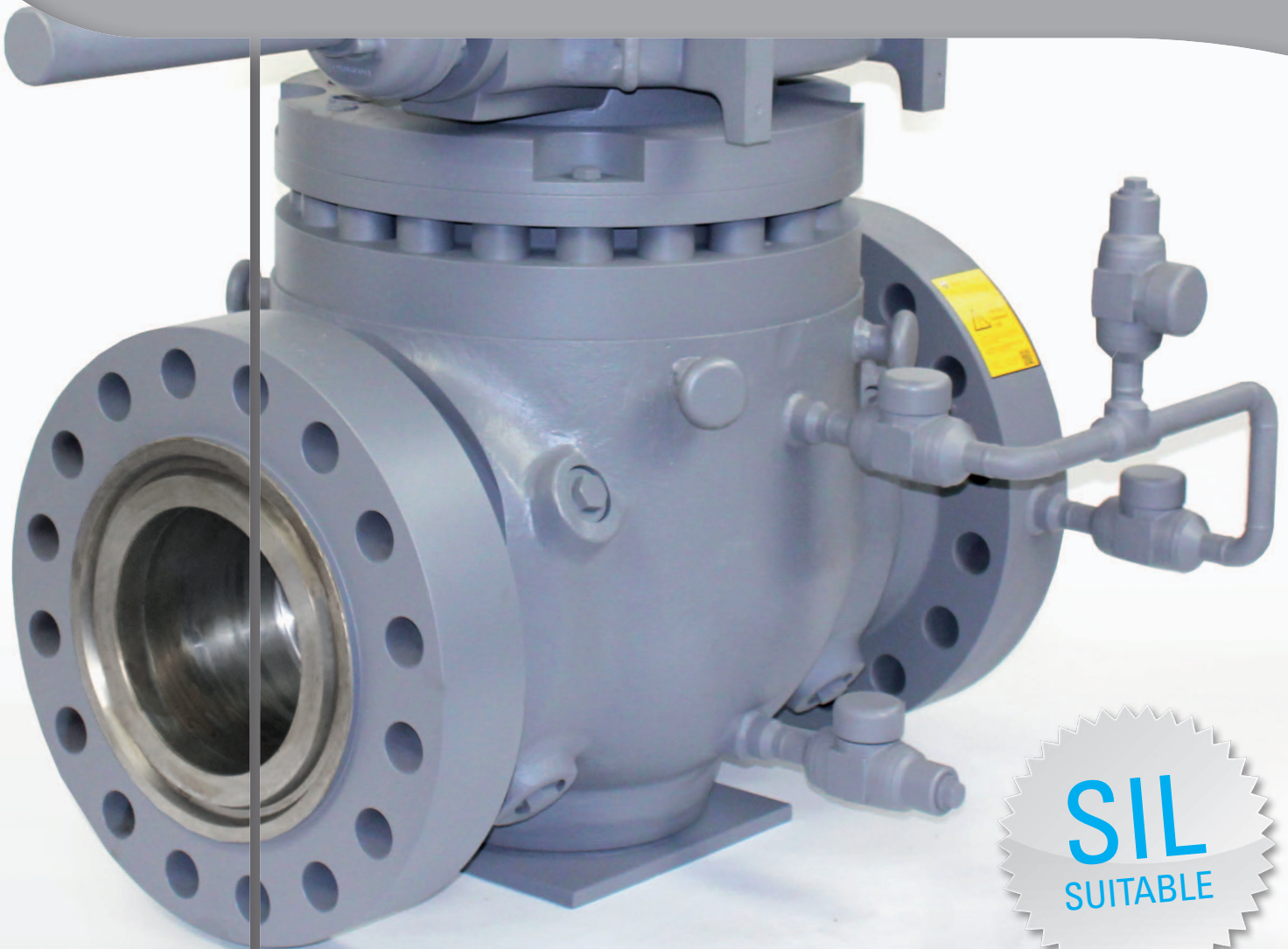

SCHUCK TYPE U BALL VALVE

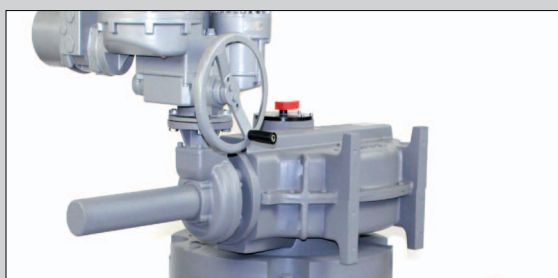
Shut-off valve in pipelines and systems for highly demanding operating conditions and high-maintenance media.



SIL
SUITABLE

SCHUCK TYPE U BALL VALVE

Shut-off valve in pipelines and systems for highly demanding operating conditions and high-maintenance media.



APPLICATIONS

Shut-off valve for above ground applications in plants, on stations, platforms, pumping stations, etc.

Minimum temperature -60° C to +80° C

Normal temperature -29° C to +120° C

Maximum temperature -29° C to +160° C

MANUFACTURING

Manufacturing, testing & design standards

EN 12266 -1 API 6D, ISO 14313 / API 6D, AD2000, ASME Sec. VIII Div. 1

Seal tightness, function & fire safety

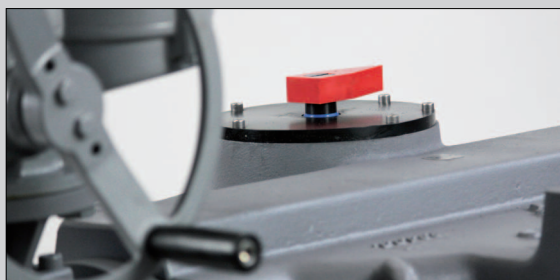
ISO5208, DIN 3230 T5 PG3 for gas , ISO 10497/API 607

You can find more detailed information in the glossary.



PRODUCT FEATURES

- » Top entry ball valve with U-shaped housing
- » Use in gas, oil and water pipeline systems
- » Wearing part renewal without valve demounting
- » Double-pin seal with fire-safe packing
- » Trunnion-mounted
- » Pressure rating up to CLASS 2500
- » Piggable
- » With anti-blow-out stem
- » Available as a single or double piston effect
- » Three sealing systems available (PMSS, SO & MM)
- » Temperature ranges from -60° C to +160° C
- » Secondary sealant injection port facility



DESIGN

Suitable for use with natural sweet and sour gas, oil, oil with sulfur, hot and cold water.

Top entry valves are primarily flanged in the pipeline.

