

Mokveld Valves



Mokveld Valves bv

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Mokveld



control valves



Mokveld control valves axial flow, a unique concept that works

Mokveld control valves have been developed over three decades of research and field applications. They combine high quality engineering with a thorough understanding of the needs of the oil and gas production, process industries and companies involved with transmission, distribution and storage of almost any product.

'Axial flow' describes the in-line symmetrical flow path between the valve inner and outer body before the flow reaches the trim zone.

Axial flow valves were originally designed for hydro power plants, where they have been in use since the early 1900's.

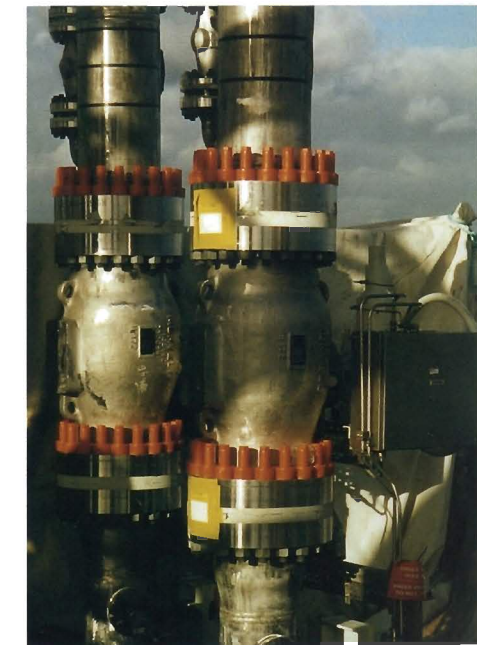
Mokveld recognised the unique advantages of the axial flow principle and adopted it for their control valves in 1955. Mokveld leads the development of the axial flow concept for use in the oil and gas industries.

Mokveld axial flow control valves have found worldwide acceptance across the full range of gas and liquid applications; production, treatment, transmission, storage and distribution. Fluids handled range from crude oil to refined products, from high GOR multiphase fluids to heavily sand loaded natural gas, and from potable water to highly corrosive and contaminated produced water.

Mokveld has supplied control valves to the world's largest crude handling facilities, LNG plants, gas storage facilities, regulating stations, compressor and pump stations.



pipeline back pressure control valve with hydraulic actuator and control system in Turkey



inline production chokes 10" ANSI 1500, FPSO Norway

pressure reducing valves 20" ANSI 900, gas receiving terminal Malaysia

the control valve that offers more

The Mokveld axial flow control valve is a rugged, low maintenance high performance valve, designed to increase total efficiency over a wide range of control valve applications.

The in-line and symmetrical flow path eliminates indirect flows and unnecessary changes in direction through the valve. This results in significant reductions in noise and turbulence, and prevention of erosion from untreated fluids in upstream applications.

The axial design provides the highest capacity per diameter compared to conventional designs.

bubble tight shut-off

Even under the most severe working conditions, Mokveld control valves maintain tight shut-off over the full pressure range. Mokveld's patented sealing system has achieved a record for reliability in applications where control valves must give 100% tight shut-off, even after extended periods of use. This feature is independent of the actuation method.

pressure balanced

Mokveld control valves in all trim styles are fitted with pressure balanced pistons. This means that the operating thrust is virtually independent of differential pressure across the valve. Fast response is therefore achieved with smaller actuators in contrast to those fitted on conventional valves. Furthermore the overall design, with a minimum number of moving parts, allows very short stroking times when required, especially important for compressor surge control.

compact design

Size for size Mokveld control valves are more compact and use smaller actuators than conventional valves rated for the same application - an important consideration for projects where component weight and size are crucial. As all Mokveld control valves are in-line valves, piping layouts may be simplified in comparison with those utilising angle type valves. This provides a more compact plant design, and reduces noise generation and pipe erosion.

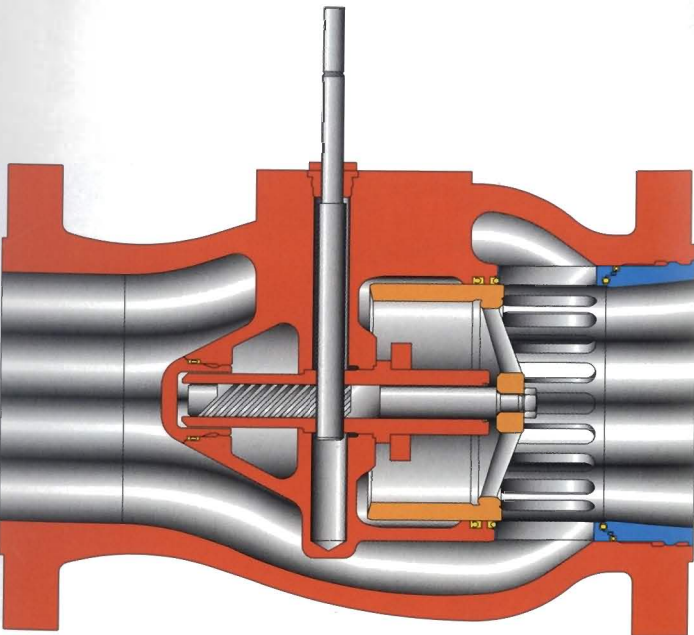
bi-directional

Mokveld axial flow valves can be supplied in bi-directional applications maintaining the bubble tight main sealing.

complete range of sizes, ratings and trims

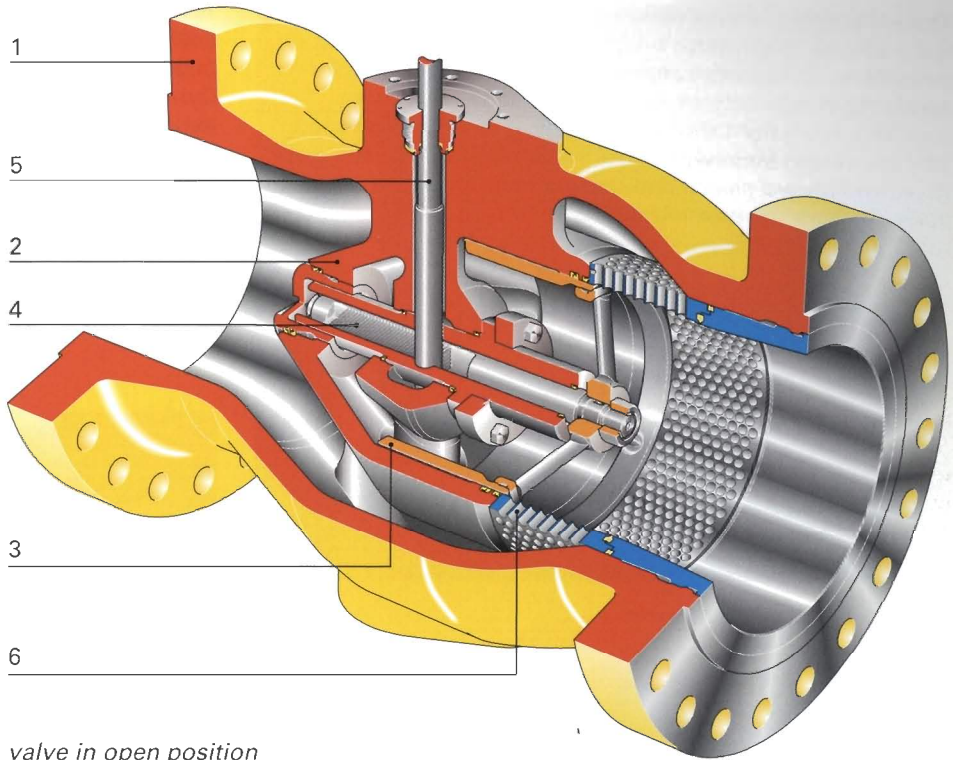
Mokveld control valves are manufactured in all standard sizes up to 48" and with pressure ratings from ANSI 150 through ANSI 2500. To cope with all possible process conditions many trim styles, from large capacity and high recovery characteristics to labyrinth cage guided multistage trims for high pressure cuts in both gases and liquids are available.

