

**HIGH PERFORMANCE CONTROL
VALVES**
DOWN TO 1.2K (-272°C or -457°F)

VELAN



S U M M A R Y

Velan

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ABOUT US

Velan group is one of the world’s leading manufacturers of industrial steel and forged valves for chemical, petrochemical, oil & gas, fossil & nuclear power, congeneration, pulp & paper and cryogenic industries. Founded in 1949 in Montreal - Canada, Velan, earned a reputation for excellence as a major supplier of gate, globe, check, ball, butterfly and knife gate valves for most critical applications. With 17 specialized manufacturing plants in Canada, USA, Europe and Asia, Velan provides world’s leading industries with best technical solutions and high quality products.



KEY FIGURES :

- > Founded in 1950 by A.K. Velan
- > 1,600 employees worldwide
- > Turnover : 400 M\$
- > 12 manufacturing sites:
Canada (2), USA, France (2), UK, Portugal, Italy, South Korea (2), Taiwan, China, and India
- > 28% of the capital floating on the Canadian Stock Exchange
- > A worldwide sales & services network
- > Specialized in high performance industrial valves

Located in Lyon, Velan France manufacturing plant is equipped with last generation machining and industrial means.



VELAN FRANCE

Cryogenic & Space applications

Velan France is a world leader in valves for Nuclear, LNG and Cryogenic & Space applications. With our field experience and technical expertise, we are able to supply any major project requiring first-class quality and perfect reliability. Our High Performance Valves have been supplied for superconductivity applications, particle accelerators, nuclear fusion, rocket launching pads, Helium and Hydrogen liquefiers.

HYDROGEN

Liquefaction plants
Receiving terminals & Regasification plants

- 254°C
- 425°F
19K



AEOSPACE FACILITIES

Rocket launch (LOx, LH2)
Rocket engine test benches (LOx, LH2)
Transonic Wind tunnels
Quantum computing
Large telescopes

- 254°C
- 425°F
19K



BIG SCIENCE

Particle accelerators : CERN LHC
Super conducting Magnets
Nuclear fusion : Tokamak, ITER
Quantum Computing

- 272°C
- 457°F
1.2K



DESIGN, RESEARCH AND DEVELOPEMENT



With more than 40 years experience in valve industry, Velan France keeps developing new design approaches and technologies in cooperation with most progressive universities and national research centers.
Velan design department is composed of 40 highly qualified engineers & technicians, with 4 major targets:

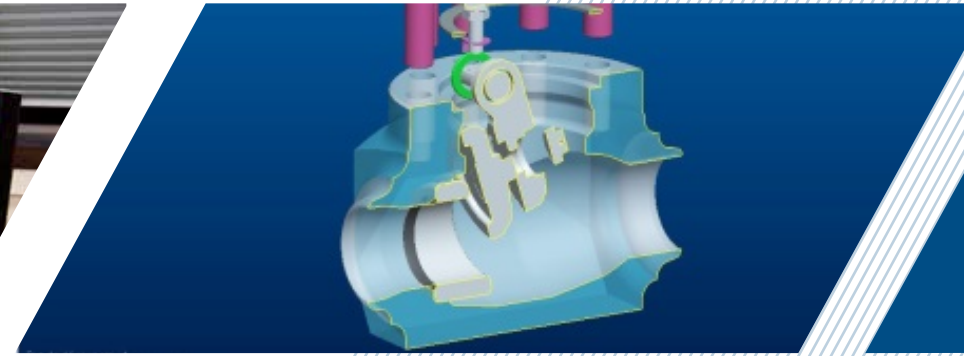
- Design of new products according to market demand and specific client requests,
- Products qualifications,
- Products improvement: tightness, resistance to accidental conditions such as earthquake, life expectancy, CV optimization, development of easy maintenance.

DESIGN SOFTWARES & CALCULATION MEANS:

- Pro-engineer : 3D drawings
- Creo drafting : 2D drawings
- Mathcad : Analytic mechanical calculation
- ANSYS :
 - Seismic calculation
 - Natural frequency
 - Spectral response
 - Mechanical calculation and thermo-mechanical
 - Plastic calculation
 - Fatigue analysis according to B3200
- CFX (ANSYS)
 - Fluid mechanics calculation
 - CV calculation (liquid or gas)
 - Cavitation analysis
 - Flow interruption stress calculations (liquid or gas)



MANUFACTURING CAPABILITIES



Latest technology machining



Orbital automatic welding machine



Cleaning & surface treatment



Valve assembling



MSLD testing



Packing & transportation



Workshop overview



Clean room

- Advanced 20 000 m2 manufacturing plant
- Industrial means which meet the highest requirements

ENVIRONMENT, HEALTH & SAFETY CAPABILITIES



WORLDWIDE MAINTENANCE & SERVICES SUPPORT

Environment & Sustainability	Health & Safety Policy
Environmental selective sorting	Use of Personal Protective Equipment
Dangerous waste management	Respect of Safety Standards for Machines & Devices
Noise levels decreasing	Regular security meetings with staff
Program for Energy and Water conservation	Training and Monitoring of Maintenance dept staff to radiation risks

A qualified engineers team is able to ensure a worldwide on-site managed services 365 days/year :

- Mounting, setting & commissioning of valves
- Technical support to dedicated teams of end users
- Hotline linked with Velan France plant
- Expertise on Velan valves during maintenance
- Training of end user's team

QUALITY ASSURANCE

Fully dedicated department of 27 Quality Experts. QMS - QUALITY MANAGEMENT SYSTEM : Certified ISO 9001, 14001, OHSAS 18001, Compliance with PED & ESPN standards, Additional 73 complementary QA procedures covering all company processes.

