VELAN

The world leader in

COKER BALL VALVES

PROFILE

Velan is one of the world's leading manufacturers of industrial valves, supplying forged and cast steel gate, globe, check, ball, butterfly and knife gate valves for critical applications in the chemical, petrochemical, oil and gas, fossil and nuclear power, cogeneration, pulp and paper and cryogenic industries.

Founded in 1950, Velan earned a reputation for excellence as a major supplier of forged valves for nuclear power plants and the U.S. Navy. Velan Inc., pioneered many designs which became industry standards, including bellows seal valves in 1954, all stainless steel knife gate valves and forged valves up to 24".

Velan valves are manufactured in 12 specialized plants, including five in Canada, two in Korea and one each in the U.S., France, U.K., Portugal and Taiwan. We have a total of 1,091 employees in North America and 384 overseas.

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HEAD OFFICE & PLANT 5

MONTREAL, CANADA 115,000 sq. ft. (10,683 m^2)
3–12" (80–300 mm) butterfly and ⅜–2" (10–50 mm) ball valves

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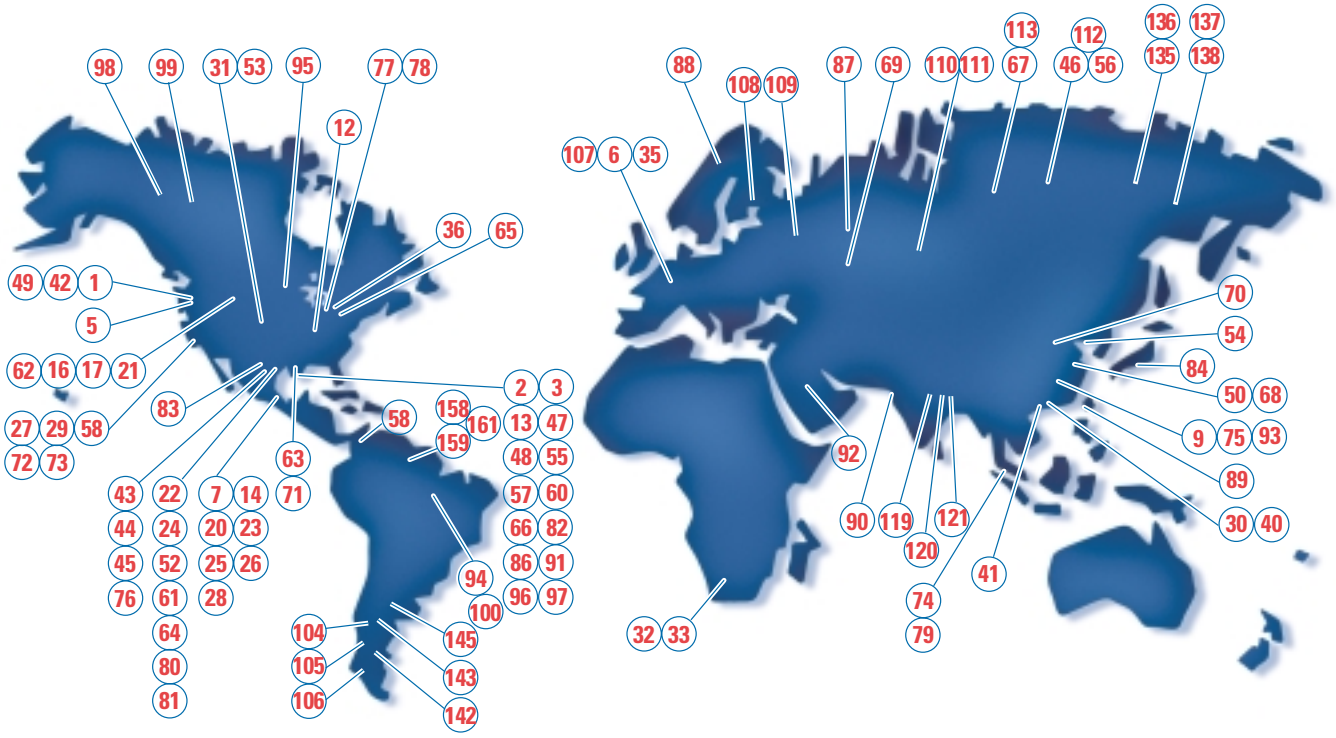
NOTE: *The material in this catalog is for general information. For specific performance data and proper material selection, consult your Velan representative. Although every attempt has been made to ensure that the information contained in this catalog is correct, Velan reserves the right to change designs, materials or specifications without notice.*

COKER BALL VALVE RELIABILITY WORLDWIDE

DELAYED COKERS WORLDWIDE CHOOSE VELAN COKER BALL VALVES



(Locations shown are currently using Velan Coker Ball Valves)

OVER 15 YEARS EXPERIENCE

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. The valve was reinstalled using the original components.

