

# Nuclear power valves solutions



**Over 70 years of proven expertise in nuclear power industry**

**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 valves
- API standard gate, globe, and check valves
- Metal-seated and resilient-seated ball valves
- Triple offset valves
- Dual plate check valves
- API 6D & 6A valves

Including: actuators and steam traps

### Quality

Velan holds major applicable approvals:

- ASME N/NPT (since 1970)
- PED
- ISO 9001 (since 1991)
- ISO 14001
- IEC 61508 SIL 3 Capable
- GOST/EAC
- OHSAS 45001
- TA-Luft
- API 6A and 6D
- 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, NRC, and shipbuilding companies.
- Total Process Improvement Program, including Lean manufacturing and Six Sigma

Headquartered in Montreal, Velan has several international subsidiaries.

### For nuclear inquiries

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For general inquiries call Velan Head Office.

[www.velan.com](http://www.velan.com)

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



Velan's engineering, planning, and manufacturing work together to produce for Duke Energy a specially designed class 150 NPS 30 (DN 750) stainless steel gate valve with two forged NPS 4 (DN 100) bypass valves, completely controlled by 40' reach rod system.

## 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 to innovate and continuously expand our offering of industrial valves.

## 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.

## A global manufacturing leader

Velan uses the latest automation technology. Thanks to a wide range of equipment, we can efficiently handle highly customized orders as well as large production runs.

## 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 aftermarket services offer customers with in-line service and maintenance on all our valve products. Our team of engineers and technicians is equipped with the most sophisticated tools available on the market and over 70 years of valve service experience to nuclear and thermal power stations, fossil fuel plants, navy fleets, petrochemicals, and other industries.

For technical support or a spare parts quote:  
+1 514 748-7743

Emergency technical support: +1 866 994-5656

# Serving the nuclear and fossil power generation industries

Velan has become a market leader in power industry valves, with an installed base of thousands of valves in over 300 nuclear power plants and over 4,000 thermal power plants. Many of these valves continue to operate after more than 40 years of uninterrupted service.

We offer a complete line of forged and cast steel gate, globe, check, ball, butterfly, and bellows seal valves in sizes up to NPS 96 (DN 2400), with or without actuators. Velan valves are designed specifically for reliable service in power plant applications.

Velan valves represent over 70 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.

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

Velan manufactures resilient seated ball valves, and metal-seated ball valves capable of handling applications to ASME class 4500.

Velan offers a variety of engineered valves for nuclear power plants, such as MOV/AOV gate, globe, triple offset and check valve, as well as main steam isolation valves.

Our engineering team is ready and able to work directly with the customer to find one-of-a-kind design solutions.



A Velan bolted bonnet valve in a PHT transfer system.

**Velan is well positioned to supply high performance valves for virtually every nuclear power application. With twelve specialized manufacturing plants in nine countries. Velan is a true global manufacturing force.**

## Velan's nuclear valve product line

### Gate valves

NPS ¼ – 64 (DN 8 – 1600),  
ASME classes 150 – 4500



### Globe valves

NPS ¼ – 24 (DN 8 – 600),  
ASME classes 150 – 4500



### Check valves

NPS ¼ – 36 (DN 8 – 900),  
ASME classes 150 – 2500



### Y-pattern valves

NPS ¼ – 4 (DN 8 – 100),  
ASME classes 1690 – 4500



### Metal-and resilient-seated ball valves

NPS ¼ – 24 (DN 8 – 600),  
ASME classes 150 – 4500



### Torqseal™ triple offset metal-seated valves

NPS 3 – 96 (DN 80 – 2400),  
ASME classes 150 – 600



### Proquip dual-plate check valves

NPS 2 – 60 (DN 50 – 1500),  
ASME classes 150 – 2500



### Bellows seal valves

NPS ½ – 12 (DN 15 – 300),  
ASME classes 150 – 2500



### Main steam isolation valves

NPS 6 – 34 (DN 150 – 850),  
ASME classes 600 – 900



### Axial no-slam check valves

NPS 2 – 56 (DN 50 – 1400),  
ASME Classes 150 to 2500



# 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 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 standards in the seventies through a cooperative, developmental program including qualification testing with Électricité de France at their R&D facility in Renardier.

## The 70s

In 1970, Velan became the first valve manufacturer to earn an ASME N stamp for nuclear valves.