Project Quality Assurance Program in case of specific contract requirements. Operational Experience Management : Production feedback, On-site maintenance department feedback, Customers' feedback.

Safety Culture : Compulsory General Safety Training for all employees, Specific Nuclear QRA training for concerned employees.

TRAINING CAPABILITIES

Modern Training center equipped with training valves on Velan site (Lyon)

Option : Technical training on customer's site

Velan training certificate is issued for each participant after training session.

Integrated Management System
=
High Industrial Performances



CRYOGENIC BELLOWS SEALED CONTROL VALVES



Design Features

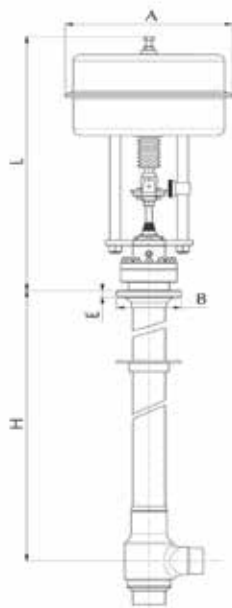
Fluid	Helium, Hydrogen, Oxygen, Nitrogen, Argon
Temperature	Down to 1.2 K (-272°C or -457°F)
Pressure rating	Class 150 to Class 300
Body type	Angle, Straight, Y pattern
End connections	Butt Welding according to ANSI B 16.25
Cold box adaptation	Welding flange
Cryogenic extension	As per BS6364
Materials	Body and seat : 316L or 304 L - Plug : Cu Al alloy or Stainless Steel
Flow characteristic	Linear or =% or on/off
Stem Tightness	Bellows Sealed
Seat Tightness Performance	10-4 mbar.l/s in standard
Across Body Tightness Performance	10-8 mbar.l/s in standard
Valve to Atmosphere Tightness Performance	10-5 mbar.l/s in standard
Tightness test means	Cryogenic test bench - Kellog method test bench - Mass spectrometer
Certificates	EN 10204 3-1 for main constitutive parts of pressure shell
Codes & Certifications	ASME - RCCMRX - AD2000 W10 - DESP

Accessories

Actuation	Manual, Diaphragm actuator, Piston type actuator (on request)
Electro pneumatic positioner	4-20mA, Profibus, Hart protocole, Position transmitter, Explosion proof
Limit switches	Mechanical or Inductive
Tubing	Rilsan or Stainless steel
Air supply control	Air filter regulator with gauge provided in standard
Air exhaust	Solenoid valve
Slow operation	Needle valve
Fast operation	Booster or Quick exhaust valve
Low heat in leaks	Thermal collar (Cupro Aluminium)
Isolation	Vacuum jacket
BW ends	Pipe stubs

Severe conditions

Oxygen service	Degreasing
Explosive area	ATEX
Magnetic field area	Remote control (electronic part)
Radiation area	Seat Seal in VESPEL + Soft parts in EPDM + tubing in stainless steel+ remote control (electronic part)



Straight on/off valve with fully stainless steel actuator and manual override



Straight manual valve with vacuum jacket and pipe stubs



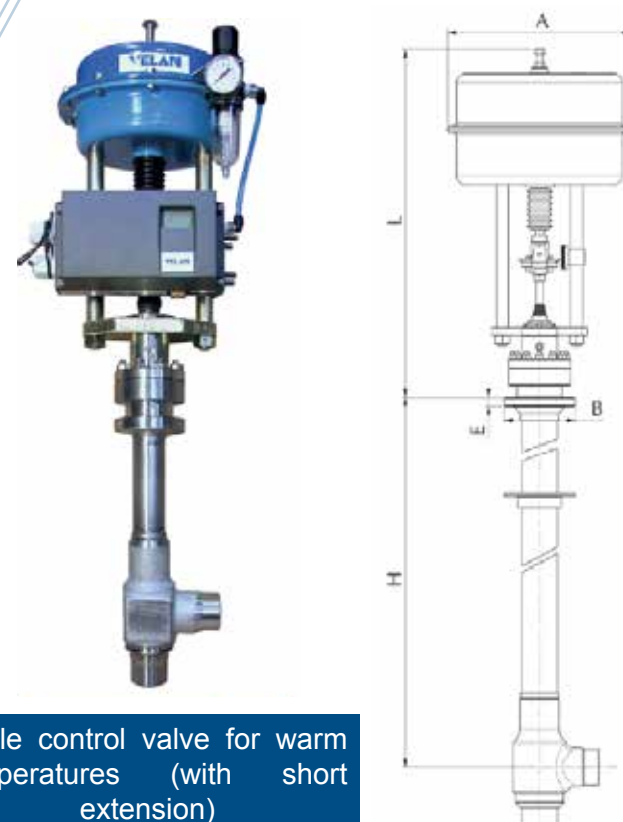
Angle control valve size ND250 with thermal collar

Standard Service Range for very low temperatures down to 1.2 K

Standard service Range for very low temperature down to 1.2 K																			
Size (mn)	6	8	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300		
Size (in)	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"		
H (mn)	650	650	650	650	650	650	650	875	875	875	875	1000	1000	1000	1000	1000	1000		
L approx. (mn)	380	380	380	380	420	420	465	520	520	620	860	860	1100	1600	1600	1600	1600		
ø A (mm)	160	160	160	160	160	210	210	310	310	310	415	415	600	600	600	600	600		
ø B (mm)	60	60	60	60	80	80	80	120	120	160	200	250	250	250	250	450	450		
E (mm)	12	12	12	12	15	15	15	15	15	15	10	15	15	15	15	15	15		
Weight (Kg) Angle type	3	3	3	3	7	7	7	18	18	30	60	85	140	140	403	403	500		
Weight (Kg) Straight type	4	4	4	4	9	9	9	27	27	50	130	200	450	450	550	550	650		
CV max range (Angle type)	Please refer to pages 18 - 19																		
Cv max range (Straight type)	Please refer to pages 18 - 19																		
Pipe Displacements	Please refer to page 21																		



