

KLINGER VALVES FOR PULP & PAPER INDUSTRY



AGENDA

- 1 - PROCESS OVERVIEW
- 2 - LOCATION & MEDIA
- 3 - KLINGER PRODUCTS
- 4 - REFERENCES

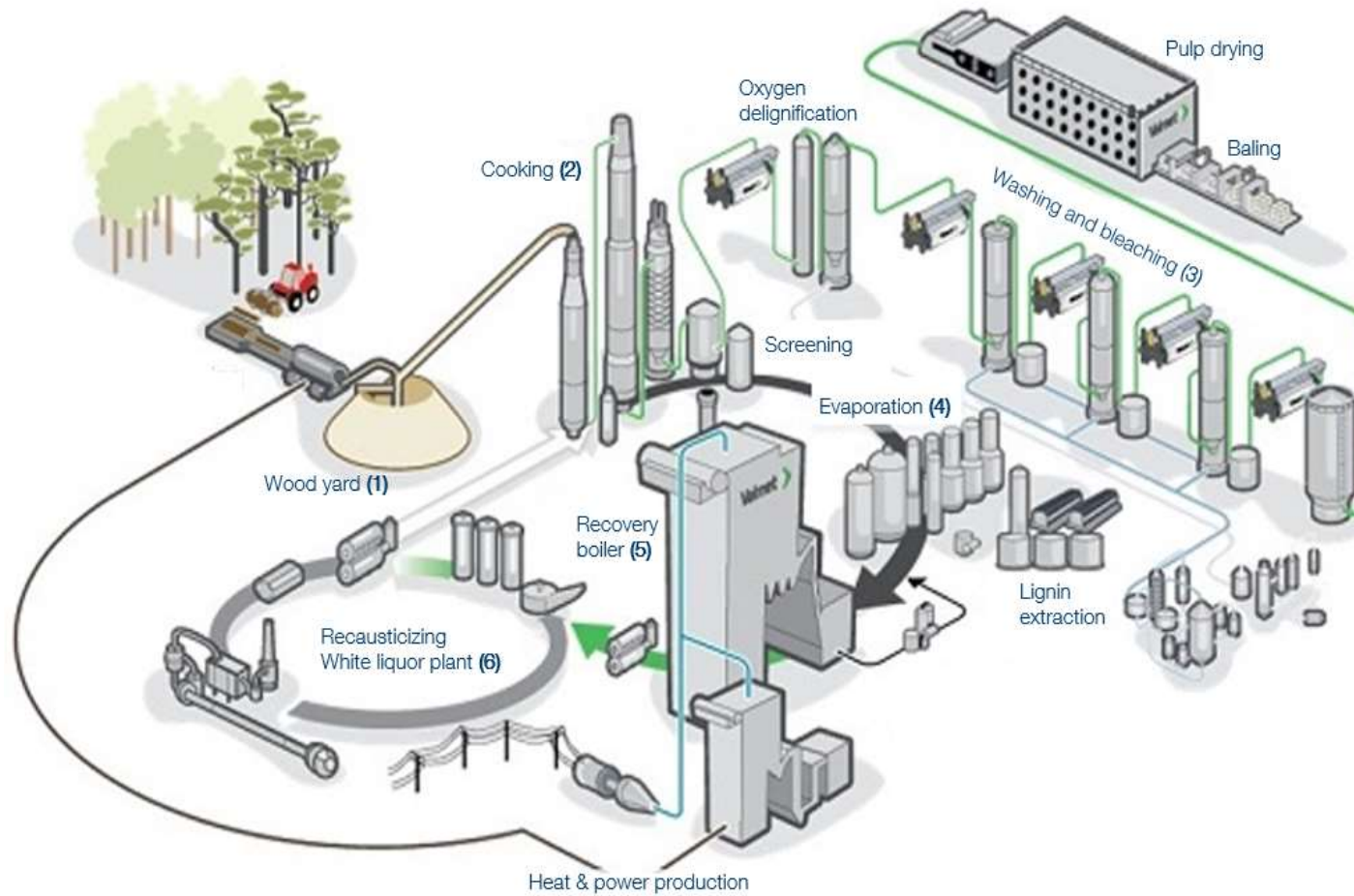


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PROCESS OVERVIEW P&P PLANT



Klinger products

- Wood yard (1)
- Cooking (2)
- Washing and bleaching (3)
- Evaporation (4)
Recovery boiler (5)
- Recausticizing White liquor plant (6)



PROCESSES DESCRIPTION

WOOD YARD:

Logs will be debarked and chopped to wooden chips. Wood contains LIGNIN, CELLULOSE, HEMICELLULOSE and TOXIC COMPONENTS.

COOKING/DIGESTER:

Wooden chips will be cooked for several hours in pressure vessels together with caustic soda, sodium sulphide and sodium sulphate (Kraft/sulphate process). In this process, LIGNIN will be split off and converted into BLACK LIQUOR which will be filtered off from the pulp. Also WHITE LIQUOR is used in the cooking process.

EVAPORATION:

BLACK LIQUOR will be dried in the evaporation process. The produced HEAVY BLACK LIQUOR will be combusted in the recovery boiler.

