

# Slurry transportation pipeline solutions



**For the most severe service applications in mining**

# VELAN

**Quality that lasts.**

### Velan at a glance

#### History

- Founded in 1950

#### People

- Over 1,700 employees

#### Product line

A world-leading range of valves across all major industrial applications:

- High pressure gate, globe, and check
- API standard gate, globe, and check
- Metal-seated and resilient-seated ball
- Triple offset and dual plate check
- API 6D & 6A

Including: actuators and steam traps

#### Quality

Velan holds major applicable approvals:

- ASME N/NPT (since 1970)
- ISO 9001 (since 1991)
- ISO 14001
- ISO 45001
- PED
- IEC 61508 SIL 3 Capable
- GOST/EAC
- API 6A and 6D
- TA-Luft
- Comprehensive quality programs that are compliant with the most stringent industry standards such as: ISO 9001, API Q1, NCA 4000, ASME NQA-1 and 10 CFR 50 Appendix B.
- Velan has been surveyed and audited by leading organizations around the world such as Bureau Veritas, API, ASME, NUPIC, DCMA, and shipbuilding companies.
- Total Process Improvement Program, including Lean manufacturing & Six Sigma

Headquartered in Montreal, Velan has several international subsidiaries.

For general inquiries:

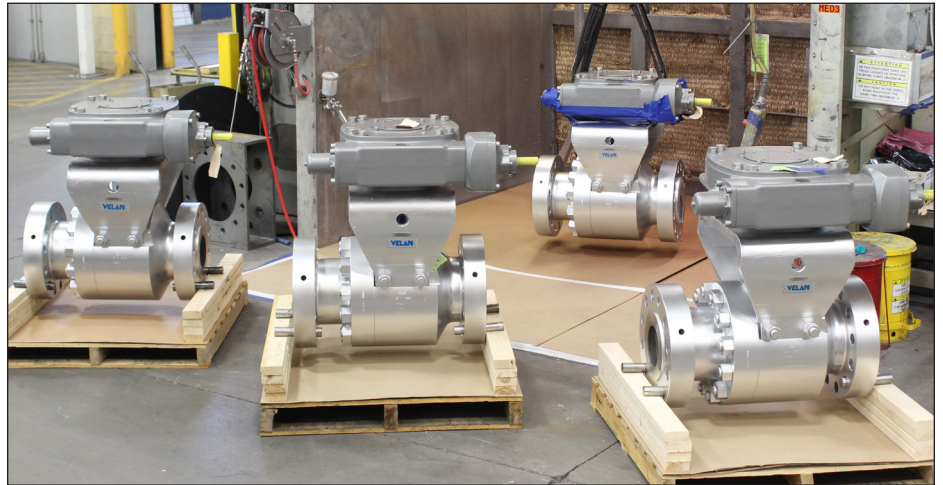
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### Velan: A world leader in valve design, engineering solutions, and manufacturing



A group of Velan Securaseal® C-series valves NPS 8 (DN 200) Class 1500 destined for Collahuasi copper mines in Chile.

#### Leading the way

Velan is one of the world's largest manufacturers of industrial steel valves, recognized as a leader in quality and innovation. Founded by A.K. Velan in 1950, our company leverages advanced engineering capabilities and innovation to continuously expand our offering of industrial valves.

Today, Velan gate, globe, check, ball, triple offset, engineered severe service valves and steam traps are installed throughout the world, handling diverse applications in cogeneration, fossil, nuclear power, oil and gas, refining and petrochemicals, chemicals and pharmaceutical, LNG and cryogenics, mining, marine, subsea, water and wastewater, and HVAC industries.

#### Engineered solutions

Velan's Engineering Group has vast experience, sophisticated software, and tools that enable us to find solutions to any customer challenge.

Whether it is for valves to handle liquid helium at -458°F (-272°C) in the world's largest particle accelerator at CERN, Geneva; four-way switch coker ball valves to handle one of the refining industry's toughest services; or valves for main steam isolation service in an operating nuclear power plant, Velan has been selected by the world's leading engineering construction firms and end users. A long-standing commitment to quality has kept Velan at the forefront of our market sectors.