Available from 6" to 42"
up to CLASS 2500

MATERIALS

Body: ASTM A 350 size LF2, GS-21 Mn5, ASTM A 352 Gr. LCC (mod)

Ball: G-X20Cr14V, ASTM A 217 Gr. CA-15, TSTE 355/nickel-plated, ASTM A 350 Gr. LF2/ENP, A 479 Type 410

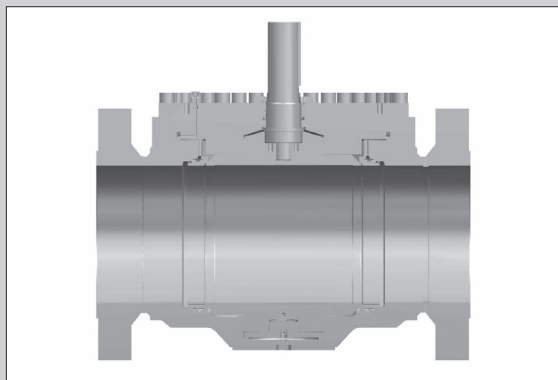
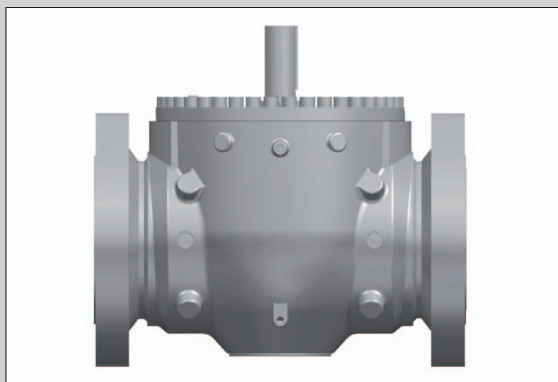
Flange/welded end: TSTE 355, ASTM A 350 Gr. LF2, ASTM A352 Gr. LCC (mod)

Other materials on request.

SCHUCK TYPE U BALL VALVE

Typ U 6 to 48", Typ U 6" to 42", Typ U 6" to 24", Typ U 6" to 12"

Type overview and design



TYP U 69/88 WITHOUT SEAT BUSHING

U-shaped housing (top entry) with bonnet for fast, easy replacement of wearing parts

Trunnion-mounted ball plugs

Main seal with pre-tensioned spring elements, soft sealing (SO), primary metal & secondary soft (PMSS) or metal to metal sealing (MM)

Actuator trunnion protected against blow-outs

Venting and draining connections

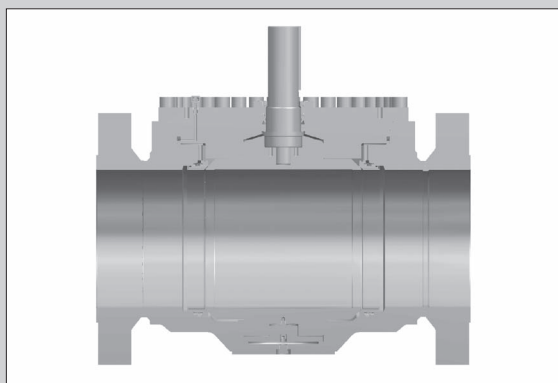
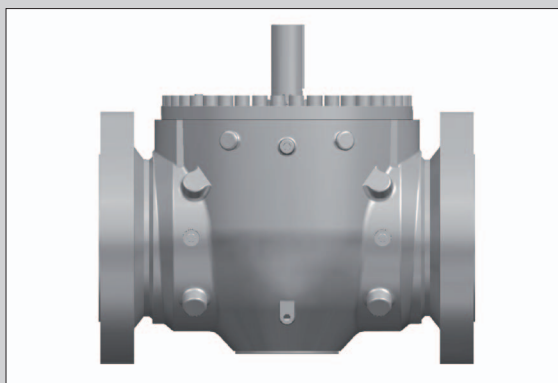
Connections for secondary sealants, optionally for main seal, trunnion seal and lid seal.

Double trunnion seal with additional fire safe seal, replaceable under pipeline pressure

Main seal double block and bleed, unilaterally sealing (single piston) with self-relieving body cavity

Available from 6" to 48",

up to ANSI CLASS 900



TYP U 69/88 WITH SEAT BUSHING

Pot-shaped housing (top entry) with bonnet for fast, easy replacement of wearing parts

Trunnion-mounted ball plugs

Main seal with pre-tensioned spring elements, soft sealing (SO), primary metal & secondary soft (PMSS) or metal to metal sealing (MM)

Actuator trunnion protected against blow-outs

Venting and draining connections

Connections for secondary sealants, optionally for main seal, trunnion seal and lid seal.

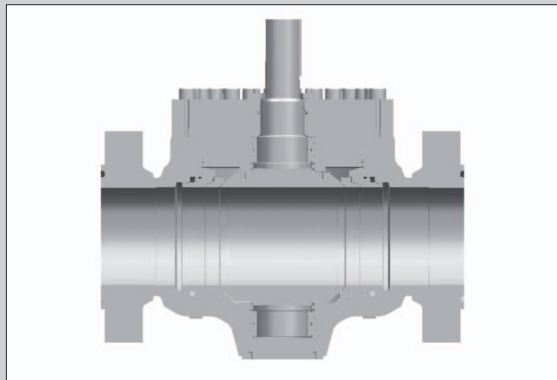
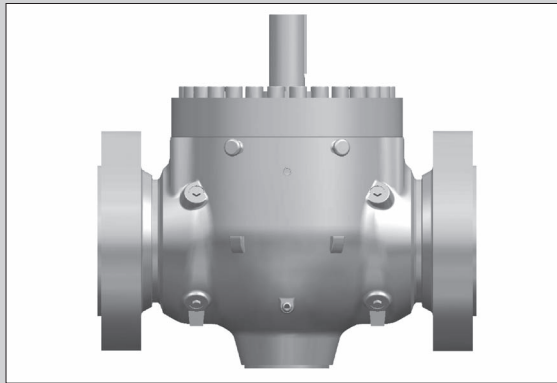
Double trunnion seal with additional fire safe seal, replaceable under pipeline pressure

Main seal double action sealing system (double piston) or unilaterally sealing (single piston) with self-relieving body cavity

Readjustable pressure of spring elements via setting screws accessible from outside

Available 6" to 42", up to ANSI





TYP U 15/10 AND 25/11 WITH SEAT BUSHING

U-shaped housing (top entry) with lid for fast, easy replacement of wearing parts

Trunnion-mounted ball plugs

Main seal with pre-tensioned spring elements, soft sealing (SO), primary metal & secondary soft (PMSS) or metal to metal sealing (MM)

Actuator trunnion protected against blow-outs

Venting and draining connections

Connections for secondary sealants, optionally for main seal, trunnion seal and lid seal.