RECOVERY BOILER:

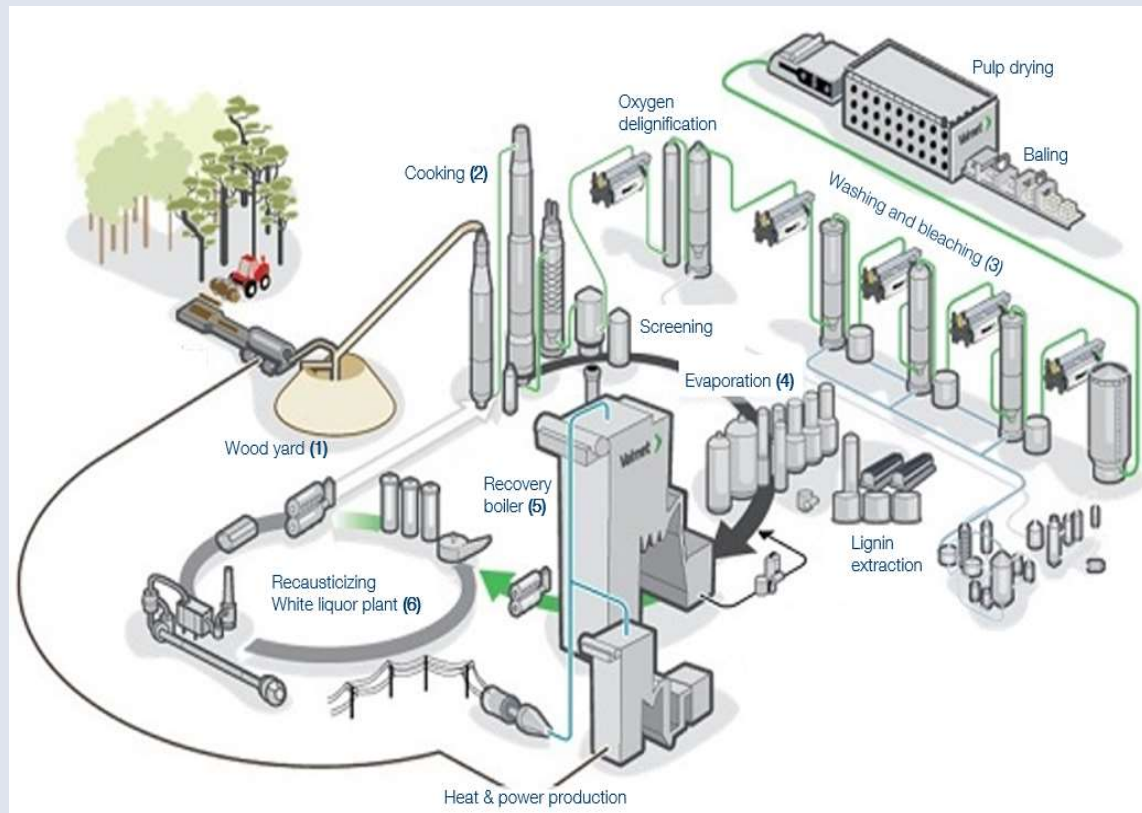
Organic material in BLACK LIQUOR will be burned to generate heat. Steam will be produced to generate electricity in a turbine.

RECAUSTICIZING:

From combustion of BLACK LIQUOR, a melt of sodium carbonate and sodium sulphide is remaining. This melt will be dissolved in water to generate GREEN LIQUOR. Sodium carbonate will be causticized with calcium hydroxide to caustic soda lye. By filtration, WHITE LIQUOR will be produced. WHITE LIQUOR will be burned in a tube oven to lime. Side products are also HYDROCHLORIC and SULFURIC ACID.

BLEACHING:

The dried pulp will be bleached with HYDROGEN PEROXIDE to get white paper.



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LOCATION: WOOD YARD, COOKER

MEDIA: WOOD CHIPS, BLACK LIQUOR, PULP



Solid wood chips:

Media properties: 100% solid content

Requirements for valves:

- Special connection to chips funnel
- Quick closing
- Robust reliable seats, long service life

Suitable KLINGER products for solid wood chips:

- Ball valve KH(SV) DN150 - DN1000, metal seated, carbon steel body



Black liquor / Pulp:

Media properties: Abrasive, with solids, high temperatures up to 180°C

Requirements for valves:

- High operating cycles
- Robust reliable seats, long service life
- Material compatibility

Suitable KLINGER products for black liquor / pulp:

- Ball valve KHA DN15 - DN125,, metal seats, stainless steel body
- Ball valve KHI DN150 - DN1000, metal seats, stainless steel body



LOCATION: COOKER, BLEACHING

MEDIA: WASTE WATER, HYDROGEN PEROXIDE



Waste water:

Media properties: Dirty, includes particles

Requirements for valves:

- Robust reliable seats
- Long service life

Suitable KLINGER products for waste water:

- Ball valve KHA DN15 to DN125, metal seated, carbon steel body
- Ball valve KH(SV)I DN150 - DN1000, metal seated, carbon steel body



Hydrogen peroxide:

Media properties: Aggressive, quick expansive

Requirements for valves:

- Material compatibility (body material stainless steel)
- Oil and grease free
- PTFE seats with pressure relief

Suitable KLINGER products for hydrogen peroxide:

- Ball valve KHA DN15 to DN125, 3, leakage rate A, stainless steel body, PTFE seats, oil & grease free, with pressure relief



LOCATION: EVAPORATION, RECOVERY BOILER

MEDIA: HEAVY BLACK LIQUOR



Heavy black liquor:

Media properties:

- Very abrasive
- Solid containing

Requirements for valves:

- High operating cycles
- Robust reliable seats, long service life
- Material compatibility (stainless steel, duplex)

Suitable KLINGER products for heavy black liquor:

- Ball valve KHA DN15 to DN125,, metal seated, stainless steel / duplex body
- Ball valve KHI DN150 - DN1000, metal seated, stainless steel body



