Delayed coker valve solutions

Proven expertise in DCUs

VELAN

Quality that lasts.

Velan at a glance

History

- Founded in 1950

People

- Over 1,600 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.

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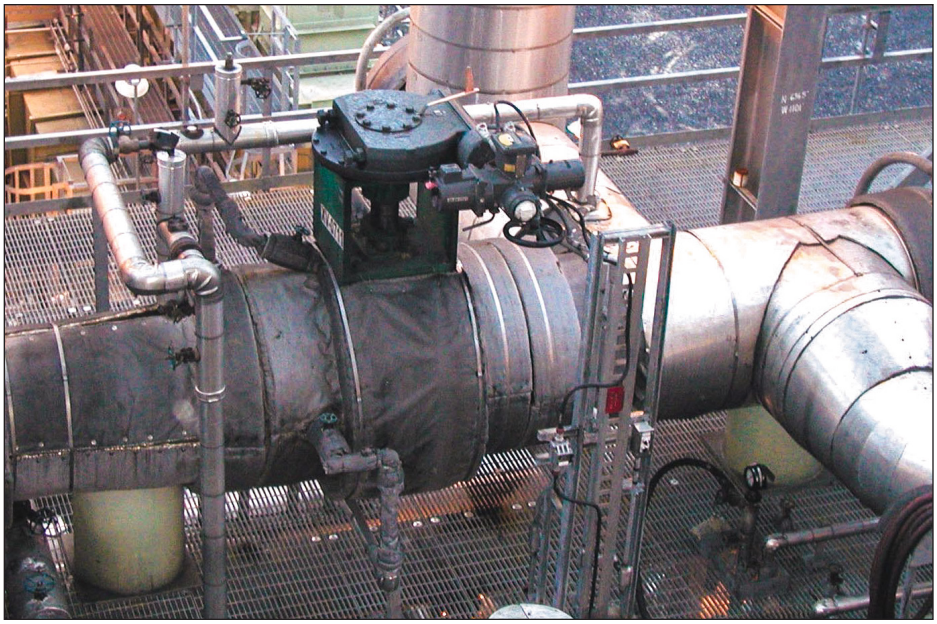
velan.com

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



A large NPS 30 (DN 750) overhead vapor valve installed in 2000 in a delayed coker on the Gulf Coast of the United States.

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 +1 514 748-7748.

Over 180 delayed cokers worldwide chose Velan coker ball valves with over 3,000 currently in-service

Experience in coking worldwide with references since 1983

Velan supplied the first, fully automated switch valve in 1983. Today Velan delayed coker valves are currently installed in over 180 delayed coker units (DCUs) in 35 countries including over 480 four-way switch valves, 2,600 Velan isolation valves, 120 Velan ring valves, and 120 Velan hydrodrill valves.

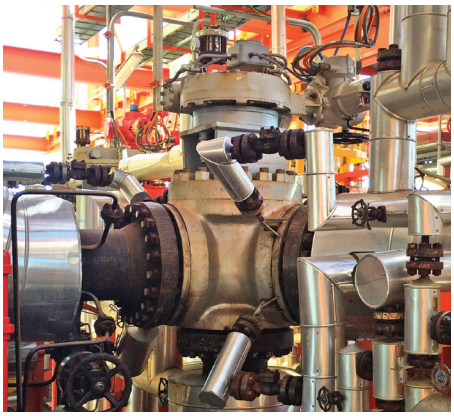
All valve sizes and classes shown in this brochure have been designed, built, installed, and are currently operating in a delayed coker unit.

Velan's isolation valves are installed in the following applications:

- Inlet transfer line
- Bypass
- Drain
- Quench
- Heater isolation
- Overhead vapor
- Blowdown
- Backpressure control
- Vent
- Hydrodrill water cutting

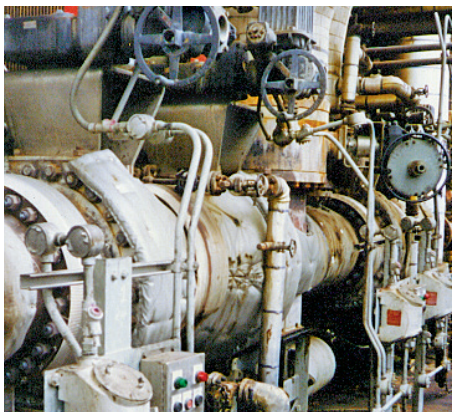
We have also supplied over 450 logic control panels both hard-wired or Programmable Logic Controller (PLC) driven. Many of our panels now interface with a PLC or directly with a Distributive Control System (DCS) for remote indication or operation. These valves are not modified commodity valves–they are specifically designed for delayed coker applications.

