD ANGLE TYPE VALVE



V. EXTERNAL DIMENSIONS

Table 5

VALVE SIZE (inch)	PRESSURE RATING (ANSI)	ACTUATOR MODEL	DIMENSIONS (mm)								
			A1 F	A1 BMSW	A2 F	A2 BMSW	φd	φB	H ± 10 P	RF	
1 1/2	150 - 600	VA1 DR	170	142	170	142	191	300	815	-	-
		VA2 DR	170	142	170	142	191	350	932	-	-
		VA3 DR	200	142	200	142	203	450	1122	1327	-
2	150 - 600	VA1 DR	-	170	-	170	216	300	874	-	-
		VA2 DR	-	170	-	170	216	350	991	1196	-
		VA3 DR	-	235	-	235	267	450	1147	1345	-
2 1/2	150 - 600	VA2 DR	-	205	-	205	229	350	1017	-	-
		VA3 DR	-	250	-	250	350	450	1273	-	-
		VA2 DR	-	220	-	220	-	350	1038	-	-
3	900 - 2500	VA3 DR	340	-	340	-	380	450	1278	1423	-
		VA2 DR	290	-	290	-	298	350	1051	-	-
		VA3 DR	-	275	-	275	380	450	1274	1428	-
4	900 - 2500	VA4 D	-	275	-	275	380	520	1414	-	-
		VA4 R	-	275	-	275	380	520	1529	-	-
		VA5 D	-	275	-	275	380	620	1640	1794	-
6	150 - 600	VA5 R	-	275	-	275	380	620	1770	1924	-
		VA3 DR	-	330	-	330	460	450	1631	-	-

F... Flanged End BW... Butt Weld End P... Plain Bonnet RF... Radiating Fin Bonnet

Table 6

Actuator Model	W	P		X
		HTP	HEP	
VA1 DR	280	216	300	230
VA2 DR	355	220	310	245
VA3 DR	450	240	335	245
VA4 DR	570	262	360	360
VA5 DR	570	270	375	420

VI. APPROXIMATE WEIGHTS

VI.1. For ANSI 150 - 600

Table 7

VALVE SIZE (inch)	ACTUATOR MODEL	WEIGHT (kg)					
		150		300		600	
		F	BMSW	F	BMSW	F	BMSW
1 1/2	VA1 DR	74	70	76	70	77	70
	VA2 DR	85	81	87	81	88	81
2	VA1 DR	92	87	94	87	95	87
	VA2 DR	103	98	105	98	106	98
2 1/2	VA2 DR	131	123	134	123	135	123
	VA3 DR	190	181	195	181	196	181
4	VA2 DR	259	246	268	246	277	246
	VA3 DR	681	640	689	640	754	640

F... Flanged End BW... Butt Weld End

VI.2. For ANSI 900 - 2500

Table 8

VALVE SIZE (inch)	ACTUATOR MODEL	WEIGHT (FLANGED)						WEIGHT (BUTT WELD)					
		900		1500		2500		900		1500		2500	
		P	RF	P	RF	P	RF	P	RF	P	RF	P	RF
1 1/2	VA3 DR	168	171	168	171	178	181	156	167	156	167	156	167
	VA3 DR	210	227	210	227	240	189	206	189	206	189	206	189
	VA3 DR	333	-	333	-	353	-	304	-	304	-	304	-
3	VA3 DR	392	409	447	423	455	368	383	368	383	368	383	368
	VA3 DR	516	540	534	558	589	613	475	499	475	499	475	499
	VA4 D	591	-	609	-	664	-	550	-	550	-	550	-
4	VA4 R	616	-	634	-	689	-	575	-	575	-	575	-
	VA5 D	616	-	634	-	689	-	575	-	575	-	575	-
	VA5 R	641	-	659	-	714	-	600	-	600	-	600	-

F... Flanged End BW... Butt Weld End P... Plain Bonnet RF... Radiating Fin Bonnet



Table 10

Actuator Model	W	P		X
		HTP	HEP	
VA 1 DR	280	216	300	230
VA 2 DR	355	220	310	245
VA 3 DR	450	240	335	245
VA 4 DR	570	262	360	360
VA 5 DR	570	270	375	420

VIII. APPROXIMATE WEIGHTS

VIII.1. For ANSI 150 - 600

Table 11

VALVE SIZE (inch)	ACTUATOR MODEL	WEIGHT (kg)					
		150		300		600	
		F	BMSW	F	BMSW	F	BMSW
1 1/2	VA 1 DR	67	63	69	63	70	63
	VA 2 DR	78	74	80	74	81	74
	VA 1 DR	94	89	96	89	97	89
2	VA 2 DR	105	100	107	100	108	100
	VA 2 DR	133	125	136	125	137	125
3	VA 2 DR	193	184	198	184	199	184
	VA 2 DR	290	277	298	277	308	277
6	VA 3 DR	719	678	737	678	752	678

