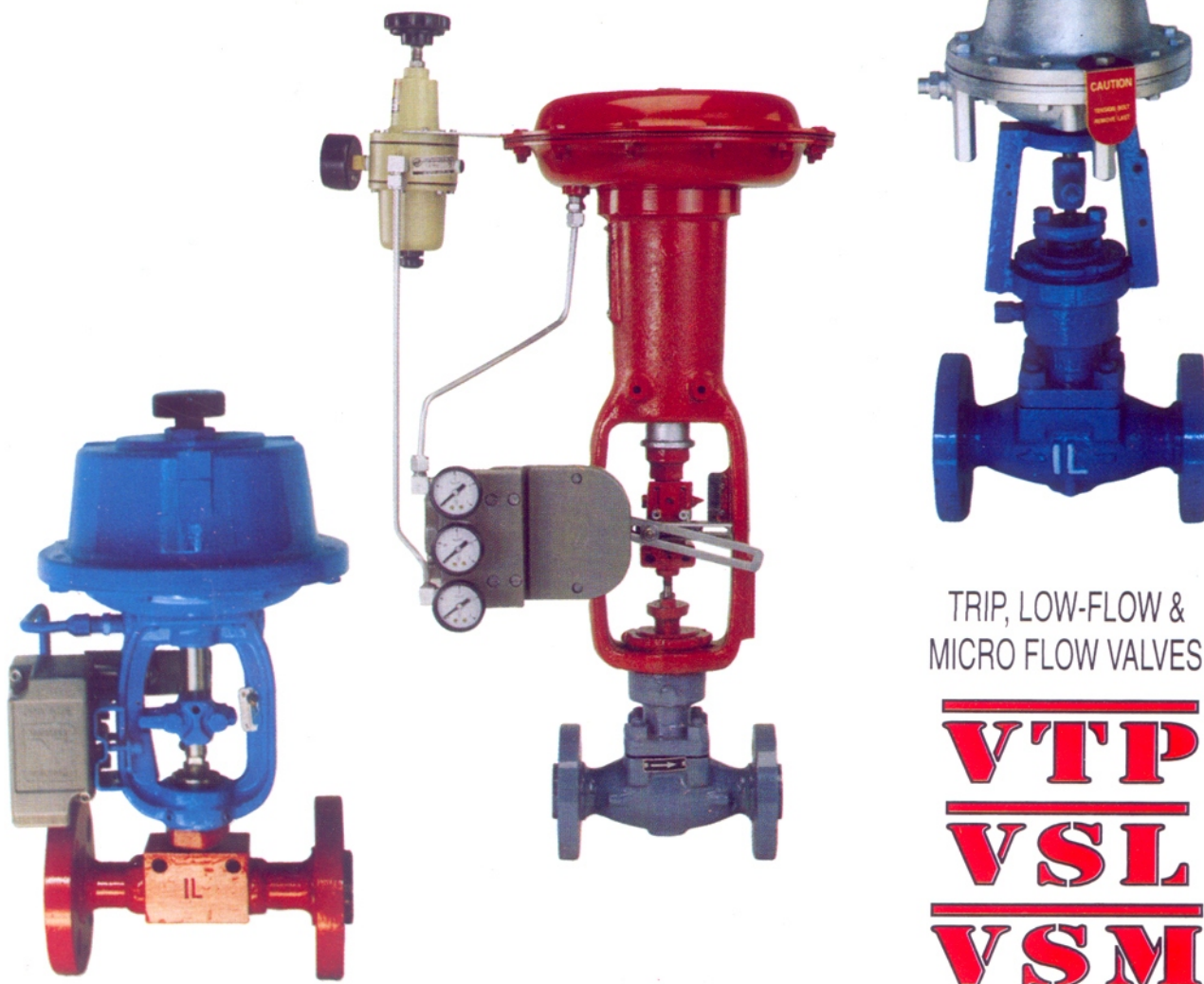
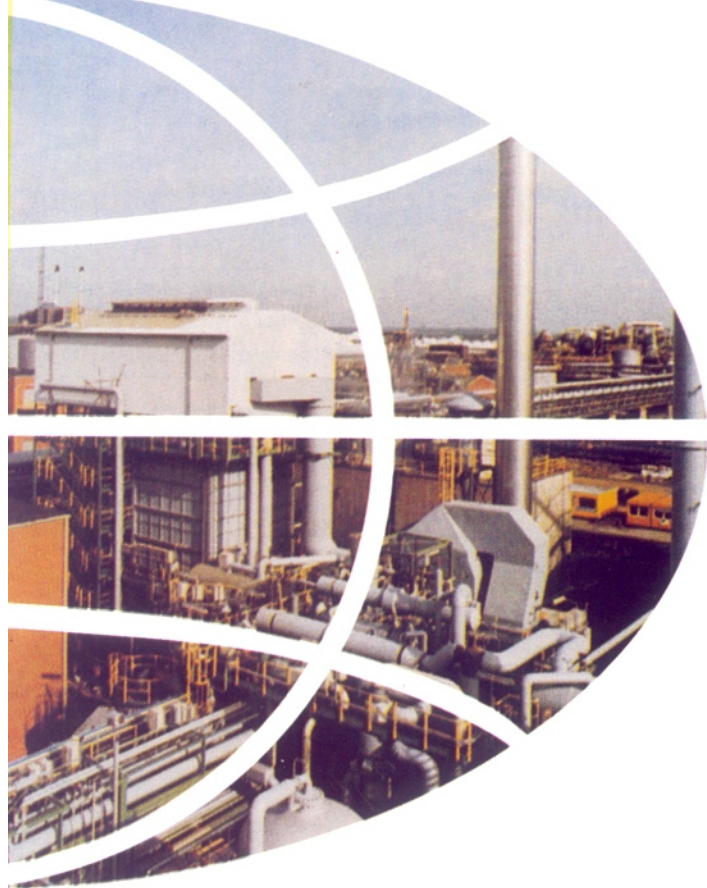




