



Expert for PTFE-sleeved and PFA-lined plug valves!
Reliable and effectively tight for years!

Safety first!



AZ Houston/Texas

Quality is our promise - Safety our focus

600 employees in 5 plants, 1 foundry and 16 service centres worldwide

1 AZ Valves North America
Houston, Texas USA



2 Headquarter Germany
Moenchweiler (Black Forest)



3 Plant Brazil
Itatiba (São Paulo)



More than 50 years of experience in design and production of soft seated plug valves with PTFE sleeves makes AZ an international partner in terms of valve design and customized solutions. AZ plug valves are designed to meet various applications in the chemical, petrochemical, pharmaceutical, food production, pulp & paper, nuclear power and many other industries.

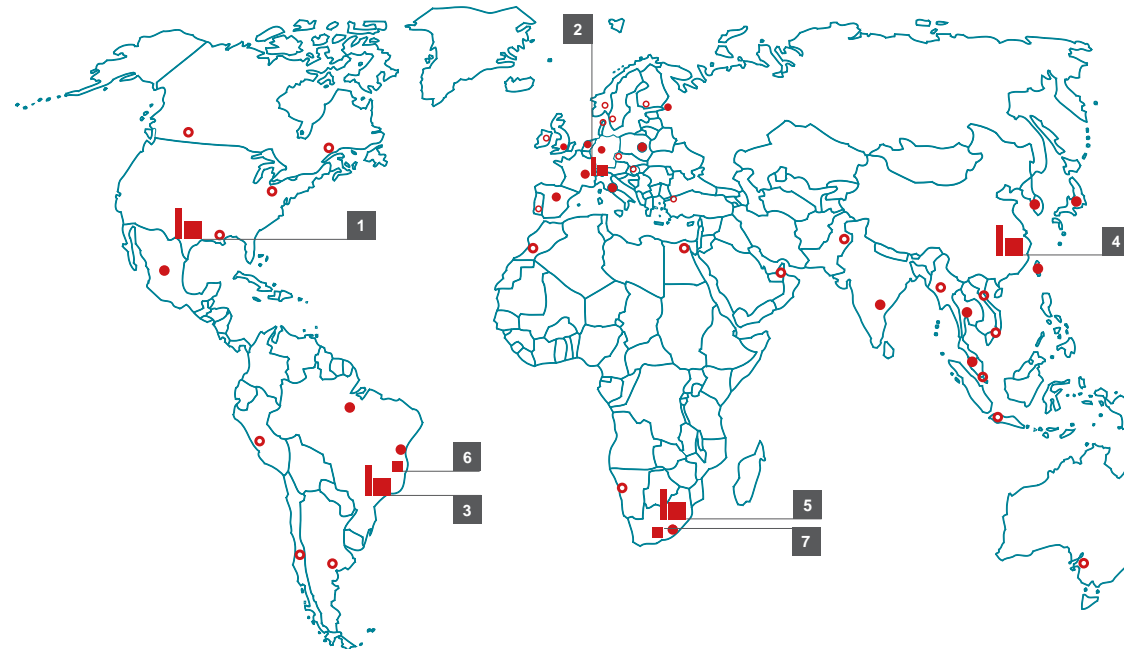
Our North American service center is over 16,000 sqft and includes storage, machining, assembly, testing and office space. Following customers with its service operations has always been one major focus of AZ's

worldwide philosophy of providing the perfect plug valve experience:

From engineering and design to manufacturing and delivery to aftersales service and repair

Putting safety first without any compromise also requires AZ to be ready and on site quickly in case any problems arise. With our location in Houston, TX AZ Valves is able to react immediately to any plug valve related customer need anywhere in North America.

AZ's Houston operation is considered the service hub for the United States, Canada and Mexico.



4 Plant China
Taicang (Shanghai)



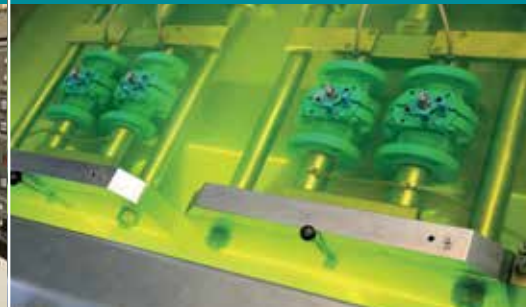
5 Plant South Africa
Boksburg (Johannesburg)



Machining capabilities for Special Solutions



100% testing philosophy



Stock keeping acc. to customer needs



Legend:

- Production plant
- AZ Foundry
- AZ service branch
- AZ agency

6 AZF Foundry, Brazil
Itatiba (São Paulo)



7 Trident Plastics
Boksburg (Johannesburg)



AZ foundry – competence right from the beginning ...
 ... active – flexible – quick

AZ service centres worldwide
 customer focus !



Precision casting specialized in lost wax technique

- from 0,01 to 80 kg



**AZF Foundry
 Brazil, Itatiba (São Paulo)**

Benefits of precision casting

- precise and clean shapes
- fast and flexible
- large lot sizes possible
- cast steel and stainless steel
- non or low post-processing

Own foundry capacity guarantees high quality and short delivery times:

- **Competence:** Many years of experience and know-how of valves and materials
- **Quick:** Own tool design and making
- **Flexibility:** Several production lines and melting furnaces of single or serial production
- **Active:** Short decision-making and direct contact



Specialised manufacturer of high-performance PTFE product, spare parts for the valve industrie



**Trident Plastics
 Boksburg (Johannesburg)**

Products

- Valve Components
- Engineered Parts
- Bellows
- Gaskets
- Spring-Energised Seals
- Semi-Finished Products