	ANSI 150	ANSI 300	ANSI 400	ANSI 600	ANSI 900	ANSI 1500	ANSI 2500
sizes 2"							
3"							
4"							
6"							
8"							
10"							
12"							
14"							
16"							
18"							
20"							
24"							
28"							
30"							
32"							
36"							
40"							
42"							
48"							



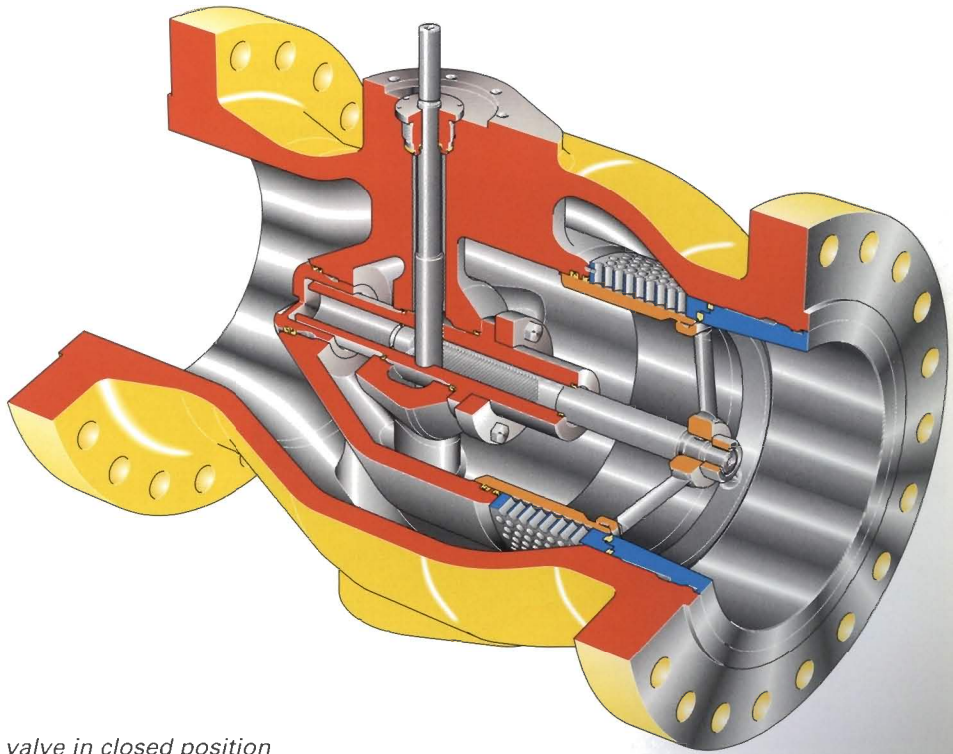
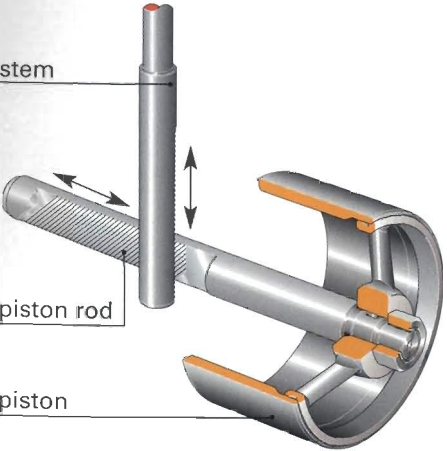
axial flow

Axial flow refers to the straight line symmetrical and unrestricted flow path between the valve inner and outer bodies. Major components of the Mokveld axial flow control valve are: valve outer body (1), inner body (2), piston (3), piston rod (4), valve stem (5) and cage (6). The valve is a one piece body design. The piston moves along the centerline of the valve.



valve in open position

The piston is operated by means of a 90 degree angle transmission consisting of a pair of sliding tooth racks with matching teeth located on both piston rod and stem. Small tolerances in the teeth ensure the transmission is hysteresis free with no 'play' between valve stem and piston rod. The flat tooth beds are isolated from the fluid by double primary seals on the piston rod and guide.

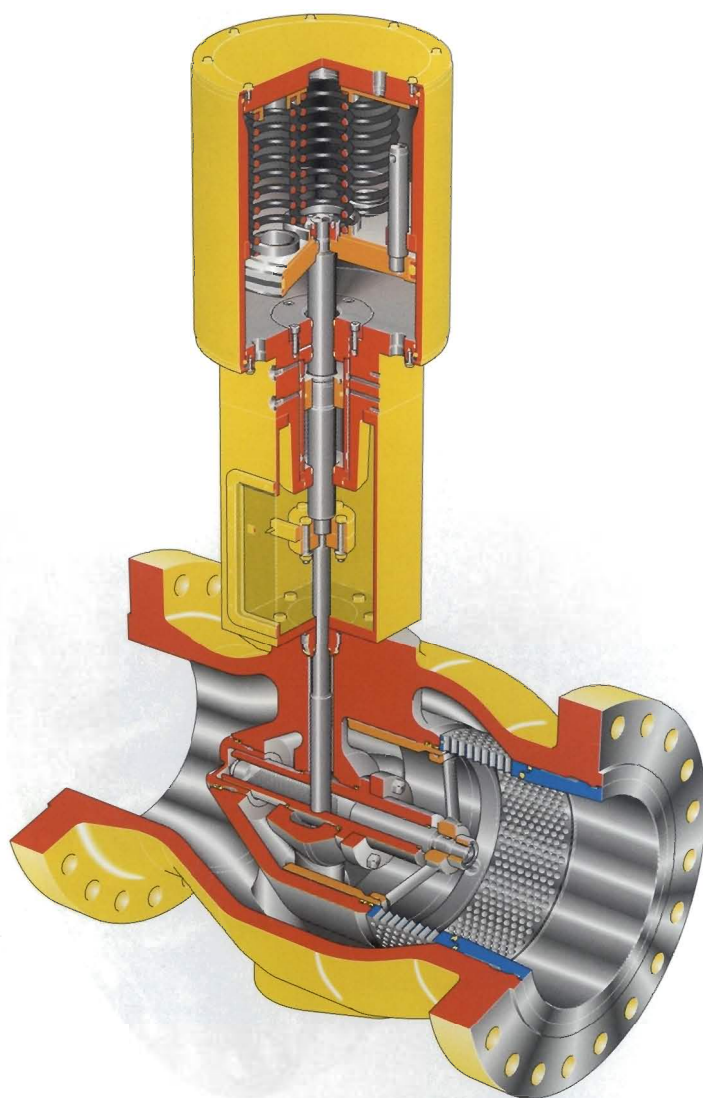
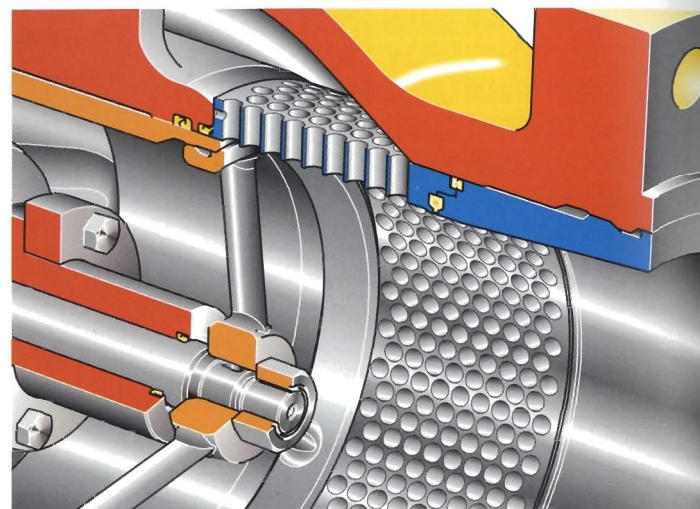