INSTRUMENTATION LTD., PALAKKAD

Low and micro-flow conditions of the fluids make the proper sizing of valves extremely difficult. These valves designed to take care of such uncertainties have the provision for series of internals with different flow co-efficients thereby enabling correct choice to meet the actual requirements.



TRIP, LOW-FLOW &
MICRO FLOW VALVES

VTP
VSL
VSM



I. FEATURES

1.1. VALVE TYPE : VSL

- Small flow Control Valves.
- Compact, Sturdy and capable of High precision performance.
- Cascaded Trims for cavitating service.

SPECIFICATIONS*	VALVE ASSEMBLY	VSL - Single Seated Globe Valve with Top guided Plug.	
	PRESSURE RATING	ANSI 150, 300, 600	
	NOMINAL SIZE (Inches)	1/2, 3/4 & 1	
	END CONNECTION	Flanged End (RF, FF & RJ), Socket & Butt welded. End connection size available upto 3" on request	
	SERVICE TEMP. RANGE	-150° C to 425° C	
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 2.	
	PACKINGS	Teflon, Teflon Impregnated Asbestos, Graphited Asbestos, Graphoil etc. Other materials on request	
	GASKET	Stainless Steel, Monel etc. Other materials on request.	
PERFORMANCE	FLOW CHARACTERISTICS	Standard Trim Linear, Equal Percentage & Quick Opening (On - Off) Cascaded Trim Modified Linear	
	RANGEABILITY	30:1 (Higher rangeabilities are available against specific requests)	
	LEAKAGE AT FULL CLOSURE (% OF Cv) AS PER ANSI B16. 104.	Soft (Teflon) Seat : 0.00001% or less (Class VI) Stellited On-Off : 0.00001% or less (Class VI) (on request only) Metallic Seat : 0.01% (Class IV) (Class V can be provided as a special case)	
	BONNET	Plain, Finned, Extension & Bellows	
	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 Table 3.	
CV VALUE	Refer Table 1		
OPTIONS	TUBING	Copper Tubing (Std 8 / 10 mm OD without / with PVC coating) SS Tubing for Copper prohibition (Std 8 mm OD) Air Connection : 1/4" NPT Standard	
	ACCESSORIES	Valves with Steam Jacketing with a max. rating of ANSI 300 for the Jacket can be provided. Manual Actuator. Side Mounted Handwheel (Top Mounted against request), 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 Tables