Since then we have installed over 130 delayed coker switch valves worldwide.

WORLDWIDE REFERENCES (as of April 2002)

Velan Delayed Coker Valves are currently installed in over 90 Delayed Coker Units (DCU) worldwide.

This includes over 130 four-way switch valves, some of which have been in service for over 15 years.

Also currently installed are over 900 isolation valves in the following applications:

- ☑ Inlet Transfer Line
- ☑ Drain
- ☑ Heater Isolation
- ☑ Blowdown
- ☑ Vent
- ☑ Bypass
- ☑ Quench
- ☑ Overhead Vapor
- ☑ Backpressure Control
- ☑ Hydrodrill Water Cutting

We have also supplied over 300 logic control panels with hard-wired or Programmable Logic Controller (PLC) driven logic. 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.

VELAN DELAYED COKER BALL VALVES

COMPLETE RANGE

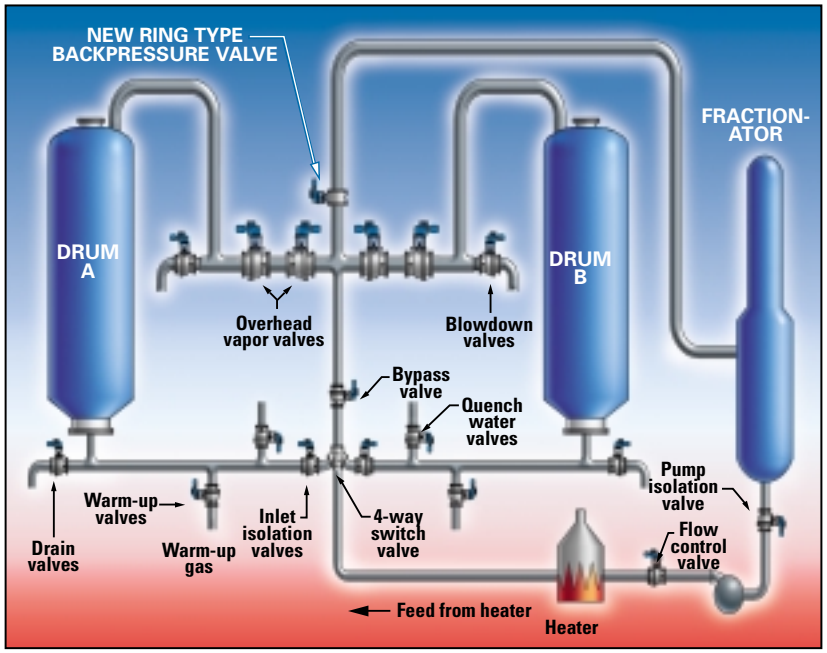
Velan currently supplies valves for delayed coker applications in the widest range of sizes and pressure classes (with a proven track record) in the industry. We have supplied the following valves:

- Four-Way Switch Valves
  6 - 14" – ASME Classes: 300 - 900
- Isolation Valves
  6 - 36" – ASME Classes: 150 - 900
- HP Water Valves
  2 - 8" – ASME Classes: 1500 - 2500
- Steam Valves
  1/4 - 2" – ASME Classes: 300 - 1500

Three years ago we supplied the largest four-way switch valves (14") currently installed in a delayed coker application anywhere.

Over the last five years, we have also supplied the largest overhead vapor and blowdown valves (30"). These are currently installed in four delayed cokers in the U.S. and the Middle East.

Valves are generally supplied in high temperature alloys such as C12 and C5, but are also offered in WCB for slightly lower temperature applications (i.e., secondary blowdown).



Velan offers a complete range of valves for all coker applications.