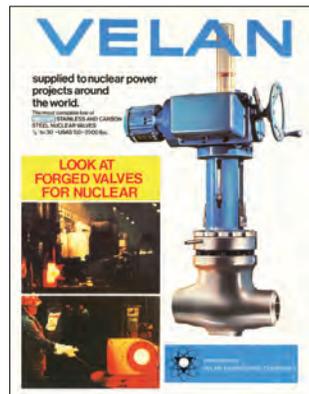
Velan Rateau, a 50/50 joint venture with GEC Alsthom, was established in 1974 to help Velan produce and service valves for France's growing nuclear industry.

## 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.



Velan valves in a cooperative program for qualification testing with Électricité de France at their R&D facility in Renardière.

| 1950                                  | 1956  | 1958  | 1970   | 1974   | 1978  | 1979   |
|---------------------------------------|---|---|--|--|---|--|
| A.K. Velan founded Velan Engineering. | Stainless steel bellows seal globe valves to A.E.C. Westinghouse for the 1st nuclear submarine, Nautilus. | Velan supplies 8,500 bellows seal valves to the Oakridge nuclear fuel enrichment plant. | Velan received as a company the 1st nuclear "N" stamp. | Joint venture in France with Alstom, to focus on nuclear industry. | New Velan plant established in U.S.A., Williston, VT. | Velan ERV block valve prevents Three-Mile Island meltdown catastrophe. |

## 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 nuclear power plants as well as the French nuclear navy. These acquisitions added many new products to the Velan nuclear valve line, including instrumentation valves, and solenoid 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.

## Global reach

Today, Velan's global reach make us the ideal choice for supplying nuclear valves to the industry. With several 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 force and partnerships with key stocking distributors such as Framatome Inc., ensure that valves and parts are readily available. Framatome Inc. stocks Velan ASME III Class 1 small forged gate, globe, and check valves up to NPS 2 (DN 50).

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

Velan valves have been installed in nuclear power stations in over 27 countries. Velan valves are also installed on all U.S. Navy and French nuclear aircraft carriers and 37 U.S. and 22 French nuclear submarines.



Velan on the first nuclear submarine, "Nautilus", a sanctuary for early Velan valves at the Groton, Connecticut naval base.



The USS Dwight D. Eisenhower, one of several nuclear-powered Nimitz-class aircraft carriers standardized on Velan valves and steam traps.



Mr. A.K. Velan was presented with a framed illustration of this next-generation USS Gerald R. Ford-class nuclear aircraft carrier by Northrop Grumman Newport News in honor of "his dedication to supporting the construction of our nation's warships."

| 1984  | 1991   | 1996   | 1996  | 2007   | 2010  | 2018  |
|---|--|--|---|--|---|---|
| Velan patents unique Y-pattern bonnetless globe valve design. | Velan is first North American valve manufacturer to obtain ISO 9001. | Velan becomes a publicly traded company, listed on the Toronto Stock Exchange. | A.K. Velan was named Nuclear Valve Pioneer by Valve World (Maas-tricht, Holland). | Acquisition of majority interest in Segault, a major supplier of nuclear control valves. | Expansion in France of plant and equipment, specializing in nuclear valve production. | Supplied several handwheel operated NPS 30 (DN 750) class 150 stainless steel gate valves controlled by 40' reach rod system for Duke Energy. |

# Duke Energy success story

## Up to the challenge

Duke Energy approach Velan in 2016, on what was to become a very special project for Velan. Since then, Velan supplied several NPS 30 (DN 750) class 150 stainless steel gate valves, integrating two forged NPS 4 (DN 100) steam bypass gate valves and three handwheel operated 40' reach rod systems for Duke Energy. The Velan team managed to successfully execute one of the more difficult projects in the history of Velan. Not only did Velan keep their promise of shipping, but delivered early. Duke Energy is one of the largest electrical power holding companies in the US with over 7 million customers.

The project was challenging for many reasons such as material availability, an entirely new design, new welding procedures, and very stringent customer specification requirements. Due to the project's very tight timeline, the manufacturing activities overlapped with the design and engineering process.

Functional and seismic tests were required, however the size of the components and the setup made it a challenge. The team had to design a special fixture to test the valve system. Moreover, the assembly of the valve's 40 foot reach rods, added another degree of challenge. The torque to actuate the valve was less than 100 ft-lbf compared to the torque of the original valve which was 1000 ft-lbf.

## Building from stock

The availability of universal joints was the true test for the team's agility and creativity. The team designed and manufactured a universal joint in-house in less than one week.