VALVE ASSEMBLY

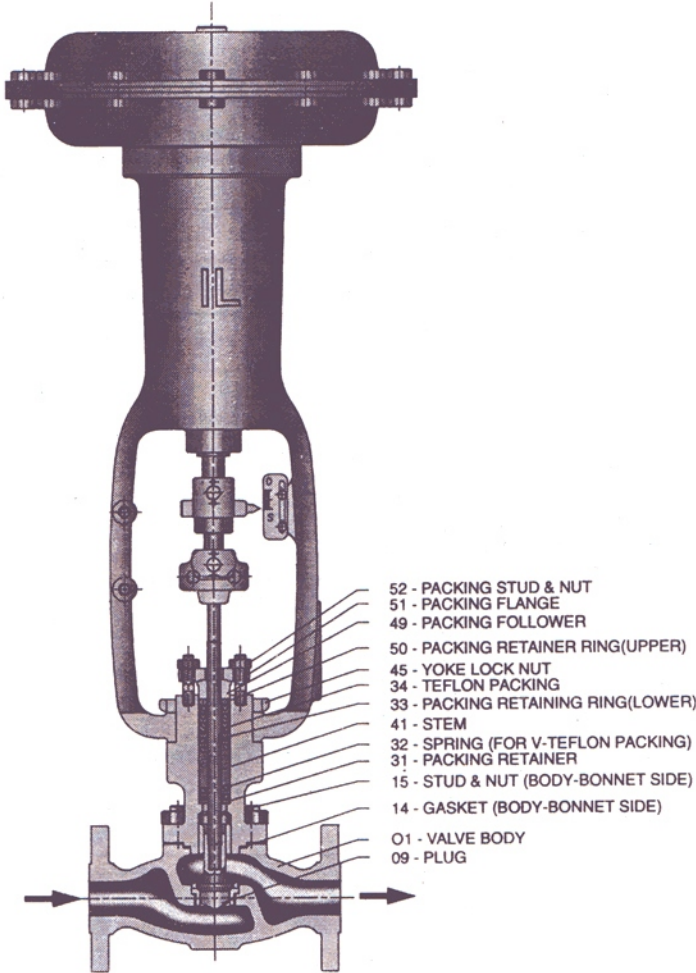


Fig. 1. VSL Assembly

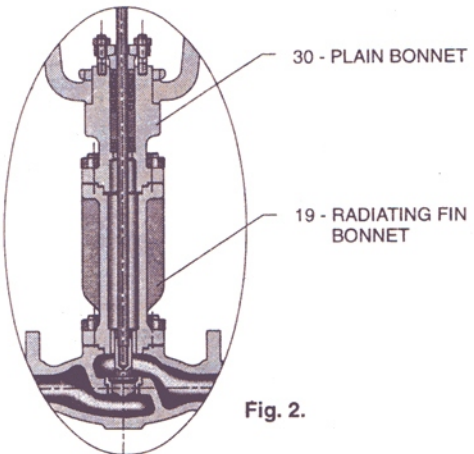


Fig. 2.

Assembly with Radiating Fin Bonnet (-30° to 450°C)

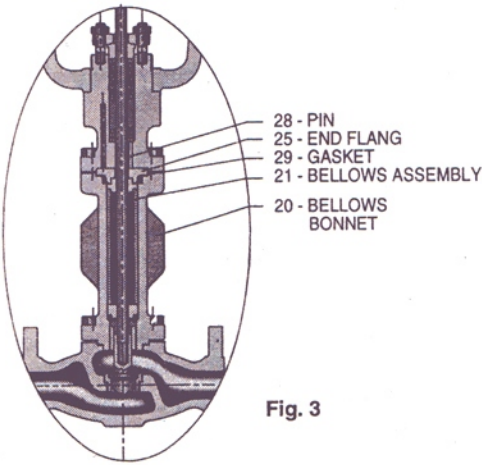


Fig. 3

Assembly with Bellow Seal Bonnet (-30° to 300°C)

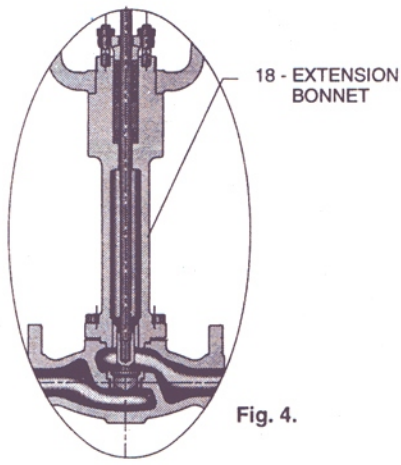


Fig. 4.