Over 480 Velan four-way switch valves in delayed coker installations



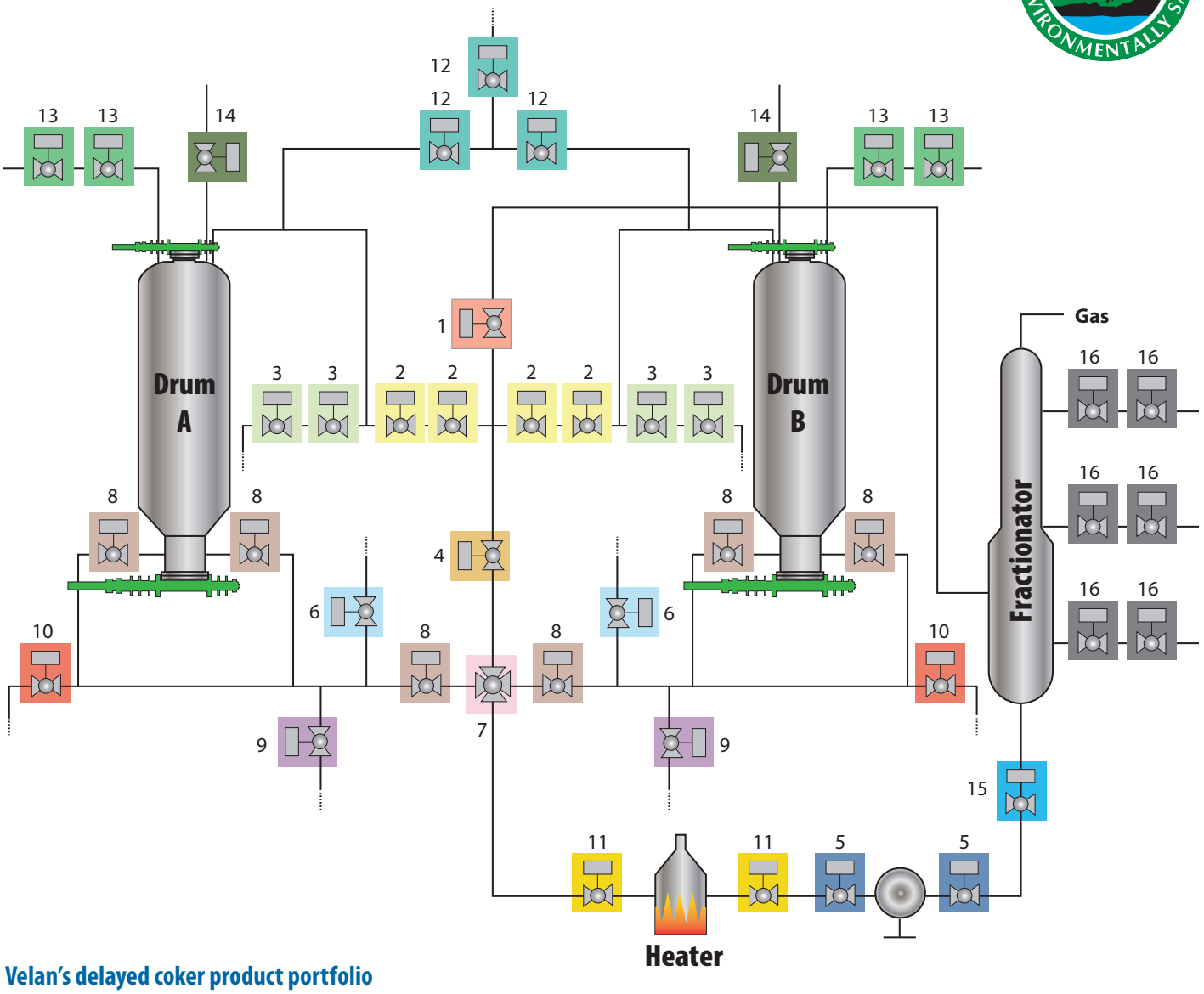
Over 2,600 Velan isolation valves in delayed coker installations

Over 120 Velan ring valves in delayed coker installations



Velan: Complete valve solutions for delayed coking

Velan offers a complete line of metal-seated ball valves for all coking applications. Here is a schematic of some typical coker valve installations.



Velan's delayed coker product portfolio

Four-way switch & three-way diverter valves
NPS 3–18 (DN 80–450)
ASME Classes 150–900

R-series high pressure hydrodrill valves
NPS 1½–12 (DN 40–300)
ASME Classes 1500–2500

Ring type backpressure control valves
NPS 14–36 (DN 350–900)
ASME Classes 150–300

Isolation valves
NSP 2–36 (DN 50–900)
ASME Classes 150–900

R-series or K-series heater isolation valves
NPS 6–14 (DN 150–350)
ASME Classes 150–1500

Programmable logic controller (PLC) and local control panels
Hard wired or PLC driven

Securaseal® R-series valves for off-drum applications
NSP 2–36 (DN 50–900)
ASME Classes 150–900

