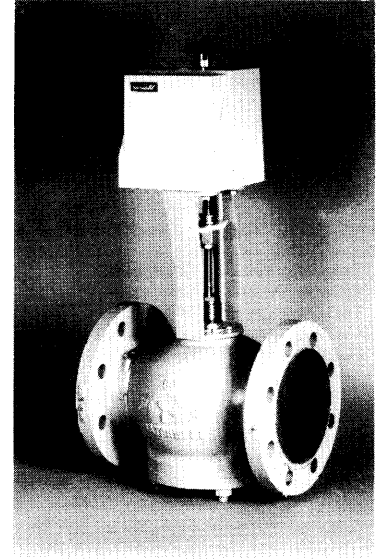


## TWO-PORT SEAT VALVES

### Types VZ, VZF, VJF, VSF

These seat valves are of 'globe' construction with a linear moving spindle and equal percentage characterised plug which closes against the seat when the spindle is lifted. They are suitable for the control of hot or chilled water, steam, brine or antifreeze solutions within the limitations given in the table below.

They may be operated electrically or pneumatically (normally closed with D.A. actuator). The information in this Data Sheet covers electric operation, using the 'AL' range of linear actuators. For pneumatic operation refer to DS 9.15.



### SPECIFICATIONS AND GUIDE TO SELECTION

VALVE					SUITABLE ACTUATORS (THRUST: 538 N):— ALM, ALX — See DS 3.20 ALE — See DS 3.22 to match stroke of actuator to valve.					CONTROL MEDIUM											
Group	Size	Type	*Kv or Cv	Stroke	Maximum differential pressure (Δp)		Optional		Brine not exceeding 15% CaCl	Antifreeze -5 to 40°C	Water	Steam	Temperature limits		Max. internal pressure		International Pressure Rating				
					Bar	lb/in <sup>2</sup>	Spring accessory kit	Gives increased max Δp:—					Min.	Max.	Bar	lb/in <sup>2</sup>					
VZ Screwed Bronze	1/2"	VZ 1401	0.2	3/8"	16	232	—	—	—	—	●	●	2°C	130°C 120°C	15 16	218 232	PN 16 (ND 16)				
	1/2"	VZ 1402	0.5																		
1/2"	VZ 1403	1.0																			
1/2"	VZ 1404	2.0																			
3/4"	VZ 1451	4.0																			
VZ Screwed Cast Iron	1"	VZ 2501	8	5/8"	9.7	140	823-1-801	16	232	—	—	●	2°C	200°C 120°C	13 16	188 232	PN 16 (ND 16)				
	1 1/4"	VZ 2551	12															5.8	85	9.0	130
	1 1/2"	VZ 2601	20															4.1	60	6.0	87
	2"	VZ 2651	32															2.4	35	3.7	54
VZ Screwed Cast Iron	1"	VZ 2502	8	3/8"	9.7	140	823-1-801	10	145	—	—	●	2°C	200°C 120°C	8 10	116 145	PN 10 (ND 10)				
	1 1/4"	VZ 2552	12															5.8	85	9.0	130
	1 1/2"	VZ 2602	20															4.1	60	6.0	87
	2"	VZ 2652	32															2.4	35	3.7	54
VJF Flanged Cast Iron	15mm	VJF 4426	0.25	3/8"	13	188	—	—	—	—	—	—	—	—	—	—	—				
	15mm	VJF 4427	1.0																		
	15mm	VJF 4428	2.5																		
VJF Flanged Cast Iron	20mm	VJF 4476	6.3	5/8"	13	188	—	—	—	●	●	●	-5°C	200°C 120°C	13 16	188 232	PN 16 (ND 16 to DIN 2401)				
	25mm	VJF 4526	10															9.3	135	—	—
	32mm	VJF 4576	16															1"	3.8	55	—
40mm	VJF 4626	25	2.4	35	—	—															
50mm	VJF 4676	40	1.4	20	—	—															
VSF Flanged SG Iron	15mm	VSF 2426	0.63	3/8"	16	232	—	—	—	●	●	●	-5°C	200°C 120°C	13 16	188 232	PN 16 (ND 16 to DIN 2401)				
	15mm	VSF 2427	1.0																		
	15mm	VSF 2428	1.6																		
	15mm	VSF 2429	2.5																		
	15mm	VSF 2430	4.0																		
VSF Flanged Cast Iron	20mm	VSF 1476	6.3	5/8"	16	232	823-1-801	—	—	—	—	—	-5°C	200°C 120°C	13 16	188 232	PN 16 (ND 16 to DIN 2401)				
	25mm	VSF 1526	10															11.7	170	16	232
	32mm	VSF 1576	16															1"	6.4	94	823-1-801
40mm	VSF 1626	25	4.0	57	6.7	98															
50mm	VSF 1676	40	2.4	35	4.1	60															
VZF Flanged Cast Iron	65mm	VZF 1727	63	1"	1.4	20	823-1-802	—	—	—	—	—	2°C	200°C 120°C	13 16	188 232	PN 16 (ND 16 to DIN 2401)				
	80mm	VZF 1777	80															1.0	14	2.1	30
	100mm	VZF 1852	125															0.5	7	1.4	20
	125mm	VZF 1902	200															1 1/2"	0.28	4.0	823-1-803
150mm	VZF 1954	315	0.18	2.6	0.30	4.4															