3 WAYS CRYOGENIC CONTROL VALVES



Angle control valve for warm temperatures (with short extension)

Standard Service Range For warm temperatures down to 213 K

Size (mn)	6	8	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Size (in)	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
H (mn)	130	130	130	130	300	300	300	370	370	370	450	450	450	450	Available on request		
L approx. (mn)	380	380	380	380	420	420	465	520	520	620	860	860	1100	1600			
ø A (mm)	160	160	160	160	160	210	210	310	310	310	415	415	600	600			
ø B (mm)	60	60	60	60	80	80	80	120	120	160	200	250	250	250			
E (mm)	12	12	12	12	15	15	15	15	15	15	10	15	15	15			
Weight (Kg) Angle type	3	3	3	3	7	7	7	18	18	30	60	85	140	140			
Weight (Kg) Straight type	4	4	4	4	9	9	9	27	27	50	130	200	450	450			
CV max range (Angle type)										Please refer to pages 18-19							
Cv max range (Straight type)										Please refer to pages 18-19							
Pipe Displacements										Please refer to page 21							
Heat Leaks (W)										Please refer to page 20							

Design Features

Fluid	Helium, Hydrogen, Oxygen, Nitrogen
Temperature	Down to 1.2 K (-272°C or -457°F)
Pressure rating	Class 150 to Class 300
Body type	3 ways
End connections	Butt Welding according to ANSI B 16.25
Cold box adaptation	Welding flange
Cryogenic extension	As per BS6364
Materials	Body and seat : 316L or 304 L - Plug : Cu Al alloy or Stainless Steel
Flow characteristic	Linear or =% or on/off
Stem Tightness	Bellows Sealed
Seat Tightness Performance	10-4 mbar.l/s in standard
Across Body Tightness Performance	10-8 mbar.l/s in standard
Valve to Atmosphere Tightness Performance	10-5 mbar.l/s in standard
Tightness test means	Cryogenic test bench - Kellogg method test bench - Mass spectrometer
Certificates	EN 10204 3-1 for main constitutive parts of pressure shell
Codes & Certifications	ASME - RCCMRX - AD2000 W10 - DESP

Accessories

Actuation	Manual, Diaphragm actuator, Piston type actuator (on request)
Electro pneumatic positioner	4-20mA, Profibus, Hart protocole, Position transmitter, Explosion Proof
Limit switches	Mechanical or Inductive
Tubing	Rislan or Stainless steel
Air supply control	Air filter regulator with gauge
Air exhaust	Solenoid valve
Low heat in leaks	Thermal collar (Cupro Aluminium)

Severe conditions

Size (mn)	6	8	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Size (in)	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
H (mn)	665	665	665	665	675	675	675	915	915	925	925	1067	1102	1102	Available on request		
L approx. (mn)	300	300	300	300	450	450	450	470	470	450	670	700	780	780			
ø A (mm)	125	125	125	125	250	250	250	250	250	250	300	300	250	250			
ø B (mm)	60	60	60	60	80	80	80	120	120	160	200	250	250	250			
E (mm)	12	12	12	12	15	15	15	15	15	15	10	15	15	15			
Weight (Kg) Angle type	3	3	3	3	7	7	7	18	18	30	60	85	140	140			
Weight (Kg) Straight type	4	4	4	4	9	9	9	27	27	50	130	200	450	450			
CV max range (Angle type)	Please refer to page 18-19																
Cv max range (Straight type)	Please refer to page 18-19																
Pipe Displacements	Please refer to page 21																
Heat Leaks (W)	Please refre to page 20																

CRYOGENIC PACKING
SEALED CONTROL VALVES



Design Features

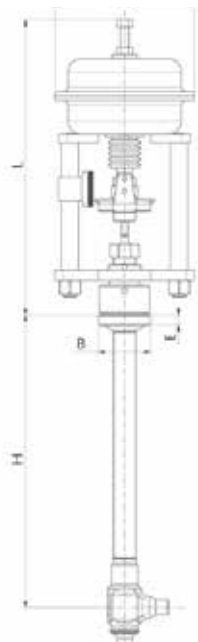
Fluid	Oxygen, Nitrogen
Temperature	Down to 77 K (-196°C or -320°F)
Pressure rating	Class 150 to Class 300
Body type	Angle, Straight, Y pattern
End connections	Butt Welding according to ANSI B 16.25
Cold box adaptation	Welding flange
Cryogenic extension	As per BS6364
Materials	Body and seat : 316L or 304 L - Plug : Cu Al alloy or Stainless Steel
Flow characteristic	Linear or =% or on/off
Stem Tightness	Bellows Sealed
Seat Tightness Performance	10-4 mbar.l/s in standard
Across Body Tightness Performance	10-8 mbar.l/s in standard
Tightness test means	Cryogenic test bench - Kellog method test bench - Mass spectrometer
Certificates	EN 10204 3-1 for main constitutive parts of pressure shell
Codes & Certifications	ASME - AD2000 W10 - DESP

Accessories

Actuation	Manual, Diaphragm actuator, Piston type actuator (on request)
Electro pneumatic positioner	4-20mA, Profibus, Hart protocole, Position transmitter, Explosion Proof
Limit switches	Mechanical or Inductive
Tubing	Rislan or Stainless steel
Air supply control	Air filter regulator with gauge
Air exhaust	Solenoid valve
Slow operation	Needle valve
Fast operation	Booster or Quick exhaust valve
Isolation	Vacuum jacket
BW ends	Pipe stubs