	Process region	NPS (DN)	Typical fluid conditions (metric)[1]	Velan advantages
1	Ring type for backpressure control	14–36 (350–900)	840°F @ 60 psig (450°C @ 4.54 Bar)	Provides excellent throttling characteristics and a full bore opening in the open position resulting in lower drum pressures and maximizing liquid yield.
2	Overhead vapor line	14–36 (350–900)	840°F @ 60 psig (450°C @ 4.54 Bar)	Quarter-turn operation ensures low fugitive emissions while a strong bellows povides a positive seal between scheduled turnarounds.
3	Drum blowdown	14–36 (350–900)	840°F @ 60 psig (450°C @ 4.54 Bar)	
4	Bypass isolation	6–20 (150–500)	940°F @ 770 psig (505°C @ 53 Bar)	Quarter-turn operation ensures low fugitive emissions while providing a positive seal between scheduled turnarounds. The valve's unique design ensures reliable performance despite infrequent operation.
5	Charge pump isolation	6–16 (150–400)	670°F @ 250 psig (inlet) 670°F @ 770 psig (outlet)	Installed at the inlet and outlet of the charge pump where positive isolation and operability are critical during maintenance.
6	Quench isolation	6–18 (150–450)	Various ranges	Quarter-turn operation ensures low fugitive emissions while a strong bellows provides a positive seal between scheduled turnarounds.
7	Four-way switch	6–18 (150–450)	940°F at 770 psig (505°C at 53 Bar)	Installed in over 160 delayed coker units worldwide[2]. Our customers have operated these valves as long as 14 uninterrupted years between scheduled maintenance. By far the most reliable four-way switch valve in the world today.
8	Inlet transfer line isolation	6–20 (150–500)	940°F at 770 psig (505°C at 53 Bar)	One of the toughest valve applications in the unit. Our valves typically provide uninterrupted operation between scheduled turnarounds.
9	Warm up isolation	6–16 (150–400)	500°F at 77 psig (260°C at 5.3 Bar)	Quarter-turn operation ensures low fugitive emissions while a strong bellows provides a positive seal between scheduled turnarounds.
10	Drain isolation	6–20 (150–500)	700°F @ 77 psig (371°C @ 5.3 Bar)	
11	Heater isolation	6–16 (150–400)	940°F[3] @ 770 psig (505°C @ 53 Bar)	We provide bi-directional sealing as well as alternative materials for in-line spalling temperatures. Our designs were originally optimized by FEA and have been installed in several delayed cokers successfully.
12	HCGO quench	3–6 (80–150)	400°F @ 33 psig (204°C @ 2.3 Bar)	We have supplied two- and three-way valves for this application.
13	Antifoam injection	3 – 6 (80 – 150)	840°F @ 14 psig (450°C @ 1 Bar)	
14	PSV discharge	6 – 16 (150 – 400)	840°F @ 77 psig (455°C @ 5.3 Bar)	Quarter-turn operation ensures low fugitive emissions while a strong bellows provides a positive seal between scheduled turnarounds.
15	Fractionator bottom	6–18 (150– 450)	670°F @ 250 psig (355°C @ 17.2 Bar)	Performs well in applications where coke fines of significant size can affect the performance of equipment.
16	HCGO/ LCGO/ naphta /wild gasoline/ gas	8–36 (200–900)	Various range	Quarter-turn operation ensures low fugitive emissions while a strong bellows provides a positive seal between scheduled turnarounds.
17	Eductor isolation[4]	6–14 (150–350)	840°F @ 14 psig (450°C @ 1 Bar)	

(1) Temperatures and pressures shown above are typical to low pressure delayed cokers.

(2) Velan is installed in over 180 cokers running a wide variety of feedstocks.

(3) Temperature transients can exceed 1300°F (705°C) during the spalling process.

(4) Not shown in schematic.

Reference list available upon request.

Note: *All valve types for the above process regions are metal-seated ball except for the ring valve.*

Velan has installed valves in a number of units that produce needle coke that typically operate at higher pressures not shown above. Velan valves have performed well in these applications over the last 25 years.

1 Body

- High quality castings RT & MT inspected per ASME B16.34.
- Valves are full bore, high Cv and light weight.

2 Ball and stem

The sturdy one-piece ball and stem:

- Provides optimal strength, and is well suited to applications where fouling due to coke fines are a concern.
- Avoids the problems generally associated with the more conventional two-piece ball and stem, which is highly susceptible to solids buildup in the ball-stem joint and a resulting increase in operating torques.
- Avoids hysteresis and misalignment.

3 Stem coupling

The stem coupling is designed to perform three main functions:

- Protect against "overtorquing" of the stem.
- Protect the actuator components.
- Protect against an unintentional switch into bypass (typically applies to four-way switch).

4 Steam purges

Steam purges to bellows and body area ensure the valve cavities are kept free of coke buildup.

5 Lantern ring

A lantern ring with steam block and extra deep stuffing box minimizes the risk of leakage occurring through the packing chamber.

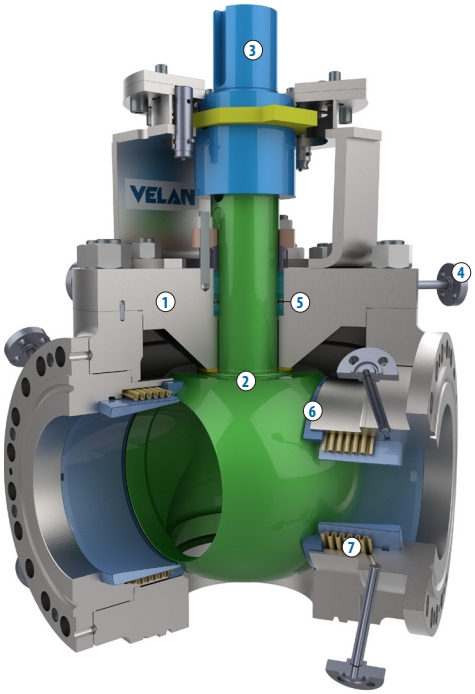
6 Scraper type seats

Velan's unique seat design scrapes coke buildup from the surface of the ball during each cycle. Seats are hardfaced to ensure a long, trouble-free service life.

