

STÖHR ARMATUREN | Training

Lesson: Basics in Valve Technique and Actuators

Königsbrunn | March 2014



Agenda

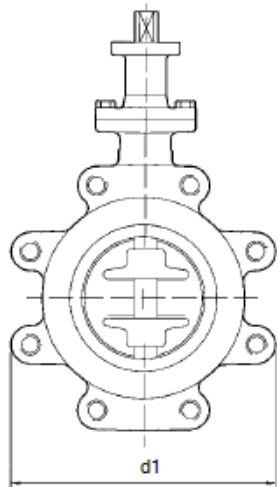
- Functional principles for cryogenic valves
- Technical requirements
- Cryogenic valve specification



Functional principles of cryogenic valves



Butterfly



KSB



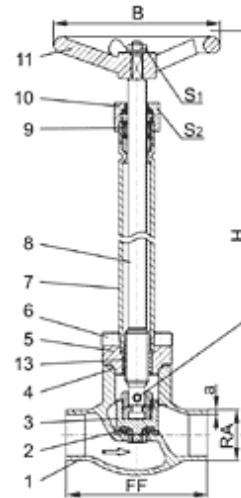
Ball



Habonim



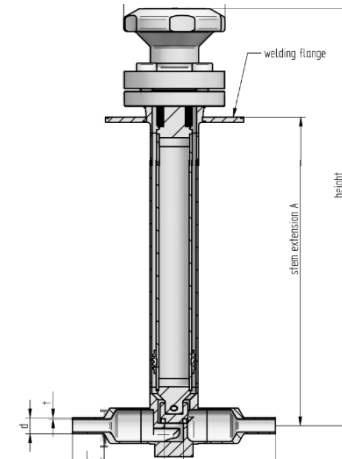