"This wasn't an ordinary valve, this is a very exotic, sophisticated design, and the end result has been amazing," stated David King (Duke's representative at Velan). "I saw a major upgrade when the new management came in, and in my opinion, there is nobody that could do something as exotic as this like Velan. The expectations to build this in one year was too extreme and I didn't think it was realistic."



## Project scope

- Replace four pre-existing spent fuel pool valves (by other manufacturer).
- The valves replaced required excessive torque (1000 ft-lbf), frequent maintenance, and leaked profusely
- Custom designed NPS 30 (DN 750) class 150 stainless steel gate valve. With Two steam bypass valves (new safety requirement)
- Class 2 Nuclear regulations
- Handwheel operated 40' reach rod system
- Every major component of the valve was fabricated and assembled by Velan!

## Team work with positive results

Coordination was vital, and Management held everyone accountable and tracked everyone's progress. The Design and Engineering teams, the Welding Engineering team, the Planning, Production and Sales teams were all an inseparable part of this project. With the continuous support of the Management, the entire team worked hand in hand to ensure that Velan delivered high quality products on time.

The complete unit is submerged into a nuclear spent fuel pool. Every major component of the valve was fabricated and assembled by Velan, down to the universal joints and bearings!



NPS 30 (DN 750) gate valve displaying 40' reach rod system.



Custom made hydro-testing rig designed for testing larger valves in-house.



Velan's universal joint for Duke Energy that was designed in less than one week.

# Velan quality focus assures performance and safety

## Quality control

Velan has held ASME 'N' and 'NPT' certificates of authorization for our North American production facilities since 1970. 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.



An ASME 'N' certificate. Velan holds ASME III certification for two North American plants.

Furthermore, Velan's comprehensive Quality Assurance Program is fully compliant with NCA 4000, ASME NQA-1 and 10 CFR 50 Appendix B. Velan's nuclear quality programs have been surveyed by ASME and audited by NUPIC, NRC, Newport News Shipbuilding, DCMA, nuclear utilities, and other organizations.

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) ANSI 1500 fast operating main steam gate valve was subjected to seismic simulation tests. 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 2.1 million 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.

## Leading choice for nuclear service

### Velan offers complete nuclear valve packages

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 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.

In countries with growing nuclear programs, Velan continues to be a leading choice for complete nuclear valve packages. Velan valves were the choice for many of East Asian 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.**



Large forged bellows seal valves for a Chinese nuclear power plant.

# Engineered solutions and capabilities

## Experienced in critical applications

Combining over 70 years of experience in critical applications in the nuclear, chemical, 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.

## Velan's state of the art R&D facility

- Steam boilers
- Superheaters
- Flow loops
- Cryogenic test stands
- Fugitive emissions cycling test station (helium and methane)
- Teledyne QUIKLOOK 3 Valve Diagnostic System testing units
- High pressure (20,000 psi) gas bunker for shell and seat testing

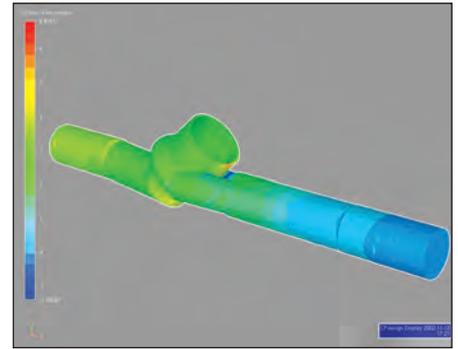
In addition, we are engaged in advanced research in metal spray technology, using the services of independent laboratories for abrasion, sliding wear, bond strength testing, scanning electron microscopy, and x-ray diffraction.

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

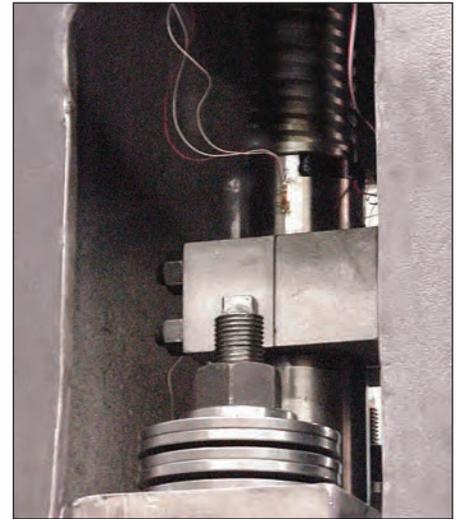
Velan nuclear valves are built to last, often having gone decades with minimal maintenance performed.