Double trunnion seal with additional fire safe seal, replaceable under pipeline pressure

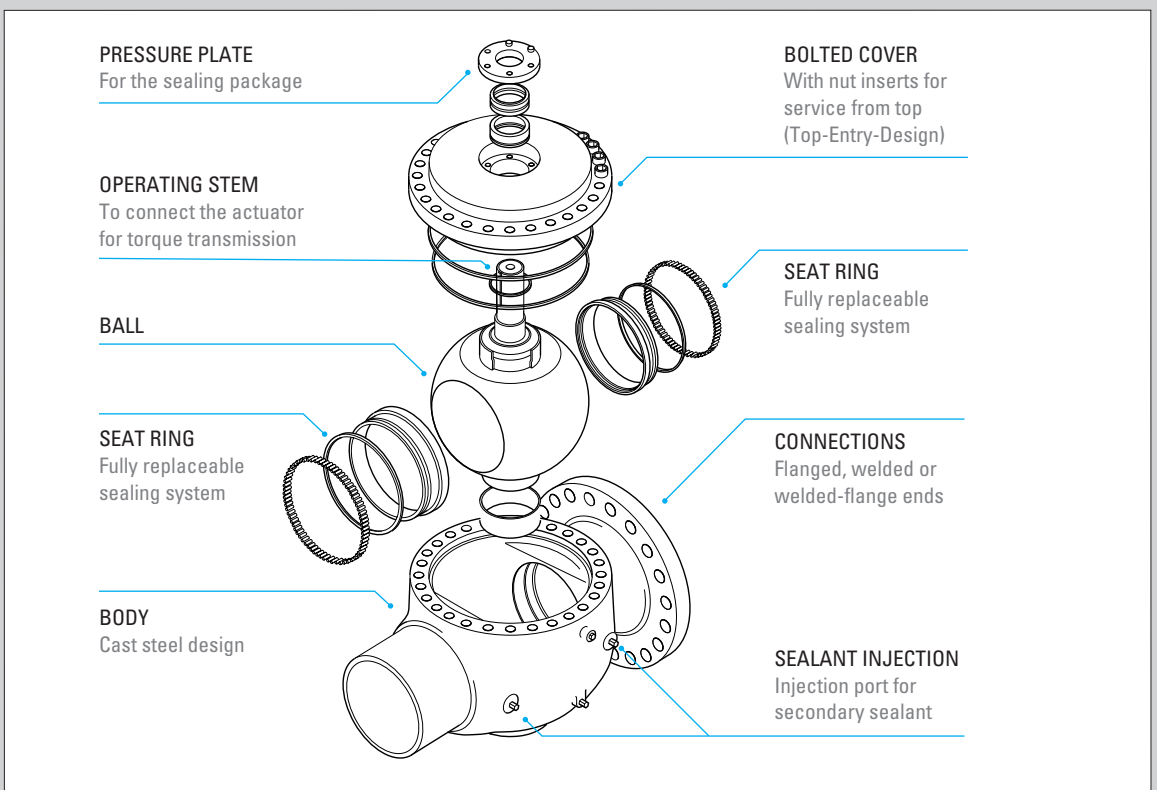
Main seal double action sealing system (double piston) or unilaterally sealing (single piston) with self-relieving body cavity

Readjustable pressure of spring elements via setting screws accessible from outside

UP TO CLASS 2500

Available from 6" to 24", ANSI CLASS 1500

Available from 6" to 12", ANSI CLASS 2500



SCHUCK TYPE U BALL VALVE

Design features

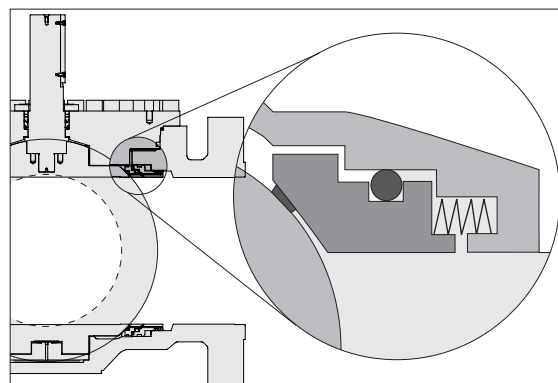
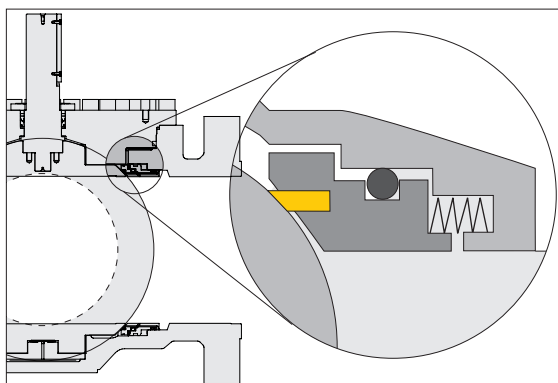
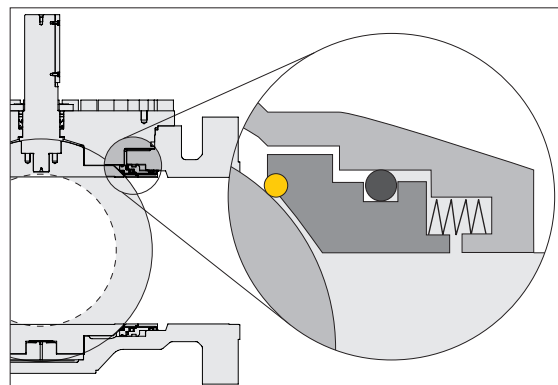
Sealing systems

Top left: Schuck seat ring

Top right: primary metal, secondary soft seated (PMSS)

Bottom left: soft seated (SO)

Bottom right: metal to metal seated (MM)



DESCRIPTION

Different sealing systems are available depending on applications. Our range of products offers soft-sealing and metallic-sealing systems as well as a primary metallic/secondary soft-sealing system with an integrated seal ring which we developed ourselves. This system is particularly resilient and reliable.

CONFIGURATIONS

Primary metal/secondary soft seated (PMSS)
metallic seal plus elastomer seal

Wear-resistant and not sensitive to dirt

Schuck standard, broad range of applications

Soft seated (SO)

A seal ring made of plastic is used for sealing

Larger variety of materials available (PTFE, PA, PEEK, etc.)

High temperatures

Low torque

For high pressures, special media

Variable sealing material and thus optimum for many types of media

Metal to metal seated (MM)