7 Strong bellows

Strong bellows offer a unique seat loading design that maintains the floating seats in constant contact with the ball and ensures a positive seal.

Four-way switch and three-way diverter valves



Sizes	NPS 3–18 (DN 80–450)
Pressure rating	ASME Classes 150–900
Body materials	WCB, A217 Gr. C5 and C12, A351 Gr. CF8M and CF8C

Specifications

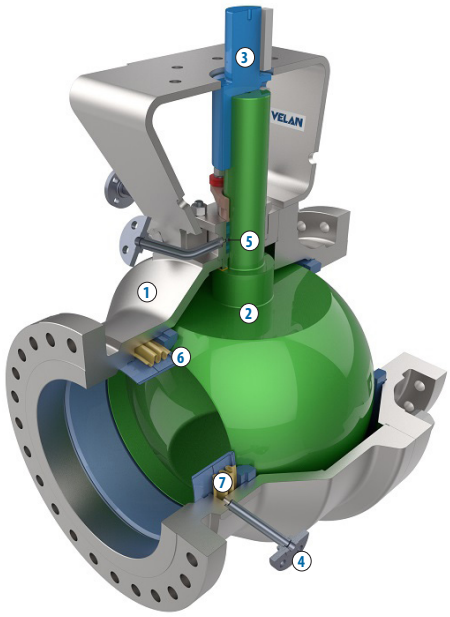
End connections: RTJ, RF
Port: Full
Valve body: ASME B16.34 and API 608
Face-to-face: ASME B16.10 long pattern
Valves flanges: ASME B16.5
Actuator mounting: ISO 5211 & MSS SP-101
Fire-safe certification: Inherently firesafe
Fugitive emission: API 622, ISO 15848-1 and ISO 15848-2 on request

Reliability and lasting performance

The first switch valve built to our design was installed in 1983. It operated 10 years before it was taken out of service for evaluation. The internal components were in perfect condition and the valve was reinstalled using the original components.

Velan's four-way switch valve is by far the most reliable in the world today providing uninterrupted performance from turnaround-to-turnaround that can exceed 10 years of continuous operation.

Isolation valves



Sizes	NPS 2–36 (DN 50–900)
Pressure rating	ASME Classes 150–900
Body materials	WCB, A217 Gr. C5 and C12, A351 Gr. CF8M and CF8C

Specifications

End connections: RTJ, RF
Port: Full
Valve body: ASME B16.34 and API 608
Face-to-face: ASME B16.10 long pattern
Valves flanges: ASME B16.5
Actuator mounting: ISO 5211 & MSS SP-101
Fire-safe certification: API 607/Inherently firesafe
Fugitive emission: API 622, ISO 15848-1 and ISO 15848-2 on request

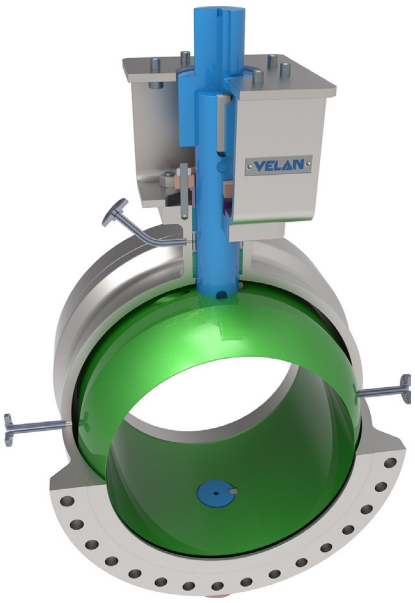
Optimized for superior isolation

Velan isolation valves are the right choice and continue to perform in uninterrupted service in delayed cokers worldwide.

In an effort to maximize liquid yield many end users are opting for larger overhead lines and have installed our NPS 36 (DN 900) valves for overhead and blowdown service.

Note: *Other body materials available upon request.*

Ring type
Backpressure control valves



Shown in full open position

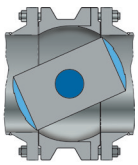
Sizes	NPS 14–36 (DN 350–900)
Pressure rating	ASME Classes 150–300
Body materials	WCB, A217 Gr. C5 and C12, A351 Gr. CF8M and CF8C

Specifications

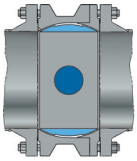
End connections: RTJ, RF, LFF
Port: Full
Valve body: ASME B16.34 and API 608
Face-to-face: Special
Valves flanges: ASME B16.5
Actuator mounting: ISO 5211 & MSS SP-101
Fire-safe certification: Inherently firesafe
Fugitive emission: API 622, ISO 15848-1 and ISO 15848-2 on request

Excellent throttling characteristics

Ring valves are exclusively for regulating back pressure control. The seatless design does not require a mechanical stop in order to avoid full closure and the resulting drum over pressurization. In the "maximum obstruction" position, the valve provides a pressure drop equal to a butterfly valve set at 15° open.