valve in closed position

patented sealing system

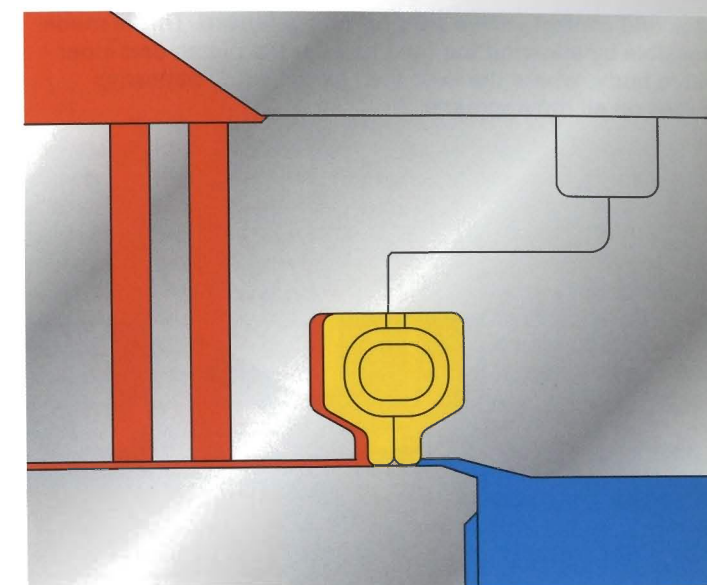
Mokveld control valves assure bubble tight shut-off over the full pressure range, even under the most severe working conditions. These valves have an unsurpassed record for reliability in applications where the control valve must maintain 100% tight shut-off capacity, even after extended periods of use. Mokveld control valves shut off equally well whether they are closed against upstream pressure, or under pressure from the downstream side.

The Mokveld Sealing Assembly, a self-energizing pressure design, consists of two high pressure rings and a spring in between, all of which are located within the cage. Dynamic seals are all self-energized, reducing friction and extending the temperature range from -90°C to +260°C (-130°F to +500°F).

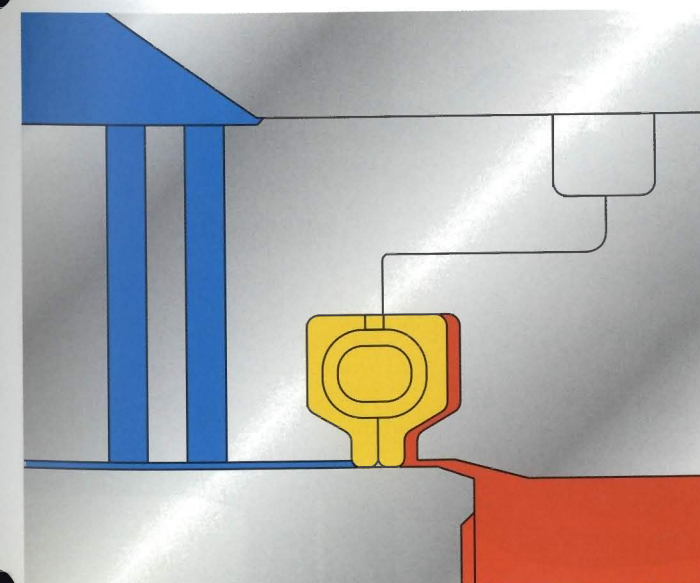


In the closed position pressure is applied to the external face of the main seal, energizing it and forcing it radially inwards against the piston, thereby assuring bubble tight shut-off against all pressure differentials.

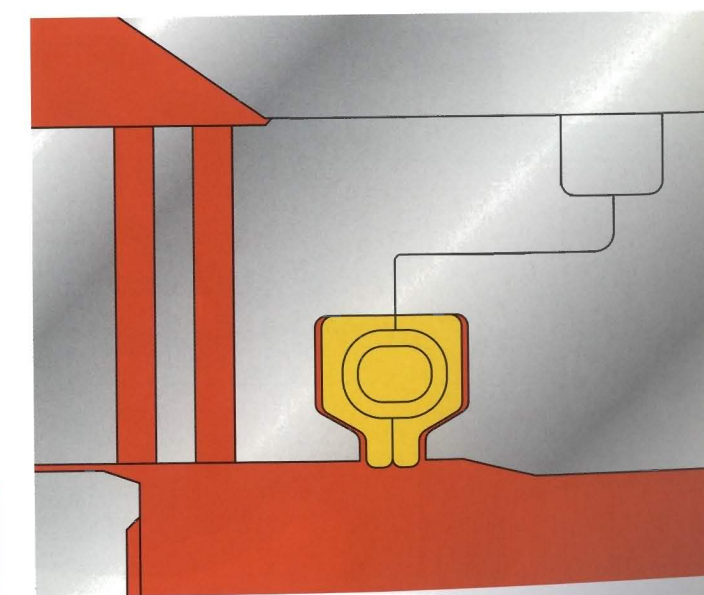
Note, the clearance between the valve piston and the seal retainer is extremely small so that throttling has taken place between metal faces only and to all intents the valve is closed before the seal is energized. Therefore the seal only completes tight shut-off and is protected from erosion. All control valves maintain bubble tight shutoff to ANSI class VI, independent of actuation method.



Under reversed flow conditions, the system works equally well. The main seal is forced against the piston by the line pressure, effecting tight shutoff.