A metallic contact is used for sealing

High resistance to wear and not sensitive to dirt and deposits

Suitable for high pressures

Wide temperature range

SCHUCK TYPE U BALL VALVES

Design features

Ball seats

Top left: Ball valve flow in open position

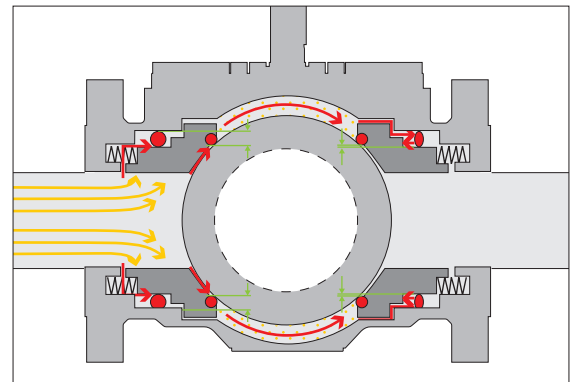
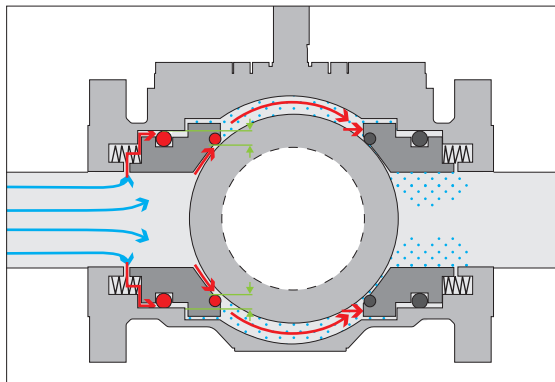
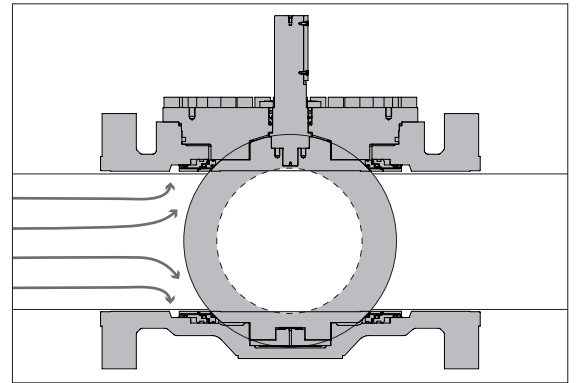
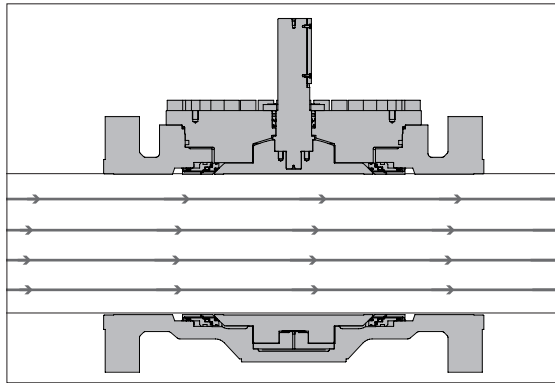
Top right: Ball valve in closed position

Bottom left: Single piston sealing system

Bottom right: Double piston sealing system

Drawing legend:

- Medium
- Pressure
- Differential pressure surface



DESCRIPTION

Different ball valve sealing systems are used depending on the type of media. Basically, there are different main seals for liquid media and main seals for gaseous media.

The different media require a special adapted sealing system. For the double piston, the seat ring also seals against a pressure load from the body cavity (or alternatively for a pressure increase in the dead space), and is therefore used for gaseous (compressible) media. With the single piston design, the seat rings retract and balance if there is pressure in the dead space. The single piston design is used for liquid (non-compressible) media.

CONFIGURATIONS

Single Piston

Sealing force is increased by the line pressure
 Self-relieving due to increased body cavity pressure
 Used for non-compressible liquid media

Double Piston

Sealing force is increased by the line pressure and the body cavity pressure
 Self-pressing seating ring
 Inlet and outlet side sealing
 Used for compressible gaseous media

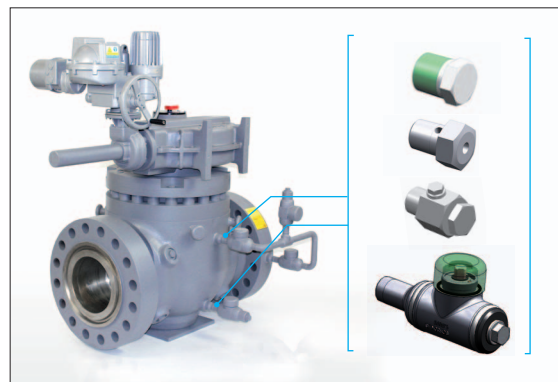
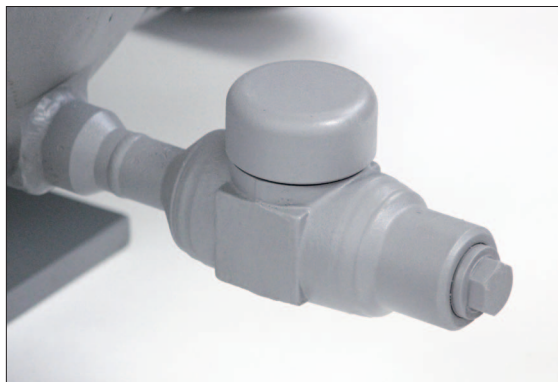
SCHUCK TYPE U BALL VALVES

Design features

Venting, draining

Top left: Venting ball valve of an above-ground ball valve

Top right: The different connections for draining/venting for an above-ground ball valve



DESCRIPTION

Different attachments can be removed for emptying and venting the body cavity. Just the right attachment is available for any application and any customer request, from the lowest-cost plug variation, continuing with the bleeder plug, up to a ball valve.

Here, the connector on the bottom is for draining, and the connector on top is for venting.

Draining and venting are used, for example, for service work in order to relief the body cavity of pressure and condensate. These attachments are also used for pressure and leak testing, and are thus an indispensable instrument for a safe and reliable operation of the ball valve.

ABOVE-GROUND CONFIGURATION

Vent and drain options

Plug, bleeder plug, venting valve, ball valve

SCHUCK TYPE U BALL VALVES

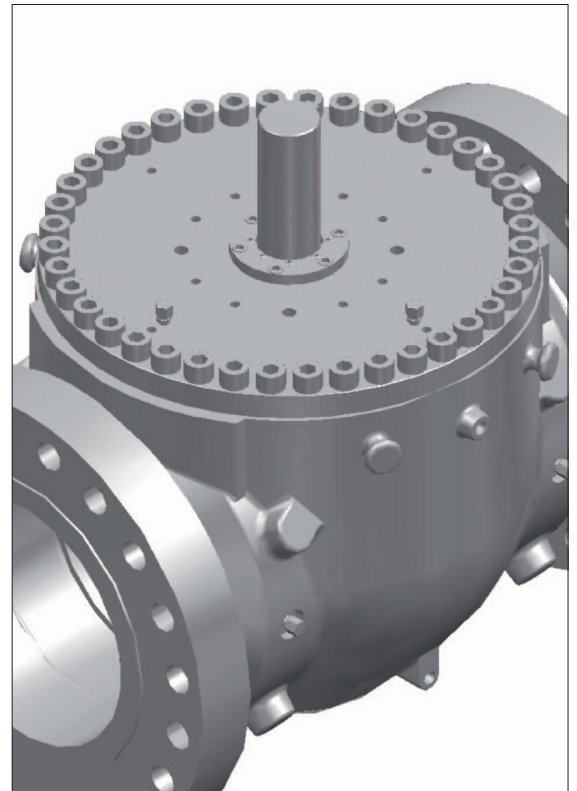
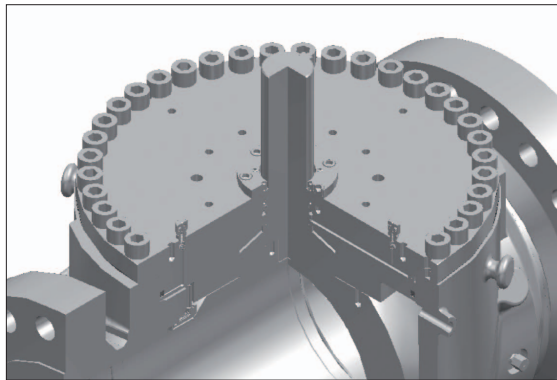
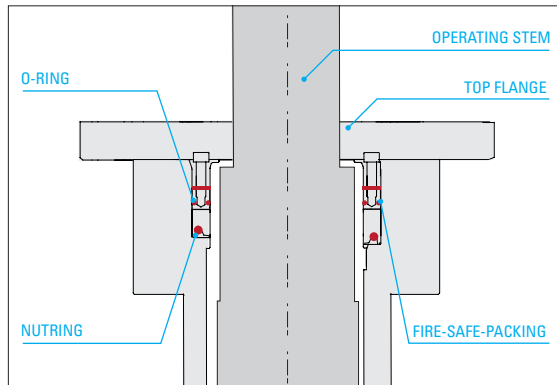
Design features

Operating Stem

Top left: The triple trunnion seal of operating stem.