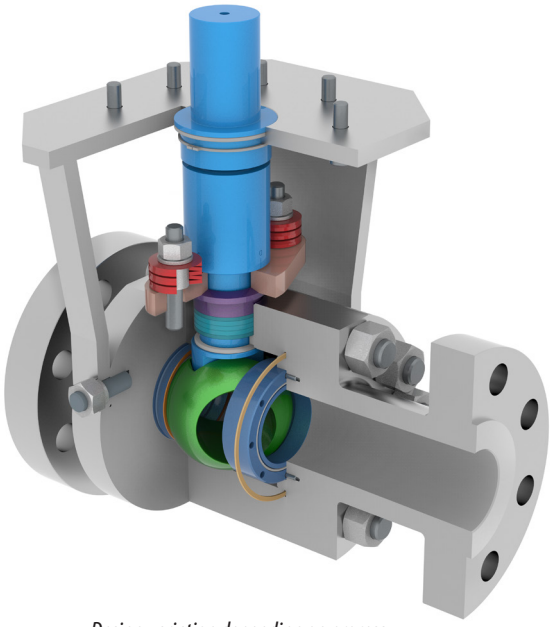


Maximum pressure drop position



Minimum pressure drop position

Securaseal® R-series
High-pressure hydrodrill valves



Design variation depending on process

Sizes	NPS 1½–12 (DN 40–300)
Pressure rating	ASME Classes 1500–2500
Body materials	A216 Gr. WCB, A105, LF2, LF6

Specifications

End connections: RTJ, RF
Port: Full
Valve body: ASME B16.34 and API 608
Face-to-face: ASME B16.10 long pattern
Valves flanges: ASME B16.5
Actuator mounting: ISO 5211 & MSS SP-101
Fire-safe certification: API 607, ISO 10497
Fugitive emission: API 622, ISO 15848-1 and ISO 15848-2 on request

Securaseal® R-series: performance-driven valves

Velan Securaseal® R-series full bore ball valves are generally installed in high pressure applications where the highly erosive and sometimes corrosive reclaimed waters (used to drill the coke out of the drum) can significantly shorten valve life.

In order to ensure long, leak-free, reliable operation all valve wetted parts are hardfaced.

Securaseal® R-series and K-series
Heater isolation valves

Sizes	NPS 6–14 (DN 150–350)
Pressure rating	ASME Classes 150–1500
Body materials	C12, CF8M, CF8C, Inconel, Incoloy

Specifications

End connections: RTJ, RF, BW, SW, threaded, hub ends
Port: Full
Valve body: ASME B16.34 and API 608
Face-to-face: ASME B16.10 long pattern
Valves flanges: ASME B16.5
Actuator mounting: ISO 5211 & MSS SP-101
Fire-safe certification: API 607/Inherently firesafe
Fugitive emission: API 622, ISO 15848-1 and ISO 15848-2 on request

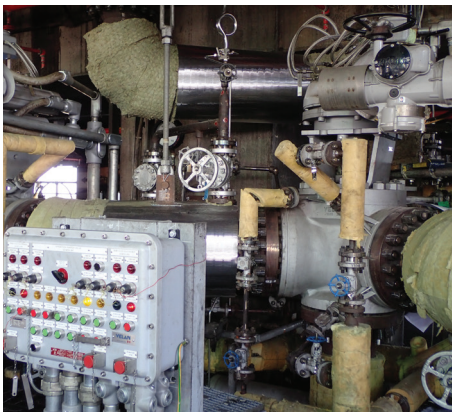
Automation capabilities

Whatever your industrial valve needs, Velan can find a solution with the highest quality products.

Velan offers a wide range of actuation options to address each customer application.

See page 8 for more details.

Note: *Other body materials available upon request.*



Our start-up team provided full support during the SAT and start-up of the Velan LCP's and PLC.

Fully automated valves

In 1983 Velan supplied the first fully automated switch valve controlled from a local panel. Shortly after, we supplied a control panel that included interlocks to the inlet transfer line valves in order to avoid dead ending of the pump.

Over time we worked with the world's leading licensors to provide a comprehensive interlock system for the automated operation of valves with minimal risk.

Today Velan offers fully automated four-way switch and isolation valves for the coker deck and has also been supplying modulating backpressure control valves with full feedback capability.

Each of these valves is operated by a local control panel (LCP) which provides safety interlocks that are either hardwired to the actuator and DCS or function through a standalone PLC for more comprehensive controls and interlocking.

Complete turnkey valve automation solutions

Velan provides turnkey valve automation solutions that include intrinsically safe panels as well as SIL rated components. Systems can be fully redundant and may provide a number of options including field touch screen interface diagnostics and remote operation capability.

