

References Ramén Ball Sector valves

Applications in pulp and paper mills



RaménValves

We know the flow

Over 50 years ago in 1968, the Swedish pulp and paper industry was greatly in need of an efficient control valve solution for fibre suspensions. Swedish engineer Torsten Ramén initiated the development of a new solution for use especially in the accurate control of fibre suspensions. Thus, Ramén Ball Sector Valve was born, and our journey started with the design, development and manufacturing of Ramén KS Ball Sector Control Valve.

Engelsberg was founded in 1949 by Avesta Jernverk, a stainless steel producer with a long and genuine tradition in the Swedish industrial landscape. Since the beginning Engelsberg have manufactured industrial ball, butterfly, gate, swing check and vacuum valves in high alloy steels and Titanium. All valve models are resistant to corrosion in extreme environments where medias such as sea water, phosphoric acid, sulfuric acid solutions and chlorine gas are common.

The Ramen Valves and Engelsberg Valves has been installed all over the globe over a period of 50 - 70 Years. We focused our reference list on a few examples of the newest applications and great success for our end users we know off in the pulp and paper industry.

References mentioned in this document

Stora Enso Skutskär, Sweden

Stora Enso Fors, Sweden

ARAUCO, Chile

GLATFELTER Gernsbach GmbH, Germany

Wood Beca, New Zealand

Siam Kraft Industry, Thailand



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The Ramén Ball Sector Control Valve could be originally designed for applications in pulp- and paper mills where pressure and temperature ratings allow. Especially in applications where segmented control valves, globe control valves, ball valves, gate valves or butterfly valve keeps on failing and production losses occurs frequently because of it. Typical applications or process where these valves fail is because of fibers in suspension especially with high consistency. Where abrasive fluids with solids are present and when the fluid is corrosive or where there is a combination of abrasive media and/or critical condition i.e. cavitation, is present.

5 reasons to why the Ramén Ball Sector Valve is outstanding in pulp and paper applications

- It is centric operating, meaning that no fibers or particles will get stuck between the seat and the ball sector
- It is self-cleaning – Improving productivity and reducing maintenance downtime
- The elliptic opening of the valve counteracts dehydration of the pulp in the control process
- The low torque operation makes it easy to automate with small actuators of all types
- The bearing never gets in contact with the fluid





Process Conditions

Temperature: 70°C

Media: Pulp with consistency 7-8% with Clo2 diluted.

Our Solution: KS-150-1Cx Scraping Seat/WM35DA/
MV24VDC/Airset

Important note: The scraping ring or self-cleaning design is standard in Ramén Ball Sector valve, both SOMAS and METSO have this as add on feature i.e. an additional cost.

Why did the customer replace a segmented valve?

Due to repeated failure on the sealing surface. The KS Valve performance is excellent with no failure or issues because the sealing surface is protected.



Ramén Ball Sector valve - 3D printed ARAUCO, Chile



Ramén Valves

We know the flow

The 3D printed KSPF-80-5 valve at ARAUCO in Chile (pulp and paper), from tank to pumps

Process Conditions

Fluid: Methanol and sodium chlorate

Media: Sodium chlorate: 700 gr/t

Why did the customer replace the Titanium ball valve?

Abrasion: The media is crystallising if temperature drops, which it does from time to time. The Ball Valves are destroyed due to abrasiveness of the crystals which are trapped in the hidden cavities between the ball and the body, when the crystals are formed it destroys the valve from inside.

Entrapment: When the ball valve closes and the fluid is trapped within the cavity of the ball the fluid gets stuck on the shaft and then the valve gets jammed in position, i.e. the valve cannot open anymore.

Our Solution: We offered a 3D Printed Ramén KSPF-80-5/MS with a hand lever in Titanium. The 3D printed manufacturing process of the Ball Sector Valve gives the customer versatility in the design so the face to face length of old ball valve could be met and no piping changes was required. 3D Printing also allowed for quicker delivery time from purchase order. The Ramén Ball Sector Valve design has not hidden cavities and is self-draining so entrapment of crystals does not happen if temperature drops.





Customer: Matthias Moermann (I&C Engineering - Technical GLATFELTER Gernsbach GmbH Composite Fibers Business Unit, Germany)

Process Information

1. **Pulp Consistency:** 3%
2. **Temperature:** 17°C
3. **Inlet Pressure:** 2 bar
4. **Outlet Pressure:** 0,5bar
5. **Flow rate:** 400l/min and max. 1200l/min, Normal 710 l/min
6. **Pipe Size:** DN80

Why the customer replaced the Pneumatic Segmented Control valve: The customer only used pneumatic control valve on their basis weight application. However, these sometimes have a too low accuracy and high hysteresis and different response time. However, pneumatic control valves are very robust but have problems if the control signal constantly changes due to small control deviations. Also, the positioner could not always detect the very fine adjustment required.