LOCATION: RECAUSTICIZING

MEDIA: GREEN & WHITE LIQUOR, FORMIC ACID



Green & White liquor:

Media Properties: Abrasive with solids

Requirements for valves:

- Robust reliable seats, long service life
- Material compatibility (stainless steel, duplex)

Suitable KLINGER products for green and white liquor:

- Ball valve KHA DN15 to DN125, metal seated, stainless steel or duplex body
- Ball valve KHI DN150 - DN1000, metal seated, stainless steel body



Formic acid (for cleaning of pipes for green liquor):

Media properties: Very abrasive and corrosive

Requirements for valves:

- Robust reliable seats, long service life
- Material compatibility, leakage rate A

Suitable KLINGER products for formic acid:

- Ball valve KHA DN15 to DN125, leakage rate A, SIL 2, KFC seats, stainless steel body



LOCATION: RECAUSTICIZING MEDIA: HYDROCHLORIC – SULFURIC ACID, TURPENTIN



Hydrochloric / sulfuric acid & turpentin:

Media properties:

- Very abrasive
- Very corrosive

Requirements for valves:

- Robust reliable seats, long service life
- Material compatibility, leakage rate A

Suitable KLINGER products for hydrochloric / sulfuric acid & turpentin:

- Ball valve KHA DN15 to DN125, leakage rate A, KFC seats, SIL 2, body stainless steel



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BALLOSTAR KH(SV)I

PRODUCT ADVANTAGES

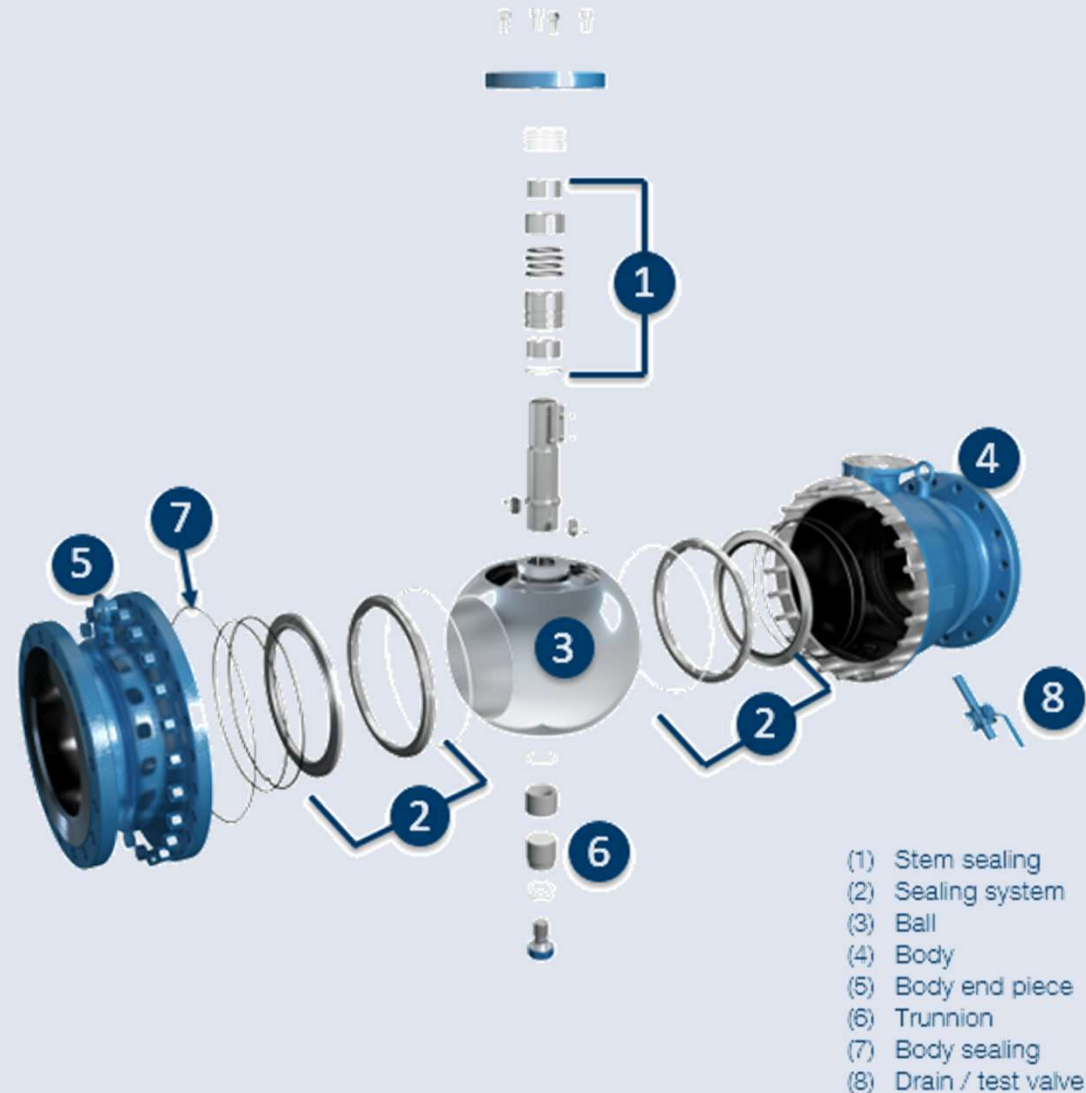
- Maintenance free
- Bidirectional flow
- Trunnion mounted with cylindrical bore
- Sealing elements protected against pressure hammers
- Double block & bleed function (TÜV certified)
- High degree of resistance against pipeline forces
- Subsequent automation possible