Severe conditions

Oxygen service	Degreasing
Explosive area	ATEX
Magnetic field area	Remote control (electronic part) Seat Seal in VESPEL + Soft parts in EPDM + tubing in stainless steel + remote control (electronic part)
Radiation area	



Straight on/off valve with fully
stainless steel actuator



Straight manual valve



Cryogenic test in
Liquid Nitrogen

Standard Service Range

Size (mn)	6	8	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Size (in)	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
H (mn)	335	335	335	335	372	372	372	472	472	514	543	586	628	628	Available on request		
ø A (mm)	160	160	160	160	160	210	210	310	310	310	415	415	600	600			
ø B (mm)	60	60	60	60	80	80	80	120	120	160	200	250	250	250			
E (mm)	12	12	12	12	15	15	15	15	15	15	10	15	15	15			
Weight (Kg) Angle type	3	3	3	3	7	7	7	18	18	30	60	85	140	140			
Weight (Kg) Straight type	4	4	4	4	9	9	9	27	27	50	130	200	450	450			
CV max range (Angle type)	Please refer to pages 18-19																
Cv max range (Straight type)	Please refer to pages 18-19																
Pipe Displacements	Please refer to page 21																
Heat Leaks (W)	Please refer to page 20																

CRYOGENIC SAFETY RELIEF VALVES

VALVE FUNCTION

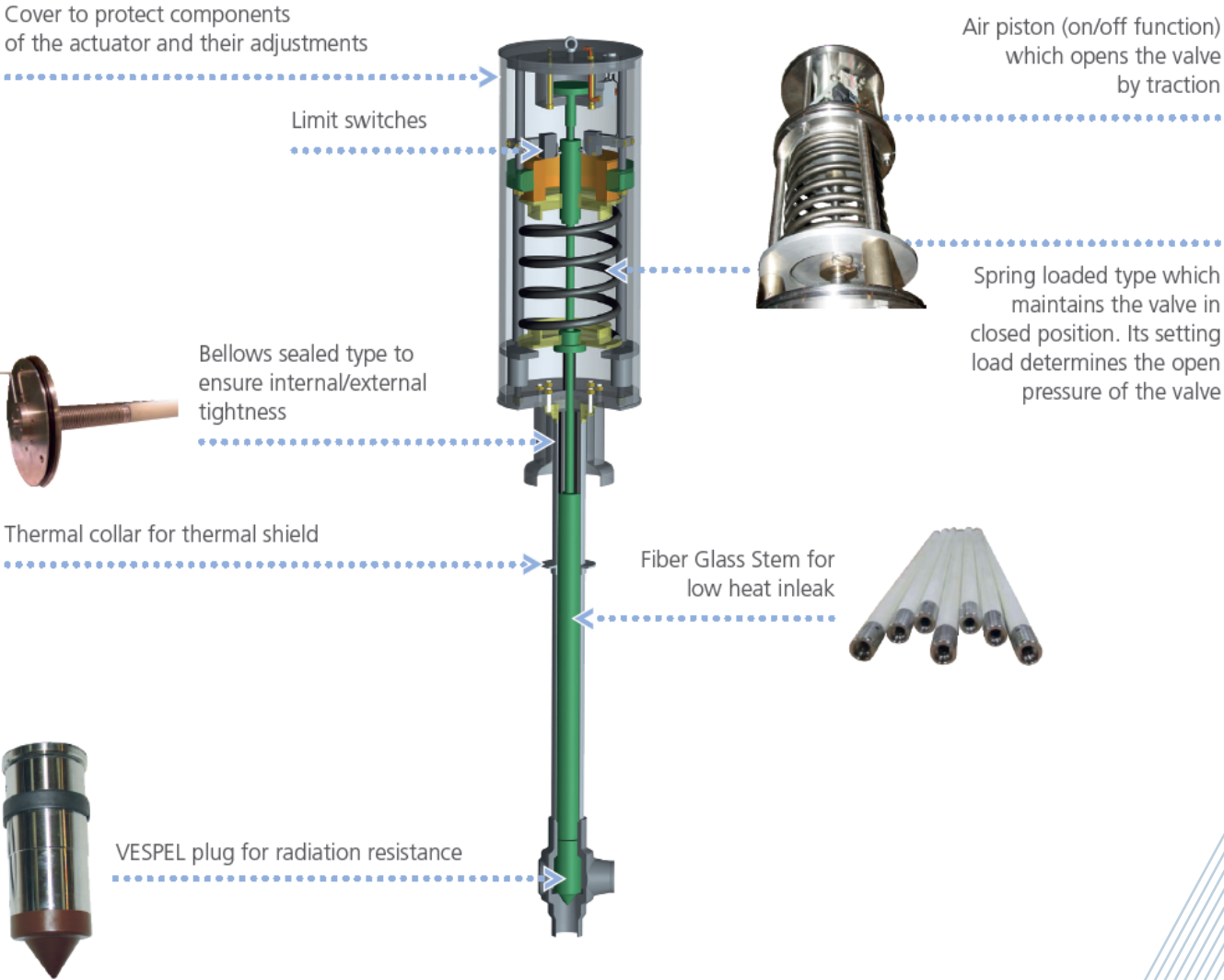
Protect against over-pressure the superfluid helium enclosures of superconducting magnet resulting from resistive transitions (Quench) as well as some of the cryogenic lines (QRL).