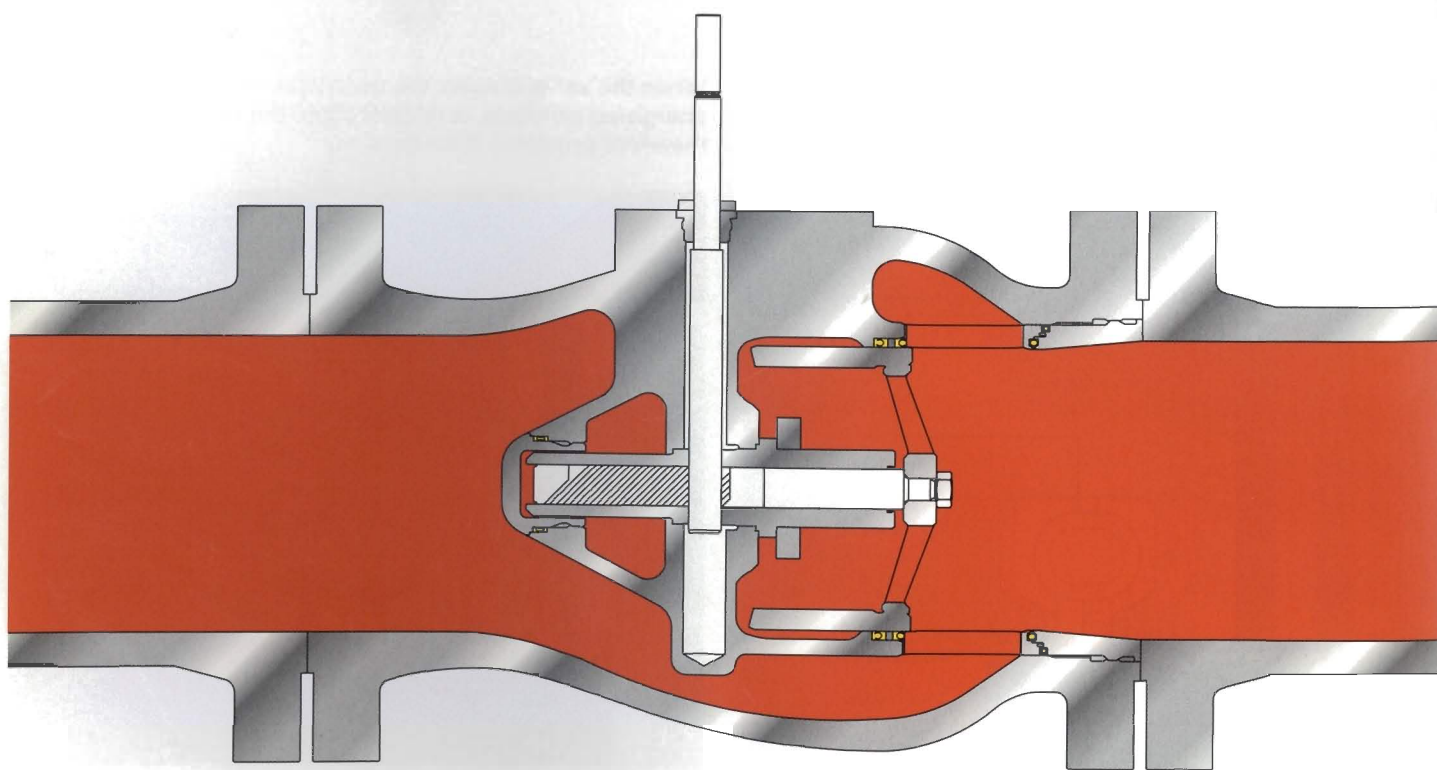
When the valve is open, the main seal, because of the energizing principle, is retracted into the cage seal profile and therefore protected from erosion.



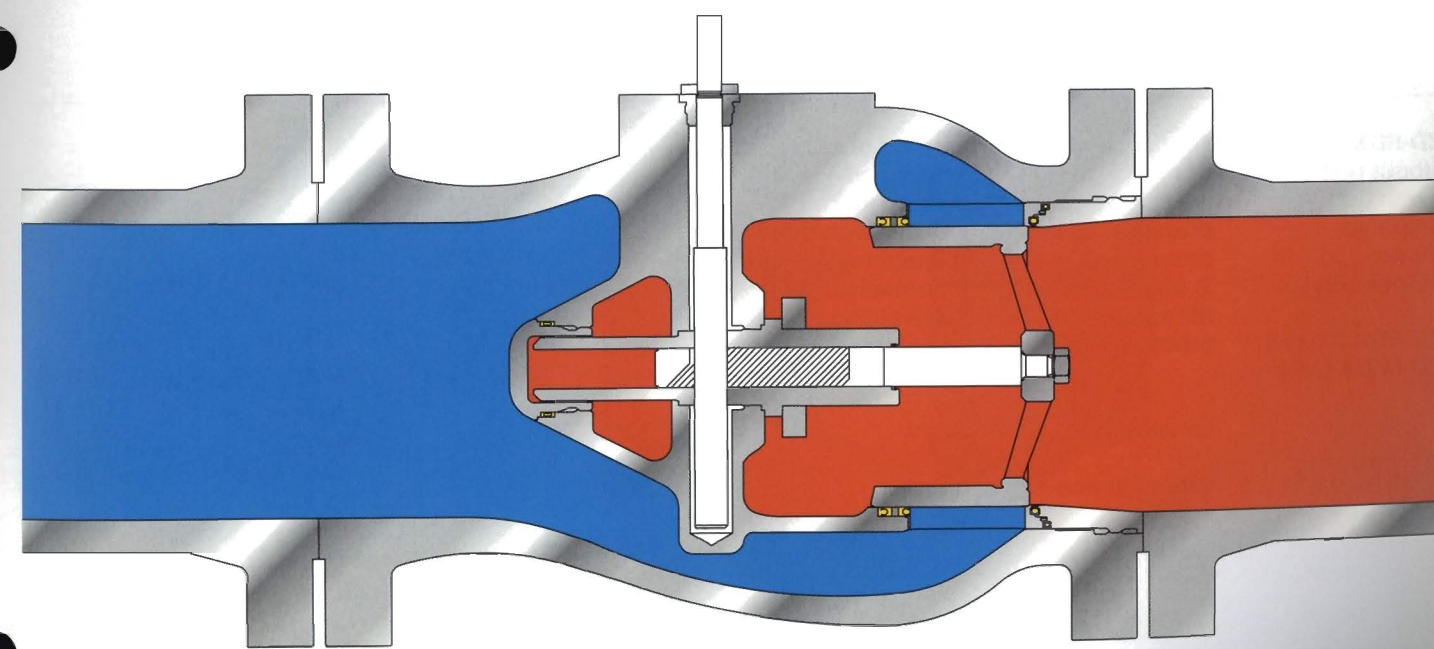
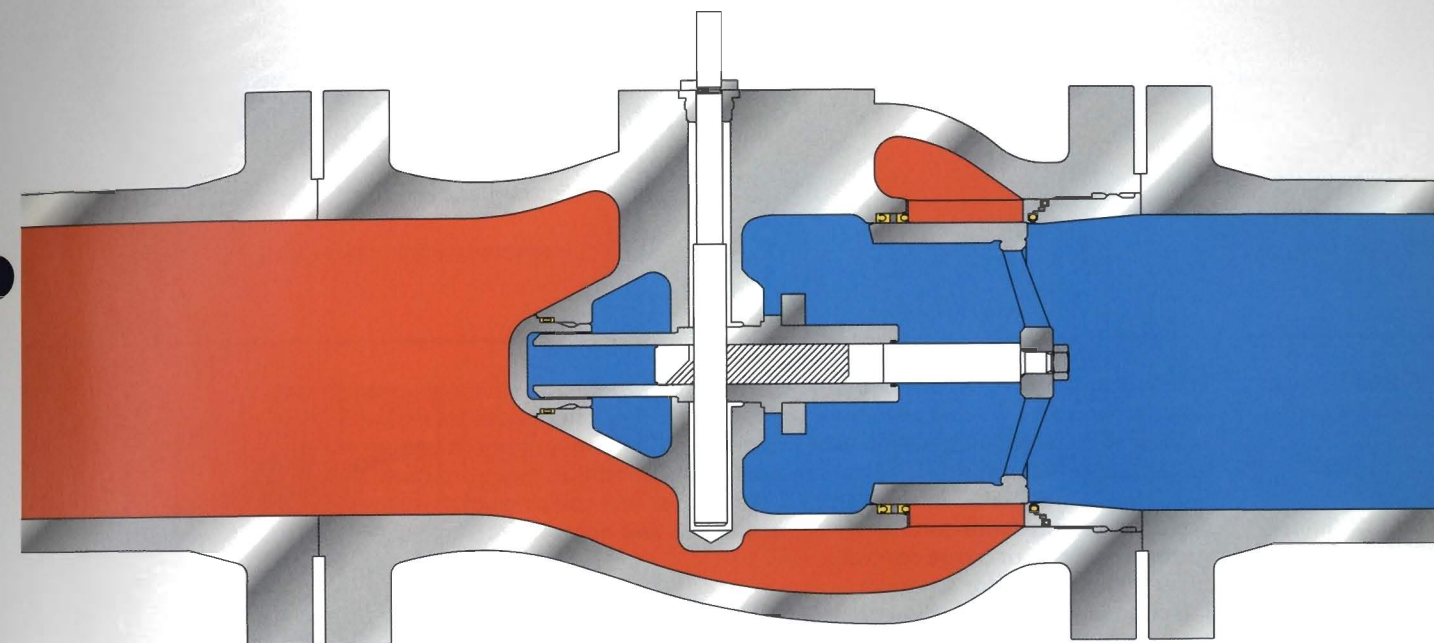
pressure balancing