Velan has a full staff in-house capable of handling every detail of these complex integrations and offers a full factory acceptance test (FAT) where valves, actuators, panels and PLC are tested as a system to ensure proper functioning prior to shipment. End users are often invited for training on these systems during the FAT.

Velan's field service team then performs a site acceptance test (SAT) and assists in the commissioning and startup of the unit. Velan also provides full training packages for operators and maintenance personnel.

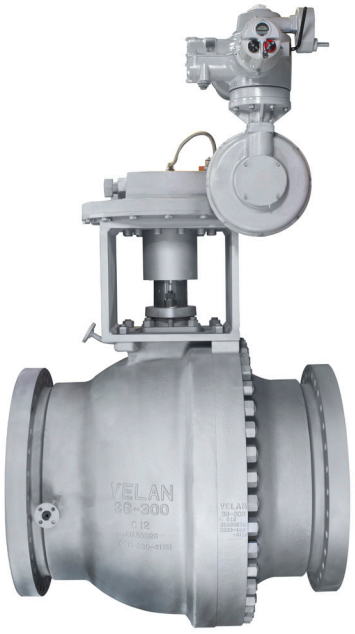
Velan supplied touch screens, to display valve status information for workers in hazardous areas of the refinery.

Actuation options

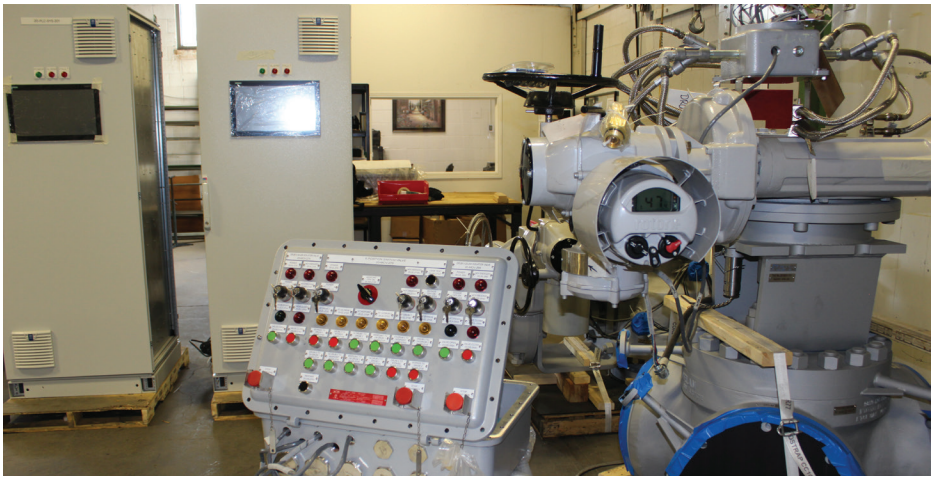
Velan and our distribution channels offer a wide range of OEM actuators that meet the most demanding on/off and control applications.

Velan's offers a wide range of products to address each customer application, from multi-turn electric actuators on rising-stem valves to scotch-yoke or double-opposed piston actuators on rotary valves.

Whatever your industrial valve needs, we can meet them with the highest quality products.



An actuated NPS 36 (DN 900) overhead vapor valve.



Velan supplies local control panels operating as stand-alone and through the DCS and / or a PLC. Our systems provide a comprehensive array of interlocks and feedback for safe operation.

Automation capabilities

- Electric, hydraulic, and pneumatic actuation
- Pre-installation switches, positioners, thrust/torque sensors, and signal conditioners
- Integral control actuation and two-wire control
- A large torque safety factor ensures the valve will cycle under the most stringent conditions.
- OEM actuators through Velan stocking distribution or other actuators of your choice
- Overrides, limit stops, and most standard accessories
- When selecting actuators, special attention is paid to the coker deck environment.

Delayed coking technology

Velan has maintained a group of experienced engineers entirely dedicated to delayed coking technology since 1983. Working closely with the end users as well as the technology providers has given us the possibility to maintain designs that are well adapted to the changing needs of the delayed coker industry.

Over the last few years we have been able to address issues arising from significantly shorter cycles and increasingly exotic crude slates.

Preventive maintenance

Velan provides baseline values and can work with the end user to implement a preventive coker unit maintenance program that includes periodic torque verifications, steam evaluations and general valve performance. These programs, already implemented in many refineries, can substantially lower the cost of turnarounds and significantly reduce the possibility of unscheduled shutdowns.

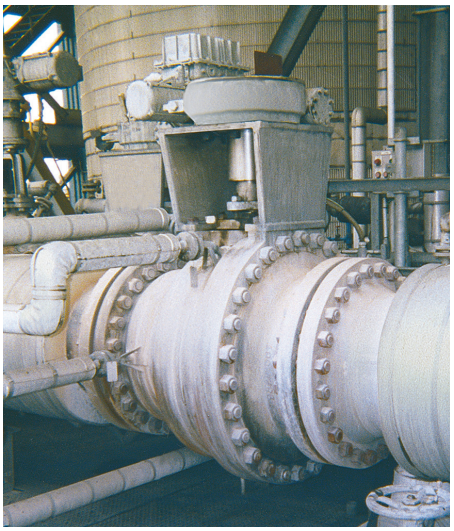
Turnaround preparation

Velan provides assistance during the preparation of a major turnaround by providing an assessment of the valves and actuators and expected spare parts requirements. We also assess local service shop capabilities and can work with the end user in preparing additional service shop capacity if required. These services ensure that all of the correct materials are available and that approved and knowledgeable personnel are on hand for the turnaround.