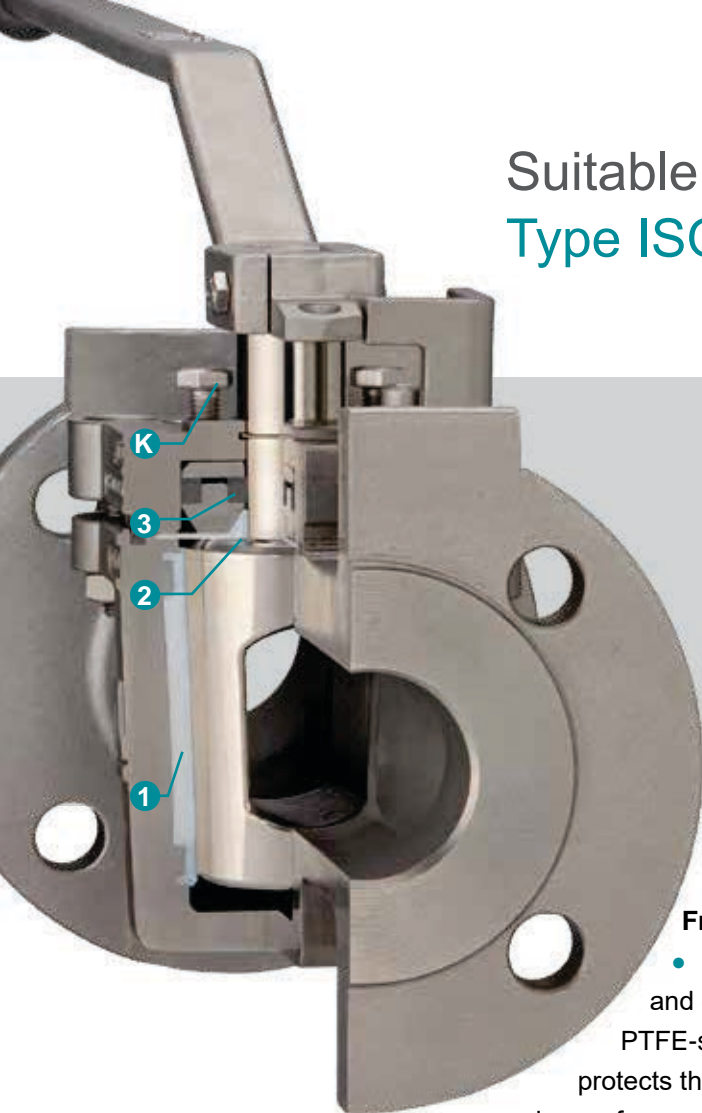


In addition to various production facilities, we maintain a worldwide net of service locations

Special valves are a valuable resource and require individual service. The service locations ensure comprehensive technical consultation for customers. Standard valves, actuators and accessories are in stock and available. Modifications, new configurations or repairs can be performed in short time.

We are always close to the customers with more than sixteen of our own worldwide service centers.

Suitable for major applications: Type ISO-STANDARD



AZ plug valves - free of cavities!
Fire safe design, type FS (optional standard sealing type STD or chemistry sealing type CA)

- 1 Primary sealing: PTFE-sleeve
- 2 Secondary sealing: V-diaphragm with Delta thrust collar
- 3 Tertiary sealing: stem packing (Graphite optional)
- K Plug adjustment

$T_{max} = 450^{\circ}F$

Free of Cavities

- the self-lubricating and chemical-resistant PTFE-sleeve covers and protects the entire plug. Sealing surfaces remain dry and do not come into contact with medium
- **maintenance free**
- **very long lifetime**
- **reliable and tight for years**

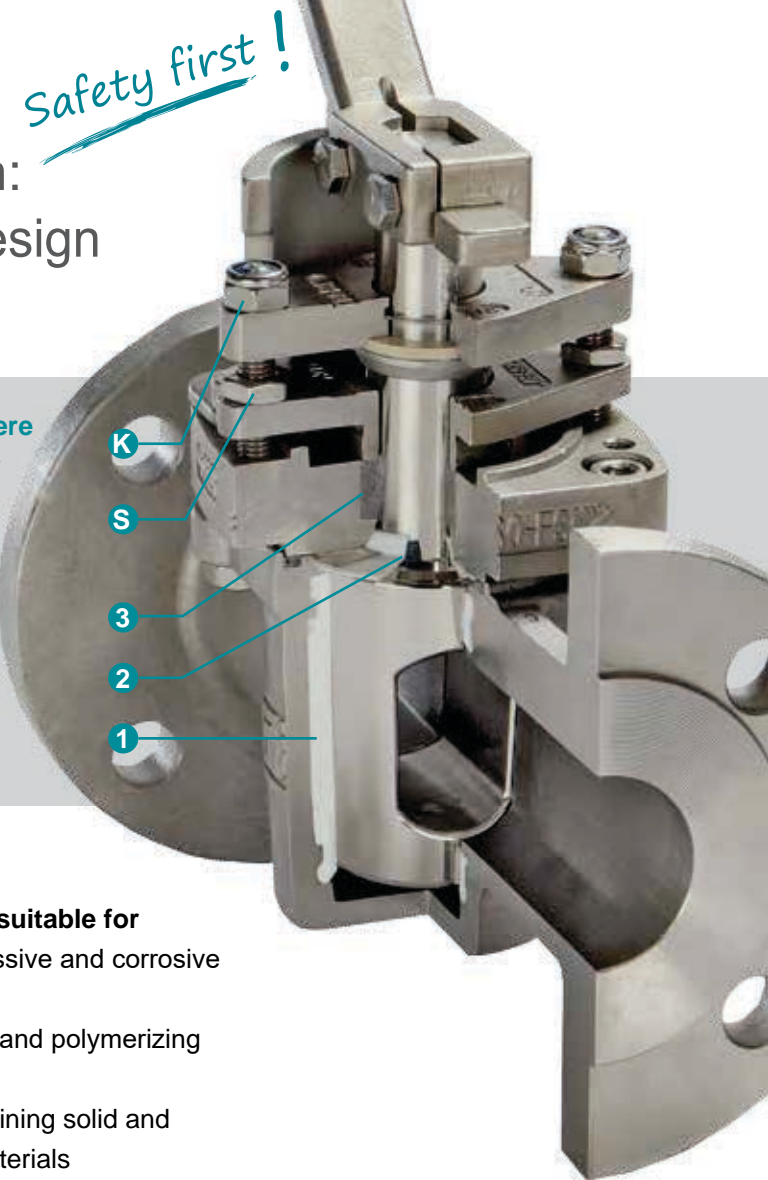
PTFE-chambering

- due to perfect and complete chambering, twisting or cold-flow of the sleeve is eliminated

Vacuum-tight

- all plug valves are vacuum-tight, also at minimal or no differential pressure, the plug valves are absolutely tight

The high performance solution: Type SAFE-SEAL, Fire-Safe-Design



Free of cavity AZ plug valves with safety sealing for severe applications. For fluctuating temperatures with triple safety stem packing, type FSN

- 1 Primary sealing: PTFE-sleeve (Graphite optional)
- 2 Secondary sealing: V-diaphragm with Delta thrust collar
- 3 Tertiary sealing: Triple safety stem packing (Graphite)
- K Plug adjustment
- S stuffing box adjustment

$T_{max} = 550^{\circ}F$ (Graphite, P-sleeve)

Sealing systems

- high performance valves for fluctuating temperatures
- Type CASN: $T_{max} 450^{\circ}F$ (PTFE)
- Type FSN: $T_{max} 550^{\circ}F$ (Graphite)

Adjustable

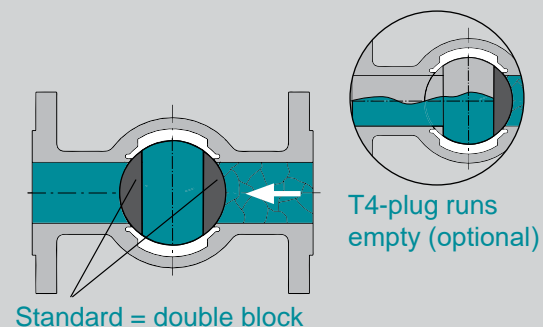
- the conical plug can quickly and easily be adjusted during operation for tight shut off!