DESIGN FEATURE COMPARISONS

Velan Ball Valves offer a number of advantages for delayed coker service, for example:

ADVANTAGES	VELAN BALL	MODIFIED COMMODITY BALL	PLUG
EXPERIENCE	Over 700 valves are currently installed in delayed cokers worldwide. Valves have been in service 1983.	Few installations and, in some cases, a short time period in service make it difficult to evaluate performance.	Certain essential design features have limited their use in newer installations.
AUTOMATION RELIABILITY	Single 90° rotary motion allows for simple, inexpensive and reliable actuation.	Few installations and, in some cases, a short time period in service make it difficult to evaluate performance.	Automation requires accommodating linear and rotary motion. The mechanism to achieve this continues to be a maintenance concern.
SEALING	Sturdy bellows maintain constant ball to seat contact, and as a result avoid a buildup of coke on the sealing surfaces. A positive seal is maintained through the life of the valve.	Seat loading methods for delayed coker applications have yielded mixed results, e.g.: 1. Weak springs allow the buildup of coke between the ball and seat, which may result in poor sealing. 2. Belleville-type springs load adequately, but have shown some difficulties in adapting to high temperature coking environments.	The "lift and reseat" method allows for the accumulation of coke between seat and plug every time the plug is lifted. In fact, the coke is compacted into the seating area every time the valve is reseated. The ensuing coke buildup may result in poor sealing.
FULL BORE	Standard. Valves are lightweight and compact.	Available. In some cases valves are 10-50% heavier.	Available. Valves are substantially larger and up to 50-200% heavier.
MAINTENANCE	Seats are easily and quickly replaced.	Certain manufacturers rely on integral seats. These seating areas are difficult to service as they often form an integral part of the body end. As a result, the end user may have to rely on a spare body end, which is costly and still requires lapping. Depending on the valve's size, lapping may be difficult.	Seating areas that require weld repair may be difficult to service as they form an integral part of the body. Substantial weld repair of C5 or C12 castings necessitates PWHT, which may further complicate the process of repairing previously machined surfaces.

The above comparison table is intended to highlight some of the advantages of Velan coker ball valves and is not intended to downgrade competitors designs.

FOUR-WAY SWITCH VALVES

OVER 130 VELAN FOUR WAY SWITCH VALVES IN DELAYED COKER INSTALLATIONS

FOUR-WAY VALVE DESIGN FEATURES:

AUTOMATION

The electric, hydraulic or pneumatic actuator is selected in function of coker service. A large torque safety factor ensures the valve will cycle under the most stringent conditions. When selecting actuators, special attention is paid to the coker deck environment.

The Stem Coupling is designed to perform 3 main functions:

- ☑ Protect against "overtorquing" of the stem.
- ☑ Protect the actuator components.
- ☑ Protect against an unintentional switch.

VALVE

A Lantern Ring with steam block and extra deep stuffing box minimizes the risk of leakage occurring through the packing chamber. Live-loading is available upon request.

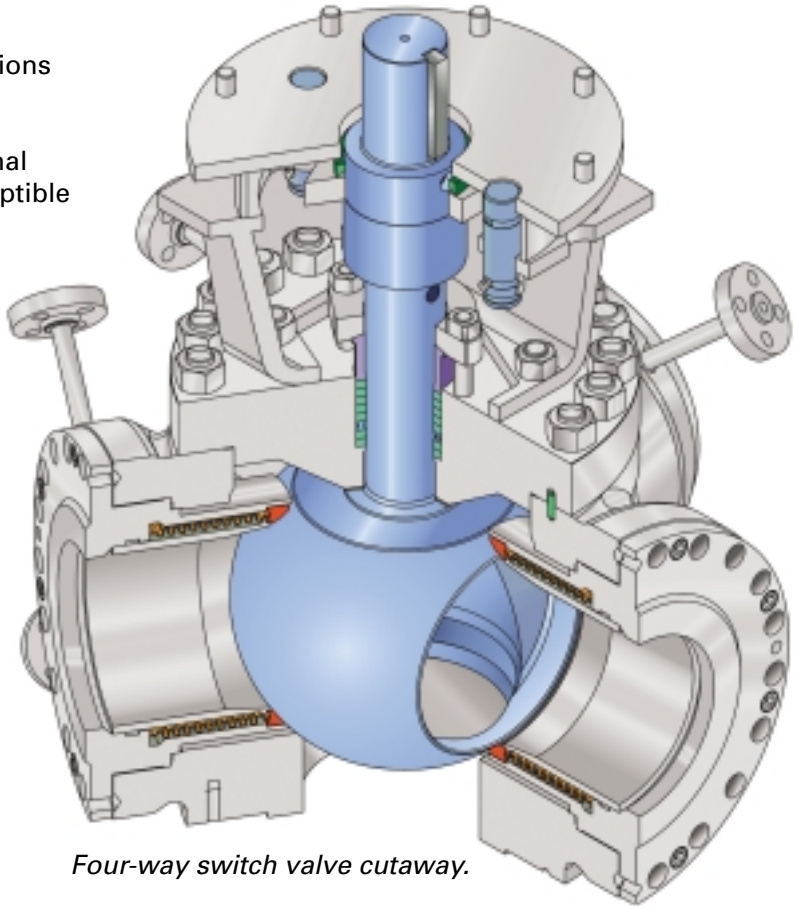
The Sturdy One-Piece Ball and Stem provides optimal strength, and is well suited to applications where fouling due to coke fines are a concern. The one-piece design avoids the problems generally associated with the more conventional two-piece ball and stem, which is highly susceptible to solids buildup in the ball-stem joint and a resulting increase in operating torques.