SPECIAL TYPES

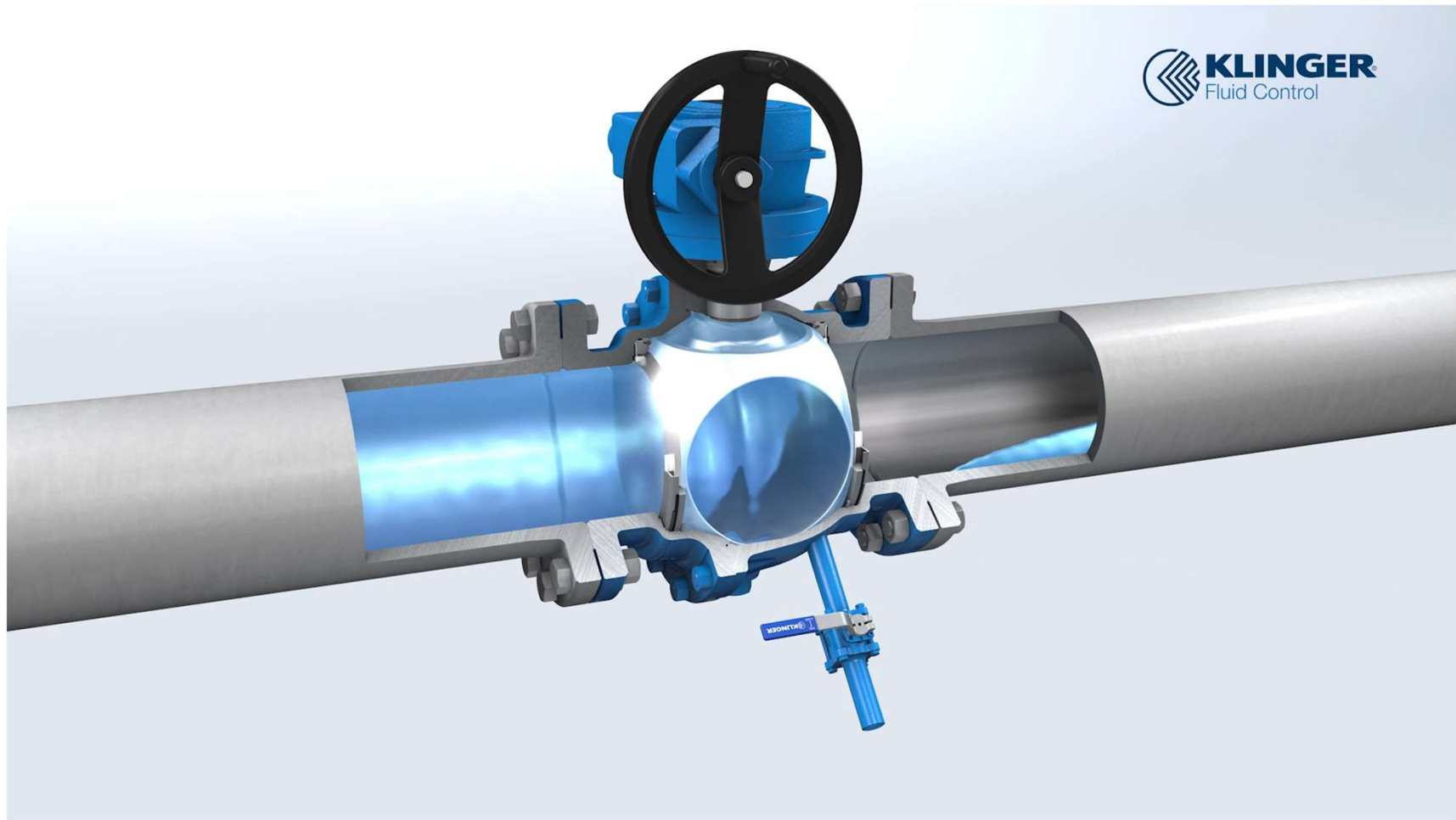
- High temperature version up to +260°C
- Metal seats for abrasive media
- Oxygen version
- Fire safe version
- Gas version

PRODUCT DETAILS

- PN 16/25/40
- DN150 – 1000
- Material cast and stainless steel
- Temperature range -45°C to +260°C
- Designs: Flanged version full / reduced bore, version with weld ends full / reduced bore, fully welded version
- Types: two piece KHI, KHSVI, KHSVI-VVS



SEAT SEALING



THE BALL

	Execution	Hardness	Surface roughness (RZ)
KLINGER®	Hard chrome plated	800 – 1000 HV	0,6 µm
Competitor	Nickel plated	500 – 650 HV	5,6 µm
	Stainless steel	300 – 350 HV	3,5 µm

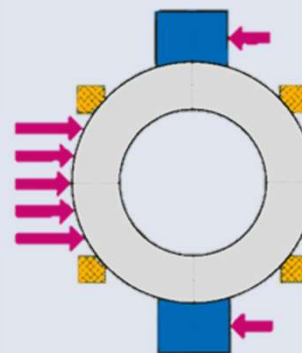
KLINGER KHI

Hollow /guide tube

Hollow ball

Equal force absorbtion in bearing

- » Ductile graphite iron ball with chrome coating
- » Chrome layer is harder than ANY stainless steel ball
- » Highest resistance against different chemical, corrosive (media) and mechanical (solids) loads
- » Very corrosion resistant



BALL VALVE KH(SV)I:



For media:
Black – green & white liquor
Waste water
Wood chips

(1) Stem sealing:

Aflas O-Rings (200°C)