AZ valves are suitable for

- toxic, aggressive and corrosive chemicals
- crystallizing and polymerizing media
- media containing solid and abrasive materials

Technical comparison

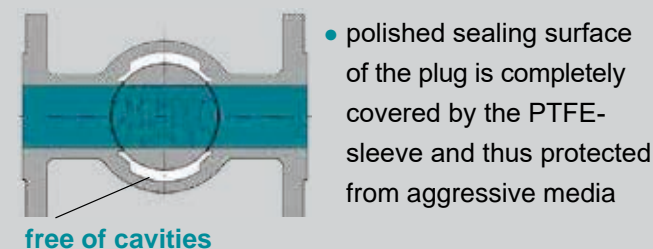
PTFE-sleeved AZ plug
• free of cavities



Crystallizing and polymerizing media

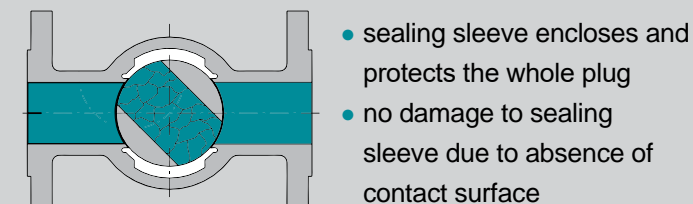
- no danger for the seal or ease of the plug
- media cannot collect or remain due to an absence of cavities

Aggressive media



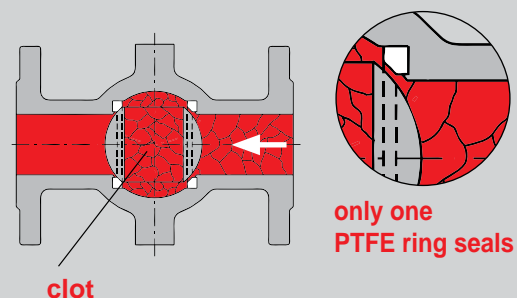
- polished sealing surface of the plug is completely covered by the PTFE-sleeve and thus protected from aggressive media

Solid materials in the media

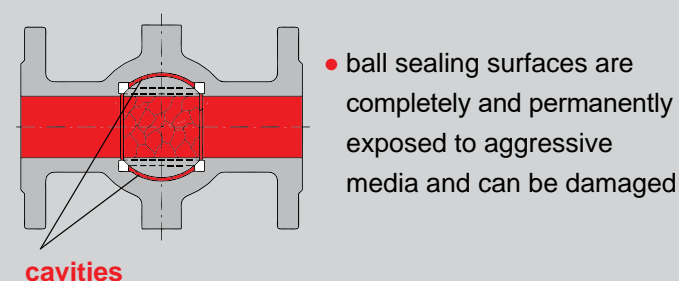


- sealing sleeve encloses and protects the whole plug
- no damage to sealing sleeve due to absence of contact surface

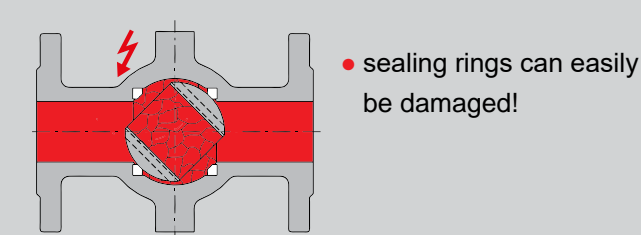
Ball valve with 2 PTFE sealing rings
• floating ball
• cavities



- clot formation in the cavities
- ball cannot be turned or can only be turned with difficulty
- damage to sealing ring/blockade
- increase of torque due to one-sided pressure when ball is floating



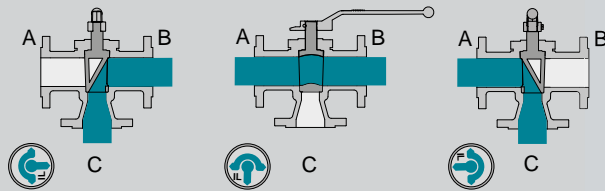
- ball sealing surfaces are completely and permanently exposed to aggressive media and can be damaged



- sealing rings can easily be damaged!

PTFE-sleeved plug valves from 2 to 7 way

- Standard plug valves up to DN 600/24" with a wide range of plugs
- Two-way up to seven-way plug valves
- Seven way plug valve with plug type "L"
- optional with heating jacket or flushing device



Two way plug valves with ISO bracket flange for actuator mounting

- Type F-2 ISO - STANDARD
- DN 15 - 600 / PN 10 - 40
 - NPS ½ - 24 / class 150 - 300



Three way plug valves vertical / horizontal with ISO bracket flange for actuator mounting

- Type F-3 ISO - STANDARD
- DN 15 - 600 / PN 10 - 40
 - NPS ½ - 24 / class 150 - 300



Four and five way plug valves with ISO bracket flange for actuator mounting

- Type F-4 / F-5 ISO - STANDARD
- DN 15 - 600 / PN 10 - 40
 - NPS ½ - 24 / class 150 - 300



Plug valves full bore design with ISO bracket flange for actuator mounting

- Type ISO-EXTRA
- DN 15 - 600 / PN 10 - 100
 - NPS ½ - 24 / class 150 - 600



Plug valves with heating jacket (cast design)

- fully jacketed design, type HM
partial jacketed design, type TM
- DN 15 - 600 / PN 10 - 100
 - NPS ½ - 24 / class 150 - 600



Plug valves with flushing device

- Type SP / DKS
- for media which tends to stick, harden, crystallize or polymerize



Plug valves with welded ends

- Type SW / BW / RO
- DN 15 - 600 / PN 10 - 100
 - NPS ½ - 24 / class 150 - 600



Screwed plug valves (cast design) with ISO bracket flange

- Type MG
- screwed ½ " - 3", WHITWORTH pipe thread DIN ISO 228/1 and DIN2999
 - NPT pipe thread ANSI B1.20.1 other on request
 - various pipe threads and tube fittings