Design Features

Fluid	Helium
Temperature	Down to 1.2 K (-272°C or -457°F)
Pressure rating	PN25
Set pressure	1 bar up to 25 bar
Size	From DN15 to DN80 (from 1/2" to 3")
Body type	Angle
End connections	Butt Welding according to ANSI B 16.9
Cold box adaptation	Welding flange
Cryogenic extension	As per BS6364
Materials	Body and seat : 316L or 304 L - Plug : Cu Al alloy or Stainless Steel
Flow characteristic	Linear or % or on/off
Stem Tightness	Bellows Sealed
Seat Tightness Performance	10-4 mbar.l/s in standard
Across Body Tightness Performance	10-8 mbar.l/s in standard
Valve to Atmosphere Tightness Performance	10-5 mbar.l/s in standard
Tightness test means	Cryogenic test bench - Kellog method test bench Mass spectrometer
Certificates	EN10204 3.1 for main constitutive parts of pressure shell
Codes & Certifications	ASME - RCCMRX - AD2000 W10 - DESP
Actuation	1 pneumatic cylinder + electro-distributor
Control	Solenoid valve or Piezo-electric valve
Remote control (on/off)	On request
Limit switches	Mechanical
Tubing	Stainless steel
Low heat in leaks	Thermal collar

Severe conditions

Magnetic field area	Control piloted by Piezo-electric valve
Radiation area	Seat Seal in VESPEL + Soft parts in EPDM + remote control (electronic part)



Standard Service Range

Size (mn)	6	8	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300
Size (in)	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
H (mn)											675	675					
L approx. (mn)											685	685					
ø A (mm)											248	248					
Total Weight (Kg)	Available on request										56	56	Available on request				
Cv max range (Straight type)											35	35					
Pipe Displacements											+/-3	+/-3					
Heat Leaks (W)											1,9	1,9					

CV RANGE

DN - Size			ANGLE				STRAIGHT			
Ø Seat	=%	Lin	On/Off	=%	Lin	On/Off				
Ø 1	?	0,001								
Ø 2	0,06									
Ø 3		0,07	0,4							
		0,09								
		0,12								
		0,15								
		0,2								
		0,23								
		0,25								
Ø 4,5	0,35	0,35								
	0,6									
	0,25	0,25	1,5			1,1				
	0,35	0,35								
0,4	0,4									
0,5										
Ø 6	0,55	0,6	1,5			1,1				
	0,6	0,6								
	0,84	1								
	1	1								
	1,25									
	1,5									
	0,55			4,5				2		
0,58										
0,84	1									
1,5	1,2									
2	2									
2,5										
3										
Ø 9,5	3,2		4,5			2				
	3	3								
	3,75									
	5			9			5			
	6	6								
	6,5									
	Ø 13	1			7				13,6	
3,75										
5										
6		5								
7										
8		8								
9			17				19			
10										
11										
15										
7		27				26				
13										
15										
18										
20										
18	24		30				N/A			
28	24							45		
Ø 25	20		45			60				
	30									
	40									
	30			58				45		
40										
52										
30	30	78				238				
40										
50	48									
70	61									
Ø 40	30		78			365				
	90									
	120									
Ø 65	30		120			535				
	90									
	120									
DN 80	59		215	50		170				
	75									
	87			100						
	140			130						
DN 100	186		400	170	130	238				
	230			230	216					
DN 125	430		520	365		365				
DN 150	300		610			535				
	500			425						
	610	600								
DN 250	1400		1450							

HEAT INLEAKS

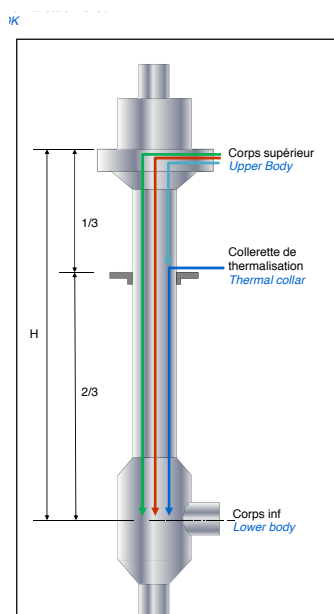
LOWER BODY DISPLACEMENT

			Sans colerette		Avec colerette	
			Without thermal collar		With thermal collar	
T°Corps inf / Lower body (K)			4	80	4	/
T°Corps sup / Upper body (K)			300	/	300	300
T°Colerette / Thermal collar (K)			/	/	80	80
DN	H mm	stem mat.	Q300-4 W	Q300-80 W	Q80-4 W	Q300-80 W
6 SP	875	V	0.22	0.19	0.09	0.42
6-15	650	V	0.48	0.43	0.15	1.07
	875	SS	0.77	0.68	0.43	1.06
20 - 32	875	V	0.34	0.31	0.10	0.77
	650	V	0.9	0.8	0.3	1.8
	650	SS	1.8	1.6	1.2	1.8
40 - 50	875	V	0.6	0.5	0.2	1.2
	875	V	1.8	1.6	0.5	4.2
50 +	875	SS	2.8	2.5	1.5	4.2
	875	V	2.1	1.9	0.6	4.9
65	875	SS	3.3	2.9	1.8	4.9
	875	V	2.8	2.5	0.8	6.2
80	875	SS	4.9	4.3	3.0	6.2
	875	V	5.9	5.2	1.8	13.3
100	1000	SS	8.9	7.9	4.8	13.3
125 - 150	1000	SS	9.8	8.6	4.9	15.5
250	1200	SS	12.1	10.7	6.0	19.5
			21.6	19.1	10.4	35.7

Displacement of the lower valve body in the conditions defined hereafter :

- The valve is in closed position in service conditions (20bar@4K)
- The upper body is welded on the coldbox => limit condition = fixed point