Assembly with Extension Bonnet (0° to ~195°C)

1.2 VALVE TYPE : VSM

- High pressure micro flow control valves for control of small flow.
- Compact & Sturdy valve body.
- Forged Structure and less affected by stress from the pipe.
- Wide Rangeability
- Top entry type, hence easier parts interchangeability without dismantling from the pipe.
- Threaded end connection.
- Compact actuator designed to reduce the overall height.

SPECIFICATIONS*	Valve Assembly	Single Seated Straight-Through type Valve
	Pressure Rating	ANSI 150 - 2500
	End Connection	NPT 1/4" and NPT 1/2"
	Service Tem.	-30° C to 400° C
STANDARD MATERIALS	Valve Body	Stainless Steel SS 304 or SS 316 or other Alloy Steel.
	Trim	Refer table 2.
	Packings	V-Teflon (For - 30° to + 200° C) Graphite (For - 30° to + 400° C)
	Gasket	Stainless Steel, Monel etc. Other materials on request.
PERFORMANCE	Flow Char.	Linear & Equal Percentage
	Rangeability	30:1 For Cv value 0.16 and above 25:1 for Cv between 0.10 and 0.02 20:1 For Cv between 0.01 and 0.001
	Leakage at Full Closure (% of Cv)	0.01% or less (Class IV) (As per ANSI B 16.104)
	Bonnet	Plain
	ACTION	
	Hysteresis Linearity	1% Full Scale or less (with Positioner) ± 3% of Full Scale or less (with Positioner)
	Max. Allowable Pressure Drop	Diaphragm Type Actuator (VM1D / VM1R) Refer Table 4
Cv Value	Refer Table 1	
OPTIONS		Pneumatic & Electro - Pneumatic Positioners, I/P Converters, Solenoid valve, Air Filter Regulator etc.

* For exact Product range Refer Cv Table.

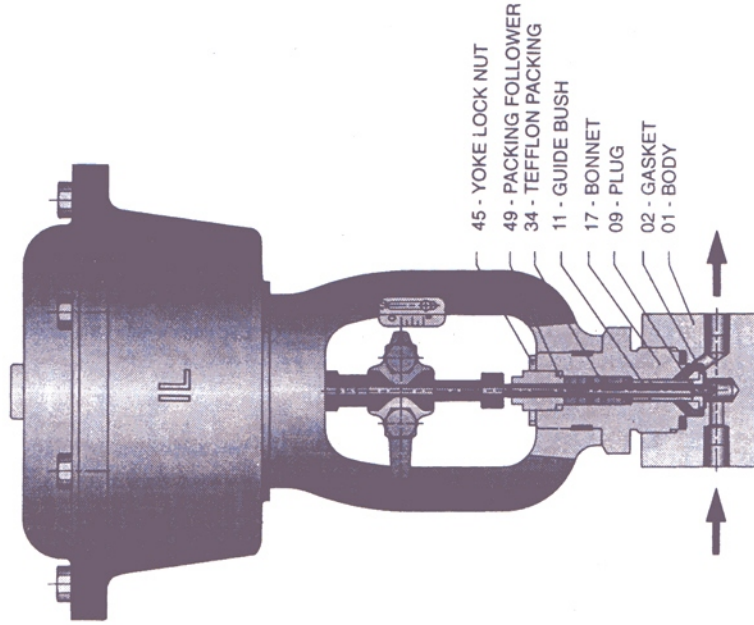


Fig. 5
VSM Valve Assembly

1.3 VALVE TYPE : VTP

- Small flow control valves meant for ON-OFF Service.
- Compact & Sturdy valve body.
- Compact actuator designed to reduce the overall height
- Operating time less than 1 second.