Mokveld control valves are pressure balanced. This is made possible by allowing the fluid to enter the piston and inner valve body, where the fluid then exerts equal opposing forces on all moving parts.

The pressure balanced design permits easier operation and faster stroking times than is possible with conventional valves. Controlled stroking times of less than 2 seconds can be provided, important for applications such as compressor anti-surge. Regardless of pressure differentials, reduction units are not required. Simple low pressure pneumatic or small electric actuators can be used. Spring return actuators can be applied to all valve sizes avoiding complex trip systems.



With the valve in closed position high pressure can be allowed from both upstream and downstream sides without effecting the stem thrust required to operate the valve.



trim styles, applications and key characteristics

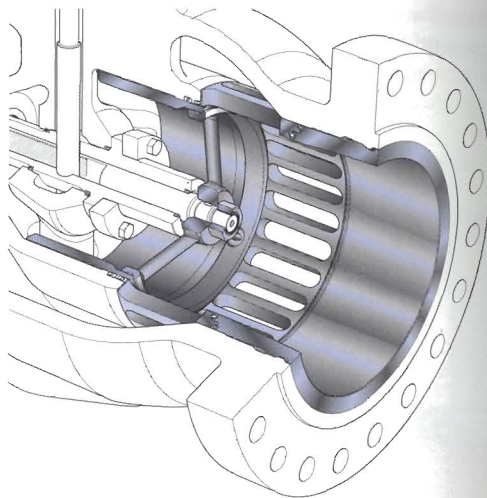
RZD-RVX (linear)
RZD-REVX (=%)

For flow and pressure control of both liquids and gases; for pump discharge applications. Multi purpose control valve with slots cage

very high Cv

average pressure recovery

average noise abatement



RZD-RCX (linear)
RZD-RECX (=%)

For flow and pressure control of liquids; for pump discharge, pump recirculation. Multi purpose control valve with multi orifice cage

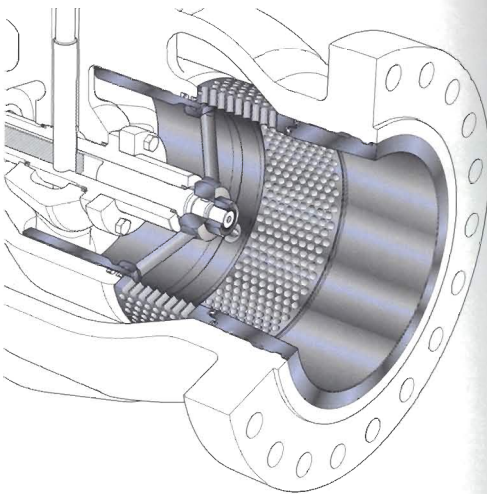
RZD-RQX (linear)
RZD-REQX (=%)

For flow and pressure control of gases, compressor surge control, blow down, separator let down, injection and gas production control
 Low noise control valve with multi small orifice cage

low pressure recovery

high cavitation index

high noise abatement



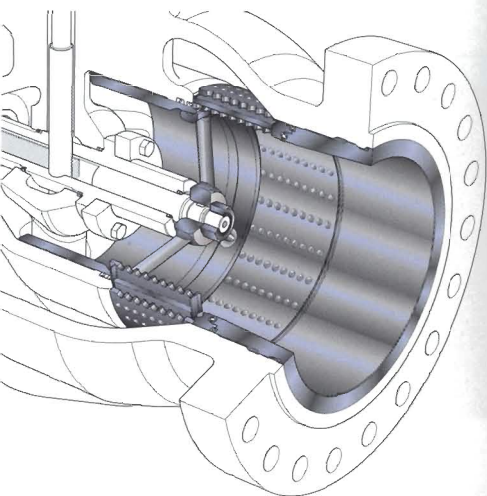
RZD-RDX 1/2
 without (=1)
 or with (=2)
 integrated
 diffuser
 (dry gas only)

RZD-RDX (linear)
RZD-REDX (=%)

For flow and pressure control of gases; for gas production, compressor and anti-surge control, let down, blow down and very high pressure drops. Control valve with three stage pressure reduction and integrated diffuser 2; (dry gas only). The intermediate stages permit full expansion of the gas avoiding critical pressure drop over the final stage

very low pressure recovery

very high noise abatement



Gas
RZD-RMX
2/ - /20
 (relates to the
 P1/P2 ratio)