Packing gland



Herose



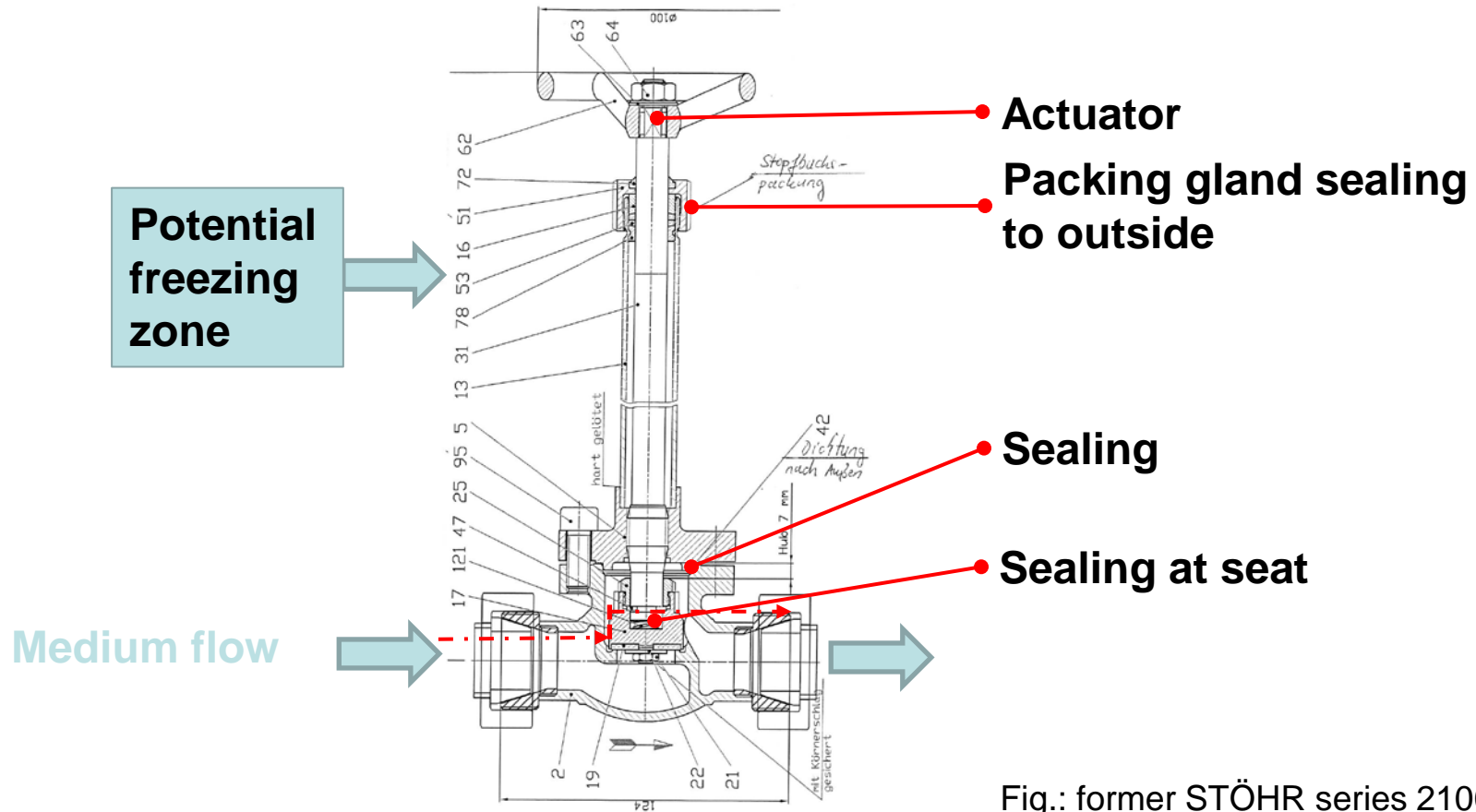
Bellow sealed



STÖHR (Source: manufacturer)



Functional principle of a cryogenic packed valve (example: globe valve)



Functional principle of a cryogenic bellow sealed valve (example: globe valve)

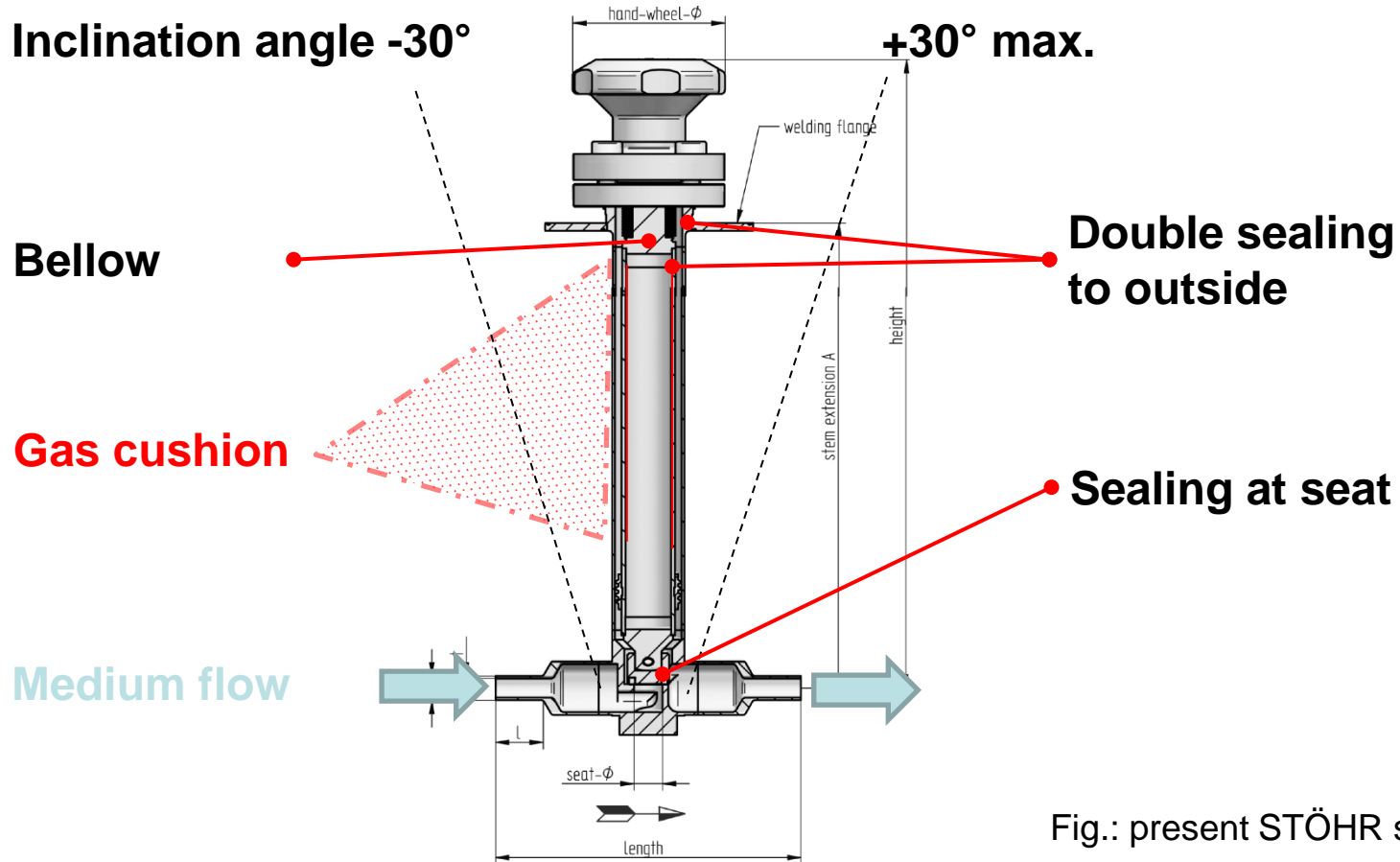


Fig.: present STÖHR series 1200

Technical requirements for cryo valves (I)