(2) Sealing elements:

Metal seated stainless steel

(3) Body:

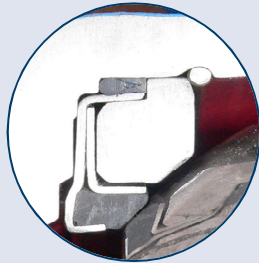
Stainless steel

Weld or flanged ends

(4) Ball:

Nodular iron, chrome coated
30µm

KH(SV)I DN150 – 800 BENEFITS



Seal system

Seal system for high temperature → Valid from -45°C to 260°C
 Elastic, robust sealing elements → Insensitive to impurities
 Seal system/ball trunion mounted → Low torque
 Bidirectional flow → Can be pressurized from both sides
 Metal sealing elements → For solids and abrasive particles in the media



Ball

Spheroidal steel chrome coated (30µm), one piece (casted) → Scratch proof (hard surface), corrosion resistant, insensitive to solids, no sticking of media particles on the surface
 Full, cylindrical bore → No turbulences, laminar flow, low pressure drop



Body

Compact, casted body → Insensitive to pipeline forces
 Top flange acc. ISO 5211 → Easy installation of actuators
 Easy handling → Installation in every position possible
 Fully welded version → Only one welding in flow direction
 Drain/ test cock available → Double Block & Bleed functionality, TÜV confirmed, max. safety at maintenance



Quality

Long service life → Reduction of maintenance cycles
 Service friendly → Top O-ring on stem is changeable inline
 Testing acc. EN12266-1, P10,P11,P12 → Leakage rate A

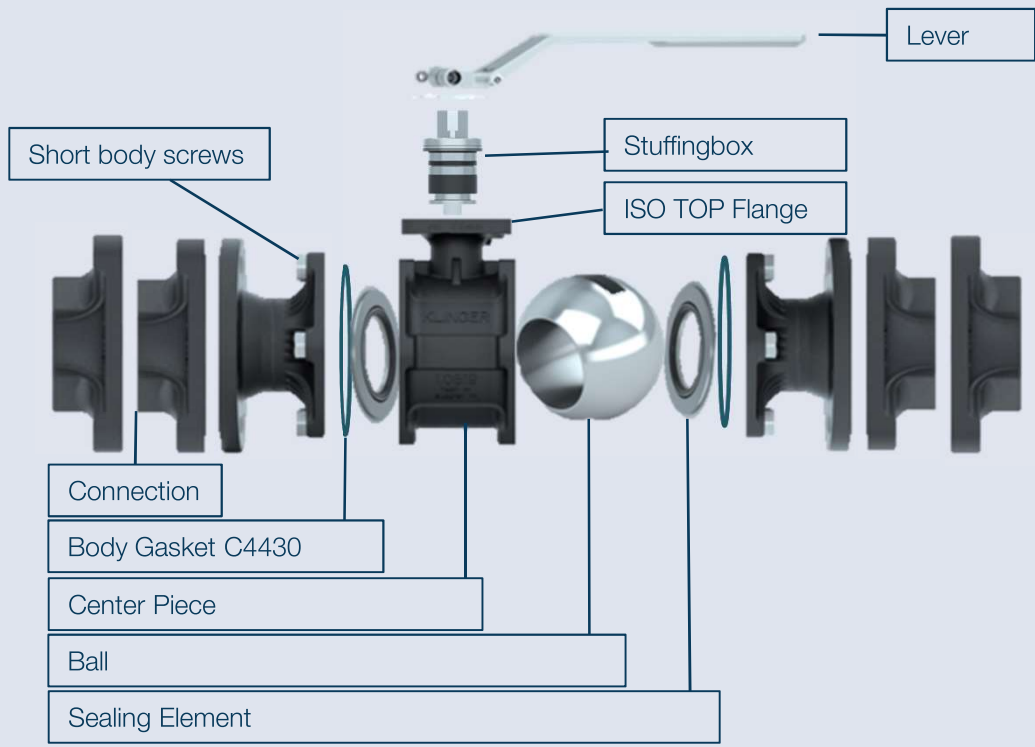
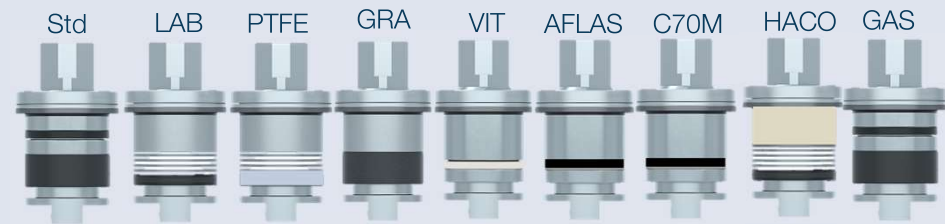
BALL VALVE BALLOSTAR KHA

Design data:

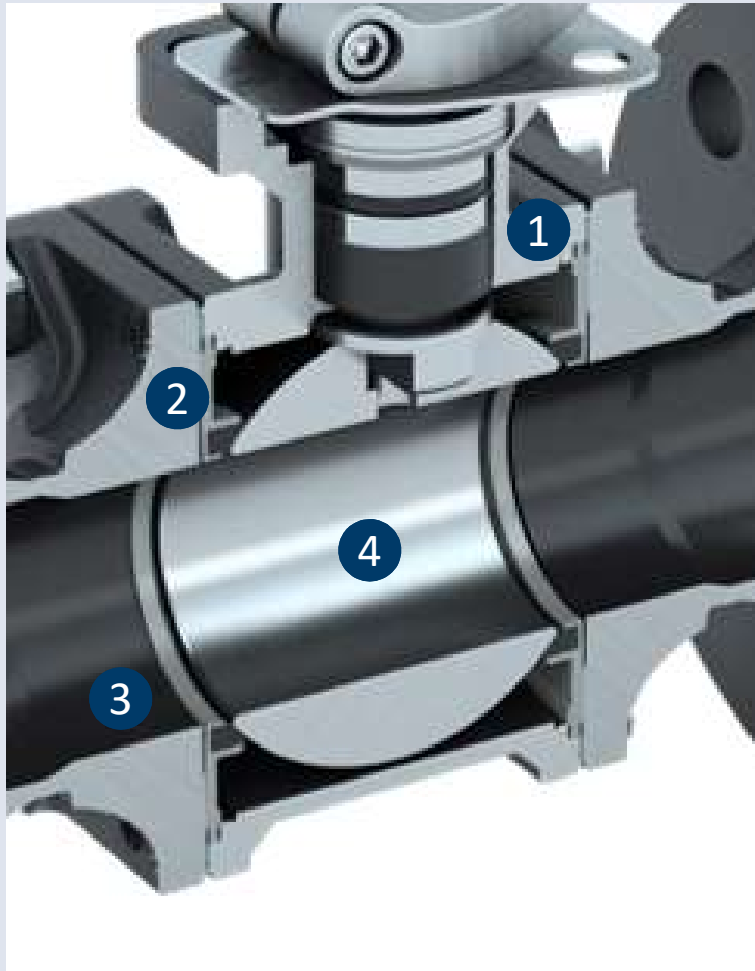
- » Line size range: DN15 – DN125, ½“ – 5“
- » Pressure classes: PN 16, 25, 40 and 63 or ANSI150 and 300
- » Temperature range: -196°C to +400°C
- » Connections: DIN or ANSI Flanges, weld ends , threaded ends BSP or NPT or mixed
- » Body materials: carbon steel 1.0619, stainless steel 1.4408, and duplex
- » Ball bearing: floating ball, trunnion mounted or double block & bleed
- » Ball version: Standard solid ball or V-Port balls in 10°,30°,60° and slotted cuttings for control applications; material: acid prove stainless steel
- » Operation: with hand lever or with installed gear, electric and pneumatic actuator on demand
- » Passage: Full bore
- » Standard version: → Fire safe acc. to API607 7th edition and EN10497:2010 and TA- Luft / ISO15848
- » Corrosion protection: New KACP protection (equal C3)
- » Marking: Laser marking on center piece acc. EN19



MODULAR CONSTRUCTION



BALL VALVE KHA:



For media:
Formic acid
Hydrochloric acid
Sulfuric acid

- (1) Stuffingbox:
Aflas / graphite
- (2) Sealing elements:
Soft seated KFC
- (3) Body:
Stainless steel
Weld, flanged or threaded ends
- (4) Ball:
Stainless steel

For oxygen use:
Valve is oil and grease free

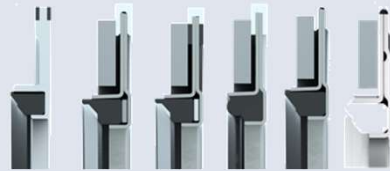
For media:
Hydrogen peroxide

- (1) Stuffingbox:
Pure PTFE
- (2) Sealing elements:
Soft seated PTFE,
upstream element with
pressure relief drilling
- (3) Body:
Stainless steel
Weld, flanged or threaded
ends
- (4) Ball:
Stainless steel

For media:
Black –green & white liquor
Waste water

- (1) Stuffingbox:
Aflas / graphite
- (2) Sealing elements:
Metal seated stainless steel
- (3) Body:
Stainless steel or duplex
Weld, flanged or threaded
ends
- (4) Ball:
Stainless steel / duplex
chrome coated

KHA BENEFITS



(1) Sealing elements:

- » High temperature range -196°C – 400°C → achievable with different sealing element versions
- » Wide range of different sealing element types → easy adaptable for many different applications
- » Design is elastic, robust, reliable and insensitive to impurities and pressure shocks → high lifetime
- » Additional C4430 gaskets on housing pitch → improved tightness to atmosphere



(2) Stuffingboxes:

- » Wide range of different stuffingbox types → easy adaptable for many different applications
- » Easy combinable with all types of sealing elements in one valve construction
- » New aflas / graphite stuffingbox → Fire safe and TA Luft / ISO15848 approved



(3) Ball:

- » Standard ball made of stainless steel 1.4401 or 1.4408 → high resistance to chemical media and mechanical loads
- » By using of metal sealing elements, the ball is chrome coated → Insensitive for solids, no sticking of media particles on the surface
- » Cylindrical bore → No turbulences, laminar flow, low pressure drop
- » Different ball bearings → floating ball or trunnion mounted
- » V – port balls in 10°, 30°, 60° and slotted cutting on demand → for control applications with different flow characteristics



(4) Body

- » Compact casted center piece → Insensitive to pipeline forces
- » Short housing screws → high mechanical stability at thermal expansion due to temperature changes
- » ISO TOP flange for every line size → Easy installation of additional equipment like gears and actuators
- » Valve could be installed in any position → easy handling
- » Modular valve construction → Max. flexibility to adopt the valve to many different applications



(5) Quality

- » In standard version fire safe and TA Luft / ISO15848 approved
- » Inline service possible → service and cost efficient
- » Long service life → Reduction of maintenance costs
- » Spare parts are quick available
- » Double block & bleed version for all sizes → TÜV confirmed, max. safety for maintenance, drainage of the cavity in closed position