DN	Dimensions	Extension	Déplacement
	Tube d'extension	Standard	Displacement
(mm)	Extension tube	Lt	f (mm)
8	ø25x1	650	+/-3
10	ø25x1	650	+/-3
15	ø25x1	650	+/-3
20	ø38x1	650	+/-3
25	ø38x1	650	+/-3
32	ø38x1	650	+/-3
40	ø60,3x2	875	+/-3
50	ø60,3x2	875	+/-3
50+	ø70x2	875	+/-3
65	ø84x2	875	+/-3
80	ø114x3	875	+/-3
100	ø141.3x3.4	1000	+/-3
125	ø168.3x3.4	1000	+/-3
150	ø168.3x3.4	1000	+/-3



Q300-4 From 300K to 4K : from upper body @300K to the fluid 4K

Q300-80 From 300K to 80K : from upper body @300K to the fluid 80K

Q80-4 From 80K to 4K : from the thermal collar @80K to the fluid 4K

Q80-300 From 300K to 80K : from the thermal collar @80K to the fluid 4K

6 SP ND6 optimized for heat inleaks

V Command stem in fiber glass & epoxy resin

SS Command stem in stainless steel

TECHNICAL SOLUTION IN CASE OF IRRADIATIONS

Materials

- Gaskets & Diaphragm of actuators in EPDM
- Tubing in stainless steel
- Plug in VESPEL

Moreover, VESPEL offers a better resistance to attacks of solid particles found in the helium pipes.

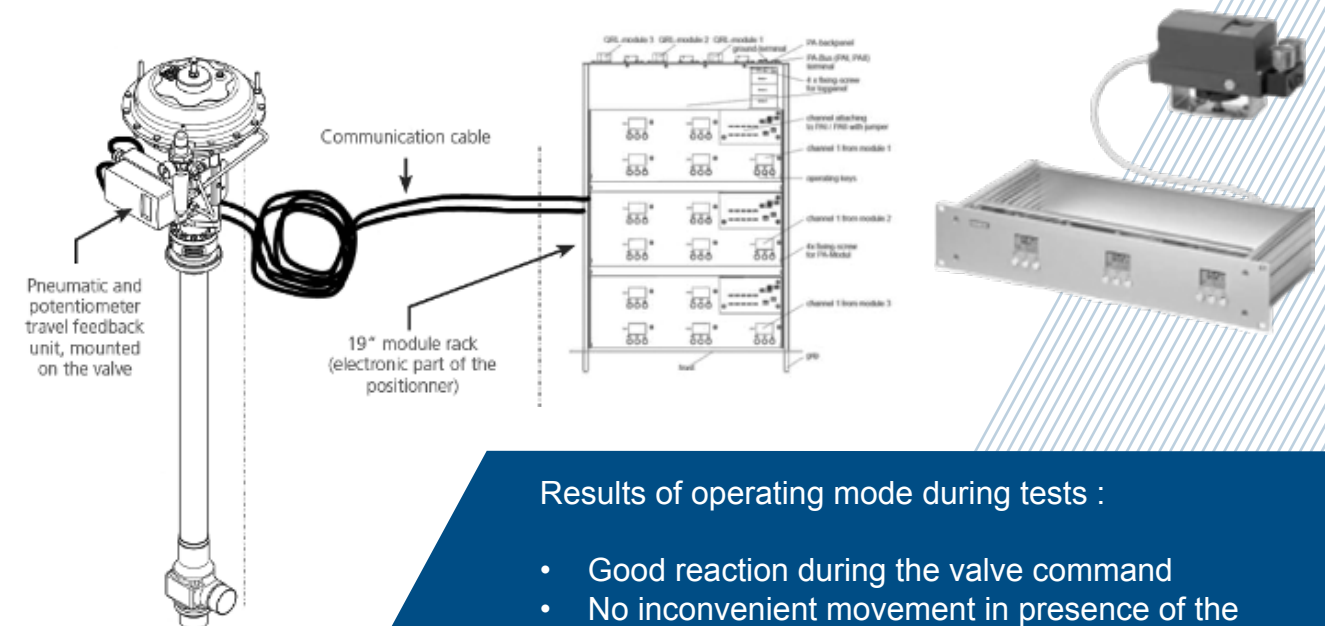


TECHNICAL SOLUTION IN CASE OF MAGNETIC FIELDS

In partnership with SIEMENS, Velan has lead operating tests under magnetic field at 150mT (= 1500G) with a remote control system.



Tests have been performed into 3 axes and 2 directions by axes with an independant laboratory approved by ITER Organization.



Results of operating mode during tests :

- Good reaction during the valve command
- No inconvenient movement in presence of the magnetic field
- No deviation of consupcion in the equipment under testing upper than 20% compared to free area

HIGH PRESSURE & SEVERE APPLICATION CONTROL VALVES

Design Features

Fluid	Helium, Hydrogen, Oxygen, Nitrogen, Methane, Argon, Natural Gas
Temperature	Down to 19 K (-254°C or -457°F)
Pressure rating	Up to Class 2500
Body type	Straight
End connections	Butt Welding according to ANSI B 16.25 or Flanged
Cold box adaptation	Welding flange (on request)
Cryogenic extension	As per BS6364
Materials	Depends on fluid, temperature and pressure class - available on request
Flow characteristic	Linear or =% or on/off
Stem Tightness	Bellows Sealed or Packing Sealed
Seat Tightness Performance	ANSI Class IV, V or VI
Across Body Tightness Performance	10-5 mbar.l/s
Tightness test means	Cryogenic test bench - Kellog method test bench - Mass spectrometer
Certificates	EN 10204 3-1 for main constitutive parts of pressure shell
Codes & Certifications	ASME - RCCMRX - AD2000 W10 - DESP