Velan holds all major industry certifications and approvals. Many prominent companies have established partnerships or global supply agreements with Velan.

Velan uses the latest automation technology, including CNC machines and many special-purpose transfer machines, enhanced by proprietary production techniques.

#### A global manufacturing leader

Velan is a global company with 12 manufacturing plants strategically located throughout North America, Europe, and Asia. Using the latest automation technology and a wide range of equipment, we can efficiently handle highly customized orders for specialty valves as well as large production runs of commodity valves.

#### Total quality commitment

Velan is totally committed to offering products and services that exceed customer expectations. All Velan valves are designed and manufactured with an emphasis on low emissions, safety, ease of maintenance and operation, reliability and long service life.

#### After sales service support

Velan products can be serviced by our experienced field service technicians, call +1 514 748-7743.

Cover photo: Velan valves in service at Collahuasi copper mines in Chile - one of the toughest mines in the world.



A cost-effective means of transporting metal minerals over long distances

Slurry transportation pipelines are used in the mining industry to transport a mixture of water and solid materials such as ore or tailings, over long distances. When transporting metal minerals such as copper and iron ore to processing facilities and/or to shipping ports, pipelines present an efficient and economical alternative to rail- and roadways, especially when mines are located in remote or inaccessible regions.

These large-diameter pipelines can move huge concentrations of slurry ore along distances spanning from 300 km to 400 km across multiple elevations. Typically constructed of steel or other durable materials, pipelines can be laid along the terrain where slurry is pumped through using large pumps. To meet large capacity targets, pipeline sizes can go upwards of NPS 30 (DN 750) and pumping pressures can reach up to 3,700 psig (25,000 kPag).

Slurry transportation requires significant infrastructure to carefully control pressures and flow rates. The installation of pump and choke stations along the course of the pipeline are necessary to effectively manage the operating velocities which is key to maintaining a longer service life.

By slowing down or maintaining proper flow, these installations are necessary to ensure the mixture remains stable and does not cause blockages or leaks.

Velan has proven experience in the toughest mining applications

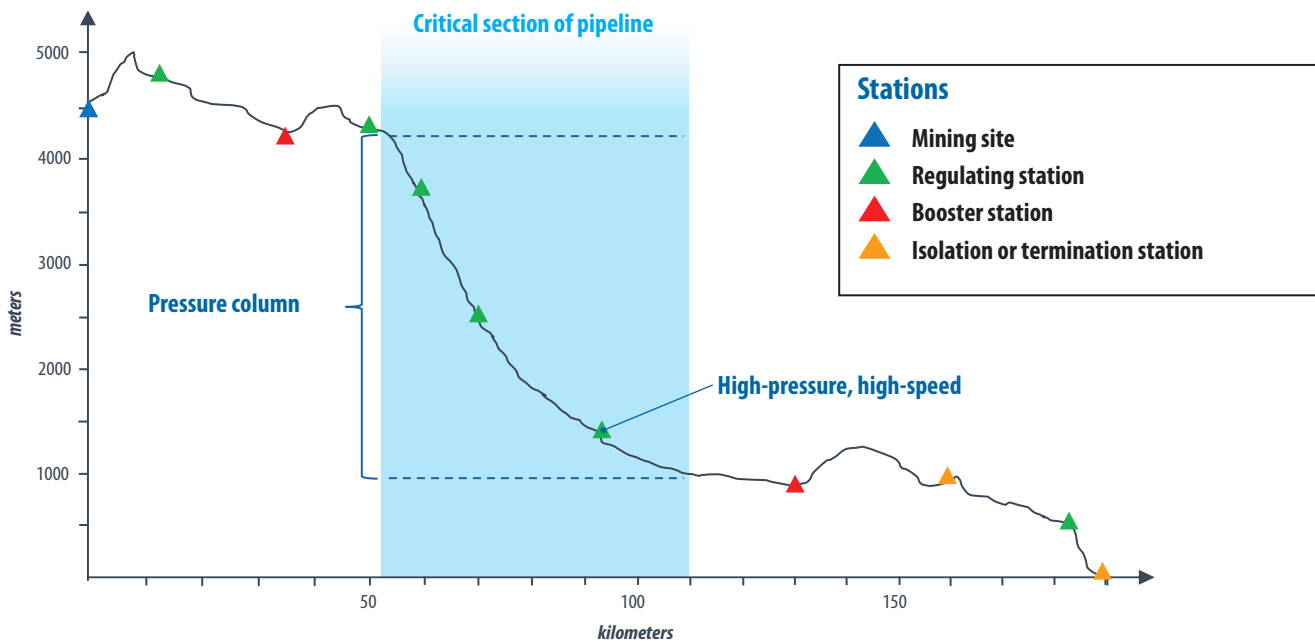
Velan has decades long-experience providing engineered valves to mining processes such as slurry transport, tailings discharge, autoclave isolation, and feed pump isolation. Velan has taken proven valve design features and incorporated them into several advanced slurry valve technologies.