Right: Type U ball valve, below-ground with trunnion, trunnion extensions, and trunnion seals.

Bottom left: Sectional view of the Type U ball valve with operating stem



DESCRIPTION

The operating stem is the connecting element of the ball valve. It is used to ultimately actuate and control the valve. Extremely high torque can be exerted on it (up to 600,000 Nm). For that reason, the operating stem, its installation, as well as the sealing codetermine the reliable operation of a Top entry ball valve.

The operating stem found on the Schuck Type U ball valve is protected against blow-outs by a press-fit construction and additional welding-in.

Trunnion seals can also be replaced under full line pressure.

CONFIGURATIONS

Trunnion seal

Double trunnion seal and fire safe package

TA-Luft approved

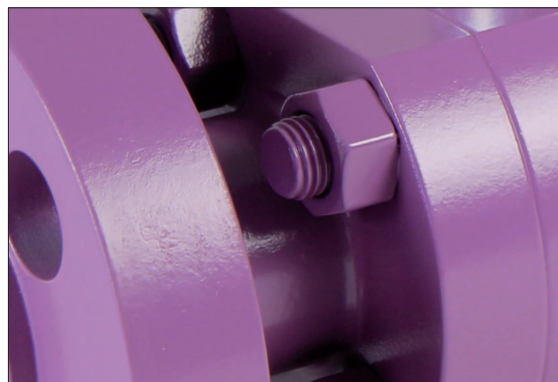
SCHUCK TYPE U BALL VALVE

Design features

Outside coating

Left: The Schuck standard coating in yellow

Right: Schuck ball valve with outer coat in any RAL tone requested by the customer



DESCRIPTION

Even a robust component like the fully-welded Schuck Type S ball valve must be protected against the effects of weather and mechanical damage above ground and also for below-ground installation. The coating is decisively responsible for this important protection. It is applied to the ball valve at the end of the production chain using a predetermined minimum layer thickness.

The coating standards of our Schuck ball valves meet all demands.

All coatings are inspected and approved by an in-house expert or by an expert hired by the customer.

Through these measures, we can guarantee the highest degree of protection against corrosion for your ball valve.

The outer coating can be implemented in any RAL color at your request.

CONFIGURATIONS

Coatings for moderate corrosiveness > 200µm
Außenbeschichtung Outer coating "C3"
ISO 12944-2

Temperature range: up to 120°C

Fields of application: above ground, urban and industrial atmospheres, moderate pollution from sulfur dioxide. Coastal regions with low salt load

Coatings for high corrosiveness > 240µm
Outer coating "C4" ISO 12944-2

Temperature range: up to 120°C

Fields of application: above ground, industrial areas and coastal regions with moderate salt load

Coatings for very high corrosiveness > 300µm
Outer coating "C5" ISO 12944-2

Temperature range: up to 120°C

Fields of application: above ground, coastal and offshore areas with high salt load

COATING SYSTEMS

Sigmadur

Dimensions: 50µm + 80 µm

Temperature range: -30°C to +160°C

Fields of application: above-ground and high temperatures

PROTEGOL UR 32-55 (Polyurethan) > 1,5 mm

Temperature range: -30°C to +80°C (briefly up to 110 °C)

Fields of application: below-ground, resistance to water, acids, alkaline solutions, and oil

SCHUCK TYPE U BALL VALVE

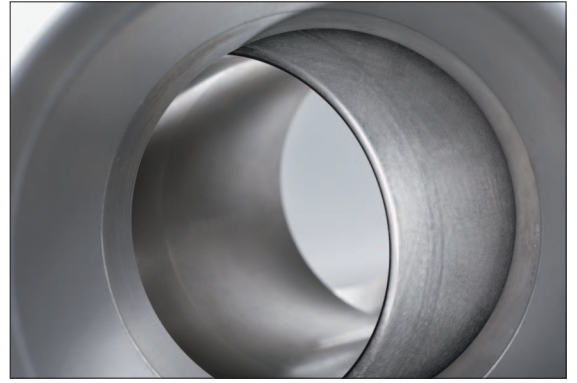
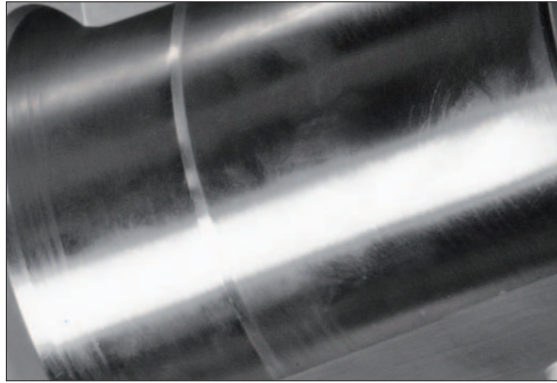
Accessories

Inner coating

AVAILABLE
ACCESSORIES

Left: Inner coating in a Schuck Type U ball valve

Right: Inner coating in a Schuck Type U ball valve with view of the ball



DESCRIPTION

The medium-compatible inner coating gives the ball valve the perfect inner skin that protects it against damage caused by the medium and prevents any possible contamination of the medium (e.g. for drinking water).

The possibility of armoring through cladding is particularly important for the Type U ball valve, mainly for special applications like sour gas, for example. Depending on the application and customer requirements, the lining applied through cladding protects the inside of the ball valve against aggressive and corrosive media and wear due to its material, thickness and the clad area.

All coatings are inspected and approved by an in-house expert or by third party.

Through these measures, we can guarantee the highest degree of protection against corrosion for your ball valve.