Liquid
RZD-RMX
68/ - /100
 (relates to the
 Cavitation index)

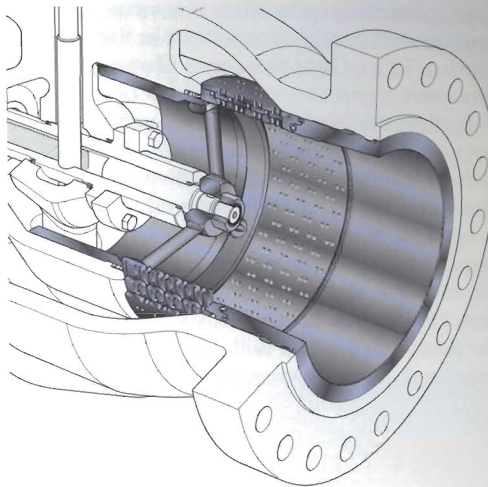
For flow and pressure control of liquids with cavitation risk; for pump back pressure control or minimum flow by-pass, pressure control on separator inlet. For flow and pressure control of gases; blowdown or letdown applications.

Control valve using the patented labyrinth style, 'multi-impingement' principal in a number of stages. To be customised to specific requirements.

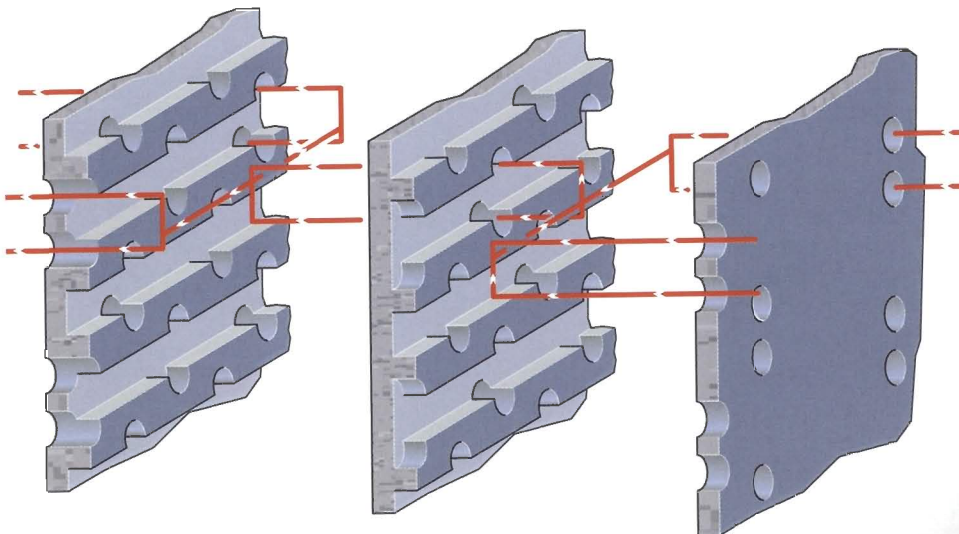
ultimate high cavitation index

ultimate low pressure recovery

very high noise abatement



The flowing velocities are controlled by forcing the fluid to follow an expanding path of right angle turns in combination with impingement. Depending on the pressure drop the exact number of steps are calculated to achieve low fluid velocities and ensure the elimination of abrasion, erosion, vibration and cavitation throughout the valve.



example of 13 stage labyrinth

custom design

The control valve is often the most critical and costly component in the control loop. Over the years Mokveld has developed the expertise for correct selection and sizing of control valves, in particular for noise predictions, determination of trim and valve characteristics, cavitation onset, rangeability, and other features required for the application. Experience, plus sound engineering ensure that the control valve selected for each application will provide excellent performance and service.

For certain complex process requirements Mokveld control valves can be provided with an individually designed trim. For these cases several trim styles are combined to match the special conditions, or to offer the most economic solution to control problems. Mokveld continues to conduct intensive studies of their valves, both in the laboratory and in the field. Comprehensive guides for valve sizing and noise prediction are provided in the

Mokveld catalogue. Clients may take advantage of the company's computerised valve sizing programme that conform to International standards.

custom design cage



control valve testing



a variety of options

materials

Mokveld has wide experience in the application of valve metallurgy in gas, oil, formation water, seawater, potable water and multiphase fluids. Material selection of valve bodies and trims are based on individual service conditions, where fluid chemical composition, temperature, pressure and velocity are important parameters, all taken into consideration.

valve bodies are available in:

- carbon steel
- austenitic stainless steel
- carbon and low-alloy steel for low temperature service
- duplex alloys
- aluminum-nickel bronze
- carbon steel with rubber or epoxy-phenolic linings
- 13% chromium steel
- Incoloy 825
- Alloy 20

temperature ranges

Mokveld control valves can be supplied to operate within a temperature range of -90°C to +260°C (-130°F to +500°F).