Our severe service ball valves are used in high-pressure and high-velocity applications, with erosive and possibly corrosive media, to exceed the capabilities of other valve types. This includes Collahuasi in Chile—the most severe copper mine and one of the toughest mines in the world—where our Securaseal® C-Series metal-seated ball valves have been in service for over 20 years.

There are several key valve stations that are found along a slurry transportation pipeline. Velan's Securaseal C-series versatile and robust valve design meets all conditions required in each station.

Example of the topography for a slurry transport pipeline copper mine

Based on the most severe high pressure copper slurry pipeline in South America and one of the toughest in the world.



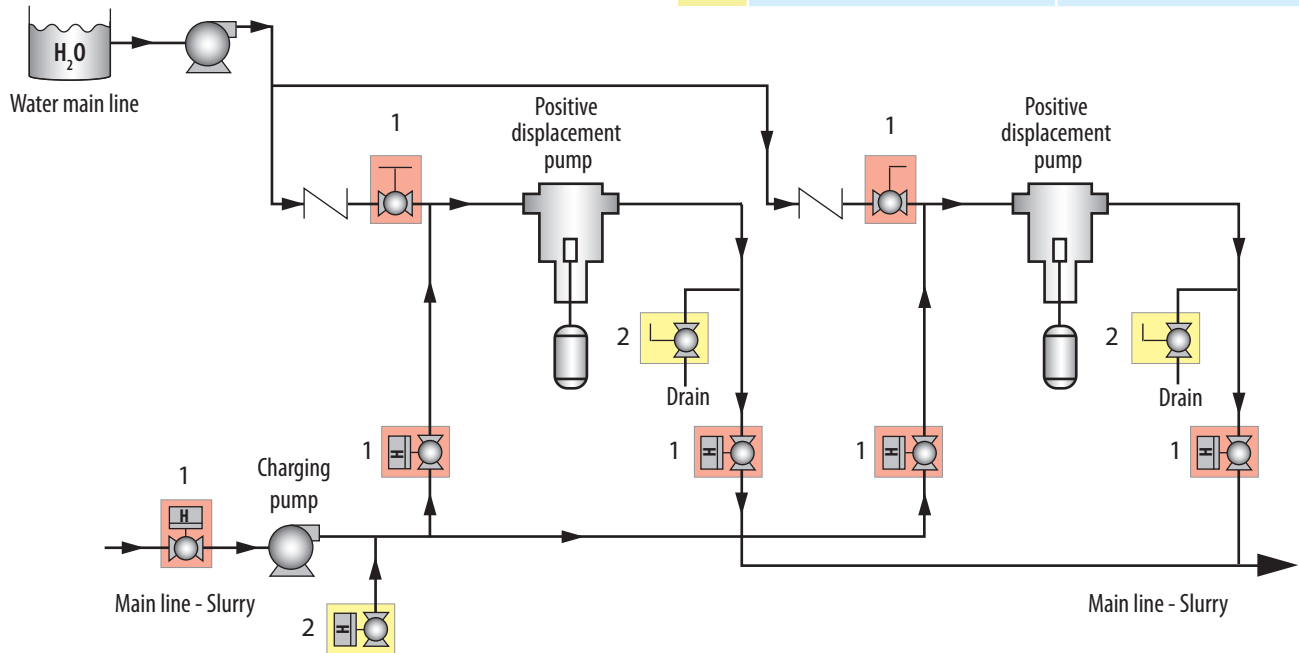
▲ Mining site	▲ Regulating station	▲ Booster station	▲ Isolation station	▲ Termination station
Starting point of the pipeline, where the slurry is first pumped into the pipeline. Typically, includes a series of valves that control the flow and pressure of the slurry as it enters the pipeline.	Used to control the flow and pressure of slurry.	Used to increase the pressure of the slurry as it moves through the pipeline. Include a series of pumps and valves that help maintain the desired flow and pressure levels.	Used to isolate a section of the pipeline for maintenance or repairs to pipeline equipment.	End point of the pipeline where the slurry is discharged into a storage or processing facility.