KLINGER PISTON VALVE:

PRODUCT ADVANTAGES

- Excellent control characteristics
- Low maintenance
- Reliably tight in the bore and to atmosphere in accordance with EN12266-1 – leakage rate A
- Suitable for steam condensate-alternating operation as well as temperature shock operations
- No erosion on sealing surface
- Revisable without removal from pipe system
- Fire Safe
- Automatable

SPECIAL TYPES

- Oxygen version (oil and grease free)
- TA Luft
- Regulation design
- Heating jacket

PRODUCT DETAILS

- PN 16/40/63, Class 150/300
- DN15 – 200, ½" – 8"
- Material grey cast iron, nodular cast iron, cast steel, stainless steel
- Temperature range -10°C to +400°C
- Designs: Flanged version, Version with weld or threaded ends



PISTON VALVE KVN:



DN15 – 50 for media:
 Superheated steam
 Saturated steam
 Oxygen

- (1) Bonnet:
Material carbon / stainless steel
- (2) Spindle:
Material stainless steel
- (3) Piston:
Material stainless steel
- (4) Valve rings:
Type KX-GT graphite
Type KX1 graphite with PTFE disc for TA Luft
- (5) Lantern:
Material Sint C10
- (6) Piston:
Material Cast / stainless steel
Flanged or welded ends
For oxygen use:
Valve is oil and grease free



DN65 – 200 for media:
 Superheated steam
 Saturated steam
 Oxygen

- (1) Spindle:
Material stainless steel
- (2) Stuffingbox:
Graphite
- (3) Piston shaft:
Material stainless steel
- (4) Valve rings:
Type KX-GT graphite
Type KX1 graphite with PTFE disc for TA Luft
- (5) Body:
Material cast steel
Flanged or welded ends
- (6) Piston:
Material stainless steel
- (7) Lantern:
Material Sint C10
For oxygen use:
Valve is oil and grease free

KVN DN15 – 200 BENEFITS



Seal system

Reliable valve ring - piston design → Constant low torque, „self cleaning function“ for milky or cloudy liquids

High temperature → Valid up to 400°C media temperature



Valve ring

Standard valve ring KX-GT (graphite with serrated stainless steel) → Valid up to 400°C, mechanical loadable – insensitive for pressure hammers

Valve ring type KX1 (graphite with serrated stainless steel + PTFE disc) → Valid up to 350°C, mechanical loadable – insensitive for pressure hammers, TA-Luft compliant



Body

Compact casted body → Insensitive to pipeline forces, pressure balanced version available

Valve bonnet acc. ISO5211 → Easy installation for actuators

Easy handling → Installation in every position possible, flow direction marked with an arrow on body