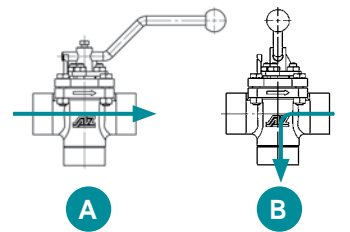
Instrumentation plug valves

- Type MGZ / MBZ / MB / WA / VINTAGE
- screwed ¼ " - 2", WHITWORTH pipe thread DIN ISO 228/1 and DIN2999
 - NPT pipe thread ANSI B1.20.1, other on request
 - various pipe threads and tube fittings



Special plug valve for safe flushing of pipe systems

- Type BMH
- for safe flushing of the pipe system (A = position 0°)
 - easy depressurizing of the flushing hose (B = position 90°)
 - space-saving design, defined plug position



Manometer plug valve

- FM 100
- for pressure gauges and instrument leads
 - safe-guarded ventilation for the pressure relief of the manometer
 - DIN-EN: DN 15 - 25 / PN 10 - 160, ASME: NPS ½ - 1 / class 150 - 900



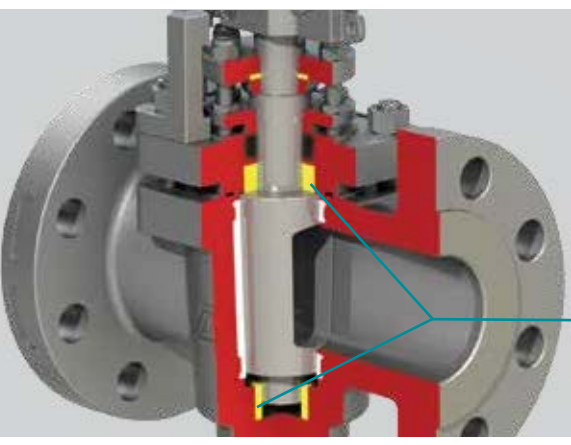
Water supply plug valves

- Type AQUA
- DIN-EN: DN 40 / PN 16



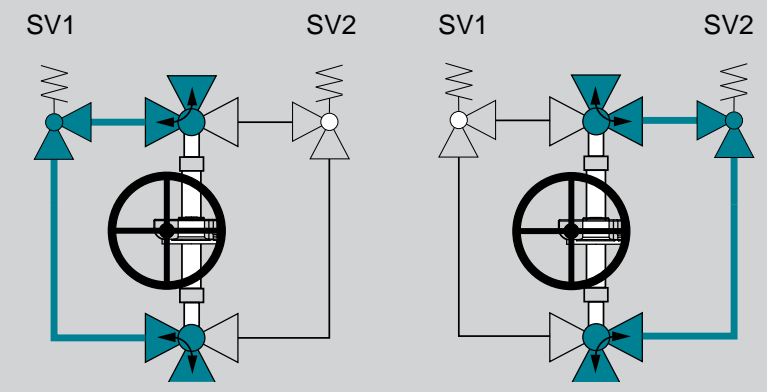
HIGH PERFORMANCE PTFE-sleeved plug valves for special applications

Safety first!



- fugitive emission design for aggressive and toxic media
 - safety sealing for fluctuating temperatures:
type FSN (Graphite packing, T_{max} 550°F or
type CASN (PTFE packing, T_{max} 450°F)
 - Fire-Safe-Design (API 607)
 - optional in high pressure design
- Type HDS: High pressure plug valve with double bearing for plug

Safety cross valves and valve combinations



- Crossover-Valve-Combinations for safety valves or
- for no interruption of circular flow

Two way plug valve for fluctuating temperatures
Type SAFE-SEAL with safety stem packing

- DN 15 - 600 / PN 10 - 40
- NPS ½ - 24 / class 150 - 300

Plug valves, high pressure design
Type HDS

- DN 15 - 600 / PN 63 - 160
- NPS ½ - 24 / class 600 - 900

Two way plug valves made of high quality Monel material
Type ISO-HF and SAFE-HF

- Special design for HF alkylation
- ASME: NPS ½ - 24 / class 300

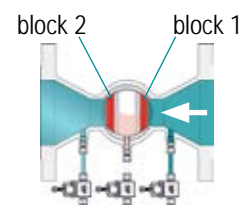


High pressure plug valves for nuclear facilities
Type NUCLEAR

- high pressure design, forged steel
- replacement of sleeve with installed valve
- nuclear approval

Plug valves with Double Block & Bleed and Inspection-Service
Type DBI

- DIN-EN: DN 15 - 600 / PN 10 - 40
- ASME: NPS ½ - 24 / class 150 - 300



Crossover valve combinations
Type UK

- all types of AZ valves combinable
- for cooling and heating cycles or reactor cycles
- for replacement or cleaning of filter systems

Special cross-over combinations for safety (relief) valves
Type SAVA

- full-flow, round bore
- operation errors impossible design-wise
- safe back-flow of blow off capacity with cross-over combination



Type SAVA
cross-over single valve



Type SAVA
cross-over valve combination

Plug valves and ball valves with chemical-resistant FEP/PFA-lining

NEW!

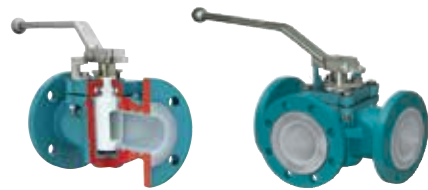
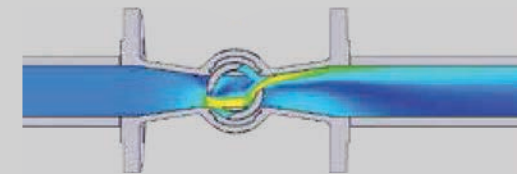
Type SAFE-LINED fugitive emission design with chemical safety sealing system

- fluctuating temperatures
- PTFE triple safety stem packing (adjustable)
- FEP/PFA lined cover
- different lining materials: FEP, PFA, PFA-conductive, etc.
- fresh granulate used, no refurbished regenerates
- locked in lining, vacuum-proof
- minimum thickness of lining ≥ 3 mm



Control plug valves PTFE-sleeved or FEP/PFA-lined

- valves with standard K_{vs} values or individual control characteristics
- optional with internal protection insert (type RH-S)
- cost-effective automation
- free passage possible with open valve
- tight shut off in closed position