CONFIGURATIONS

Cladding e.g. Inconel, AISI 316, tungsten carbide, nickel, chrome, others on request

For gas standard without inner coating

Other inner coatings for the respective media on request

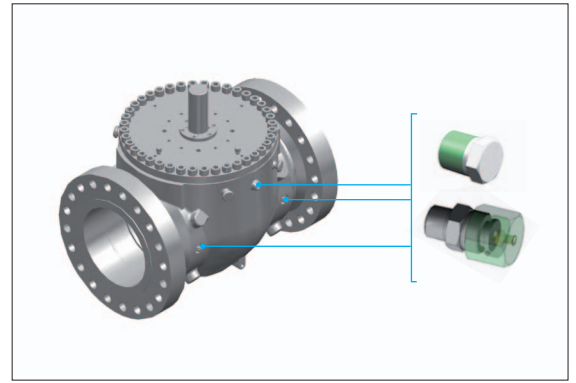
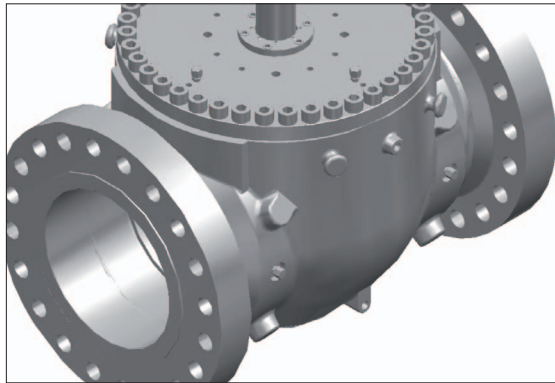
SCHUCK TYPE U BALL VALVE

Design features

Secondary injection of sealant

Left: Injection heads for a above-ground ball valve type Uu for injection.

Right: The different connectors for the secondary sealant injection for a Type U above-ground ball valve.

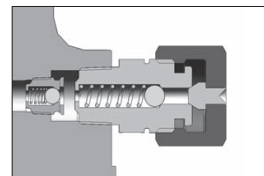


DESCRIPTION

It is possible to equip Type U top entry ball valves for the injection of a secondary sealant. In an emergency, a suitable secondary sealant can be injected if there is a leak at the seating rings or the actuator trunnions.

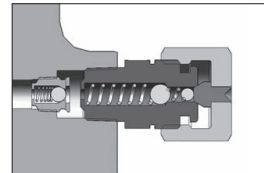
The choice of sealant is based on the medium, temperature and pressure. Very high pressures may be needed for injection depending on the sealant. The sealant press and all the lines must be designed for that pressure (up to 1000 bar).

CONFIGURATIONS



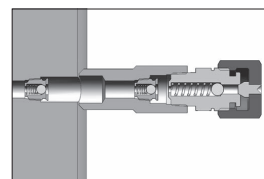
Secondary sealant injection (standard)

Injection head
Check valve



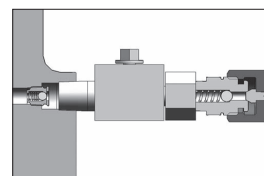
Secondary sealant injection

Double injection head
Check valve



Secondary sealant injection

Injection head
Two check valves



Secondary sealant injection

Injection head
Block ball valve
Check valve

SCHUCK TYPE U BALL VALVE

Accessories Bypass lines



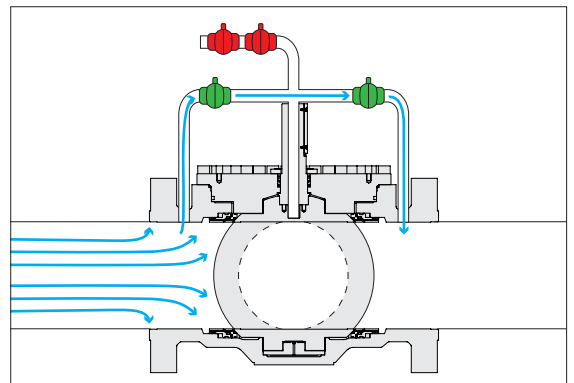
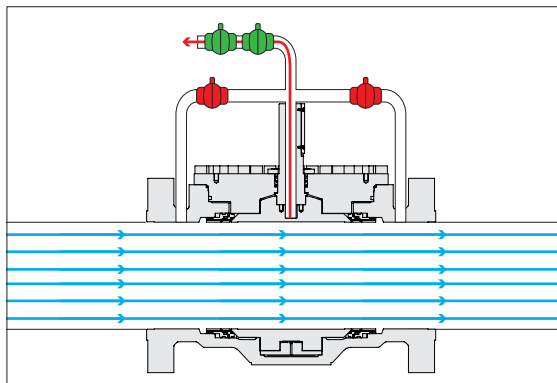
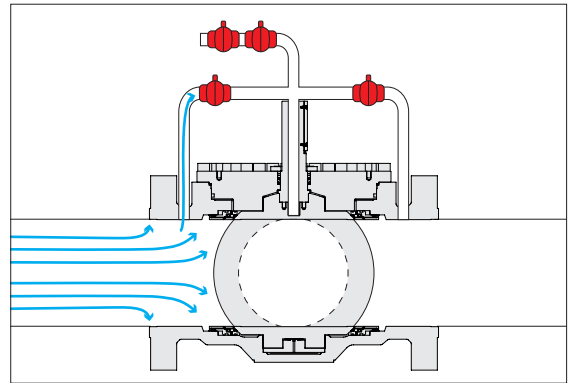
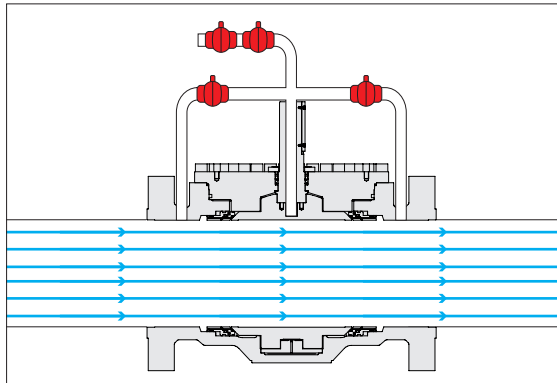
Top left: Bypass lines with an open ball valve in the open position.

Top right: Bypass lines with closed ball valve in the closed position.

Bottom left: Venting the dead space through the bypass line with an open ball valve.

Bottom right: Pressure compensation through the bypass lines before actuation of the ball. As a result, the ball seats are noticeably offloaded and the valve operates more gently and with less wear.

All illustrations are given as examples



DESCRIPTION

High-pressure ball valves are often equipped with a by-pass so that as a rule, pressure equalization of both sides and the dead space can take place before actuating the valve.

This makes switching the valve gentler on the seals and minimizes wear.

Through this simple but effective accessory, the Schuck Type U ball valve can be used more effectively for a longer time.

CONFIGURATIONS

Connection lines between the two pipe connections of the ball valve

Connection lines to the dead space

Possible shut-off devices via high-pressure ball valves for all line components

SCHUCK TYPE U BALL VALVE

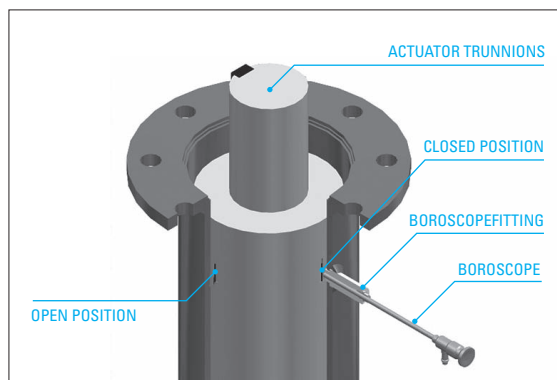
Accessories

Boroscope with boroscope opening and markings

AVAILABLE
ACCESSORIES

Left: Setup of the boroscope opening with the position markings and an inserted boroscope.