Body construction → Valve rings are not located directly in the flow



Quality

Long service life → Reduction of maintenance cycles

Service friendly → Inline service possible

Test acc. EN12266-1,P10,P11,P12 → Leakage rate A

Availability → All valve parts available as a spare part

Options

Regulation version

Heating jacket

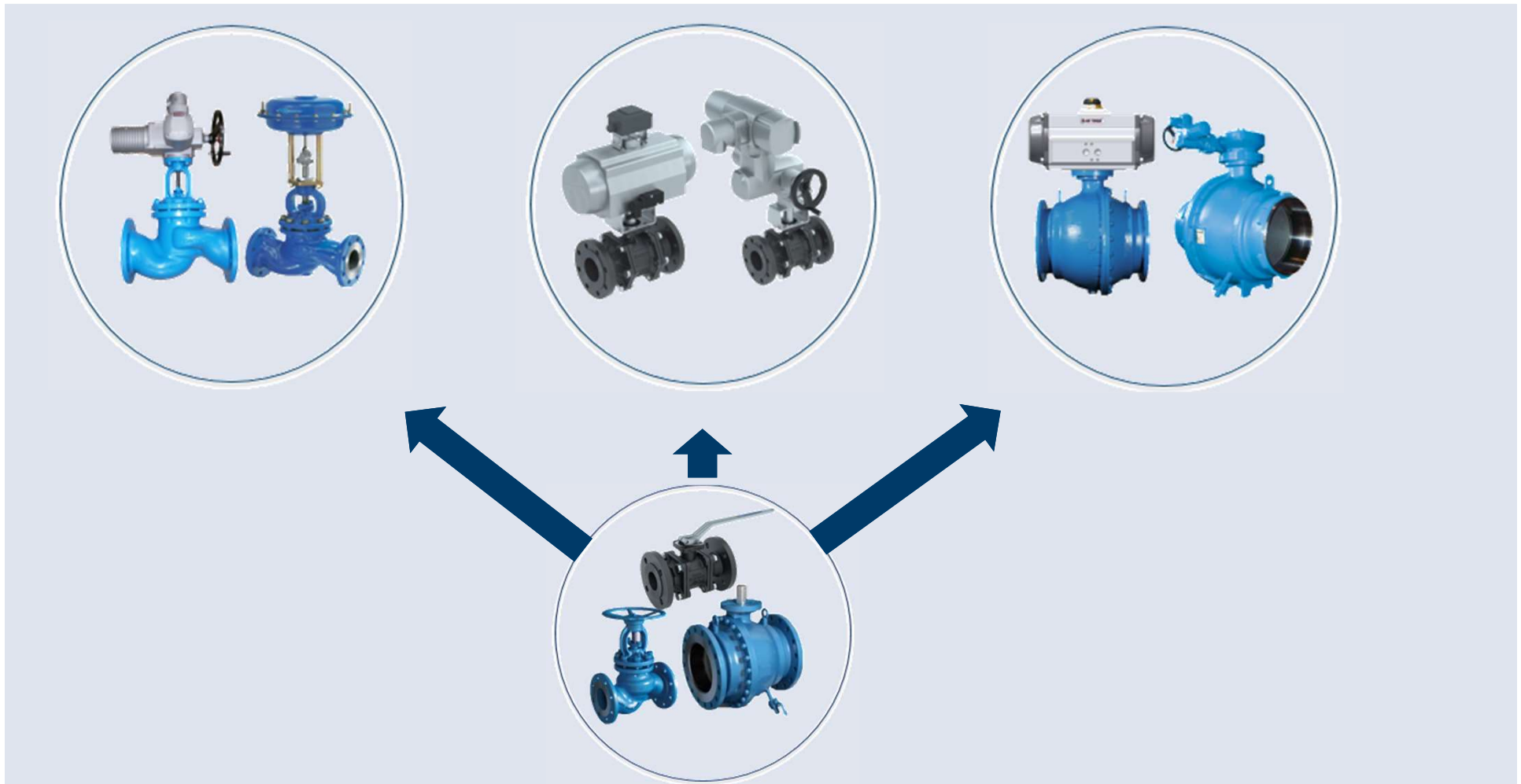
Oxygen version

TESTING ACC. EN12266-1, P10, P11 & P12



Test	Test Duration		Test pressure and media
	DN 15 – 150	DN 200 – 300	
P10 (Strength)	1 Minute	2 Minutes	1,5x PN Water
P11 (Tightness)	1 Minute	2 Minutes	1,5x PN Water
P12 (Seat Tightness)	1 Minute	2 Minutes	6 bar ± 1bar Air or 1,1x PN Water

AUTOMATION AUMA, AIR TORQUE & SART ACTUATORS



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REFERENCES



Country:	Sweden	
Area of application:	Digester of paper mill	
Function of the valve:	Shut-off	
	Type	Material
Applied KLINGER valve:	KHI/KHVSI	Xc
Nominal diameter (DN):	From DN 200 up to DN 250	
Service pressure:	4 bar	
Service temperature:	120°C	
Operating media:	Black liquor with rest of solids	
Operating cycles:	Several per month	
Type of actuation (manually, gear, actuator):	Pneumatic actuator	

REFERENCES



Client:	PORTUCEL	
Country:	Portugal	
Area of application:	Paper industry: digester of paper folder	
Function of the valve:	Shut-off	
	Type	Material
Applied KLINGER valve:	KHA-FL-XC	Xc
Nominal diameter (DN):	From DN 50 up to DN125	
Service pressure:	15 bar	
Service temperature:	From 80°C up to 100°C	
Operating media:	Black liquor	
Time of installation:	1997	
Operating cycles:	Several per month	
Type of actuation (manually, gear, actuator):	Manually	

REFERENCES



Client:	Mondi Stetí a.s.	
Country:	Czech Republic	
Area of application:	Paper Mill	
Function of the valve:	Shut-off	
	Type	Material
Applied KLINGER valve:	KHI-Xc metal sealing elements	Xc
Nominal diameter (DN):	DN 150 and DN 100	
Service pressure:	3 bar	
Service temperature:	100°C	
Operating media:	Lyre with abrasive parts	
Time of installation:	2002	
Operating cycles:	3-4 per day	
Type of actuation (manually, gear, actuator):	Pneumatic Actuator	

REFERENCES



Client:	INTERNATIONAL PAPER Kwidzyn S.A.	
Country:	Poland	
Area of application:	Paper Mill	
Function of the valve:	Shut-off	
	Type	Material
Applied KLINGER valve:	KVN	VIII, Xc
Nominal diameter (DN):	From DN 25 up to DN 80	
Service pressure:	12 bar	
Service temperature:	190°C	
Operating media:	Steam, hot water	
Time of installation:	2007	
Operating cycles:	Several per day	
Type of actuation (manually, gear, actuator):	Manually	

REFERENCES



Client:	INTERNATIONAL PAPER Kwidzyn S.A.	
Country:	Poland	
Area of application:	Paper Mill	
Function of the valve:	Shut-off	
	Type	Material
Applied KLINGER valve:	KHA (metal seat)	VIII, Xc
Nominal diameter (DN):	DN 25 - DN80	
Service pressure:	12 bar	
Service temperature:	190°C	
Operating media:	Water, steam	
Time of installation:	2007	
Operating cycles:	Several per month	
Type of actuation (manually, gear, actuator):	Manually	

REFERENCES



Client:	Mondi Packaging Paper Swiecie S.A.	
Country:	Poland	
Area of application:	Paper Mill	
Function of the valve:	Shut-off	
	Type	Material
Applied KLINGER valve:	KHA	VIII, Xc
Nominal diameter (DN):	DN 25 – DN 40	
Service pressure:	20 bar	
Service temperature:	140°C	
Operating media:	Mazout	
Time of installation:	2006	
Operating cycles:	Several per year	
Type of actuation (manually, gear, actuator):	Manually	

REFERENCES



Client:	Vitavel AD	
Country:	Bulgaria	
Area of application:	Steam collector	
Function of the valve:	Shut-off	
	Type	Material
Applied KLINGER valve:	KVN KX-GT	VIII
Nominal diameter (DN):	DN 100	
Service pressure:	13 bar	
Service temperature:	190°C	
Operating media:	Steam	
Time of installation:	2004	
Operating cycles:	Twice a day	
Type of actuation (manually, gear, actuator):	Manually	