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

Scraper Type Seats "scrape" coke buildup from the surface of the ball during each cycle. Seats are hard- faced to ensure a long, trouble-free service life.

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

The adjacent photograph shows a 12" switch valve installed with the stem in the horizontal position. The valve is one of (42) Velan valves installed in a delayed coker unit, where the valves were interlocked through a DCS for safer operation. Our logic control panel allows the valve to be operated both locally or remotely.



Four-way switch valve cutaway.

ISOLATION VALVES

OVER 600 VALVES OF THIS DESIGN IN DELAYED COKER INSTALLATIONS

The valves shown in the adjacent photograph were installed as part of a debottleneck project aimed, among other things, at increasing the units' liquid yield. As this was an existing structure it was important to minimize piping changes. Because the existing valves were 70% plug valves the engineering firm evaluated full bore plug valves, but found the units' weights to be substantially higher. Rather than evaluate the structural changes required in order to accept these heavier, larger units the end user opted to use our lighter full bore ball valves. As a bonus, the ball valves provided a better seal than was possible with the previous valves. Two years later the same end user installed 24" Velan Overhead Ball Valves on their number 2 coker.

ISOLATION VALVE FEATURES:

AUTOMATION

The electric, hydraulic or pneumatic actuator is selected in function of coker service. A large torque safety factor ensures the valve will cycle under the most stringent conditions. When selecting actuators, special attention is paid to the coker deck environment.

The Stem Coupling is designed to perform 2 main functions:

- ☑ Protect against "overtorquing" of the stem.
- ☑ Protect the actuator components.

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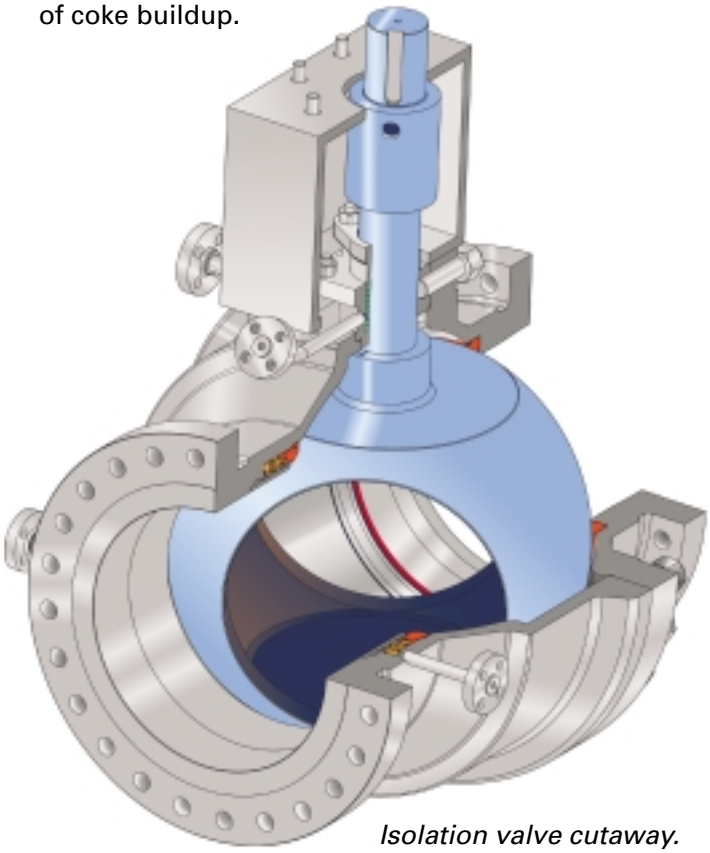
Strong Bellows offer a unique seat loading design that maintains the floating seats in constant contact with the ball and ensures a positive seal.