SPECIFICATIONS*	<p>Valve Assembly Single Seated Globe Valve with Top guided Plug.</p> <p>Pressure Rating ANSI 150, 300, 600</p> <p>Size $\frac{1}{2}, \frac{3}{4}$ & 1 inches</p> <p>End Connection Flange Type (FF, RF, RJ), Socket & Butt Weld</p> <p>Service Tem. -20° C to 425° C (Max. 200° C for soft seat)</p> <p>Valve Body Carbon Steel ASTM A 216 Gr. WCB Stainless Steel ASTM A 351 Gr. CF8 or CF8M</p> <p>Trim Refer table 2.</p>
STANDARD MATERIALS	<p>Packings V-Teflon, Teflon Asbestos, Graphited Asbestos, Graphoil</p> <p>Gasket Stainless Steel, Monel etc. Other materials on request.</p> <p>Flow Char. Linear, Equal Percentage & Quick Opening</p> <p>Rangeability 30:1</p>
PERFORMANCE	<p>Metallic Seat Class IV ($\leq 0.01\%$)</p> <p>Soft Seat 0.00001% or less (Class VI) According to ANSI B 16.104</p> <p>Bonnet Plain, Finned</p> <p>Operating Time Less than 1 Sec.</p> <p>Max. Allowable Pressure Drop Diaphragm Type SA1D / SA1R Actuator Refer Table 5</p> <p>Cv Value Refer Table 1</p>
OPTIONS	<p>Valves with Steam Jacketing can be provided with a maximum rating of ANSI 300 for the jacket.</p> <p>Top Mounted Handwheel</p> <p>Solenoid Valve, Air Filter Regulator, Limit switches, Quick Exhaust and speed valve.</p>

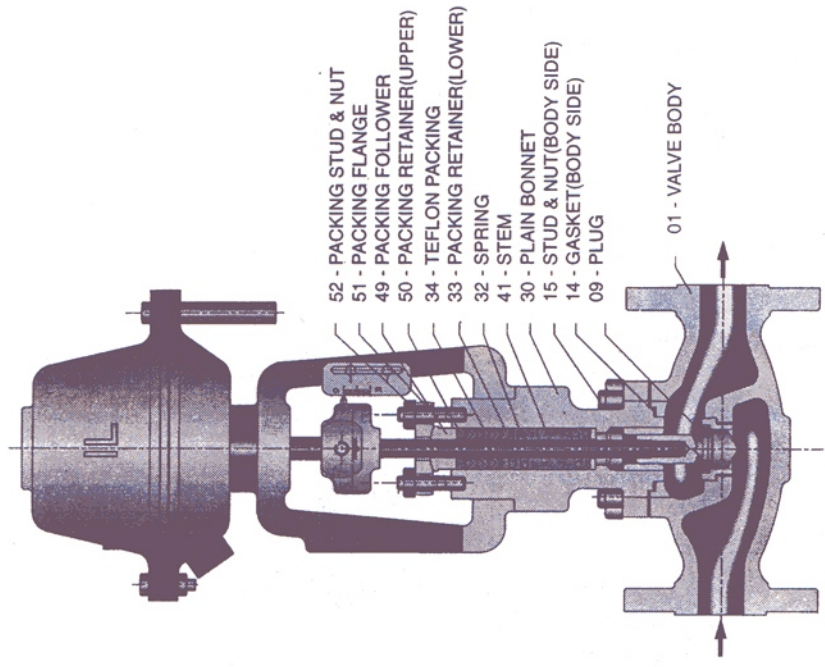
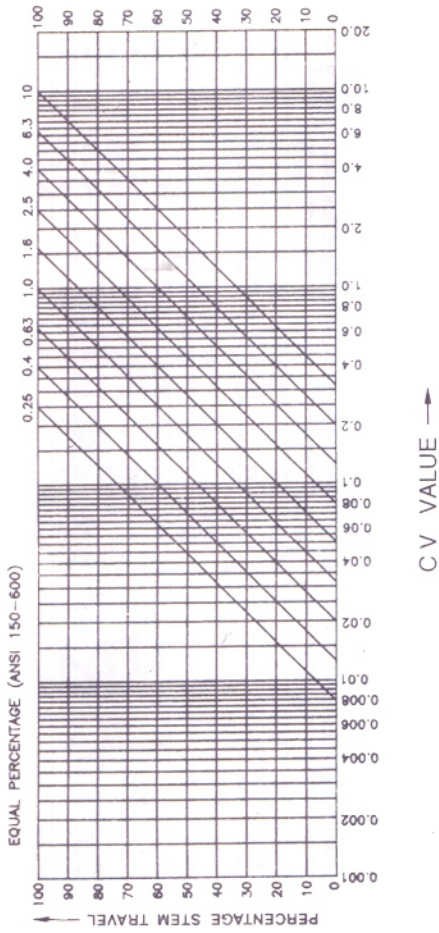