Booster (pump) station: Typical valve installation schematic

Typical process conditions (SI units):

77 °F at 3,625 psig (25°C at 25,000 kPag)

	Application	Size NPS (DN)
1	Pump isolation	14–30 (350–750)
2	Pump drain	2–3 (50–80)

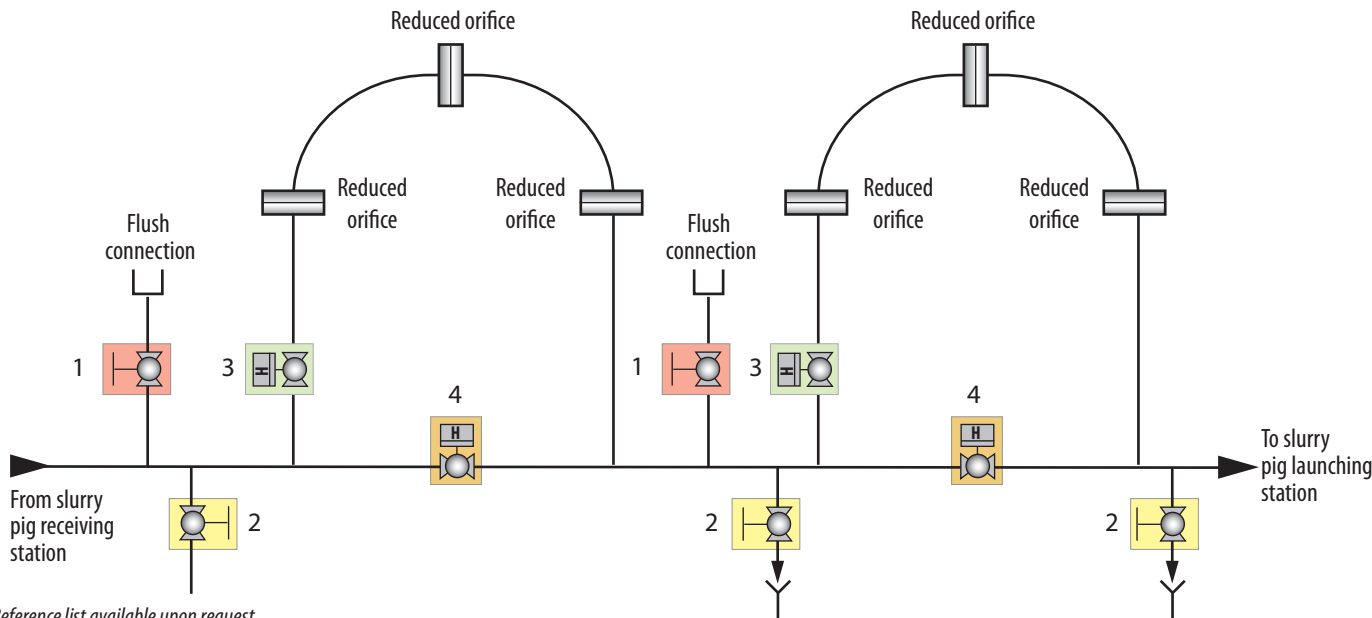


Regulating (choke) station: Typical valve installation schematic

Typical process conditions (SI units):