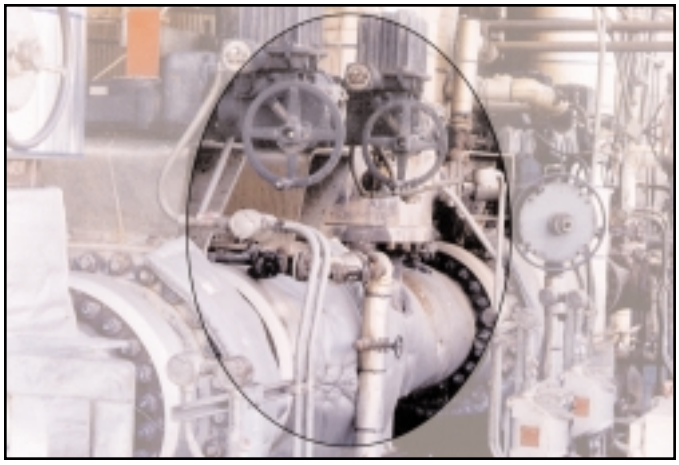
Scraper type seats "scrape" coke buildup from the surface of the ball during each cycle. Seats are hard-faced to ensure a long, trouble-free service life.

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



Isolation valve cutaway.

RING VALVES (FOR BACKPRESSURE CONTROL)



This patented Velan Ring Valve was installed to replace an existing butterfly valve. The end user required the use of this valve only when shorter cycle times required quicker drum "backwarming". The end user could not justify the high pressure drop across the butterfly valve with his efforts to increase liquid yield. They required a valve with good throttling characteristics, but which provided no obstruction in the full open position. The Ring Valve fully met these requirements.

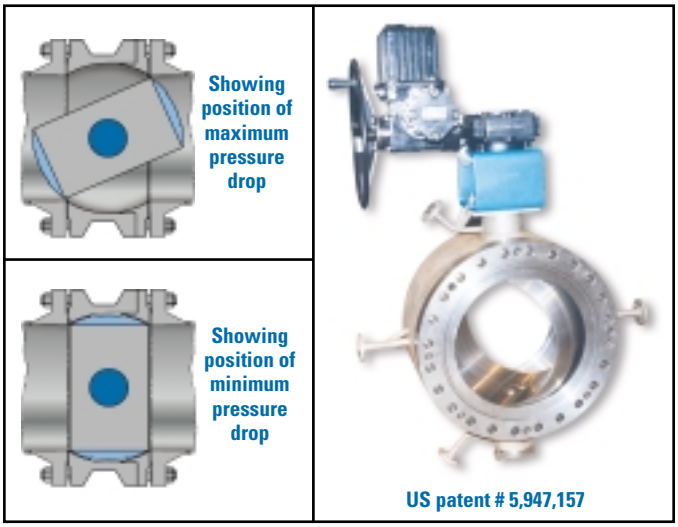
RING VALVE FEATURES:

NO OBSTRUCTION (HIGH CV) in the full open position.

EXCELLENT THROTTLING CHARACTERISTICS. In the "maximum obstruction" position, the valve provides a pressure drop equal to a butterfly valve's set at 15° open.

INTRINSICALLY SAFE DESIGN. The Ring Valve has no seats. It is a throttling valve. As a result, it does not require a mechanical stop in order to avoid full closure and the resulting drum overpressurization.

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



LOGIC CONTROL PANEL

Velan supplies hard-wired or PLC driven panels to operate as stand-alone units or through a PLC/DCS for safe, sequential valve operation.

Velan supplies panels to operate the switch valve as well as all valves around the coke drum.

HIGH PRESSURE (HYDRODRILL) VALVE

Velan Securaseal 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 hard-faced.

FOCUS ON DELAYED COKER APPLICATIONS

Velan maintains a group that has handled delayed coker applications exclusively for over 15 years. The group's design and service staff maintain contact with end users regularly appraising valve performance in the field. Our approach has yielded several design improvements over the years based on evolving coker operating trends.