Fig. 6
VTP Valve Assembly

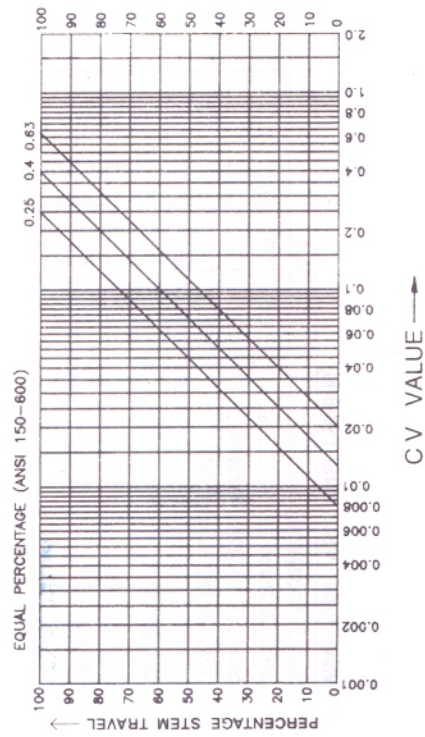
* For exact Product range Refer Cv Table.

II. FLOW CHARACTERISTICS

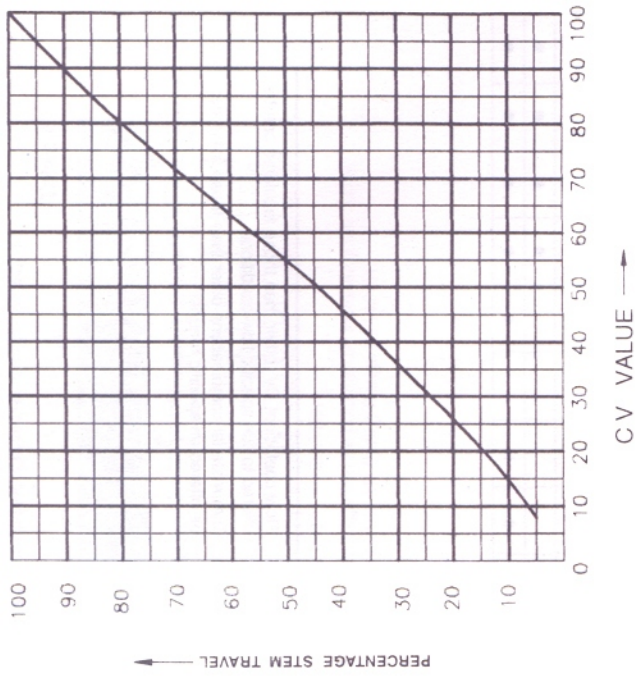
II. 1. Flow Characteristics for VSL Type



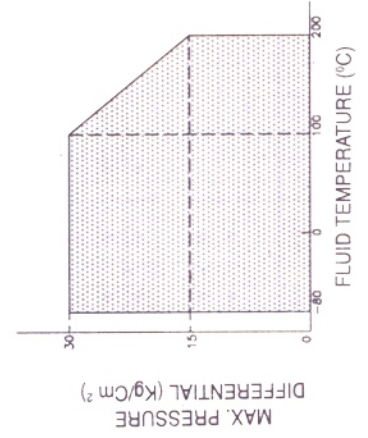
II. 2. Flow Characteristics for VSM Type