## Specific engineering capabilities

- 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



Velan used computational fluid dynamics to improve the flow characteristics of this NPS 4 (DN 100) globe valve.



Velan delivers valves with pre-installed thrust and torque sensors, signal conditioners and cabling (smart stems).

# Triple offset valve design benefits

## Becoming tomorrow's benchmark

We have leveraged our 20 years of triple offset valve experience in handling critical applications in the nuclear, navy, and process industries, and an extensive R&D program, to bring customer driven enhancements and optimizations to our Torqseal® 2.0 design. This versatile valve provides lower cost of ownership through improved service life, fugitive emissions control, less downtime, and lower maintenance.

## Nuclear power applications

- Containment vent / Isolation
- Residual Heat Removal System (RHR)
- Recirculation Spray Heat Exchanger (RSHX)
- Service water
- Heater drain
- Feedwater loop

## Reliability, efficiency, and cost savings

- All metal design, inherently firesafe
- A compact, lightweight, quarter-turn design
- Offer low torque, smaller actuators
- Low emissions
- Full bi-directional zero leakage



## TOV standards and certifications

- Design:** ASME Sec. III  
N Stamped  
10CFR Part 21  
10CFR50 (Appendix B)  
API 609 (Cat. B)  
B16.34  
API 600 wall thickness
- End connections:** B16.5 / B16.47 (A/B)
- Face to face:** API 609  
B16.10  
ISO 5752
- Seat leakage:** MSS-SP-P61  
API-598  
API 6D (resilient seat criteria)
- Fire safe:** API 607 7th Edition & ISO 10497

# Velan ABV's compact No-slam check valve

## Space saving and lightweight

Velan ABV's Engineering team is aware of the importance of saving space and reducing weight. For this reason, the compact No-slam check valve has been designed. This compact solution includes the same internal components as the standard Axial No-slam check valve, but with a significant reduction of the face-to-face dimension leading to a total of 50% in weight savings.

Additionally, Velan ABV's compact No-slam check valve sets itself apart because of its easy installation and that no special support is required. It is lightweight compared to the traditional Axial No-slam check which reduces the cost of installation for the customer.

## Applications

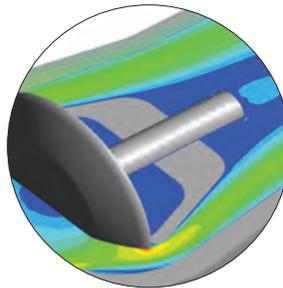
- Water hammer mitigation
- Pressure transients damage prevention in pumps
- Centrifugal and reciprocating compressor protection
- Reverse flow prevention in critical systems
- Fluid contamination prevention in complex networks

## No-slam axial check valve design

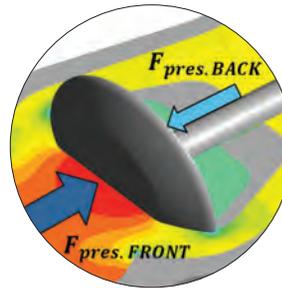
The No-slam axial check valve design has been optimized by using advanced computational fluid dynamics (CFD) simulation technologies. This technology is used to simulate the fluid/gas flow through the valve to maximize the internal flow contour Venturi effect and to minimize recirculation zones. The reduction of the head loss across the valve has a beneficial impact on the efficiency of the whole transmission system.



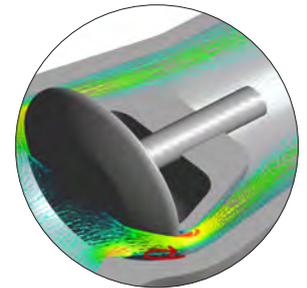
Velan also offers compact version both for Axial and No-Slam nozzle check valves.



Maximize the internal flow contour Venturi effect



Maximize the resulting pressure force on disk



Minimize recirculation zones

# Proquip dual-plate wafer check valve

## Delivering value through performance

Retainerless body surface with uninterrupted gasket surface. The internal retention method does not encroach on the gasket sealing surface, maximizing the flow path area through the valve with a lower pressure drop.

With no drilling through the body wall, the Proquip dual-plate check valve's retainerless design is intrinsically fire safe and emission-free.