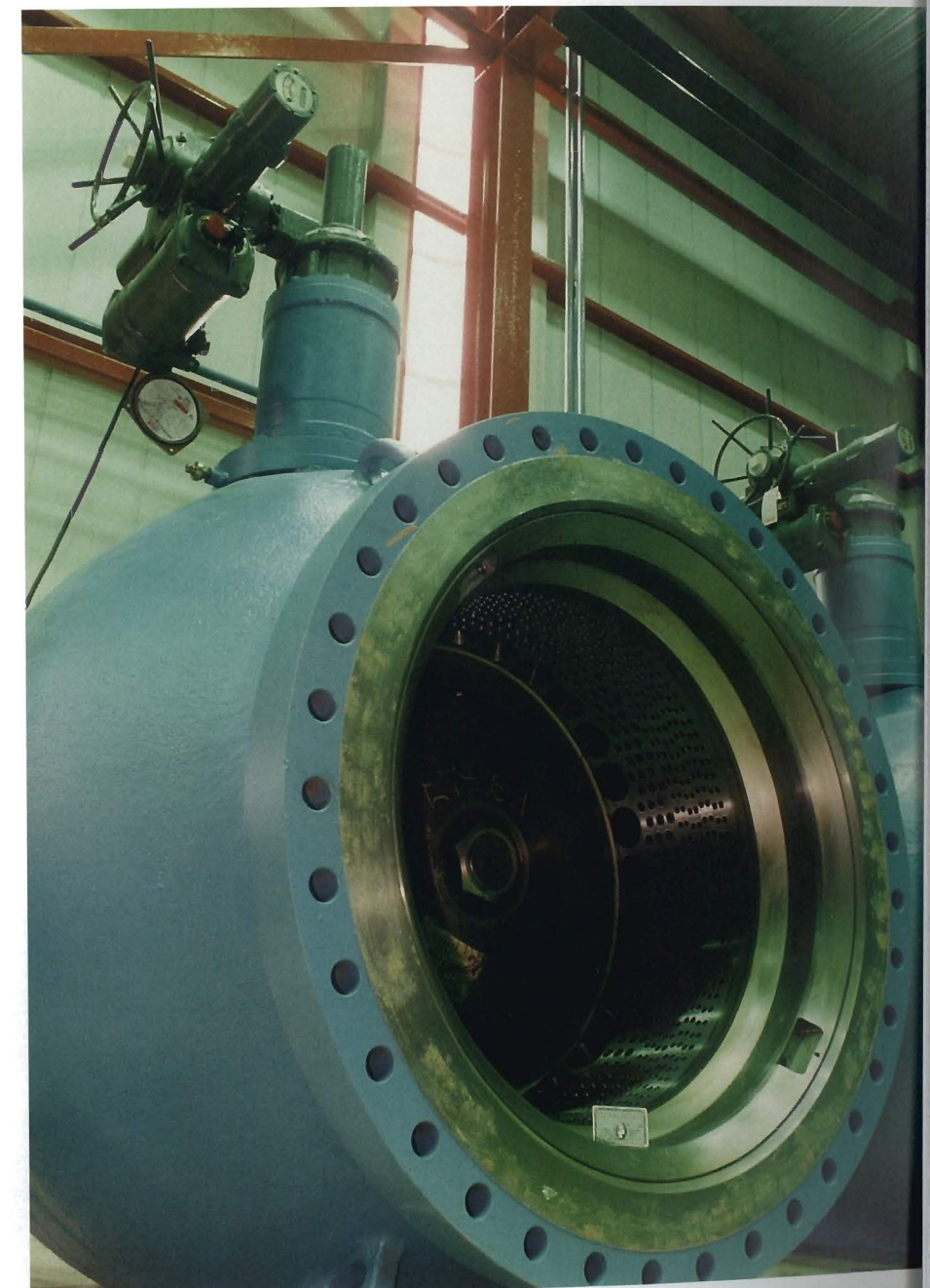
actuators and control systems

Mokveld control valves can be equipped with the following types of actuators:

- pneumatic
- hydraulic
- electric
- electro hydraulic

Control systems are available to suit all requirements including fail safe action, positioning, power packs, etc.

For more details please refer to our brochure 'Actuators and Control Systems'.



quality control and quality assurance

It is Mokveld's policy that all valves are manufactured within strict quality standards. All valves are subjected to body and seat tests prior to shipment.

Mokveld Quality Assurance department takes full responsibility to ensure that all applicable customer contractual requirements are fulfilled. For this purpose, the Mokveld Quality Assurance Manual has been developed. The manual outlines all relevant procedures to ensure a high quality level. The procedures include all stages of sales, engineering, procurement and manufacturing. A copy of the Quality Assurance Manual is available upon request.

Mokveld's quality system is in full compliance with ISO 9001 and API Q1 and has been audited and approved by all major oil and gas companies, engineering contractors and inspection authorities.

Mokveld control valves are designed and manufactured with the most up-to-date machine tools and systems. The design work is done on CAD systems and manufacturing takes place on advanced CNC machines.

Inventory control, order processing and QA/QC are computerised to provide efficient and reliable customer service. The same systems are used for after sales service and spare parts control. Hence, the users of Mokveld control valves will receive a level of service that every oil and gas operating company requires.

Mokveld manufactures and tests its products in accordance with standards and codes issued by ASME, ANSI, API, BS, CSA, DIN, MSS, NACE, NS, TRbF, TRB 801; no 45, TRGL and more.

In-house valve test facilities are available for hydrostatic and nitrogen body tests, hydrostatic and pneumatic seat tests and functional tests. The facilities and procedures meet the requirements outlined in industry standards like ASME B16.34, ANSI/FCI 70-2, API 6D, API 6A, and other specifications.

Non-destructive testing is performed by certified ASNT-TC-1A level II inspectors. Where applicable, weld procedures are developed, qualified and executed in accordance with ASME Code Section IX.



other Mokveld products

Mokveld Valves is manufacturer of:

control valves
shut-off valves
surge relief valves
choke valves
check valves
actuators and control systems

Separate brochures are available upon request.



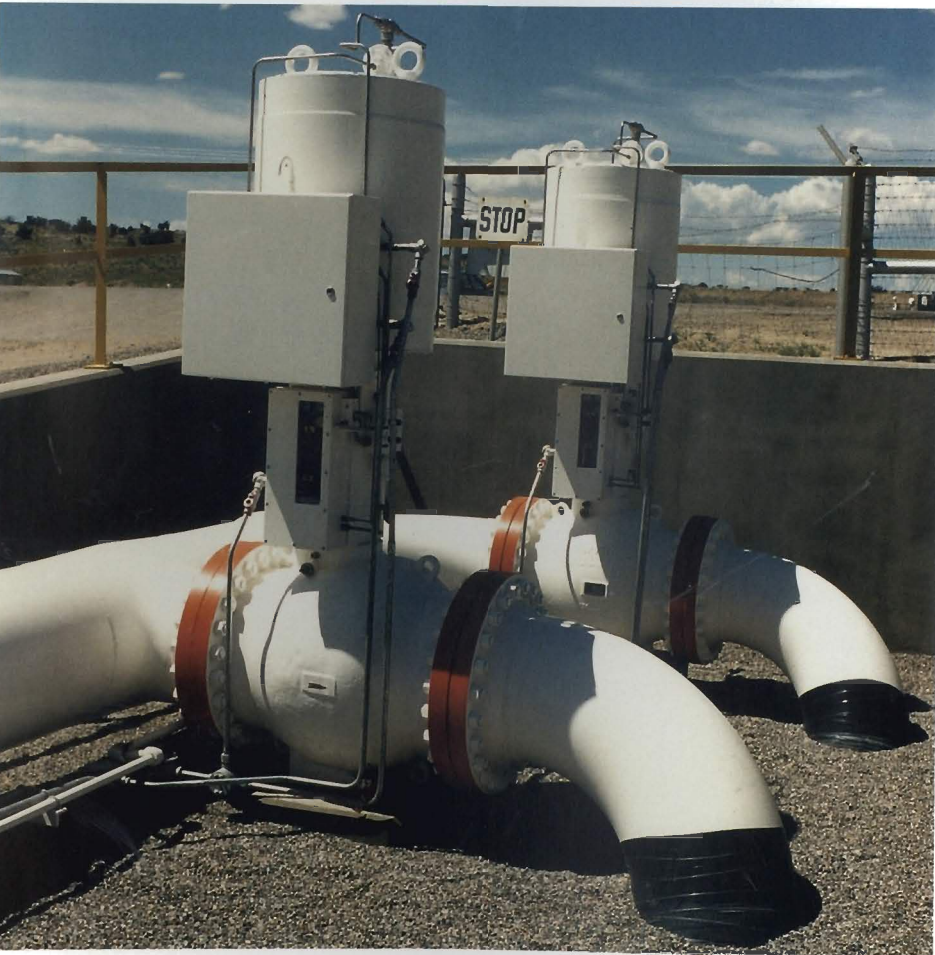
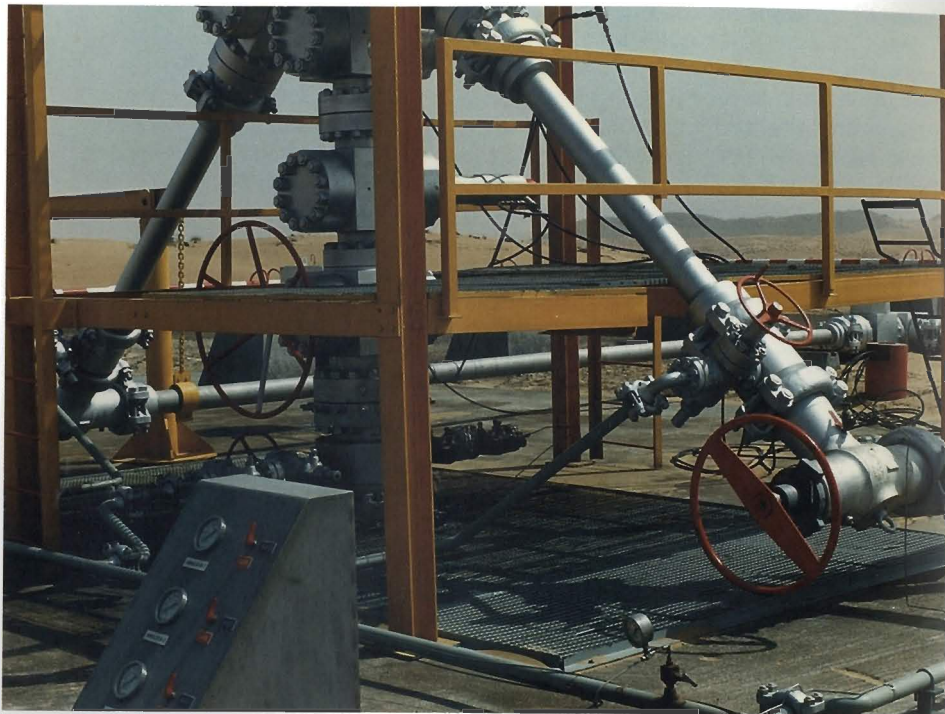
anti-surge control valve 12" ANSI 600
compressor station Russia