II. 3. Flow Characteristics for Cascade Trim



III. OPERATING TEMPERATURE & PRESSURE DIFFERENCE LIMIT FOR TEFLON SEAT VALVE



IV. FLOW COEFFICIENT Cv WITH STEM TRAVEL

Table 1

PLUG TYPE & CHARACTERISTICS	STEM TRAVEL (mm)	PORT SIZE (Cv VALUE)																			
		0.001	0.002	0.005	0.01	0.02	0.04	0.05	0.1	0.16	0.25	0.4	0.63	1.0	1.25	1.6	2.5	4.0	6.3	10	
Valve Type : VSM (ANSI 150 - 2500)																					
Equal % Contoured	10																				
Linear Contoured	10	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Valve Type : VSL (ANSI 150-600)																					
Equal % Contoured	14.3																				
Linear Contoured	14.3																				
Equal % Contoured, Teflon seat	14.3																				
Linear Contoured, Teflon Seat	14.3																				
On-Off Plug, Teflon seat	14.3																				
Stellited On-Off	6																				
Quick Opening	6																				
Cascaded Trim	25																				
Valve Size	1/2"																				
	3/4"																				
	1"																				
Valve Type : VTP (ANSI 150-600)																					
Equal % Contoured	14.3																				
Linear Contoured	14.3																				
Equal % Contoured, Teflon Seat	14.3																				
Linear Contoured, Teflon seat	14.3																				
Quick Opening	6																				

V. TRIM MATERIAL SELECTION

Table 2

TRIM COMBINATION NO.	TRIM DESIGNATION	PLUG	CAGE / SEAT RING	APPLICABLE TEMP. RANGE (°C)	STANDARD TRIM		CASCADED TRIM (VSL)
					VSM	VTP	
1	SS 304	SS 304	SS 304	-195 to 300	•		
2	SS 304 St. Seat	SS 304 St. Seat	SS 304 St. Seat	-195 to 425	•		
3	SS 304 St. Sheath	SS 304 St. Sheath	SS 304 St. Sheath	-195 to 600	•		
4	SS 304 Teflon Ins.	SS 304 Teflon Ins.	SS 304	-70 to 200	•		
5	SS 304 L	SS 304L	SS 304L	-20 to 300	•		
6	SS 316	SS 316	SS 316	-195 to 300	•	•	
7	SS 316 St. Seat	SS 316 St. Seat	SS 316 St. Seat	-195 to 425	•	•	
8	SS 316 St. Sheath	SS 316 St. Sheath	SS 316 St. Sheath	-195 to 650	•		
10	SS 316 Teflon Ins.	SS 316 Teflon Ins.	SS 316	-70 to 200	•		
11	SS 316L	SS 316L	SS 316L	-195 to 300	•		
12	SS 316L Sterilized	SS 316L St. Seat	SS 316L St. Seat	-195 to 425	•		
16	SS 440C	SS 440C	SS 440C	-30 to 425	•		•
17	MONEL	K. MONEL	K. MONEL	-195 to 300	•		
18	Hastelloy B	Hastelloy B	Hastelloy B	-195 to 370	•		
19	Hastelloy C	Hastelloy C	Hastelloy C	-195 to 450	•		
20	Titanium	Titanium	Titanium	-195 to 315	•		
21	Alloy 20	Alloy 20	Alloy 20	-195 to 300	•		

[NOTE]

- Flow coefficient Cv other than those tabulated can be offered to suit specific flow conditions.
- Trim material combinations other than those listed can be offered on specific request





VI. PRESSURE DIFFERENTIAL

VI.2. VSM Valves (ANSI 150- 2500)

Table 4

Actuator Model	Action	Air to Diaphragm (Kg/cm ²)	Spring Range (Kg/cm ²)	Positioner	Pressure Differential (Kg/cm ²)
VM 1D	Direct	1.4*	0.2 - 1.0	O	100
		2.8*			250
		3.5			250
VM 1R	Reverse	1.4	*0.2 - 1.0	O	40
		2.8	*0.8 - 1.54		250
		3.5	1.4 - 2.14		250

Positioner : X... Without O... With

Note : Class V leakage can be obtained by increasing the supply pressure for VM 1D Spring Range for VM 1R.