Velan also maintains coker trained personnel in Asia, Europe, South America as well as North America who are available for turnaround support.

IEC 61508 SIL 3 Capable

Velan in association with Exida have assessed coker designs for Failure Modes, Effects, and Diagnostic Analysis (FMEDA) to meet the needs of system designers for data reliability. Velan offers the capability to integrate the valves into a Safety Instrumented Function (SIF) and evaluate Partial Valve Stroke Test (PVST) requirements.



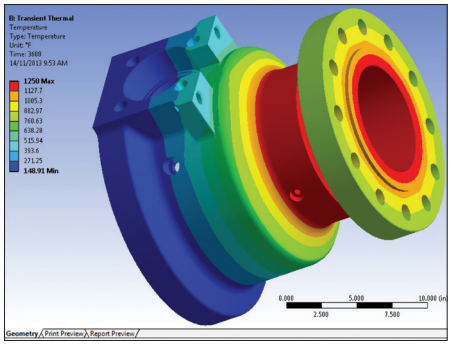
These NPS 30 (DN 750) full bore overhead vapor valves have been in uninterrupted service since 2002.

Engineering expertise

Velan has brought together a strong team of professional engineers with extensive experience in critical applications. Using advanced software applications including Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), and 3D Solid-Modeling, Velan engineers design superior-quality valves that meet the most demanding performance requirements.

Our R&D facilities, equipped with steam boilers, superheaters, flow loops, and cryogenic test stands, enable us to run comprehensive testing programs.

Velan also has a long-standing history of partnering with major architects/engineers and end users to develop innovative solutions for their valving needs.



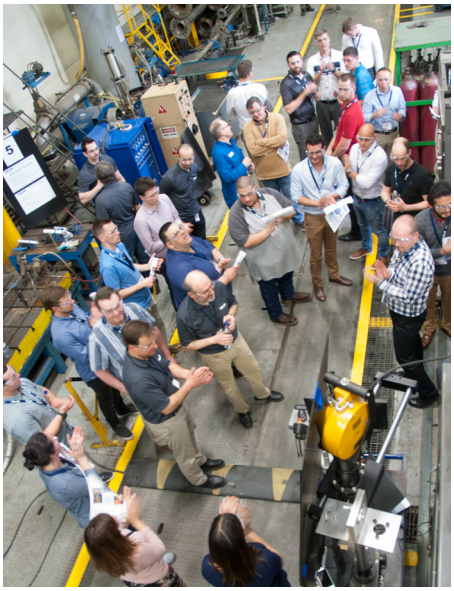
Stress calculations are done using 3D Finite Element Analysis (FEA) software, like ANSYS and Pro/Mechanica, with 3D models developed in Pro-Engineer.

Technical field services

- Start-up and commissioning support
- Troubleshooting
- Forensic examination, investigation and root cause analysis
- Process, start-up sequence study
- Line hydro/steam blow/acid-clean witness
- Stress analysis and FEA/system upgrade/weak link analysis
- Applications engineering/Flow analysis/ materials selection
- Non-destructive and UT testing/x-ray review
- Design of special tooling/validation of retrofit changes
- Long term service contracts

Velan coker valves in pre-commissioning.

Research & Development



Customers get a first hand look at Velan's R&D facilities in Montreal, Canada.

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 operate in 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.

Velan R&D services

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

Aftermarket services

We are your one-stop-shop for repairs backed by Velan quality and warranty. Velan offers our end-users technical support and in-line service and maintenance on all our valve products.

Field service & technical support

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 turn-arounds. 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.

We're nearby to help you when you need it most

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 and are your best choice for servicing your Velan valves.

To find a service shop in your area, visit our website: velan.com/en/services/service locations

Spare parts

Certified genuine Velan in-stock spare parts are at locations around the world. Our spare parts are manufactured to Velan's stringent quality standards for easy replacement.

- OEM parts are guaranteed to work
- Competitive lead times
- Expedited shipment capability
- Upgrade options to make your equipment last longer
- Engineering support & analysis

Velan Aftermarket services

- On-site service, maintenance, and product support on all Velan valve products
- Complete library of Velan maintenance manuals and product catalogs
- Engineering support, and unsurpassed know-how
- Severe service and refinery turnaround planning, support, and management

How to order Velan coker metal-seated ball valve

Type of connection	Size of connection			Pressure rating	Port	Type	Body material			Trim (ball/seat)	Trim (stem)	Coating (ball/seat)	Service
A	B			C	D	E	F			G	H	I	J
F	1	6	—	2	1	K	0	9	—	C	A	2	R

Example: Flanged B16.5 (B16.47 Series A), NPS 10, 600 Class, full port, split-body, one bellow seat and one fixed seat, C12 Body, CA6NM one-piece ball/stem, chrome plated ball and CoCr alloy seat, coker design.