77 °F at 3,625 psig (25°C at 25,000 kPag)

	Application	Size NPS (DN)
1	Flush connection	2–4 (50–100)
2	Drain	2–4 (50–100)
3	Choke loop isolation	14–30 (350–750)
4	Choke loop bypass	14–30 (350–750)

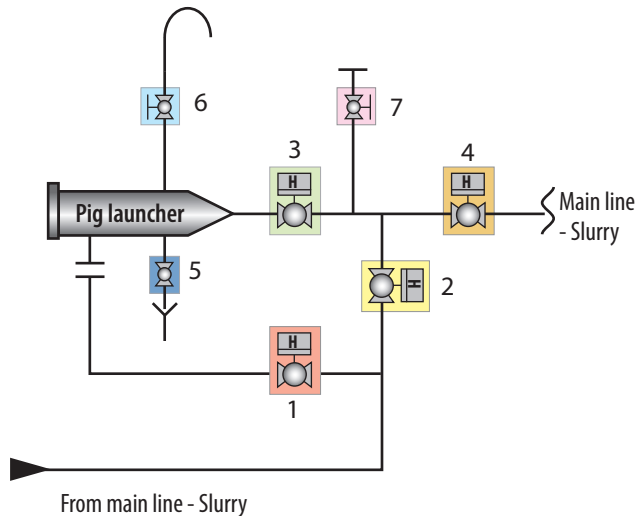


Reference list available upon request.

Isolation (pig launcher and receiver) station: Typical valve installation schematic

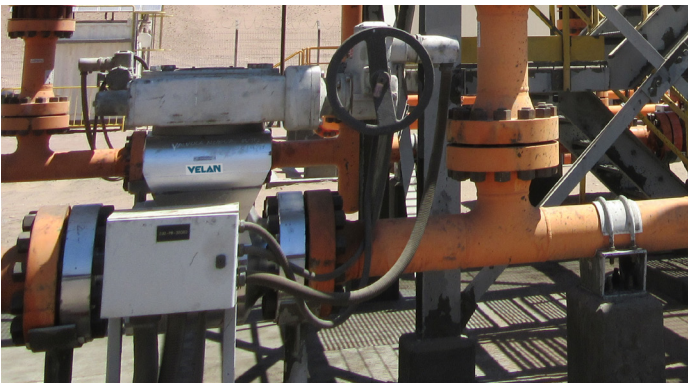
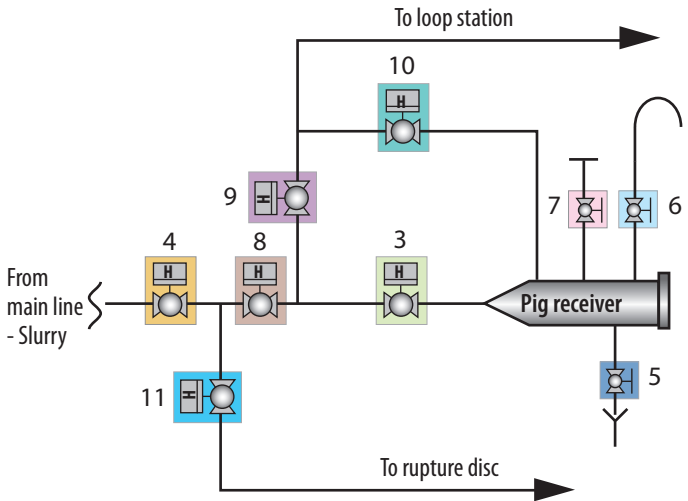
Typical process conditions (SI units):

77 °F at 2,436 psig (25°C at 16,800 kPag)



	Process region Pig launcher	Size NPS (DN)
1	Pig launcher: kicker	14–16 (350–400)
2	Pipeline isolation	14–30 (350–750)
3	Pig launcher isolation	14–30 (350–750)
4	Station isolation	14–30 (350–750)
5	Pig launcher drain	2–3 (50–80)
6	Pig launcher vent	2–3 (50–80)
7	Instrument isolation	1–2 (25–50)

	Process region Pig receiver	Size NPS (DN)
3	Choke loop/ Pig receiver isolation	14–30 (350–750)
4	Station isolation	14–30 (350–750)
5	Pig receiver drain	2–3 (50–80)
6	Pig receiver vent	2–3 (50–80)
7	Instrument isolation	1–2 (25–50)
8	Station seal	1–2 (25–50)
9	Station wear isolation	1–2 (25–50)
10	Pig receiver return	1–2 (25–50)
11	Rupture disc isolation	14–30 (350–750)



Velan Securaseal C-series isolation valve in service.