Our Solution: The Ramén KS-80-1A with high resolution stepper motor actuator and backlash free coupling between actuator and valve stem was offered. The high-resolution stepper motor actuator has 5000 steps per 90° rotation (55 steps per 1 degree of rotation) and it is used by Ramén for high accuracy applications such as surface basis weight. This technology uses electrical pulses to move a specific number of well-defined steps i.e. this is the same technology used in industrial robots where accuracy is crucial, and hysteresis must be eliminated. In combination with mechanical gears designed for minimal backlash Ramén manage to get a high accuracy control valve with negligible hysteresis. The high-resolution stepper motor actuators have 100% ED, meaning they can be in motion constantly without overheating as normal electric actuators tend to do when input signals are constantly varying.



Pulp and paper- green liquor, black liquor, white liquor, chlorine applications



Ramén Valves

We know the flow

The Ramén KS Series Ball sector Control Valve are used to several on/off and control all liquor if it is within the temperature and pressure range. The KS Valve installed in reversed flow direction will successful control slurries with high content solids. The sealing surface is out of the flow stream and thus make it very successful in abrasive applications. The KS Series valve has a self-cleaning effect on the ball which reduce the chances of product build up or coating effect on the seating surface.

The KS series valves are manufactured in 316L SST as a standard but we also manufacture the valve in Titanium, Super Duplex, Duplex, SMO 254 and Hastelloy C-276, 904L SST, etc.

Vacuum Breaker in operation on digester since 1970



Customer: Wood Beca – New Zealand

Process Conditions

Temperature: 105 - 130°C

Max Operating Pressure: 12.16 Barg

Setpoint: -10.34 kPag

Media: Atmospheric air and the wetted parts of the valve is exposed to a mixture of white and black liquors.

Our Solution: DN80 EB VAC 100

Material: 316 SST

- The existing valve was supplied to New Zealand Forest Products Ltd, as part of a Kraft Pulp Digester installation by Kamyr AB in the 1970's. It is located at the very top of the digester vessel.
- The working fluid is air when the vacuum breaker valve opens during the occasional draining down of the digester, but the wetted side below the valve is exposed to a mixture of white and black liquors at temperatures of about 105°C (maximum is about 130°C).
- The maximum working pressure for the top of the digester is 12.16 barg. The pressure inside the digester when it is drained could reach full vacuum.
- The VAC-100 valve relief setting is minus (-)10.34 kPag.
- The nominal material of construction is 316 stainless steel.



Process Conditions

Temperature: Between 30°C and 50°C

Media: Black liquor with 18% sodium hydroxide. Some crystallization can occur meaning that the media can be very abrasive.

Pressure: 4 barg

Function: ON/OFF (the valve is used to fill a tank)



Why the customer replaced the stainless-steel ball valve

Due to repeated leakage problems with the previous stainless-steel ball valve, the customer decided to replace it with a Ball Sector Valve model KS-1A (soft seat and hard chromed ball sector), which offer several advantages for this application:

- As the seat is fully protected by the ball sector and the seat holding ring, we could use in this case a soft seat that provides a class VI tightness as the seat is not in contact with the abrasive media when the valve is fully open or fully closed.
- It is not possible for any abrasive materials to enter the bearing, as a result of the position of the O-rings upstream of the bearing position. Meaning that no leakage can occur through the stem.
- The valve is self-cleaning due to its centric design. Deposits on the ball surface are wiped off by the seat ring. Therefore, no solid materials can get jammed between the seat ring and the ball sector when closing the valve.
- The valve do not have any hidden cavities, meaning that no fluid entrapment can occur that can lead to damage on the shaft for example.



Process Conditions

Temperature: <40 °C

Media: Reject pulp with Sand mixing 5-10%

Pressure: 1,3 barg

Flow: 75 l./min

Function: Control valve



Why the customer replaced the stainless-steel ball valve

The customer used a regular stainless-steel ball valve that only last 4 months. We offered our Ball Sector Valve model KS-1E on which the customer installed an actuator and a positioner. This valve is still in operation after 2 years of operation. Even though the media is extremely abrasive, our solution could withstand this harsh application due to its outstanding ability to handle abrasive media.

The model KS-1E is a unique design in the market providing the following features

- Extended protection of the seat holding ring as the “deep stellite seat” cover it partially.
- Complete protection of the body as the valve is installed in reverse direction, meaning that the high velocity in the vena contracta is outside the valve.
- Complete protection of the seating surface as this surface is not exposed to the media.
- Due to the “elliptical to circular opening” shape, the velocity at the throttling edge is lower compared to any other type of valve, meaning that the wear is much lower as well.



The media going through the valve

Other Products



Ramén Valves

We know the flow

Ramén Valves have several Engelsberg valves in liquor in Arauco mills. The chemical plants inside the mills were designed by EKA AkzoNobel, so we have an important installed base in that applications. Arauco own 45% of the AkzoNobel factory in Chile, because they produce their resins.

Engelsberg valves being manufactured in 316L SST is the lowest material grade as a standard but we specialize in manufacturing the valves in Titanium, Super Duplex, Duplex, SMO 254 and Hastelloy C-276, 904L SST etc.

Engelsberg product range installed in the pulp and paper industry consist of various sizes of 3-piece ball valves, swing check valves, vacuum valves, Y-type check valves, butterfly valve and globe style valves.

Do you need help with a valve solution for your pulp and paper application? Do not hesitate to contact Ramén Valves

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