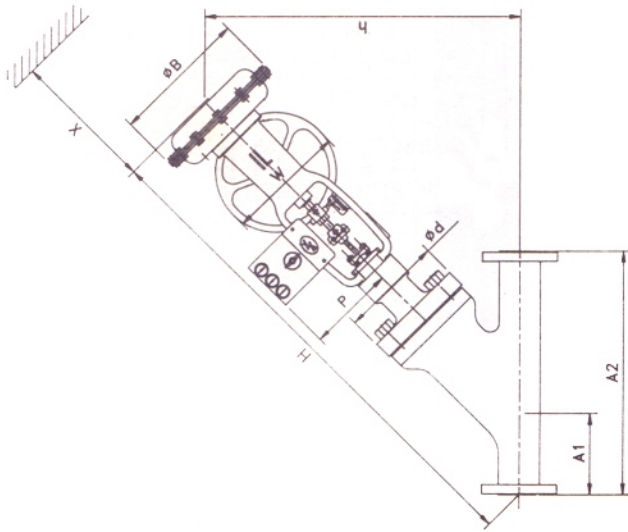
F... Flanged End BW... Butt Weld End

VII. EXTERNAL DIMENSIONS

Table 9

VALVE SIZE (inch)	PRESSURE RATING (ANSI)	ACTUATOR MODEL	DIMENSIONS (mm)											
			A1	A2	A4	A8	P	H	RF	P	h	RF		
1 1/2	150 - 600	VA 1 DR	140	445	191	300	988	-	627	-	-	-	-	-
		VA 2 DR	140	445	191	350	1105	-	711	-	-	-	-	-
		VA 3 DR	155	495	203	450	1321	1526	857	1002	-	-	-	-
2	150 - 600	VA 1 DR	180	540	216	300	1108	-	690	-	-	-	-	-
		VA 2 DR	180	540	216	300	1223	-	774	-	-	-	-	-
		VA 3 DR	190	600	267	450	1412	1610	994	1044	-	-	-	-
2 1/2	150 - 600	VA 2 DR	230	640	230	350	1279	-	789	-	-	-	-	-
		VA 3 DR	280	825	350	450	1622	-	1007	-	-	-	-	-
		VA 2 DR	195	685	273	350	1322	-	837	-	-	-	-	-
3	900 - 2500	VA 3 DR	325	875	380	450	1660	1825	1025	1128	-	-	-	-
		VA 2 DR	245	770	310	350	1384	-	856	-	-	-	-	-
		VA 3 DR	280	875	380	450	1657	1800	1032	1133	-	-	-	-
4	900 - 2500	VA 4 D	280	875	380	520	1797	-	1131	-	-	-	-	-
		VA 4 R	280	875	380	520	1912	-	1212	-	-	-	-	-
		VA 5 D	280	875	380	620	2023	-	1291	-	-	-	-	-
6	150 - 600	VA 5 R	280	875	380	620	2153	-	1382	-	-	-	-	
		VA 3 DR	340	1092	460	450	1865	2120	1149	1330	-	-	-	

P... Plain Bonnet RF... Radiating Fin Bonnet



F... Flanged End BW... Butt Weld End P... Plain Bonnet RF... Radiating Fin Bonnet

VIII.2. For ANSI 900 - 2500

Table 12

VALVE SIZE (inch)	ACTUATOR MODEL	WEIGHT (FLANGED)						WEIGHT (BUTT WELD)					
		900		1500		2500		900		1500		2500	
		P	RF	P	RF	P	RF	P	RF	P	RF	P	RF
1 1/2	VA 3 DR	144	155	144	155	154	165	132	143	132	143	132	143
	VA 3 DR	196	213	196	213	209	226	175	192	175	192	175	192
	VA 3 DR	329	-	329	-	349	-	300	-	300	-	300	-
2	VA 3 DR	446	464	461	499	496	534	422	460	422	460	422	460
	VA 3 DR	535	559	553	577	608	632	494	518	494	518	494	518
	VA 4 D	610	-	628	-	683	-	569	-	569	-	569	-
4	VA 4 R	635	-	653	-	708	-	594	-	594	-	594	-
	VA 5 D	635	-	653	-	708	-	594	-	594	-	594	-
	VA 5 R	660	-	678	-	733	-	619	-	619	-	619	-

The contents of this catalogue may be altered for improvement without notice. Printed on 11-7-97