\*Kv = Flow in m<sup>3</sup>/hr to produce 1 bar pressure drop  
CV = Flow in UK gal/min to produce 1 lb/in<sup>2</sup> pressure drop (Cv = approx Kv)

For full TECHNICAL SPECIFICATION see table on Page 2 which gives details of flange drillings, materials etc.

## CONSTRUCTION &amp; TECHNICAL SPECIFICATION

Technical Specification		VZ ½" & ¾"	VZ Bronze 1" to 2"	VZ Cast Iron 1" to 2"	VJF 15 to 50mm	VSF SG Iron 15mm	VSF 20 to 50mm	VZF 65 to 150mm
Pipe Connections	Screwed B.S.P. to BS 21 female—taper Screwed B.S.P. to BS 21 Female—parallel Flanged BS 4504 16/11. = DIN 2533 ND 16 Face to face dimension to DIN 3300	• — — —	— • — —	— • — —	— — • •	— — • •	— — • •	— — • —
Characteristic Rangeability	Equal percentage 50:1	• •	• •	• •	• •	• •	• •	• •
Let-by	Tight Shut-off—Soft seat	•	—	—	—	—	—	—
	Based on:— % Cv at 1 lbf/in <sup>2</sup> pressure drop % Kv at 1 bar pressure drop	— — —	— • —	— — •	— — •	• — —	• — —	— — •
Temperatures	See table 1	—	—	—	—	—	—	—
Working Pressure	See table 1	—	—	—	—	—	—	—
Test Pressure	24 bar	•	•	•	•	•	•	•
Body Material	Bronze: leaded gunmetal BS 1400 LG2 Close grained cast iron BS 1452 Grade 14 or 17 Spheroidal Graphite Iron BS 2789 Grade 370/17 (Low temperature)	• — —	• — —	— • —	— • —	— — •	— • —	— • —
Seat	Integral with body Leaded gunmetal BS 1400 LG2 Aluminium brass BS 2871 CZ 110 (or arsenical brass) Stainless steel BS 970 Grade 303 (S21 or S41)	• — — —	• — — —	— — • —	— — — •	— — — •	— — — •	— • — —
Plug	High tensile brass BS 2874 CZ 114 High tensile brass BS 2874 CZ 114 with ethylene propylene seating Leaded gunmetal BS 1400 LG2 Stainless steel BS 970 Grade 303 (S21 or S41)	— • — — —	• — — — —	• — — — —	— — — • •	— — — • •	— — — • •	— — — • —
'O' Ring in plug	Ethylene Propylene	—	—	—	•	•	•	—
Spindle	Stainless steel BS 970: Grade 431 S29 Grade 316 S16	— •	• —	• —	• —	• —	• —	— —
Guide	Stainless steel BS 970 Grade 303 S41 or S21 Leaded brass BS 2874 CZ 121 Leaded brass BS 2872 CZ 122	— — —	— • —	— • —	— — —	• — —	• — —	— • —
Bonnet	Integral with body Arsenical brass Close grained cast iron BS 1452 Grade 14 or 17	• — —	• — —	• — —	— — •	• — —	— • —	— • —
Gland (non adjustable spring loaded)	Packing chevrons: PTFE Scraper rings: PTFE Headers: brass BS 2874 Grade CZ 121 brass BS 2874 Grade CZ 132 Spring: Stainless steel BS 970 Grade 302 S25 Gland Nut: Aluminium brass BS 2871 CZ 110 or arsenical brass Leaded brass BS 2874 CZ 122	• • — • • • • —	• • • • • • • —	• • — • • • • —	• • — • • • • —	• • — • • • • —	• • — • • • • —	• • — • • • • —
Gland 'O' Ring	Viton Fluorocarbon	• —	• —	• —	• —	• —	• —	— •
Replacement Gland Kit	626-9-203 667-9-201 626-9-202	• — —	• — —	• — —	• — —	• — —	20 & 25mm 32 to 50mm —	— — •

**Spring Accessory Kits:** Available for use with VSF, VZ and VZF valves, to increase maximum differential pressure. See Table on page 1.