Lined plug valve two-way or three-way, with ISO bracket flange

- Type ISO-STANDARD-A
- DN 15 - 300 / PN 10 - 40
 - NPS ½ - 12 / class 150 - 300



Lined plug valve for severe service applications that require a sealing system of higher integrity

- Type SAFE-LINED with safety stem packing
- DN 15 - 300 / PN 10 - 40
 - NPS ½ - 12 / class 150 - 300



Lined plug valves with exchangeable PTFE-sleeve, with ISO bracket flange for actuator mounting

- Type AB 2000
- DN 15 - 300 / PN 10 - 40
 - NPS ½ - 12 / class 150 - 300



Lined ball valves, one-piece durable body (top entry), cavity minimized design

- Type MONOBLOC / Type NVN
- DN 15 - 200 / PN 10 - 25
 - NPS ½ - 8" / class 150



Lined ball valves, two piece body Type NVN Lined Ball valve and bottom outlet valve (short pattern) Type NEO-VAL / KA cavity minimized design

- DIN-EN: DN 15 - 200 / PN 10 - 25
- NPS ½ - 8 / class 150

Control valves with equal percentage or linear characteristic control

- Type RH, RH-S, RH-A
- DN 15 - 450 / PN 10 - 40 - 63 - 100
 - NPS ½ - 18 / class 150 - 300 - 600



Piping accessories metallic or with FEP/PFA-lining

Lined Ball check valves with or without sight-glass

- Type GLOBUS, DELTA, MRV
- DN 15 - 250 / PN 10 - 40
 - NPS 1 - 4 / class 150



Sight-glasses / Tubular sight-glasses

- Type OCULAR, CIRCULAR
- DN 15 - 250 / PN 10 - 40
 - NPS 1 - 4 / class 150



Strainers with different mesh width

- Type BASKET, DELTA-SF
- DN 15 - 250 / PN 10 - 40
 - NPS 1 - 4 / class 150

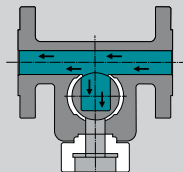


Safe and simple sampling valves and systems – free of pressure and cavities (PTFE-sleeved or FEP/PFA-lined)

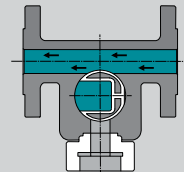


Type CONTIFLOW

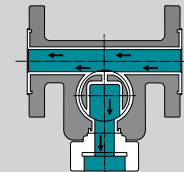
- defined representative sample quantity
- closed system - no emission
- pressure-less sampling of incompressible media (pure liquids)
- simple and safe operation, optional with needle system for bottles with septum



filling of plug



pressure-less sampling (positive overlap)



sampling in bottle



Sampling plug valve for liquids and solids

Type CONTIFLOW

- no flow interruption, piggable
- DN 15 - 150 / PN 10 - 40, NPS ½ - 6, class 150 - 300



Sampling system for liquids

Type VARIO

- free definable representative sample quantity
- DN 6- 25 / PN 10 - 100, NPS ¼ - 1, class 150 - 600
- pipe threads (tube fittings optional)



Sampling plug valve for liquids

Type SAMPLING

- spilling eliminated and contamination free
- DN 15 - 100 / PN 10 - 40, NPS ½ - 4, class 150 - 300



Sampling system for gas and liquid gas

Type GSP and LG-SP

- contamination free
- DN 15 - 100 / PN 10 - 40, NPS ½ - 4, class 150 - 300



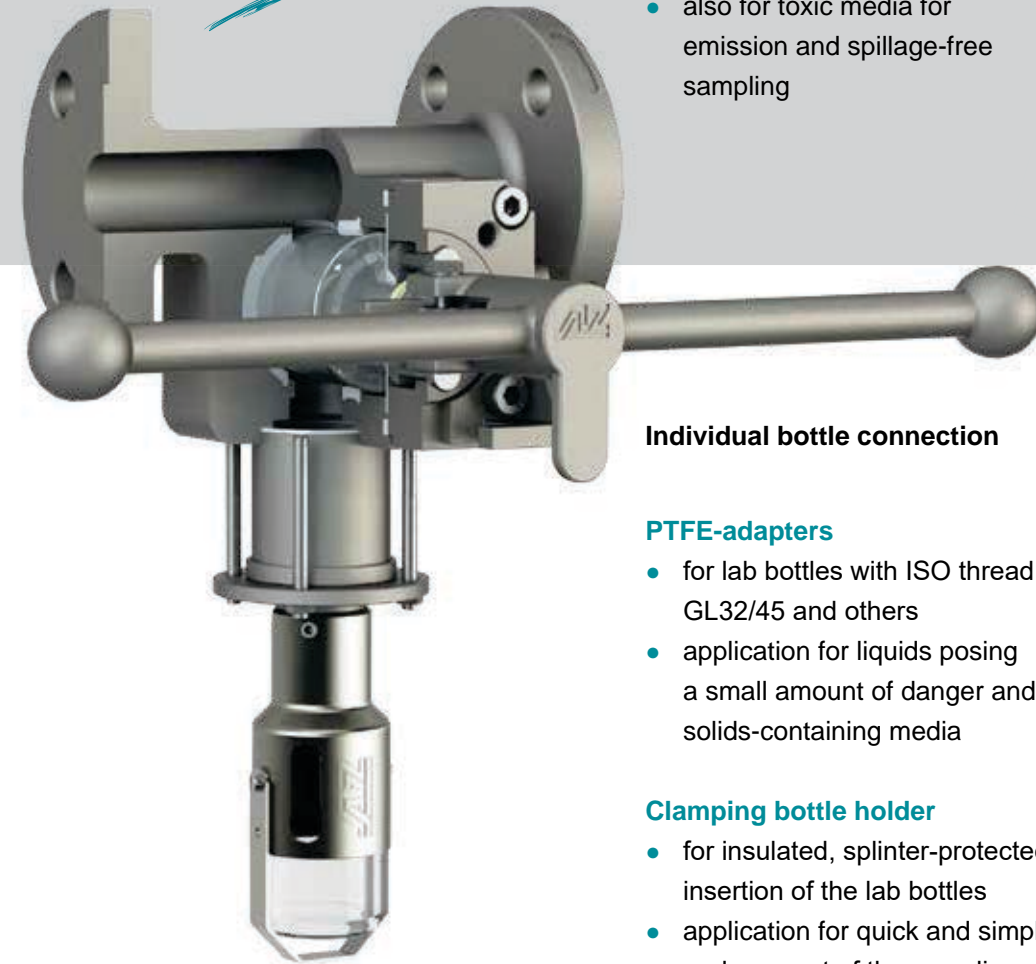
Sampling system for two-phase liquids (E.g. oil and water)