Reference list available upon request.

**Velan Securaseal® C-series unique design features**

**① Mounting bracket**

Operator-friendly thanks to the large heavy-duty bracket with versatile mounting pattern and easy access to packing studs.

**② External roller bearing**

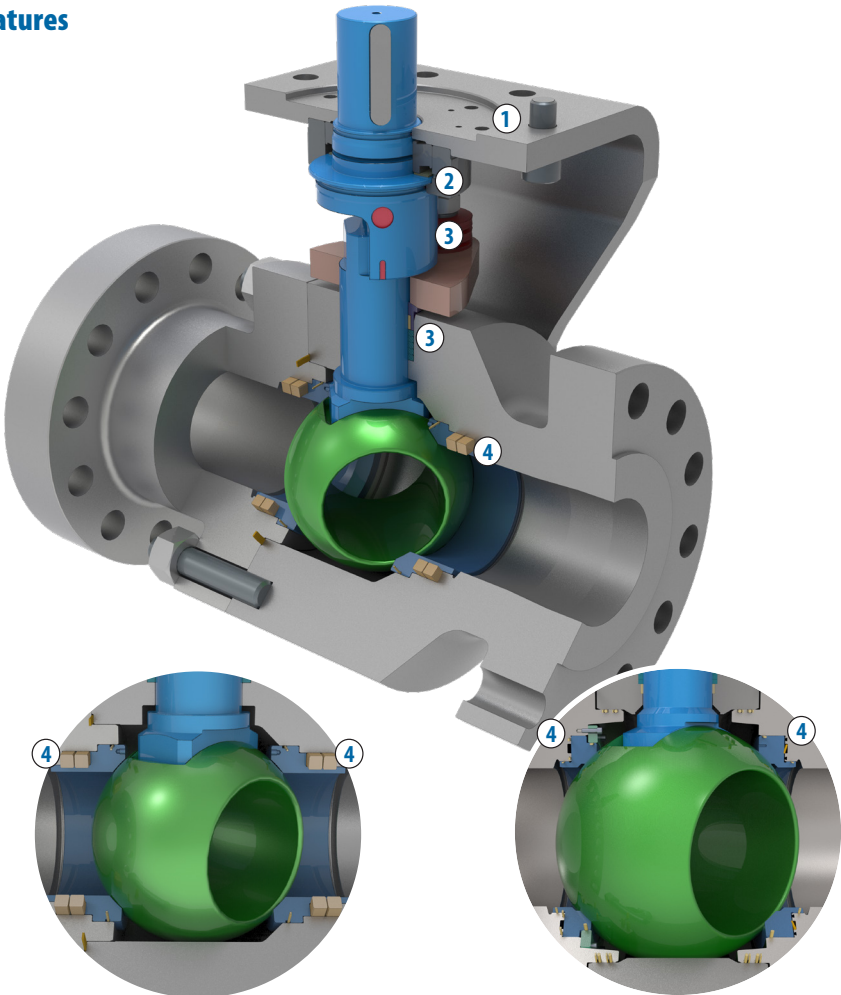
Lower torque due to a robust drive train that ensures operability no matter the slurry challenges with an external tapered roller bearing.

**③ Optimized stem sealing & live-loading**

- Robust design in a potentially corrosive atmosphere
- Stem/packing ring reduces friction
- Live-loading maintains a permanent sealing on the stem/packing rings regardless of the pipeline pressure cycling.

**④ Slurry-proof internals**

Ensured shut-off and minimized clogging with slurry-proof internals in high velocity slurries with protective shrouds and graphite backseat rings.



