A world leader in valve design and manufacturing

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, knife gate, and engineered severe service valves are installed throughout the world, handling diverse applications in cogeneration, fossil, nuclear power, oil and gas, refining and petrochemicals, chemicals and pharmaceutical, pulp and paper, LNG and cryogenics, marine, mining, water and wastewater, and HVAC industries.

Engineered solutions
Velan’s Engineering Group has vast experience, sophisticated software, and testing 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 services that exceed customer expectations. All Velan valves are designed and manufactured with an emphasis on low emissions, safety, simple maintenance, ease of operation, and, above all, long, and reliable service life.

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, simple maintenance, ease of operation, and, above all, long, and reliable service life.

Sales offices for the nuclear power market

Visit our website at www.velan.com

VELAN AT A GLANCE
History
• Founded in 1950
Sales
• Over $500 million
People
• Over 2,000 employees
Product line
A world-leading range of valves across all major industrial applications:
• Cast steel gate, globe, check, and ball valves
• Forged steel gate, globe, check, and ball valves
• Triple-offset butterfly valves
• Knife gate valves
• Severe service valves
• Bellows seal valves
• Steam traps
Quality
All major certifications and approvals
• ASME N stamp and NPT for nuclear valves (since 1971)
• ISO 9001 (since 1991) Currently certified to ISO 9001:2008
• PED
• GOST (TR and RTN)
• API 6A and API 6D
• TA-Luft
• Quality programs fully compliant with ISO-9001, NCA 4000, ASME NQA-1 and 10 CFR 50 Appendix B, surveyed by ASME and audited by NUPIC, Northrop Grumman Newport News, DCMA, utilities, architect/engineers, and other organizations from around the world

Headquartered in Montreal, Velan has several international subsidiaries
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www.velan.com
Serving the nuclear and fossil power generation industries

With an installation base covering over 300 nuclear power plants and over 4,000 thermal power plants, and installed valves with over 40 years of uninterrupted nuclear service, Velan has become a market leader in power industry valves.

We offer a complete line of forged and cast steel gate, globe, check, ball, butterfly, and bel lows seal valves in sizes up to NPS 64 (DN 1600), with or without electric or pneumatic actuators. Velan valves are designed specifically for reliable, low fugitive emissions service in power plant applications.

Velan valves represent over fifty years of evolutionary improvements that have helped us perfect our designs. Central to Velan’s power valve technology is our use of rugged forged valve bodies offering greater strength and longer service life.

Another key feature of Velan valves is our emphasis on simple maintenance, such as y-pattern bonnetless globe valves with in-line replaceable packing glands, or our RAMA globe valve with in-line replaceable seat.

Velan also manufactures ball valves, with metal or resilient seats, capable of handling applications to ASME Class 4500, including a new power ball valve design that features a forged body, available in sizes up to NPS 4 (DN 100).

Furthermore, Velan offers a variety of engineered valves for special services in nuclear power plants, including bellows seal gate and globe valves, main steam isolation valves, valves for sodium-cooled fast breeder reactors, and engineered valves for uranium enrichment.

Velan’s vast offering of valves is well positioned for high performance in virtually every nuclear power application.

With 1,476,426 sq. ft. (137,163 m²) of production space in fourteen specialized manufacturing plants, Velan is a true global manufacturing force.

Velan’s nuclear valve product line

Gate valves
NPS 1/2 – 64 (DN 8 – 1600), ASME classes 150 – 4500
Catalogs: VEL-PS, VEL-SFV, VEL-CSV

Globe valves
NPS 1/4 – 24 (DN 8 – 600), ASME classes 150 – 4500
Catalogs: VEL-PS, VEL-SFV, VEL-CSV

Check valves
NPS 1/4 – 36 (DN 8 – 900), ASME classes 150 – 2500
Catalogs: VEL-PS, VEL-SFV, VEL-CSV, VEL-DPCV

Y-pattern valves
NPS 3/4 – 4 (DN 15 – 100), ASME classes 1690 – 4500
Catalogs: VEL-KGV

Metal-and resilient-seated ball valves
NPS 1/4 – 24 (DN 8 – 600), ASME classes 150 – 4500
Catalogs: VEL-BV, VEL-MS, VEL-PBV, VEL-TE, VEL-GPBV

Torqseal™ triple-offset valves
NPS 3 – 48 (DN 80 – 1200), ASME classes 150 – 600
Catalogs: VEL-BF

Proquip dual-plate check valves
NPS 2 – 60 (DN 50 – 1500), ASME classes 150 – 2500
Catalogs: VEL-DPCV

Bellows seal valves
NPS 1/2 – 12 (DN 15 – 300), ASME classes 150 – 2500
Catalogs: VEL-BS