Right: Boroscope with opening for battery operated handheld light source



DESCRIPTION

The positioning of the ball plays a decisive role in guaranteeing safe operation of the Schuck Type U ball valve. After installation of the valve, the boroscope opening makes it possible to accurately check the ball position in the end position. Independent of the actuator, both the open position as well as the closed position of the shut-off valve can be set and checked.

There are markings on the actuator trunnion for the open and closed position. With the help of the boroscope opening and the boroscope, the marking and hence the exact position of the ball in the open and closed position can be determined optically. If the ball valve is used in an above ground variation, then the boroscope opening is on the gear plate. If the valve is used below-ground, then the boroscope opening is on the pipe stands.

Generally, adjusting the open and closed position using the boroscope opening is a more exact setting than using the end position display on the top side of the gear unit.

The associated boroscope has cross hairs that guarantee exact setting and checking of the end position of the ball. In addition, the boroscope has a lighting option, so that the markings on the actuator trunnion are clearly visible.

CONFIGURATIONS

Boroscope opening

Open position marking

Closed position marking

Boroscope sleeve for insertion of the boroscope

Boroscope

Long version D8 x 465 mm

Short version D8 x 200 mm

Accessory: battery operated handheld light source for the boroscope

SCHUCK TYPE S BALL VALVE

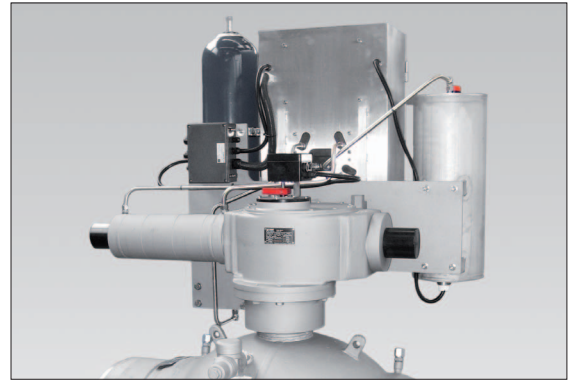
Accessories Actuators



Top left: Schuck gas over oil Type G actuator with solar package including emergency power supply



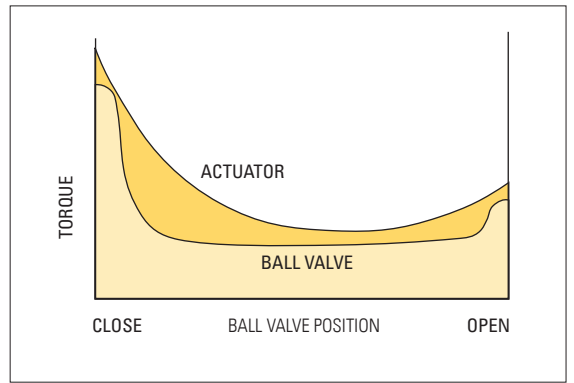
Top right: Schuck Type C electro-hydraulic actuator on a Schuck ball valve



Bottom left: Schuck control cabinet for the hydraulic actuator control



Bottom right: Torque behavior of ball valve and Schuck basic actuators



DESCRIPTION

A working shut-off valve inevitably also includes a reliable and powerful actuator suitable for the application. The Schuck Group has successfully delivered, developed, manufactured and installed actuator components with modern controllers for almost any application for years.

Schuck actuators are in use worldwide, from the Kazakhstan steppe and the Indian highlands up to Chinese cities with millions of inhabitants.

The Schuck Type S ball valve harmonizes especially well with the company's own actuator systems. A complete solution from a single source guarantees an optimum and effective design of the actuator systems. Of course, we also deliver ball valves with third party actuators.

You can find more information on Schuck actuators in the actuator catalogues or in the Internet at www.schuck-actuator.com.

CONFIGURATIONS

- Gas over oil actuator system - Type G
- Pneumatic actuators systems -Type K
- Electro-hydraulic actuator system - Type C
- Electro-hydraulic compact control - Type SHC
- Direct gas system -Type KY
- Electro-hydraulic actuator system -Type X
- Manual actuator
- Electric actuator systems
- Electro-hydraulic spring return - Type C7/C8
- Pneumatic spring-return - Type K7/K8

SCHUCK TYPE U BALL VALVE

Maintenance and service

Top left: Schuck Service assignment – flight of Schuck service specialists into Novy Urengoy, Russia for maintenance work



Top right: Schuck Servicecar – always ready for action on-site



DESCRIPTION

Our job isn't finished when our products have been dispatched. Safety-critical components such as our shut-off valves or Schuck actuator systems need to be properly installed, initialized and maintained.

Maintenance is particularly critical in the calculation and adherence to probabilities of failure (SIL values). It is not only the process itself that is critical, but particularly the quality of the maintenance work performed.

The Schuck Service division assumes these duties. Internationally. Reliably. Expertly. Our range of services covers everything – from maintenance to repair, from renovation to replacement, from new parts to consulting and training. This applies not only to Schuck's own products, but also to many third-party manufacturers.

The team also performs all repair and maintenance work, including procurement of spare parts, for ball valves manufactured by Borsig – in accordance with company tradition. If the necessary spare parts are no longer available, we specially produce these on the basis of available documentation ourselves.

Our international team, with service offices in India, China, Kazakhstan, Uzbekistan and Germany, is always up-to-date, and works both on and off-shore.

SERVICE

Maintenance and servicing

- Condition analysis
- Maintenance plans
- Maintenance

Repairs

- Project planning
- Logistics planning
- Spare parts supply
- Spare parts processing
- Spare parts production
- Repairs
- Recommissioning

Conversions

- Project planning
- Logistics planning
- Parts provision
- Part production
- Part reconstruction
- Conversion work
- Initial operation

Spare and new parts

- Spare parts
- New parts
- Processing

Counseling and Training

- Modification consulting
- Realisation consulting
- Product trainings
- Startup procedure trainings
- Service trainings