Table 3

Actuator Model	Action	Air to Diaphragm (Kg/cm ²)	Spring Range (Kg/cm ²)	Positioner	Pressure Differential (Kg/cm ²) (Corresponding to Cv Value)						
					0.25& Below	0.4& 0.63	1.0& 1.6	2.5& 4.0	6.3	10	
METALIC SEAT											
VA 1D	Direct	1.2	0.2 ~ 1.0	O	100	57	30	18	10	7.5	
		1.4			100	100	76	47	25	19	
		2.8			100	100	100	100	100	95	
VA 1R	Reverse	1.2	0.2 - 1.0	X or O	100	57	30	18	10	7.5	
		1.4			100	100	90	56	30	22	
		2.8			100	100	100	100	70	52	
STELLITED ON-OFF											
VA 1D	Direct	1.4	0.2 - 1.0	X					27.5	15	11
		2.8							100	63	47
		1.4							9.3	5	3.8
VA 1R	Reverse	2.8	0.8 - 2.4	X					37	20	15
		1.2							12.5	7.0	5.2
		1.4							30	21	15
VA 1R	Reverse	1.2	0.2 - 1.0	X or O					12.5	7.0	5.2
		1.4							30	21	15
		2.8							30	30	30

Positioner : X... Without O... With P... Preferably with

Note : 1. DP Shut off shown are for Class IV Leakage.

2. Class V Leakage can be obtained by increasing the Supply pressure & Spring Range for Direct and Reverse action respectively.

3. For Reverse action, the Pressure differential limits for 0.4 - 1.2 Kg/cm² & 0.4 - 2.0 Kg/cm² are same as that for 0.4 - 1.2 Kg/cm².

VI. 3 VTP Valves

Table 5

Actuator Model	Action	Air to Diaphragm (Kg/cm ²)	Pressure Differential (Kg/cm ²)	
			Teflon Seat	Stellite Seat
SAI D/R	Direct OR Reverse	2.5	15	15
		4.5	30	40

VII. EXTERNAL DIM. & WEIGHTS

VII. 1. VSL Valves

VII.1.1. Dimensions

Table 6

Valve Size (Inch)	A ± 1.6 mm					
	ANSI 150		ANSI 300		ANSI 600	
	RF/BW/SW	RJ	RF/BW/SW	RJ	RF/BW/SW	RJ
1/2 & 3/4	206	-	206	-	206	206
1	197	-	197	210	210	210

RF... Raised Face RF... Ring Joint BW... Butt weld SW... Socket Weld

VII. 1.2. Heights & Weights

Table 7

Description	Bonnets Type			Approx. Weight (Kg)
	Plain	Finned	Below Seal	
Height (mm) H ± 10	645	795	795	1070
Approximate Weight (Kg)	30	32	33	30

VII. 2. VSM Valves

Table 8

Actuator Model	Action	Dimensions (mm)				Approx. Weight (Kg)
		A	H	E	P	
VM 1D	Direct	70	315	21	125	10.5
VM 1R	Reverse	70	340	21	125	10.5

* Face to Face Dimension (A) for NPT 1/2" Connection will be 90 mm.

VII. 3. VTP Valves

VII.3.1. Dimensions

Table 9

Valve Size (Inch)	A ± 1.6 mm			
	ANSI 150		ANSI 300	
	RF	RJ	RF	RJ
1/2 & 3/4	206	-	206	-
1	197	-	197	210

RF... Raised Face RJ... Ring Joint

Table 10

Actuator Model	SA 1D		SA 1R	
	With HW	Without HW	With HW	Without HW
Description	Plain	Finned	Plain	Finned
Height (mm) H ± 10	534 (517)	684 (667)	384 (367)	535 (518)
Approximate Weight (Kg.)	14	14	14	13.5
X	100	100	100	100

RF... Raised Face RJ... Ring Joint HW... Hand Wheel
 Heights given in () are for Valves with a Lift of 6 mm.