Main steam isolation valves
NPS 6 – 34 (DN 150 – 850), ASME classes 600 – 900
Product Catalogs: VEL-PS

Steam traps
0 – 2600 psi (179 bar), 1,100°F (593°C)
Catalogs: VEL-ST

One of Velan’s three production centers with ASME ‘N’ stamp credentials, this plant in Montreal, Canada houses 170,000 sq. ft. (15,800 m²) of production space devoted to manufacturing Velan’s most sophisticated valves.
Velan in nuclear power: a historical perspective

The nuclear pioneer
Our involvement in nuclear energy goes back to the fifties, supplying valves for experimental reactors that were precursors to the Navy and commercial nuclear programs. To date, Velan valves have been installed on more than 950 U.S. Navy and NATO ships, submarines and all U.S. Navy nuclear aircraft carriers.

The 50s
Velan pioneered many valve technology innovations that later became industry standards. For example, Velan designed the first emission-free bellows seal valves for nuclear service and supplied 8,500 to Oak Ridge National Laboratory’s research reactor.

The 60s
In the sixties, Atomic Energy of Canada and Velan engaged in a cooperative development program to establish new levels of safety, reliability and maintainability of nuclear valves and electric actuators. Developments that came from this initiative included: a redesigned packing chamber standards in the seventies through a cooperative, developmental program including qualification testing with Électricité de France at their R & D facility in Renadier.

The 70s
In 1971, Velan became the first valve manufacturer to earn an ASME N stamp for nuclear valves. Velan Rateau, a 50/50 joint venture with GEC Alsthom, was established in 1974 to help Velan produce and service valves for France’s growing nuclear industry.

The 80s
The company expanded in 1989, with the acquisition of the French company Serseg, Schlumberger’s nuclear and high performance valve division, and again in 1999, with the acquisition of Bouvier-Darling.

Velan supplied the first contract for nuclear bellows seal valves in 1958.

A Velan nuclear valve catalog in the 1970s promotes forged valves for nuclear service.

with pre-compressed packing rings and live-loading; leakproof body-bonnet joints, including stronger body-bonnet flanges with higher bolting torques; and the use of forged bodies for valves as large as NPS 24 (DN 600) for greater structural integrity and increased resistance to fatigue—a feature that is still unique to Velan today.

We raised our valve technology to even higher

Milestones:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1956</td>
<td>Stainless steel bellows seal globe valves to A.E.C. Westinghouse for the 1st nuclear submarine, Nautilus.</td>
</tr>
<tr>
<td>1958</td>
<td>Velan supplies 8,500 bellows seal valves to the Oakridge nuclear fuel enrichment plant.</td>
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<tr>
<td>1971</td>
<td>Velan received as a company the 1st nuclear “N” stamp.</td>
</tr>
<tr>
<td>1974</td>
<td>Joint venture in France with Alstom, to focus on nuclear industry.</td>
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<tr>
<td>1978</td>
<td>New Velan plant established in U.S.A., Williston, VT.</td>
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A wide range of valves

Velan remains committed to providing new solutions for an ever-evolving industry. Our triple-offset Torqseal™ valve, introduced in 2001, has consistently proved its value in nuclear service.

The company further strengthened its position in 2007 with the acquisition of a majority interest in Segault, a major supplier to plants as well as the French nuclear navy. These acquisitions added many new products to the Velan nuclear valve line, including instrumentation valves, solenoid valves, and safety valves.

Velan has also developed a range of valves for sodium-cooled fast breeder reactors, in which the fluid itself is used to perform the seal. During this process, liquid sodium is cooled in the upper part of the cover extension to freeze along the upper part of the stem; the frozen sodium acts as a continuous packing, thereby ensuring a perfect level of tightness.

Global reach

Today, Velan’s global reach make us the ideal choice for supplying nuclear valves to the industry. With four state-of-the-art manufacturing centers certified for nuclear valve production, and over 100 people in engineering, QA/QC, and customer service functions, we are ready to handle the requirements of the most demanding nuclear orders.

Our international sales organization and partnerships with key stocking distributors such as Areva-NP Inc., ensure that substantial amounts of valves and parts are readily available. Areva-NP Inc. stocks Velan ASME III Class 1 small forged gate, globe, and check valves; they are also embarking on a ball valve and bellow seal program.

Velan’s North American and European service departments have vast experience working with customers in the nuclear industry, for on-site maintenance, or many other services.

Currently, Velan nuclear valves have been installed or are on order in well over 300 nuclear power stations in 27 countries. Velan nuclear valves are also installed on all U.S. Navy and French nuclear aircraft carriers and 37 U.S. and 22 French nuclear submarines (of which five are under construction).

1979

Velan patents unique Y-pattern bonnetless globe valve design.

1984

Velan ERV block valve prevents 3-Mile Island meltdown catastrophe.