Parameter	„standard cryo valve“	„high-end cryo valve“	Remark
Type of sealing	Packing gland, also ball type or gate type	Bellow sealed, when required: additional spindle sealant	
He-tightness (<u>S</u> eat, <u>O</u> utside) acc. to vacuum method; Dimension: mbar liter / sec	S = 10^{-6} , O = 10^{-3} S = n. a. (metallic)	S = 10^{-6} , O = 10^{-8} physically tight S = 10^{-3} (metallic)	at high pressure and O ₂
Temperature range (°C)	-196°C up to +120°C	-269°C up to +50°C (+)	(+) higher temp possible on request
Nominal pressure (PN)	max. 50 bar (PN 50)	max. 420 bar (PN 420)	
Purity of valve	Not defined	Free of oil and grease; usable for UHP gas	Apropriateness for O ₂ ; surface treatment according to application
Medium	Not for He, H ₂ (*) etc.	All mediums	(*) depends on temperature
Medium compatibility	conditioned	without limitation	non-ferrous metal possible
Medium flow	Swirl at seat	swirl at seat, full bore also available	Full bore = 3 x industry standard



Technical requirements for cryo valves (II)

Parameter	„standard cryo valve“	„high-end cryo valve“	Remark
Flow direction	One-way	One or both-ways	
Ultra High Vacuum (UHV) in medium space	Not possible	possible	
Control (preciseness and characteristics)	Not mentioned	linear or equal percentage, regulation ratio 1:30 / 50 / 100	
Heat input	Not defined, but significant; standard stem length (A) only; usually no vacuum insulation	Well defined and additionally adaptable by variable stem length (A); vacuum insulation possible	Consequence of missing insulation: icing of fitting and pipe
Actuator	All types available	All types, and adaptable to closing time, operating pressure, fail safe function	
Body type, installation position	Angle or straight-through type, upright position with minimal degree deviation	Angle type, straight-through type, corner type; some with free installation position	Depending on manufacturer



Valve specification for cryogenic valves

- Valve type:
 - globe valve
 - control valve
 - check valve
 - overflow check valve
 - pressure regulator
 - filter
- Body type
 - straight-through
 - angle
 - bevel seat (Y type)
- nominal diameter (DN)
- Pressure: min. / norm./max. (PN)
- Cracking Pressure (for check valve only)
- Type of medium (or medias)
 - Temperature medium/-as
 - condition of medium (liquid, gas, dual)
- expected heat input
- required connections
- environmental conditions:
 - Temperature installation area
 - Location of installation (indoor, outdoor)
 - special requirements (dessert, salty water etc.)
- Ventilart:
 - Absperrventil
 - Regelventil
 - Rückschlagventil
 - Overflow-Rückschlag-Ventil
 - Druckminderer
 - Filter
- Gehäuseform
 - Durchgang
 - Eck
 - Schrägsitz (Y-Ventil)
- Nominaldurchmesser (DN)
- Druck: min./norm./max. (PN)
- Öffnungsdruck (bei Rückschlagventil)
- Art des Mediums (oder der Medien)
 - Temperaturbereich
 - Zustand (gas, flüssig, duale Phasen)
- erwarteter Wärmeeintrag
- Benötigte Anschlüsse
- Umgebungsbedingungen:
 - Temperaturbereich Umgebung
 - Aufstellungsort (innen, außen)
 - spezielle Anforderungen (Sand, Salzwasser etc.)



Valve specification for cryogenic valves (II)

- **Kind of Actuation:**
 - in case of pneumatic or hydraulic drive, how much service pressure is given
 - in case of electrical power, how many Volt is given and which type
- **Position of installation**
- **for regulation valves:**
 - Flow rate
 - Inlet Pressure
 - Outlet Pressure
- **Positioner type**
- **Selected regulation function (linear / same percentage)**
- **Further options:**
 - Welding Flange for VI
 - Surface treatment (polished, electropolished)
 - Purge connections
 - Purge valves
 - Thermal brake copper flange
- **Betätigungsart Antrieb:**
 - Falls pneumatisch oder hydraulisch, wie viel Druck ist für die Versorgung des Antriebs vorhanden
 - Falls elektrischer Antrieb: wie viel Spannung und welche Spannungsart
- **Einbaulage**
- **bei Regelventilen**
 - Volumenstrom (in Nm³/h)
 - Vordruck
 - Hinterdruck
- **Art des IP-Reglers**
- **gewünschte Regelkegelart (linear / gleichprozentig)**
- **Weitere Optionen:**
 - Einschweißflansch für Vakuumisolierte Leitung
 - Oberflächenbehandlung (geschliffen / E-Pol)
 - Spülstutzen
 - Spülventil
 - Konvektionsbremse (Kupferflansch)