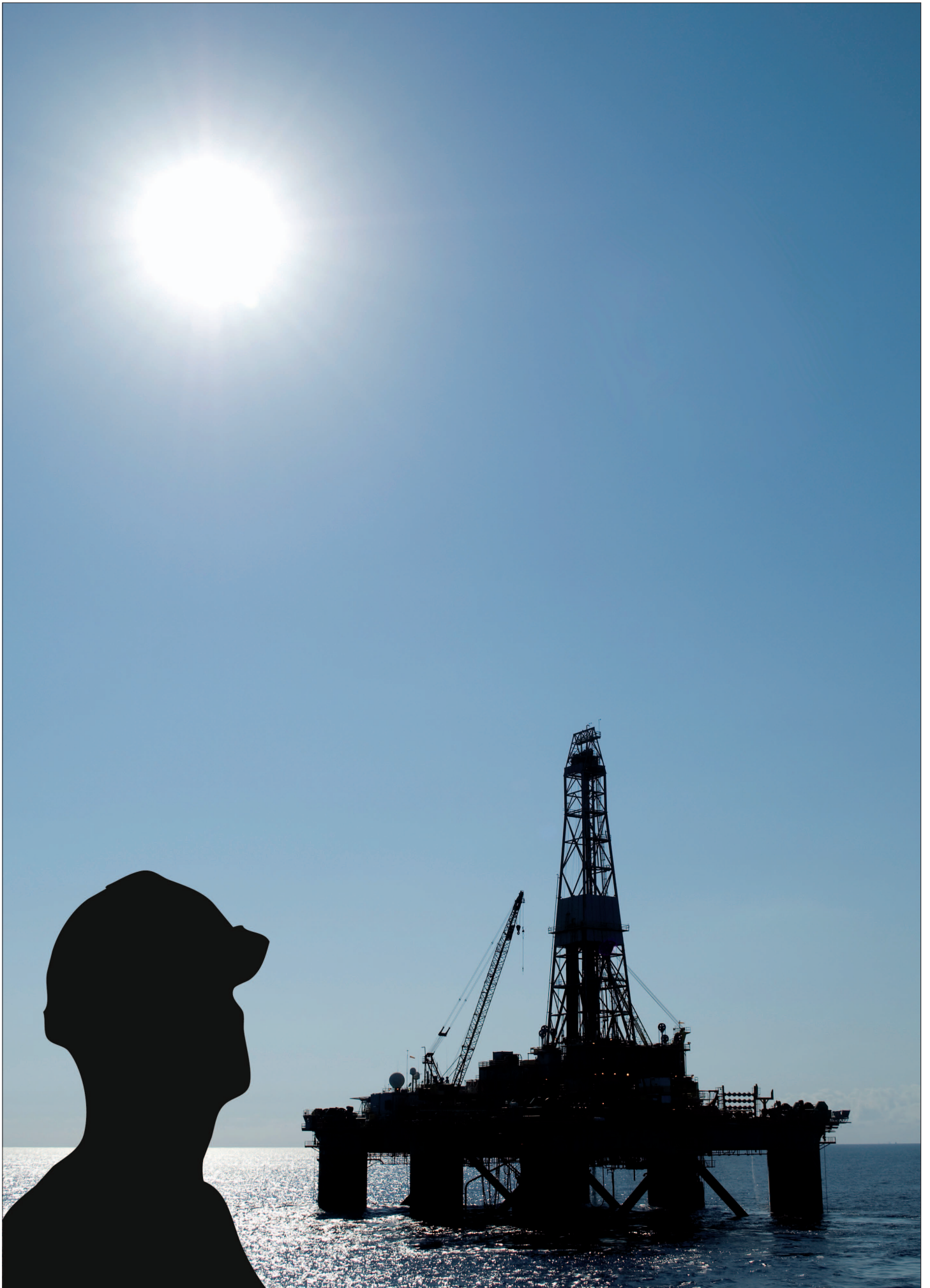
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SCHUCK GLOSSARY

Important technical information and definitions

DOUBLE BLOCK AND BLEED

Checking a ball valve that is in operation for leaks

Testing can take place in an open or closed position by monitoring the pressure in the dead space via the drainage or venting connection

Apply pressure to the ball valve passageway (or to both sides in a closed position)

Leak testing of the seat rings by venting or draining

It might also be possible to determine the quantity of the leak

During testing, the specified maximum operating pressure must not be exceeded

SIL

Safety Integrity Level

International standard in compliance with IEC 61508/IEC61511

SIL 1 to SIL 4

Reliability of safety functions

Based on the level, there are design principles that must be complied with to minimize the risk of malfunctions.

All ball valves are evaluated according to SIL.

A SIL manufacturer's declaration can be issued.

MANUFACTURING AND TESTING

DIN ISO 9001 Quality management systems – requirements

PED 97/23/EC Pressure Equipment Directive

AD2000 – HPO General principles for design, manufacture, and thus the associated tests

AD2000 - W0 General principles for materials

DVGW, ÖVGW, SVGW - German/Austrian/Swiss Gas and Water Industry Association

API Q1 Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry

API 6D Specification for Pipeline Valves

DIN EN 14141 Valves for the transport of natural gas in pipelines – requirements of usability and testing

VdTÜV Merkblatt Valve 100 EC – Prototype testing

ISO 14313/ API 6D Oil and gas industry – transport pipeline systems – pipeline valves

EN 12266-1, EN 12266-2 Industrial valves – Testing valves made of metal - Part 1: Pressure testing, test methods and acceptance criteria – binding requirements Part 2: Tests, test methods, and acceptance criteria

DIN 30690-1 Components in gas supply systems – Part 1: Requirements of components in gas supply systems

DIN 3230 T5 Technical delivery conditions for isolating valves

EN 12516 Industrial valves – body strength – table methods for the pressure-bearing body of valves

EN 12516-2 Industrial valves – body strength – table methods for the pressure-bearing body of valves

EN 13355 Unfired pressure vessel

ASME sec. VIII div. 1 Boiler and pressure vessel code

ASME b16.34 Valves – flanged, threaded, and welding end

EN 10497 Testing of valves – requirements of product certification for fire safety

ISO 15156/ NACE MR 0175 Materials for use in environments containing H₂S in oil and gas production

STANDARD MATERIALS

Body A350 LF2, A105, P355 (TSTE355)

Bolts, nuts A193 B7/A194 2H, A193 B7M/A194 2HM, A320 L7, A320 L7M

Ball plugs A350 LF2 + ENP, A182 F6A, F51 (duplex)

Seat ring A350 LF2 + ENP, A182 F6A, F51 (duplex)

Seal ring soft PA, PTFE, PEEK, PEEK

Seal ring PMSS FKM

Operating stem A276 TYPE 420, A182 F6A, A276 TYP 410, A564 630 (17-4PH), F51 (duplex)

Any others on request

LIST OF ABBREVIATIONS

DN	Nominal diameter
SW	Spanner width
PN	Nom. pressure
PT	Test pressure
CL	Pressure rating based on American standard
PS/MOP	Maximum operating pressure
FB	Floating mounted ball
TM	Trunnion-mounted ball
RF	Raced face flange
RTJ	Ring type joint flange
SP	Single piston
DP	Double piston
PMSS	Primary metal/secondary soft seated
MM	Metal to Metal
SO	Soft seated
PUR	Polyurethane
SI	Secondary sealant complete (standard as of 6")
SIS	Secondary sealant only on seating ring
SIT	Secondary sealant only on actuator trunnion
oSI	Without sealant
DIN	Deutsches Institut für Normung (German Standardization Institute)
EN	European Norm (Standard)
ISO	International Standards Organization
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
Mgmt	Guide Line
ANSI	American National Standards Institute
DGRL/ PED	Pressure Equipment Directive
DVGW	Deutsche Vereinigung des Gas- und Wasserfaches e.V. (German Gas and Water Industry Association)



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