1991

Velan is first North American valve manufacturer to obtain ISO 9001.

1996

Velan becomes a publically traded company, listed on the Toronto Stock Exchange.

2004

A.K. Velan was named Nuclear Valve Pioneer by Valve World (Maastricht, Holland).

2007

Acquisition of majority interest in Segault, a major supplier of nuclear control valves.

2010

Expansion in France of plant and equipment, specializing in nuclear valve production.

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Velan quality focus assures performance and safety

Furthermore, Velan’s comprehensive Quality Assurance Program is fully compliant with NCA 4000, ASME NOA-1 and 10 CFR 50 Appendix B. Velan’s nuclear quality programs have been surveyed by ASME and audited by NUPIC, Newport News Shipbuilding, DCMA, nuclear utilities, and other organizations—such as Framatome-ANP and Black & Veatch—from around the world.

We have a history of meeting and exceeding the exacting requirements of our customers. All Velan valves undergo the stringent, code-prescribed non-destructive testing regimen before they are shipped to customers. In addition, for nuclear applications, certain valves also go through destructive testing in order to prove the performance of the product line.

To meet a particular customer's needs, a NPS 20 (DN 500) Velan ANSI 1500 fast operating main steam gate valve was subjected to seismic simulation test. The test program consisted of hot and cold cycling, biaxial resonant searches, biaxial random multi-frequency testing with design nozzle loads applied, and cold cycling tests performed during seismic simulation. Eighteen uniaxial strain gauges were mounted on the stem, crotch and other critical areas, and strain data was recorded. It was demonstrated that the valve possessed sufficient functional and structural integrity to withstand a seismic event of prescribed magnitude.

A further example of Velan nuclear valves' superior reliability comes from simulated line rupture tests. At the cost of about $500,000, a major North American utility carried out closure tests on a Velan forged NPS 8 (DN 200) ASME Class 1500, fast-closing (20 seconds) electrically actuated isolation valve to simulate a Loss of Coolant Accident (LOCA). The energy dissipated during each discharge of 2,129,570 lb/h was dramatic.

The accompanying vibrations caused a local earth tremor, but the Velan valve shut off perfectly during all sixteen closure tests, with little wear exhibited during subsequent examinations.

**Flow testing on a NPS 10 (DN 250) class 1500 forged bolted cover swing check valve.**

**Diagnostic testing at elevated temperature.**

**Quality control**

Velan has held ASME ‘N’ and ‘NPT’ certificates of authorization for our North American production facilities since 1971. Constantly working to improve the quality of our products, Velan adopted a Total Quality Management Program, aimed at improving production processes in 1990, and was awarded ISO 9001 status the following year.

[Image of ASME 'N' certificate. Velan holds ASME III certification for three North American plants.]

Diagnostic testing at elevated temperature.
MOV Qualification Test Program

Velan has been in the forefront of qualification testing for valves to address issues raised in the Nuclear Regulatory Commission’s Generic Letter 89-10.

GL 89-10 required operating nuclear utilities to identify critical MOV’s and re-analyze the actuator’s ability to close the valve in a “worst case” design/operation condition as in a LOCA. In addition, the utilities have called upon Velan to reevaluate the ability of valves to withstand higher operating thrust end torque valves dictated by the GL 89-10 considerations.

One of the corollary actions initiated to assure proper actuator and valve sizing and integrity was a MOV Qualification Test Program that verified proper actuator/valve function at extreme design limits.

As a primary supplier to nuclear power, Velan has participated heavily in this testing, qualifying a wide range of MOV’s for a variety of applications in operating plants.

Velan completed a comprehensive test program for Duke Energy at Wyle Laboratories, the results of which were presented at the 2002 ASME/NRC Valve Symposium.

In this series of tests, a Velan Class 900, 8”x 6”x 8” flex wedge gate valve with a Limitorque SMB-1-60 electric actuator was submitted to a series of inspections and tests.

The loop isolation and blowdown test (shown below) was designed to demonstrate the capability of the valve to isolate sections of the nuclear plant in the unlikely event of a catastrophic loss of coolant accident.

The flow interruption test with saturated steam (shown below) is just one segment of a suite of tests designed to prove that the valve will close under extreme accident conditions and to demonstrate resistance of the valve to pressure entrapment, thermal binding and seismic loading.

The valve was designed and fabricated in accordance with Velan’s ASME Nuclear Certificate of Authorization and stamped per Section III, Class 2 requirements. Duke Energy procured this valve to their newly developed MOV Specification that incorporated requirements gleaned from operating experience, the input of Velan design engineering and EPRI-PPM data. These valves are currently installed and providing excellent service at Duke Energy’s Oconee Nuclear power plant.