Accessories

Actuation	Manual, Diaphragm actuator, Piston type actuator (on request)
Electro pneumatic positioner	4-20mA, Profibus, Hart protocole, Position transmitter, Explosion proof
Limit switches	Mechanical or Inductive
Tubing	Rilsan or Stainless steel
Air supply control	Air filter regulator with gauge provided in standard
Air exhaust	Solenoid valve
Slow operation	Needle valve
Fast operation	Booster or Quick exhaust valve
Low heat in leaks	Thermal collar (Cupro Aluminium)
Isolation	Vacuum jacket
BW ends	Pipe stubs

Severe conditions

Oxygen service	Degreasing
Explosive area	ATEX
Cavitation	Multi-stage system
High shut off pressure	Multi-stage system + Edel technology pilot operated system



Cryogenic on/off valve size 14" with multi-stage system and EDEL technology



Class to 150 to 2900 up to 2"



Class 150 to 1600 up to 16"



Class 2500 up to 10"

STANDARD SERVICE RANGE

Class 150 to 2500

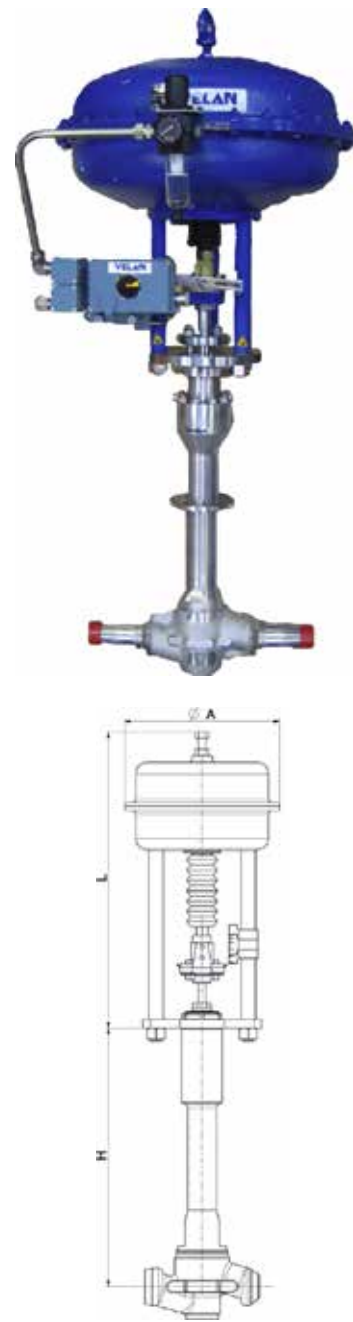
Size (mn)	15	20	25	40	50
Size (in)	1/2"	3/4"	1"	1 1/2"	2"
H (mn)	350	350	350	445	480
L approx. (mm)	290	380	380	455	450
ø A (mm)	160	210	210	310	310
Weight (Kg)	4	4	4	4	9
CV min	0,06	0,1	3,5	8	8
Cv max	3	6,5	11	30	30

Class 1500 *

Size (mn)	25	40	50	80	100	150	200	250
Size (in)	1	1 1/2"	2"	3"	4"	6"	8"	10"
CV max = % single port	13	22	35	75	125	270	-	-
CV max = % Edel design	-	-	33	72	116	255	470	695
CV Linear On/Off single port	13	22	35	76	128	280	515	780

Class 150 to 900 *

Size (mn)	25	40	50	80	100	150	200	250	300	350	400
Size (in)	1	1 1/2"	2"	3"	4"	6"	8"	10"	12"	14"	16"
CV max = % single port	13	26	46	100	157	307	501	747	1077	1309	1636
CV max = % Edel design	-	-	43	94	148	289	471	698	966	1230	1550
CV Linear On/Off single port	13	26	47	104	165	326	536	802	1120	1440	1800



MULTI-STAGE SYSTEM
ANTI CAVITATION - NOISE REDUCTION

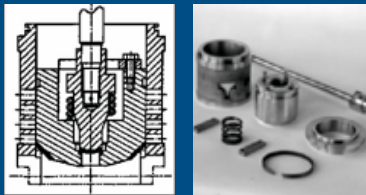
In case of high differential pressure, cavitation and/or noise can occur in the valve which involve early deterioration.

Velan has developed a multi-stage system according to Computational Fluid Dynamics analysis and tests to improve life time of the valve.



EDEL TECHNOLOGY PILOT OPERATED SYSTEM

EDEL pilot-operated valves allow the use of non-oversized actuators and provide high stability of control by reducing the load on the valve stem. The EDEL closure system is a metal pilot plug offering both good balance characteristics and tightness on closure.