Up to NPS 6 (DN 150)

NPS 8 (DN 200) and larger

**Fully bi-directional sealing**

Maximized life expectancy using this bi-directional design that offers a permanently energized ball and seat contact as well as effective scraping of sealing surfaces. Symmetrical spring-loaded seat configuration that ensures bidirectional sealing as per API 598. Spring is protected by the seat.

**Wear/erosion protection**

Stainless steel weld overlay throughout the valve flow passage, protecting against erosive slurry velocities. Weld overlay extends into seat pocket areas and upwards to stem position.

**Extra wear/erosion protection**

An extra HVOF hardfaced coating is applied on top of the stainless steel overlay giving surfaces extra wear/erosion resistance against the harsh operating conditions.

**Coating solutions**

Advanced thermal spraying coating technology to resist thermal shock, erosive catalyst and sulphidation corrosion.

**Custom IIoT panel and sensors**

One web-enabled panel can collect, send and act on data acquired from their surrounding environments using embedded sensors, processors and communication hardware connected to multiple valves.

**RFID tag technology**

Radio frequency identification (RFID) tag technology for digital identification and tracking of valves in-service.

**Material selection**

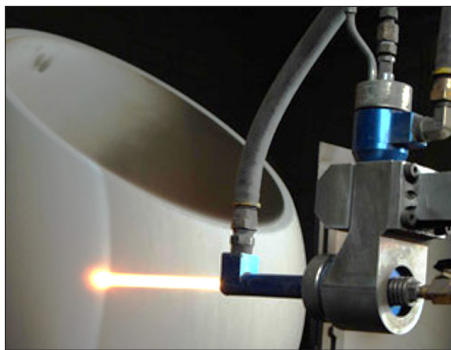
Valve part	Typical station applications	
	Drain, vent, isolation instrumentation	Pump, pigging, choke, isolation
Body	A564 Gr. 630 (17-4 PH) / waterway coating optional	A105 / SS overlay in seat cavity / waterway coating
Ball	17-4 PH / coated	
Seat	17-4 PH / coated	
Stem	17-4 PH	

**Cable drive actuator**

Velan’s patent-protected cable drive actuator is a good choice in slurry pipeline transport with its linear characteristics, constant efficiency, zero backlash, and reduced lag.

**Fire test qualifications**

Full size range of valves meet the latest recent fire test standards, having qualified to API 607 and ISO 10497.



HVOF coating of a ball.

### Coating solutions

**Thermal spraying (TS)** encompasses various methods in which a material powder is totally or partially melted in a high temperature gas flame and then sprayed through a nozzle onto the substrate.

**HVOF coatings** are mechanically bonded to the substrate. The average bond strength, between the coating and the substrate ranges from 55 MPa up to 82.7 MPa (8,000 psi up to 12,000 psi). HVOF coating has been used successfully in applications at moderate temperature and pressure.

**Spraying and fusing (S&F)** is a variant of HVOF coatings in which a self-fluxing alloy is first deposited onto the surface using HVOF process. In a second step, the coating deposit is heated in a vacuum furnace with controlled heating and cooling parameters.

Due to its characteristics, the bond strength is significantly higher than HVOF, exceeding 482.6 MPa (70,000 psi). S&F coating has been used successfully in the most severe applications where thermal shock and high differential pressures are a concern.

### RFID tag technology

Radio frequency identification (RFID) tag technology enables digital identification and tracking of valves in-service using software to communicate and collect data.

### Fire test qualifications

Velan valves tested to the most current industry fire test standards, achieving qualifications:

- API 607
- ISO 10497
- API 6FA
- API 589
- Tested on both preferred and non-preferred sides.

Velan has both a vast prequalified commodity product range and provides project specific qualifications made to order. Securaseal C-series valves can be purchased with API and ISO fire test certification up to Class 2500 for all sizes.

### Automation capabilities

Velan offers a wide range of products to address each customer's application. Our valves can be equipped with electric, hydraulic, or pneumatic actuation. We also offer preinstalled switches, positioners, sensors (thrust and torque), and signal conditioners. Other available accessories include integral control actuation and two-wire control, overrides, limit stops, and most standard accessories.