Type SAMPLING SIC

- representative long-term measurement
- DN 15 - 600 / PN 10 - 40, NPS ½ - 24 class 150 - 300

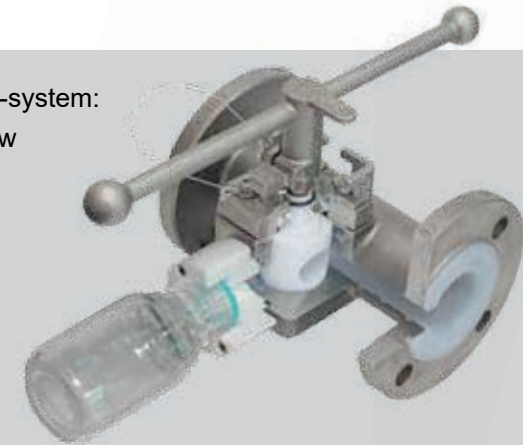
Defined sample volume, sampling pressure-less and representative, safe for liquids, liquid gas, gas and solids

Safety first!



Type CONTIFLOW with needle-system:

- pressure-less and without flow interruption
- also for toxic media for emission and spillage-free sampling



Individual bottle connection

PTFE-adapters

- for lab bottles with ISO thread GL32/45 and others
- application for liquids posing a small amount of danger and solids-containing media



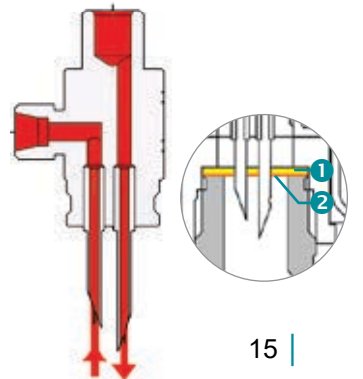
Clamping bottle holder

- for insulated, splinter-protected insertion of the lab bottles
- application for quick and simple replacement of the sampling container even with hot media



Needle system with septum

- for lab bottles with septum (consisting of butyl ① and PTFE diaphragm ②)
- needle system in different inner diameters of 2-6 mm
- application for highly aggressive and toxic media for emission- and spillage-free sampling



AZ-Actuation modular and simple !

High torques solutions !



Modular build:

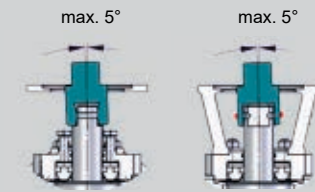
- actuation by hand lever, hand gear or actuator
- setup via console according to DIN ISO 5211
- alternatively with flange extension (FV) or other accessories

Benefit: Flexible setup

Cardanic coupling:

- patented AZ coupling to connect plug shaft and actuator
- no lateral forces

Benefit: very long lifetime



Type ISO-EXTRA 24[®] and AIR GEAR

AZ - AIR GEAR: Alternative rotary actuator 90°/180°/270°/360° for all valves with high torques

- compact design
- $M_d \geq 200.000 \text{ Nm}$ and higher possible
- Double-acting / single-acting
- Manual emergency operation
- Economical manufacturing due to standard components
- Space and weight savings
- 100% pneumatic (ATEX certification)
- Adjustable opening and closing speed

Actuators / AZ - AIR GEAR

- single and double acting design
- for valves with high torques 200.000 Nm (AZ - AIR GEAR)
- end position adjustable 0° – 360° (multiport automation AIR GEAR)

Ratchet-coupling for multiway valves

Type SSK

- Switching for 90°, 180°, 270°, 360° and 120°, 240°, 360°

Flange extension, locking devices optional

Type ISO-FV

- simple mounting of the extension and the actuators
- easy plug adjustment accessible

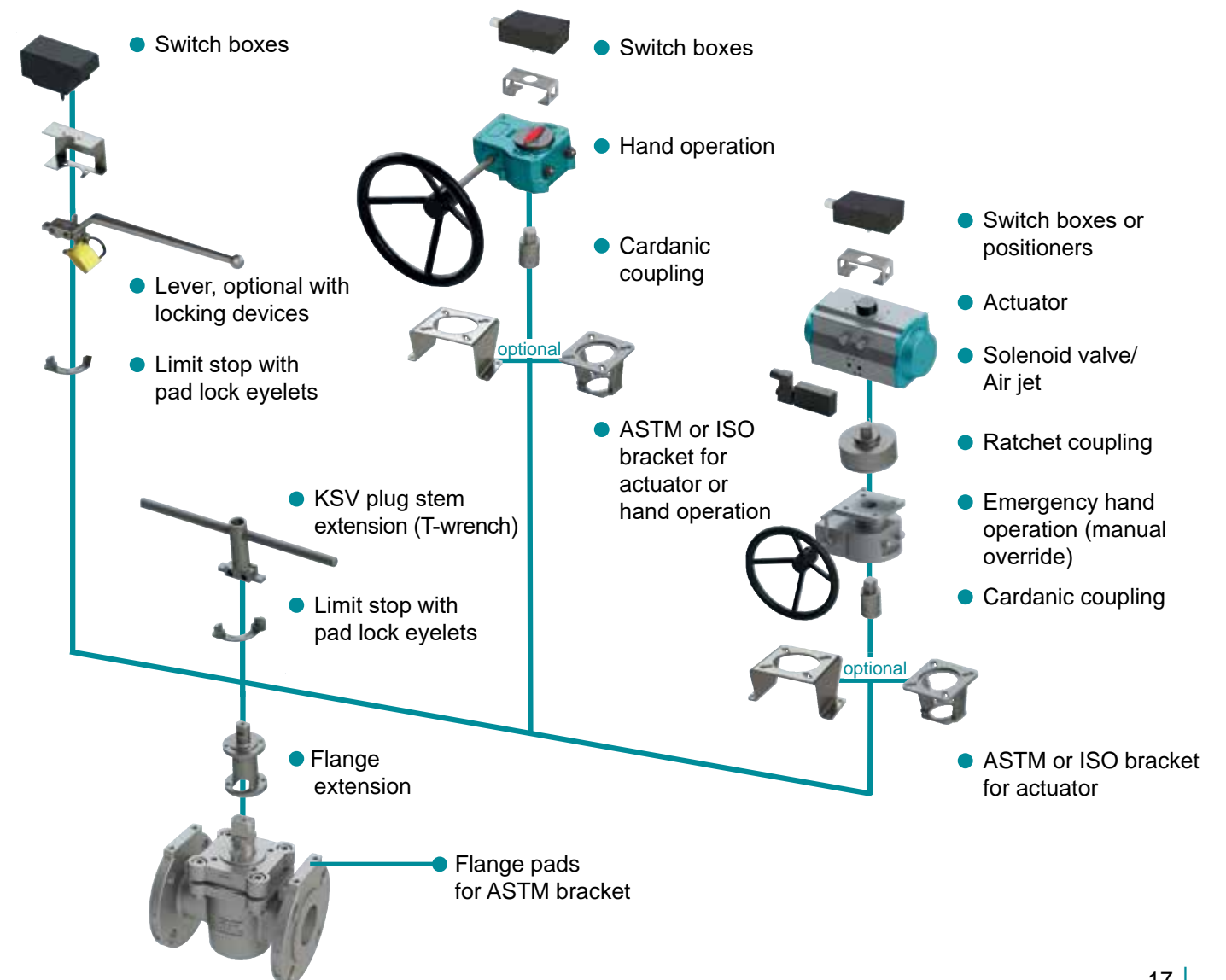
Plug stem extension (T-wrench) for all AZ valves, locking devices optional