EXAMPLES:

Simple, Reliable Automation.
Fully automated, fully interlocked valve operation for a safer drum switch and unheading.

Total remote operation capability of switch and isolation valves including logic or hardware features to avoid unwanted operation.

Process Debottlenecking.
Full bore valves for higher throughput and a lower pressure drop in the overhead lines. This results in a lower drum pressure, which in turn translates into higher liquid yields and enhanced coker profitability.

In fact, the requirement for lower drum pressures resulted in a new, patented backpressure control valve design called the Ring Valve.

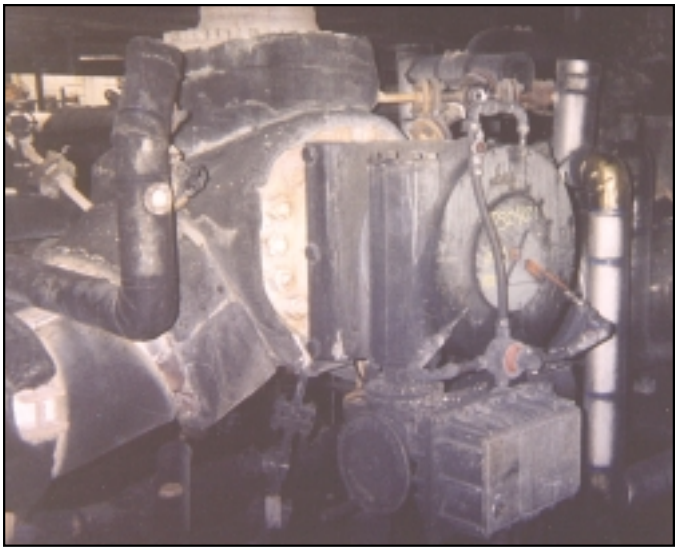
Shorter Cycles.
Valves are better suited to perform under the operating conditions imposed by shorter cycle times such as:

- ☑ Increased thermal stresses due to shorter quench times.
- ☑ Water hammer in part due to higher quench rates.

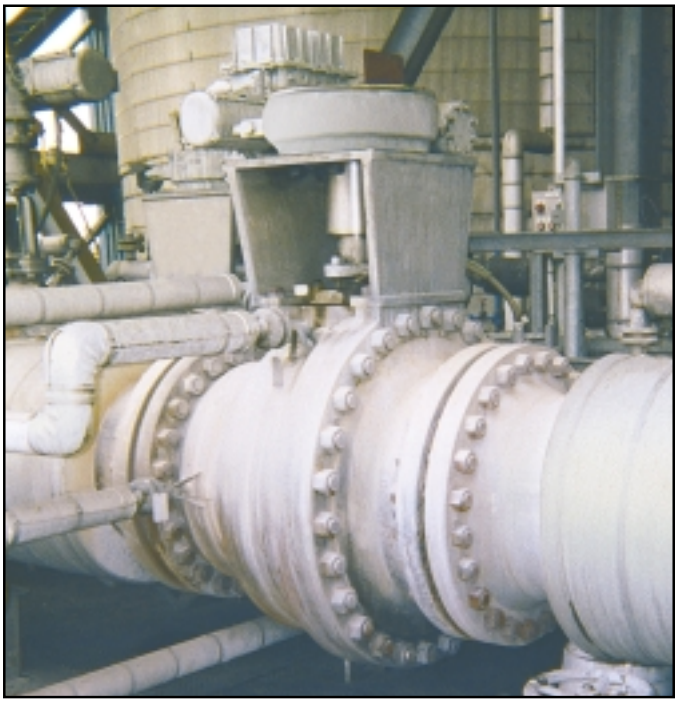
Special Applications.
Needle coke type applications where operating conditions provide new challenges.

In-Line cleaning capability.
Valves can be decoked without removal from the line.

Learn more about Velan Coker Ball Valves, or any of Velan's complete range of industrial steel valves at www.velan.com.



The 12" Velan Switch Valve shown above has been in uninterrupted service for 7 years. This Valve was installed as part of a Valve automation Project.



These 24" full bore overhead vapor valves have been in uninterrupted service for over 6 years. In an effort to maximize liquid yield Delayed Cokers worldwide are opting for larger overhead lines. In fact some of the newer DCU's have already installed our 30" valves for overhead and blowdown service.

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