A TYPE OF CONNECTION

F	Flanged Raised Face (RF) B16.5 / B16.47 Series A
P	Flanged Raised Face (RF) B16.47 Series B (API-605)
R	Flanged ring joint

B SIZE OF CONNECTION

Sizes shown in NPS (DN)

04	¾ (20)	**12**	4 (100)	**19**	14 (350)	**24**	24 (600)	**34**	34 (850)
05	1 (25)	**14**	6 (150)	**20**	16 (400)	**26**	26 (650)	**36**	36 (900)
07	1½ (40)	**15**	8 (200)	**21**	18 (450)	**28**	28 (700)		
08	2 (50)	**16**	10 (250)	**22**	20 (500)	**30**	30 (750)		
10	3 (80)	**18**	12 (300)	**23**	22 (550)	**32**	32 (800)		

C PRESSURE RATING

0	150	**2**	600	**4**	2500
1	300	**3**	1500	**7**	900

D PORT

0	Reduced port	**1**	Full port	**4**	Full port, unidirectional

E VALVE TYPE

D	Bidirectional trunnion mounted ball, 2 bellows loaded seats
E	Ring type backpressure control, no seats (1)
F	Four-way switch, 1 inlet / 3 outlets, 3 bellows loaded seats (1)
G	Three-way diverter, 1 inlet / 2 outlets, 3 bellows loaded seats (1)
K	Preferred direction, floating ball, 1 bellows loaded seat / 1 static seat (1)
R	Preferred direction, floating ball, 1 belleville loaded seat / 1 static seat (2)

F BODY MATERIAL (3) (4) (5)

02	WCB / A105	**13**	CF8M / F316	**32**	CD3MN / F51 Duplex
04	C5 / F5	**15**	CF8C / F347	**34**	C12A / F91
05	WC6 / F11	**26**	LCB / LF2	**37**	Incoloy® 825
09	C12 / F9	**28**	CG8M / F317	**54**	LF6
10	CF10M / F316H				

G TRIM MATERIAL (ball/seat) (6) (7) (8)

A	CA15 / 410	**F**	Inconel® 718
B	CF8M / F316	**G**	CW6MC / Inconel® 625
C	CA6NM	**H**	CG6MMN / Nitronic® 50
E	CB7Cu-1 / 630 (17-4PH)	**Y**	C12 / F9

H TRIM MATERIAL (stem)

A	One-piece ball/stem	**G**	410
E	630 (17-4PH)		

I COATING (ball/seat)

A	Uncoated	**2**	Ball: Chrome plated Seat: CoCr alloy
B	Chrome carbide (HVOF)	**6**	Ball: Chrome carbide (HVOF) Seat: CoCr alloy

J SPECIAL SERVICE

A	Standard	**W**	Hydrodrill (water cutting)
I	NACE (9)	**X**	Special
R	Coker		

(1) Valve types (E, F, G, K) are generally offered with steam purges for service around the coke drums. Type K valves may be supplied without purges for clean ancillary applications.

(2) Valve type R is generally supplied for the de-coke systems or ancillary applications.

***Note:** Velan supplies a number of non-steam purged metal-seated ball valves for non-coking applications.*

(3) Valves for coker applications (Class 300-900) are typically supplied with a cast body/body end.

(4) Valves for water cutting applications (Class 1500-2500) may be supplied with a cast or forged body/body end.

(5) For on-line spalling applications on heater outlet isolation we require maximum spalling temperatures.

(6) Valves for coker applications (Class 300-900) are typically supplied with a CA6NM one-piece ball/stem and F9 (CoCr alloy coated) seats unless otherwise stated.

(7) Valves for coker applications (Class 300-900) are typically supplied with a one-piece ball/stem. Ball is hard chrome plated. The stem is not typically hardfaced.

(8) Material alternatives are available on request.

(9) Valves to NACE meet MR0103.

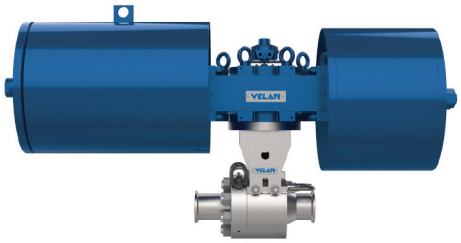
***Note:** CoCr alloy as used throughout this catalog refers to cobalt chrome hardfacing alloys as supplied by Kennametal Stellite™, and other approved manufacturers.*

General information on how to order

- The figure numbers shown on this brochure are designed to cover essential features on Velan valves.
- Please use figure numbers to ensure prompt and accurate processing of your order.
- A detailed description must accompany any special orders.

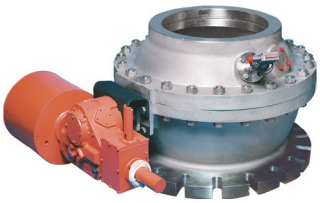
Part of Velan's leading portfolio of valves for severe service applications

Delayed coking



Ebullated bed

Mining



Other severe services

Learn more about Velan's full product line at 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

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

Check our website for more resources

Go to the *Resources* tab on 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.

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