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Engineered solutions

Combining over 50 years of experience in critical applications in the nuclear, chemicals, oil and gas, coker and mining industries, Velan has brought together a team of over 50 professional engineers who form the core of the Engineering Design Group. Advanced software applications, including finite element analysis, computational fluid dynamics and three dimensional solid modeling, help Velan design superior quality valves that meet the most demanding performance requirements.

We have two R&D facilities, with steam boilers and superheaters, flow loops and cryogenic test stands. In addition, we are engaged in advanced research in metal spray technology, using the services of independent laboratories for abrasion, sliding wear, bond strength testing, scanning electron microscopy and x-ray diffraction.

Velan has a longstanding history of partnering with major Architect/Engineers and Electric Utilities to develop innovative solutions for their valving needs.

Velan nuclear valves are built to last, often having gone decades with minimal maintenance performed.

SPECIFIC ENGINEERING CAPABILITIES INCLUDE:

- Valve design
- 3-D modeling
- Stress analysis and finite element analysis
- Weak link analysis
- Application engineering
- Flow analysis using computational fluid dynamics
- Seismic qualification
- Thrust and torque calculation
- Actuator sizing
- Root - cause failure analysis
- System upgrades
- Risk analysis
- Custom testing and test data analysis (NDT, x-ray review, UT testing, etc.)
- Validation of retrofit changes

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VELOCITY FIELD

A. Acceleration over disc  B. Deceleration of flow at stagnation point  C. Vortex behind the seat  D. Wake with vortices

A computer simulation of flow through Velan Torqseal™ triple-offset valves destined for nuclear containment isolation service.
Velan used computational fluid dynamics to improve the flow characteristics of this NPS 4 (DN 100) globe valve.

Field service capabilities

Our over 50 year history of supply to the nuclear industry has developed our expertise in a complete range of valve maintenance and other field services.

At Velan, we take aftermarket service seriously, maintaining a high level commitment to support our products.

SPECIFIC FIELD SERVICE CAPABILITIES INCLUDE:

- Commissioning
- Troubleshooting
- Witness start-up
- Forensic engineering
- Process, start-up sequence study
- Valve repair, refurbishment and upgrading
- Sales of tooling and lapping equipment

Duke Energy’s Dave King wrote, “overall, the entire main steam valve replacement project has gone well and has been a model that we will follow in future replacement motor operated valve projects.”

At Velan, we take aftermarket service seriously, maintaining a high level commitment to support our products.

A next generation gate valve developed by Velan to meet the requirements of a major North American utility.

In-line seat removal and seat welding and lapping, performed in association with global field services.
The leading choice for nuclear service

Velan valves became the standard for many of the world’s largest nuclear energy programs, with an installation base that includes 98% of American and French units, and all British and Canadian units. Our valves are installed in all worldwide Candu (PHWR) stations, in a majority of PWR and BWR stations, and in many other reactor types including GCR, AGR, LGR, VVER, HTGR and LMFBR.

Overall, Velan valves have been installed or are on order in over 300 nuclear power stations in 27 countries.

In countries with growing nuclear programs, Velan continues to be a leading choice for complete nuclear valve packages. Velan valves were the choice for the majority of South Korea’s, China’s, and Taiwan’s units. Velan has, for example, enjoyed a long and mutually beneficial relationship with Korea Electric, whose installed nuclear capacity is second in Asia only to Japan. From Kori 1, which began operation in 1978, to the prestigious Yonggwang units 3 and 4, which were designed and constructed mainly with domestic technology.

Our valves are installed in all worldwide Candu (PHWR) stations, in a majority of PWR and BWR stations, and in many other reactor types including GCR, AGR, LGR, VVER, HTGR and LMFBR.

Yonggwang nuclear power station in South Korea. Velan valves are installed in many of South Korea’s nuclear power stations.

Nuclear valves from a package of over 5,000 valves destined for the Taiwan Power Lungmen station.

Large-size bellows seal valves ready to be shipped to a nuclear plant in China.
There is no substitute for experience

Since its founding in 1950, Velan has worked with the nuclear power generation industry to innovate and improve valve technologies for the world’s nuclear power plants, marine propulsion, and other steam-driven systems.

Today, Velan continues to be an integral supplier to the industry, renowned for its dedication to safety, reliability, and long service life. We have delivered valves to over 300 nuclear power stations—representing two-thirds of the world’s operating units.

What’s more, our forged nuclear valves are installed in virtually every nuclear plant in the U.S., Canada, France, Korea, and China, and on U.S. and French Navy, nuclear aircraft carriers, and submarines.

Velan. Quality that lasts.

+1 514 748 7743
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The most comprehensive line of industrial forged and cast steel
gate, globe, check, ball, butterfly, and knife gate valves and steam traps.

ASME pressure classes 150–4500 in carbon, alloy, and stainless steel

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