## Extended seat life

Due to the clearance between the disc hinge and hinge pin which eliminates any dragging effect.



## Proquip's low total cost of ownership

The shock bumper arrangement on the back of each disc prevent the discs from striking the stop pin, eliminating lateral force on the internal retention mechanism, resulting in minimal wear under the most severe service conditions. Thereby lowering the long-term cost of ownership.



### Visit [velan.com](http://velan.com) for Velan's latest product literature

Go to the *Resources* tab to access our most up-to-date library of literature and tools.

**Join My Velan** to gain access to even more! 'MyVelan' members can access and download additional resources including Maintenance manuals (IOMs), Data sheets, Product updates, Application notes, and our Supplier portal.

# MOV qualification test program

## Verifying proper actuator/valve functions

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 and torque as recommended by EPRI.

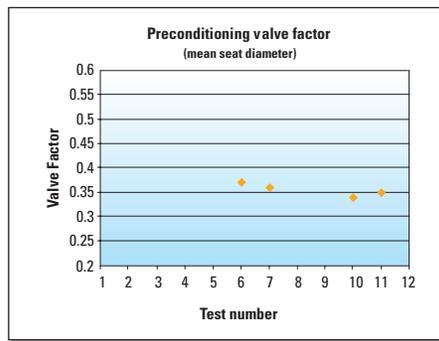
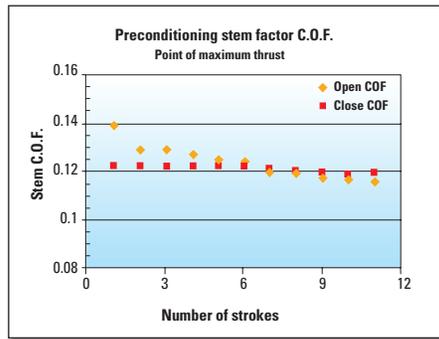
One of the corollary actions initiated to assure proper actuator and valve sizing and integrity was a MOV qualification test program that verified proper actuator/valve function at extreme design limits.

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

Velan completed a comprehensive test program for Duke Energy at NTS (formerly 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" flexible wedge gate valve with a Limatorque SMB-1-60 electric actuator was subjected to a series of inspections and tests.

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.



Two graphs from the Wyle test report results show the preconditioning stem factor and valve factors based on the mean seat diameter.

The loop isolation and blowdown test was designed to demonstrate the capability of an NPS 8 (DN 200) class 900 gate valve to isolate sections of a CANDU nuclear plant in the unlikely event of a catastrophic loss of coolant accident.

The flow interruption test with hot pressurized water is just one segment of a suite of tests designed to prove that the valve would open and close under extreme accident conditions and to demonstrate resistance of the valve to pressure locking, thermal binding and seismic loading.

## Valve performance

Validation by full differential pressure flow interruption testing (blowdown testing) procedures:

- A comprehensive pre-test inspection.
- Static pressure stroking of valve to develop performance baseline characteristics.
- Disk and seat preconditioning.
- Three full differential steam flow tests @1050 psig and 240,000 lbm/hr flow.
- A pressure locking test.
- A thermal binding test. (Close hot - open cold and close cold - open hot).
- A hot static, seismic deflection test.
- Comprehensive post-test inspection.
- Test results in all categories surpassed requirements.



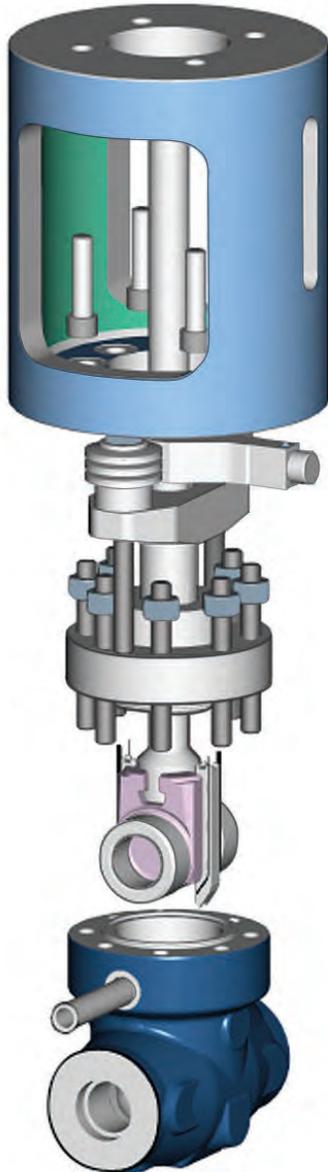
Loop isolation valve blowdown test with hot pressurized water of Velan electrically actuated NPS 8 (DN 200) class 900 regular port loop isolation valve. The water flashes to steam in a starburst pattern as it blows down to atmosphere.