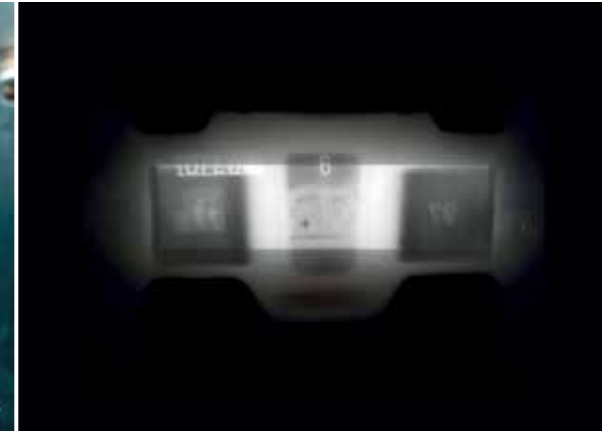
Type KSV

- for remote control
- for thick-walled insulation tubes

Locking Devices for all AZ valves

- pilot valve combinations
- linear key conception
- indexing plunger arrester / pad lock eyelets





Quality control is carried out throughout the whole manufacturing process by internal tests and external labs

Non destructive tests in our own AZ labs

- RFA analysis / PMI (Positive material identification) and spectral analysis
- ISO 3452 / ASME Section V dye penetrant test
- EN 12681 / ASTM E446 / ASME B16.34 - X-ray tests

Leakage testing

- EN 12266, API 6D, API 598, ISO 5208, MSS-SP-61 - Strength and tightness tests
- ISO 15848 - Helium leakage testing
- High pressure leakage test with water and gas
- vacuum testing

Production controls

- performance tests, manually and automated
- ISO 2746 - of lining (20 kV)
- layer thickness and wall thickness testing
- oil and grease free testing using UV light

Additional inspections

- all other non-destructive or destructive tests by external labs

Quality standards in the manufacturing process

- certified welders/welding procedure approvals (MIG, MAG and WIG)
- 3D-CAD computer-aided design with CFD computational dynamics, e.g. for control valves
- CNC manufacturing for maximum accuracy
- full traceability
- approved suppliers

Company certificates

- **ISO 9001** - Quality management
- **ISO 14001** - Environmental management
- **ISO 18001** - Health & Safety management
- **EcoVadis** - Business Sustainability Rating

Product certificates

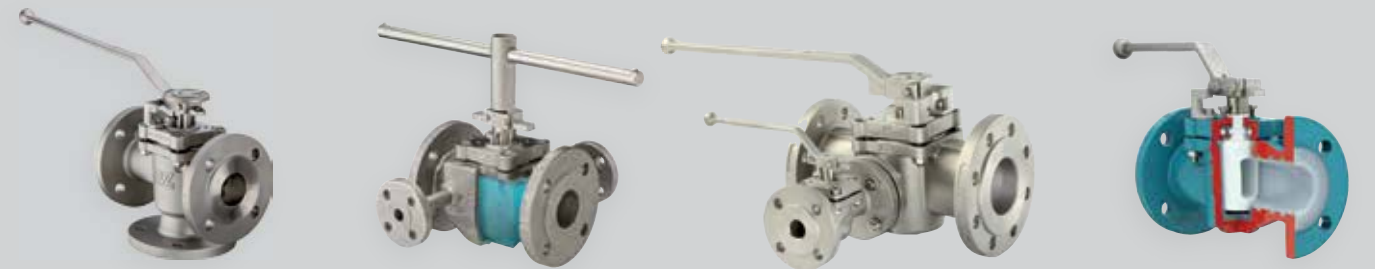
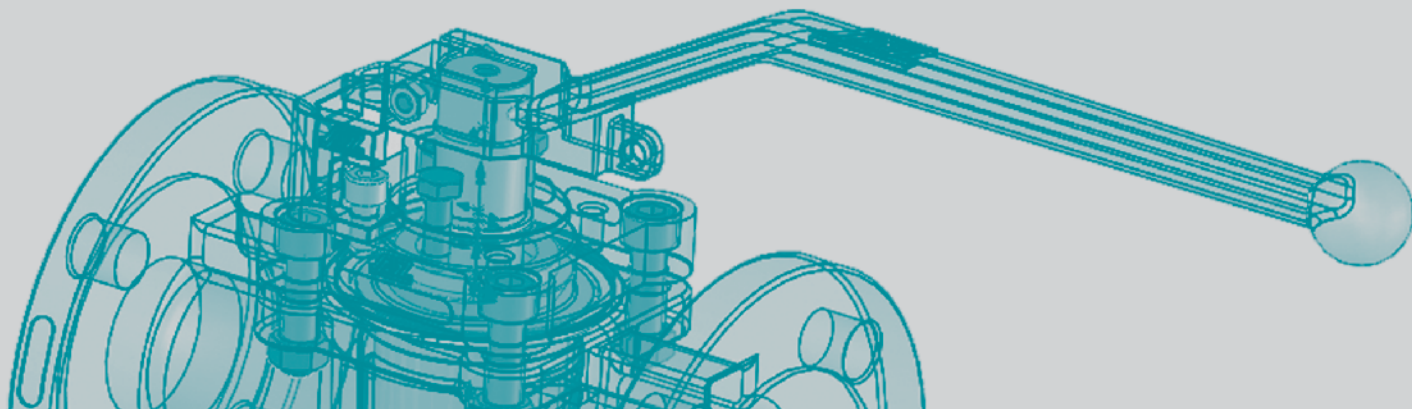
- **TA-Luft / ISO 15858-1 / EPA-21** - Low Fugitive Emission
- **API 607 / ISO 10497** - Fire-Safe Approval
- **PED 2014/68/EU** - Pressure Equipment Directive
- **UOP Honeywell** - HF Alkylation Equipment
- **TÜ-AGG** - Type Examination
- **EM 14432** - Transport of dangerous goods
- **API 591** - Process Valve Qualification
- **SIL 3 IEC 61508** - Safety Integrity Level
- **BV NR 320 / IGC / IBC** - Marine & Offshore Approval
- **DVGW** - Gas supply / gas transmission
- **ATEX 2016/34/EU** - Explosive atmosphere
- **FDA** - Food and Drug Administration