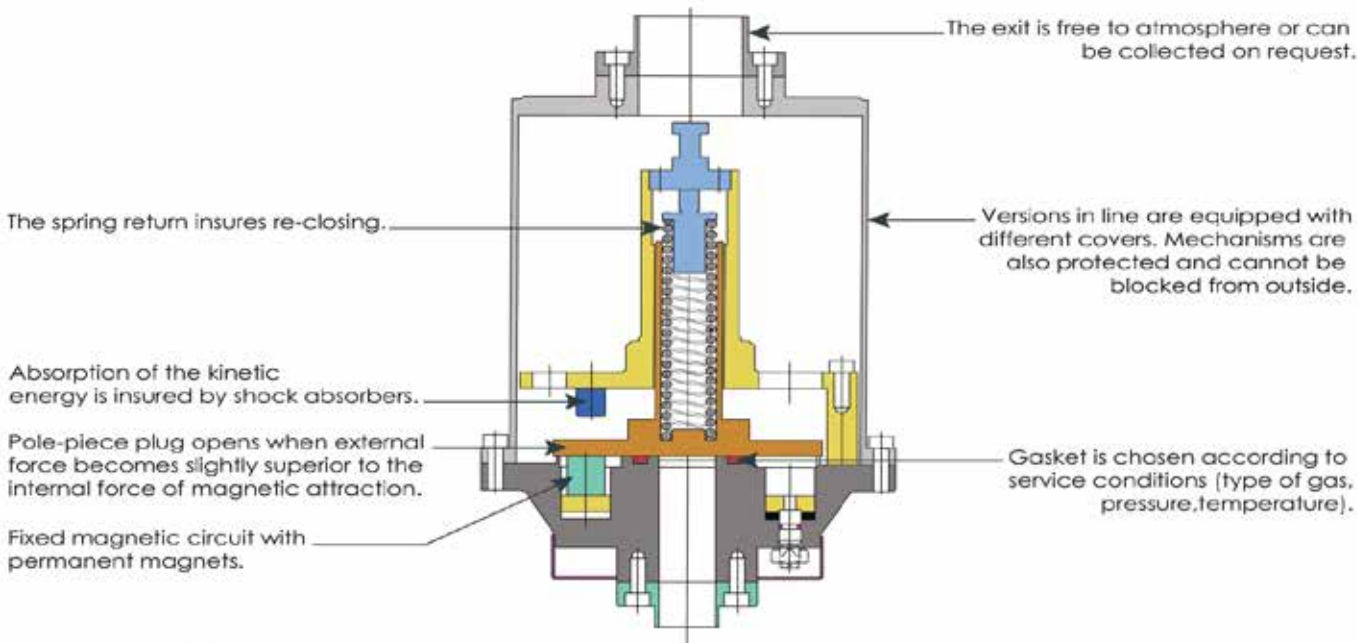
A small pilot plug opens first to reduce the load, and the main plug opens then with a smaller differential pressure.

MAGNETIC SAFETY DEVICE



Concept

The Magnetic Safety Device (DMS) has especially been designed to protect containers and pressure shells against overpressures for compressed fluids at ambient temperature or during cryogenic discharge.



Advantages

- Testability of the setting pressure
- Operating pressure very closed to opening pressure
- Full open system since beginning of setting pressure overpass
- Closing pressure adjustable
- Safety of pressure shell is insured as soon as the device is closed again



Developped by the CEA (French Committee for Atomic Energy) for its own needs, Velan has industrialized a range of Magnetic Safety Device (DMS) from DN10 to 150 and for pressures up to 25 bar.

CRYOGENIC BUTTERFLY VALVES



Design Features

Fluid	Helium, Oxygen
Temperature	Down to 19 K (-254°C or -425°F)
Pressure rating	Up to Class 150
Body type	Straight
End connections	Butt Welding according to ANSI B 16.25 or Flanged
Cold box adaptation	Welding flange
Cryogenic extension	As per BS6364
Materials	Depends on fluid, temperature and pressure class - available on request
Flow characteristic	Double offset disc rotation
Stem Tightness	Packing Sealed
Seat Tightness Performance	2.10-2 mbar.l/s in standard
Across Body Tightness Performance	5-10-7 mbar.l/s in standard
Valve to Atmosphere Tightness Performance	10-5 mbar.l/s in standard
Tightness test means	Cryogenic test bench - Kellog method test bench - Mass spectrometer
Certificates	EN 10204 3-1 for main constitutive parts f pressure shell
Codes & Certifications	ASME - DESP

Accessories

Actuation	Pneumatic, Hydraulic, Electric or Manual gear
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Severe conditions

Oxygen service	Degreasing
Explosive area	ATEX

- Double offset disc rotation
Butterfly valves are fitted with a flexible PCTFE seat which offers following advantages:
- A high elastic restitution ensuring a perfect tightness whatever the temperature
 - An increased expected life



THEY TRUST US



Institute of High Energy Physics
Chinese Academy of Sciences



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प्लाज्मा अनुसंधान संस्थान



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ORSAY

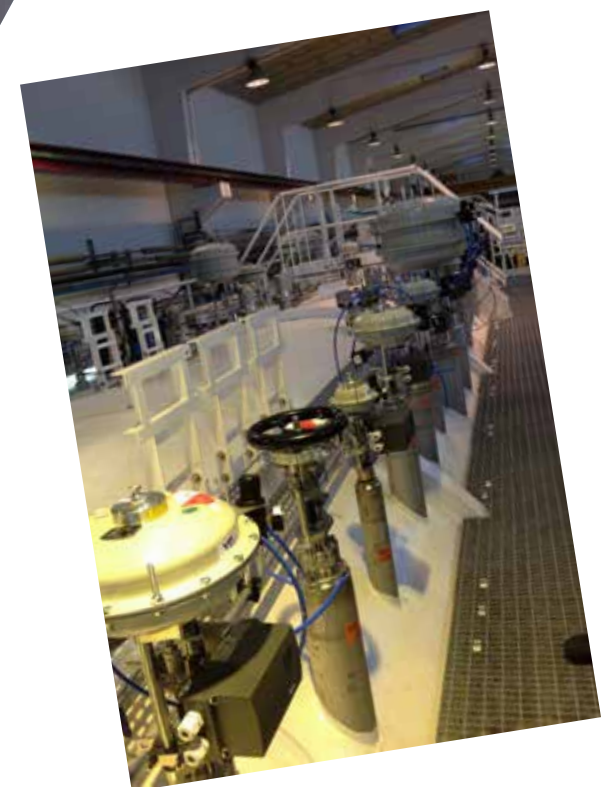


Advanced Superconducting Tokamak
BA-Satellite Tokamak Program

Making our world
more productive



中国科学院
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