flowline shut-off valves
gas production plant N/E
Netherlands
(by courtesy of NAM)



other Mokveld products

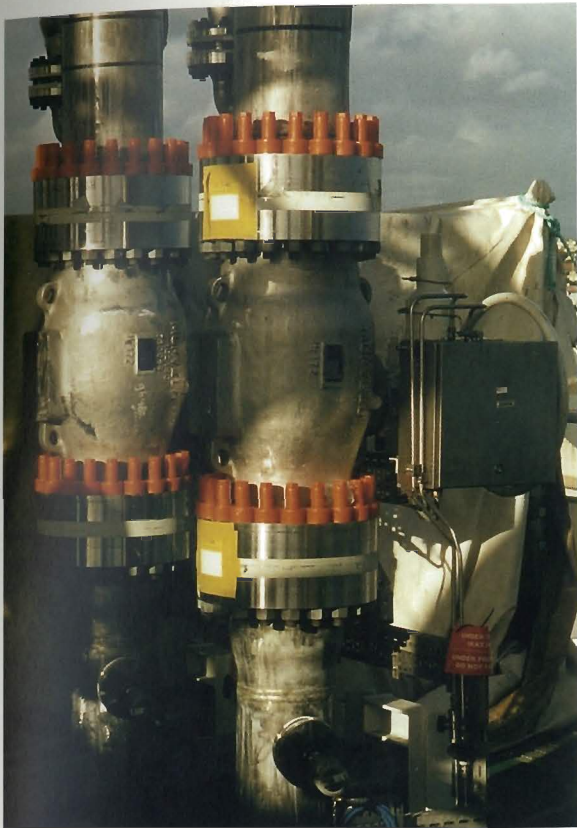
adjustable choke valves 7 1/16" API 10,000 with inconel cladding, gas production field UAE



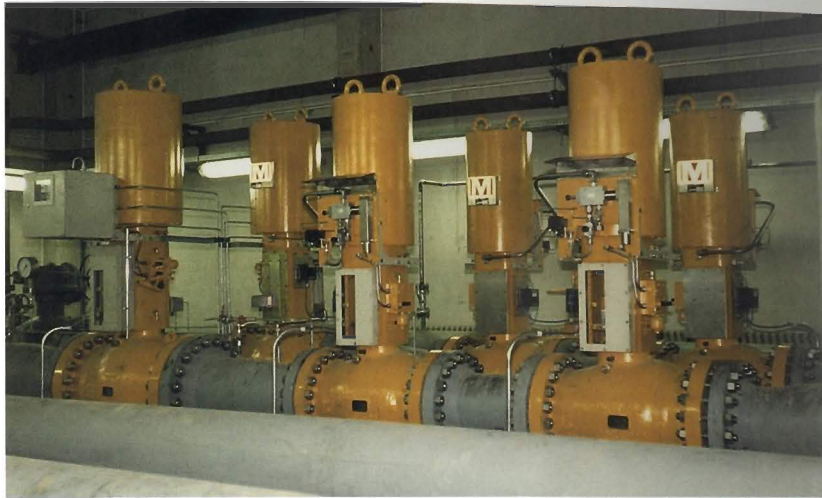
adjustable choke valves 8" ANSI 900 lbs with pneumatic actuators, gas production offshore Malaysia

surge control valves 20" and 24" ANSI 300 lbs, gas compression facility New Mexico

other Mokveld products



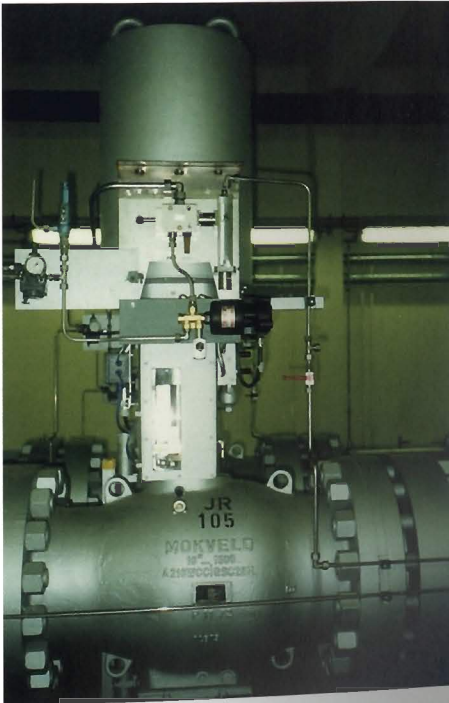
inline production chokes 10" ANSI 1500, FPSO Norway



pressure control valves 20" ANSI 600 lbs and safety slam shut valves 16" ANSI 600 lbs, M & R station Germany

safety shut-off valve 16" ANSI 600, underground storage field Germany

flow control valves, underground gasstorage field Germany



other Mokveld products



shut-off valves and non-slam check valves
6" ANSI 900 lbs, water injection manifold
of a crude oil production field, North Africa



flow pressure control valves and safety shut-off
valves, M & R station Germany