Country-specific certificates

- **Canada** - TSSA / CRN
- **China** - Manufacture License of Special Equipment
- **Poland** - TDT - Transportation Equipment
- **Russia** - T- R-TS
- **South Africa** - SAGA - Valves for gas transmission

High expertise and professional advice ensures high quality customized products

Plug valves for highest demands



Two-way up to five-way plug valve

Heating jacketed plug valves with different connections

Plug valves with flushing device

Plug valves with chemical-resistant PTFE/PFA-lining



A global network of professional experts will answer all technical questions. Extensive experience and technical knowledge are required for customized special valves

- **p** Pressure
- **T** Temperature
- **M** Media
- **A** Aggregate state
- Safety standards
- Test certificates
- Standards

These values together with the implementation conditions are the basis for further selection of valve material, sealing system and the valve configuration.

Each order, with its challenges to technology, material, seal and quality certificates, is handled individually by an experienced team from planning until delivery.

Standard materials body

- Ductile Iron ASTM A395, EN-GJS-400-18 (GGG 40.3)
- Carbon Steel ASTM A216 WCB, 1.0619 (GS-C 25)
- Stainless Steel ASTM A351 CF8M, 1.4408

Standard materials plug

- Stainless Steel ASTM A351 CF8M, 1.4408
- Stainless Steel ASTM A351 CF8
- 1.4308

Special materials body/plug

- Hastelloy B / C
- Inconel / Monel
- Nickel
- Zirconium
- Titanium / Tantalum
- Duplex
- Super Duplex
- other on request

As the PTFE-sleeved AZ plug valves are free of cavities and very durable, they can be used in many industrial production plants

Chemical and petro-chemical industry

Plug valves and sampling systems for aggressive, toxic, crystallizing and polymerizing media (e.g. PVC, HCE, H₂SO₄, PP, PE, acetic acid, melamine applications, TDI/MDI production processes etc.)

Refineries

Plug valves for HF-Alkylation, heating jacketed valves for bitumen, sulfur, sulphuric acid and for sulfur recovery

Pulp and paper industry

Plug valves for H₂O₂, chlorine and sulphuric acid applications

Ship building

Plug valves for heavy oil and diesel applications



Fertilizer industry

Plug valves for ammonia and urea applications, ammonium nitrate, nitrogen, nitric acid



Food industry / Pharmaceutical industry

Inner polished plug valves with flushing devices, pharmaceutical CIP resistant, FDA compliant



Sea water desalination

High pressure plug valves made of Duplex or Super duplex for reverse osmosis processes



Production plants

Plug valves for control applications. 4-way plug valve for absorption-air dryer systems



Power plants

Plug valves for fossil and nuclear plants (primary and secondary circuits, cooling circular or flue gas desulphurization)

Customized solutions: the highest added value for our customers!



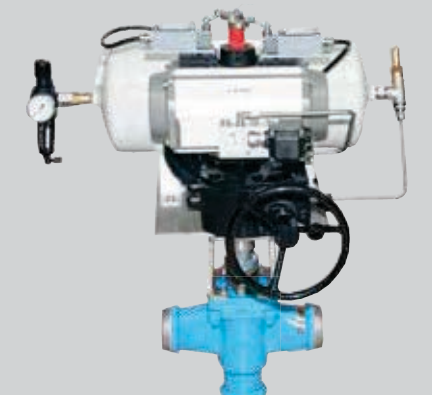
Type ISO-EXTRA

- full bore plug valve 18"
- AZ design for fast acting actuator <12 sec
- main valve, actuator and control valves for ambient temperatures of -62°F up to 284°F



Special valves

- a special flange, pressure transmitters with large diaphragm surface guarantees precise measurement
- 3 measurement devices can be installed on the valve



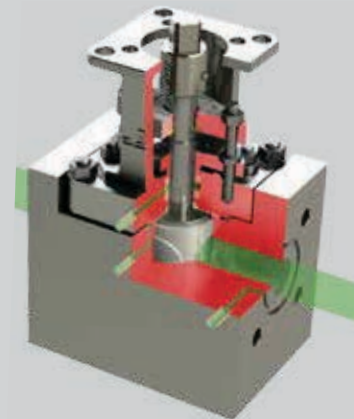
Type BW-3-STANDARD

- 3-way plug valve with weld-ends
- pneum. actuator
- air buffer tank for emergency
- manual emergency gear box



Type RH

- Individual K_{VS} values and control characteristics
- for large pressure difference with hole plug



Type PSV

- phosgene special valve (block design)
- 3 detection ports !
- triple sealing system to atmosphere



Type ISO-STANDARD

- completely made of stainless steel (plug valve, actuator and control valves)
- PST type (partial-stroke-test)

Special sampling valves and sampling systems



Type CONTIFLOW-PLC

- Safe programmable and automatic sampling in a protecting box
- Inline-system for process, loading, resp. unloading applications



Type GSP

- gas sampling system with a very small gas sampling cylinder (90 ml)



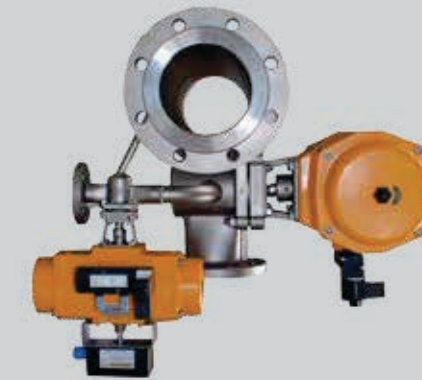
Type VARIO

- insulated cabinet sampling system with integrated heating system
- sample quantity 500 ml
- with nitrogen flushing



Type KP-S

- sample from container
- stainless steel, special materials, PFA-lining



Type CONTIFLOW + SP

- DN 150
- $P_V = 80$ ml
- with flushing valve
- completely automatized



Customized solutions

- Sampling valve CONTIFLOW
- for 6" main stream pipeline (or bigger)
- hand lever
- Bottle holder: PTFE adapter

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