## VALVE STROKE TIME

This table gives total stroke time related to type, size and stroke of valve with type of actuator used.

*Note: If application requires faster valve stroke time, refer to Satchwell for actuator details.*

VALVE TYPE AND SIZE	VALVE STROKE	VALVE STROKE TIME (Secs.)	
		Actuator speed 8.5 s/mm	Actuator speed 2.5 s/mm
VZ VJF & VSF ½" & ¾" 15mm	9.5mm (⅜")	81	24
VZ VJF & VSF 1" to 2" 20 & 25mm	15.9mm (⅝")	135	40
VJF & VSF VZF 32 to 50mm 65 to 100mm	25.4mm (1")	216	64
VZF 125 & 150mm	38mm (1½")	323	95

For information relating to the following associated products see the Data Sheets listed:—

Actuators, mains voltage (ALM) and 24 volt (ALX)

Actuators with electronic positioner responding to 0 to 10 V dc command signal (ALE)

Pneumatic actuators

DS 3.20

DS 3.22

DS 9.15

## GOOD DESIGN PRACTISE

### CONTROL MEDIUM

The table on page 1 lists suitable fluids and which valves are appropriate.

Steam should be dry, saturated. A small degree of super-heat (up to about 20°C maximum) is permissible, but wet steam will damage plugs and seats due to the scouring action of water droplets at high velocity.

Other fluids — e.g. seawater, oils etc: Satchwell cannot accept responsibility for use of these valves with fluids other than those listed in table on page 1. Detailed specifications of all materials in contact with the fluid are given in table on page 2 and it is the responsibility of the specifier to check their suitability.

Note that all brass components used in valve construction, which are in contact with the fluid, are manufactured from dezincification resistant materials.

The valves are intended to be used in closed circuits for water; if the circuit is open e.g. mains water or from exposed cooling tower ponds it is possible that a build-up of mineral deposits may impair the operation of the valve and frequent maintenance will be necessary. Appropriate precautions should be taken.

### STEAM VALVES

Steam valves should be sized to give a pressure drop of about 40% of absolute inlet pressure. Allowance should be made for this and for the drop through isolating valves and other pipe fittings when sizing heating coils.

In calculating the maximum differential pressure against which the valve will close, consider the possibility of a vacuum existing downstream of the valve as the steam condenses.

If the steam supply drops to the valve from a main at higher level, trapping is essential also *before* the valve to prevent a slug of water being hurled at the valve plug on opening.

Correct steam trapping after the coil is also essential so that the condensate is cleared *continuously*. A build-up causes waterlogging which impairs heat exchange and may produce on/off control.

### WATER VALVES

The valve should have an authority of approximately 0.5. That is, the pressure drop through the valve should be as near as practicable equal to the pressure drop through the rest of the circuit which it controls.

Efficient air venting is important, especially for systems handling low flow rates.

STEAM AND WATER SIZING CHARTS ARE GIVEN IN DS V110.

### PLANNING THE INSTALLATION

In planning pipework layout the following considerations apply when deciding on the valve position:—

- Allow sufficient access for actuator and wiring.
- Avoid spindle pointing vertically downwards to avoid risk of condensation or leakage damaging actuator.
- Observe the upper ambient temperature limitation of actuators (50°C).
- Where fluid in valve exceeds 100°C actuator must *not* be above valve. Therefore valve should be mounted with spindle horizontal.
- Observe correct direction of flow through valve as indicated by arrow cast on body.
- Ensure system is efficiently vented, particularly for low flow rates.
- Where operating conditions are particularly arduous, use the VSF valve with Spheroidal Graphite iron body.
- For valves having a Kv/Cv of, say, 1.0 or below, it is recommended that a pipeline strainer be installed upstream of valve.