#### Actuation feature to cycle on demand

- Valves can be supplied for direct mounting with no additional bracket or coupling.
- Drive train sizes are taken into consideration when selecting material and temperature.
- Oversized actuators ensure reliable valve cycling.

### Latest fugitive emissions qualifications

Velan has both a vast prequalified commodity product range and provides project specific qualifications made-to-order to current industry Fugitive emissions standards with include: ISO-15848, API 624 & API 641, API 622, and TA-LUFT.

### Field Engineering Services (FES) & Aftermarket support

Velan offers our end-users technical support and in-line service and maintenance on all our valve products. We are your one-stop-shop for repairs backed by Velan quality and warranty. Our team of service engineers and technicians are available 24 hours a day. We are equipped with the most sophisticated tools available and over 50 years of valve service experience in nuclear and thermal power stations, fossil fuel plants, naval fleets, petrochemical, chemical and mining applications.

We offer complete support leading up to and throughout your maintenance outages and turnarounds. All our work carries the Velan quality our customers have learned to trust and is backed by our warranty.



On-site service for Velan valves.

### Velan R&D services

- Project management
- Design and analysis
- Experimental prototyping and lab simulation
- Performance evaluation
- Product release or launch

### Research & Development

Velan's Research & Development (R&D) group is a key part of the Velan engineering team, and the services they provide include technical project management, design and analysis, standard and customized experimentation work, performance evaluation, and turn-key support from project initiation to program completion.

Velan's R&D provides customized testing programs, working closely with specialized third-party labs, to help develop and qualify our valves to client's specifications and qualification needs.

Velan's severe service valves are custom designed to handle applications that can't be adequately handled using established materials and commercial valve designs. As a result, severe service valves require significant R&D to address the specific performance requirements for processes in which a valve undergoes harsh conditions such as high speed actuation, high temperature, acid leach, slurry, and more.

### Global network of service providers

Velan has a network of authorized service shops across the globe, ensuring we can meet your maintenance and service requirements whatever your location.

Service providers are qualified with Levels I, II, III and IV shop classification, with Level I shops being the highest qualified. Velan's authorized valve service and repair shops are your best choice for servicing your Velan valves.

### Velan FES & Aftermarket services

- On-site service, maintenance, and product support on all Velan valve products.
- Engineering support, and unsurpassed know-how.
- Velan OEM spare parts are specific to Velan's design and testing.



# Part of Velan's leading portfolio of valves for severe service applications



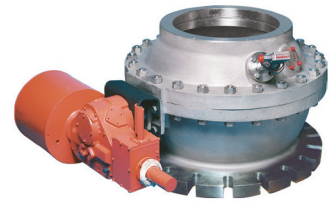
Coking



Ebullated bed and  
slurry-phase hydrocracking



Mining



Other severe services

Learn more about Velan's full product line at [velan.com](https://www.velan.com)

## Quarter-turn

- Memoryseal® ball valves
- Securaseal® metal-seated ball valves
- Torqseal® triple offset valves
- Velflex high performance cryogenic butterfly valves
- Coker ball valves
- Velan ABV API 6A & 6D trunnion-mounted ball valves

## Check our website for more resources

Go to the *Resources* tab on [velan.com](https://www.velan.com) to access our most up-to-date library of literature and tools.

**"Join My Velan"** to gain access to even more! As a member of the MyVelan community, you can access additional resources including Maintenance manuals (IOMs), Data sheets, Application notes, Product updates and our guide on How to order Velan valves.

## Gate, globe, and check

- API 600 gate, globe and check valves
- API 603 corrosion resistant gate, globe and check valves
- Pressure seal high pressure gate, globe and check valves
- API 602 small forged gate, globe and check valves
- Proquip dual plate check valves
- Y-pattern bonnetless globe and check valves
- Velan ABV expanding and slab gate valves

## Special applications

- Nuclear
- Cryogenic
- HF Alkylation



Headquartered in Montreal, Canada, Velan has several international subsidiaries. For general inquiries:

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