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.

## Next generation nuclear valves

To address the unique, critical application requirements for nuclear power stations, Velan designed special NPS 1½ (DN 15) gate valves to accommodate actuators capable of withstanding stall thrust in both directions. This design incorporates hardfaced guides (wedge and body), rounded leading edges of all seating and guiding surfaces (per the EPRI guidelines) and specially designed backseat, seat rings, bore profile and barrel style yoke. This design has now become our standard for high pressure nuclear MOVs.

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."



Next generation gate valves developed by Velan to meet the requirements of major North American utilities.

## In-field servicing

### Velan's Aftermarket team is qualified and experienced

At Velan, we take aftermarket service seriously, maintaining a high level commitment to support our products in the field. We have a team of highly trained technicians and engineers to provide customer service.

Every service issue reported is documented and maintained in a database, which is periodically reviewed to determine if trends are evident.

Keeping the owners/users of Velan products satisfied is a major key to our success. Our Aftermarket department takes pride in continuing this tradition of excellence.



On-site service for Velan valves.

### Contact Aftermarket

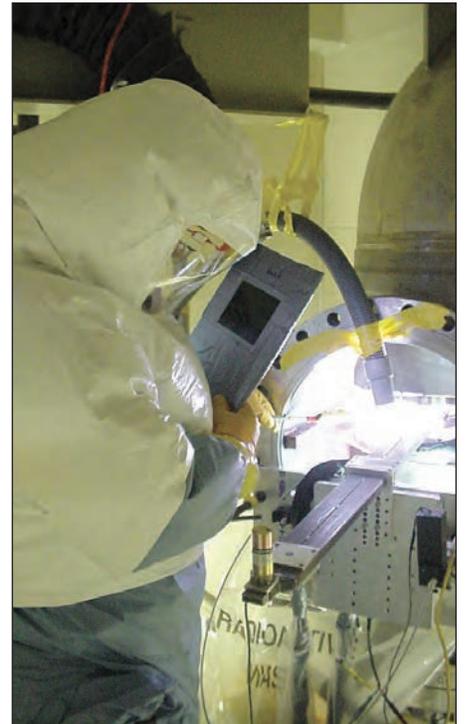
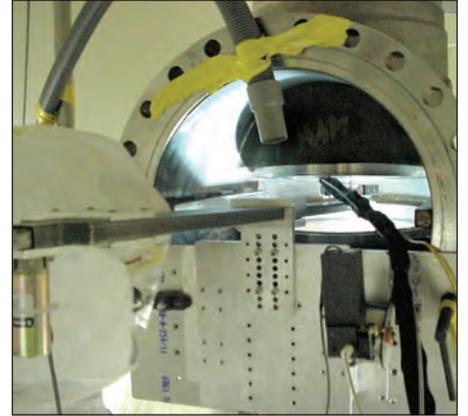
For technical support or a spare parts quote:  
+1 514-748-7743

Emergency technical support:  
+1 866-994-5656

Email:  
Technical support: [after.market@velan.com](mailto:after.market@velan.com)  
Spare part quotes: [spare.parts@velan.com](mailto:spare.parts@velan.com)

### Specific field service capabilities

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



In-line seat removal and seat welding and lapping, performed in association with global field services.

# Velan's extensive portfolio of valves are installed worldwide to handle diverse applications

## Process

- Refining and downstream
- Unconventional oil processing
- Chemicals and petrochemical
- Coker
- Mining
- Cryogenic
- HF Alkylation
- Pulp and paper

## Upstream and midstream

- Onshore exploration and production
- Pipelines • Underground gas storage
- Offshore production, platforms,
- FPSOs, and FLNGs
- Subsea
- LNG liquefaction and regasification terminals and tank farms

## Power

- Nuclear
- Fossil
- Combined-cycle
- Supercritical
- Ultra-supercritical
- Geothermal
- Solar
- Hydro
- Biomass

**Learn more – visit our website: [velan.com](http://velan.com)**

## Gate, globe, and check

- API 600/623 /594 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

## 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](http://velan.com) to access our most up-to-date library of literature and tools.

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