### INSTALLATION

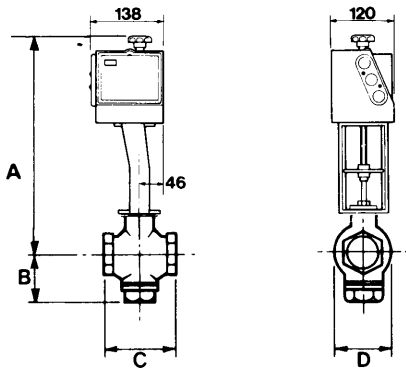
The system should be thoroughly flushed out to remove foreign matter before fitting the valve. Step-by-step installation instructions are packed with each valve and the precautions listed under 'Planning the Installation' must be observed.

Instructions for fitting electric actuators to valve are packed with actuator.

### MAINTENANCE

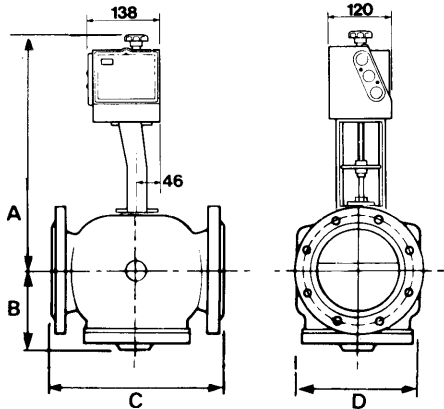
A periodic check of the valve gland should be made. For replacement gland kits see table on page 2.

**VZ**



Size	A mm	B mm	C mm	D mm
1/2 in	391	39	62	36
3/4 in	392	40	74	43
1 in	396	67	97	54
1 1/4 in	401	62	108	73
1 1/2 in	405	74	121	79
2 in	412	77	145	96

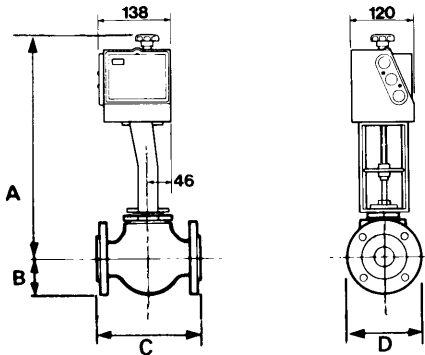
**VZF**



Size	A mm	B mm	C mm	D mm
65mm	414	108	238	185
80mm	415	108	254	200
100mm	431	140	292	220
125mm	465	227	347	250
150mm	477	248	396	285

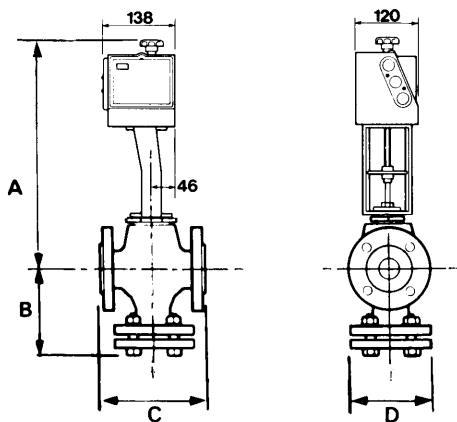
Note: VZF 65mm has 4-hole flange drilling.

**VJF**



Size	A mm	B mm	C mm	D mm
15mm	400	48	130	95
20mm	399	53	150	105
25mm	400	58	160	115
32mm	405	70	180	140
40mm	405	75	200	150
50mm	405	83	230	165

**VSF**



Size	A mm	B mm	C mm	D mm
15mm	390	48	130	95
20mm	402	101	150	105
25mm	424	121	160	115
32mm	425	145	180	140
40mm	425	145	200	150
50mm	425	147	230	165

Note: Outline shown is typical for sizes 20-50mm only.

- NOTE:
- Allow 110mm between top of actuator and nearest obstruction to permit fitting and removal of actuator, also access to manual operator.
  - Allow 150mm clearance for access to actuator terminal cover.

**CAUTION**

- Observe recommendations under 'Good Design Practise'.
- Observe maximum ambient temperature limits.
- Observe limits of water temperature, system pressure and maximum differential pressure.
- Interference with those parts under sealed covers renders the guarantee void.
- A periodic system and tuning check of the control system is recommended.
- When valve plug/spindle assemblies are changed after factory test or replaced in service, the original specified percentage let-by can no longer be guaranteed.
- Information is given for guidance only and Satchwell do not accept responsibility for the selection or installation of its products unless information has been given by the Company in writing relating to a specific application.
- Design and performance of Satchwell equipment are subject to continual improvement and therefore liable to alteration without notice.

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