



# ITT



ITT Brands

# Pumps and Valves for CO<sub>2</sub> Capture, Transportation and Storage



# CO<sub>2</sub> Capture

In most cases, carbon dioxide captured and purified for commercial applications would be vented into the atmosphere at the production point if not recovered for transport or beneficial use at other locations.

**Goulds Pumps, Rheinhütte Pumpen, and Bornemann pumps have proven experience meeting highly challenging applications like these. From the initial pump selection or design to aftermarket support, we will support your carbon capture needs:**

- Complete line of process pumps, including high-efficiency units for virtually every CO<sub>2</sub> service
- Customized onboard diagnostics that improve efficiency, reduce downtime and optimize life cycle costs
- Unmatched expertise in a broad range of materials of construction and advanced surfacing technologies.
- Vast global service network with unrivaled experience performing hydraulic re-rates and upgrades, regardless of OEM

The most common operations from which commercially-produced carbon dioxide is recovered from industrial plants which produce hydrogen or ammonia from natural gas, coal, or other hydrocarbon feedstock, and large-volume fermentation operations in which plant products are made into ethanol for human consumption, automotive fuel, or industrial use. Breweries producing beer from various grain products are a traditional source. Corn-to-ethanol plants have been the most rapidly growing source of feed gas for CO<sub>2</sub> recovery. CO<sub>2</sub>-rich natural gas reservoirs found in underground formations found primarily in the western United States and Canada, are another source of recoverable carbon dioxide.



# Experience You Can Trust

Goulds Pumps, Rheinhütte Pumpen, and Bornemann pumps are leading global solution providers with strong expertise in pump design, quality, and technical innovation. With over 160 years of experience, Goulds Pumps, Rheinhütte Pumpen, and Bornemann pumps offer a full line of pumps, equipment and service to major industries, including Oil and Gas, Chemical Processing, Hydrocarbon Processing, Power Generation, Pulp and Paper, and General Industry.

As the only manufacturer to enable digital monitoring on any process pump, we continue to lead the industry in both mechanical pump design and the adoption of smart technologies.

Goulds Pumps, Rheinhütte Pumpen, and Bornemann pumps provide comprehensive pump solutions to Carbon Capture and Storage (CCS) applications. Building on our history of being a strong partner to our customers with proven engineering expertise, we have expanded our development of pump solutions for CCS.



# CO<sub>2</sub> Capture

## Pump Supplier of Choice for Carbon Capture and Storage (CCS)

ITT Goulds Pumps, Rheinhütte Pumpen, and Bornemann pumps boast unrivaled expertise in developing and implementing pumping technologies and systems for capturing, transporting, and storing carbon dioxide (CO<sub>2</sub>). ITT Goulds Pumps, Rheinhütte Pumpen, and Bornemann pumps also possess unsurpassed experience in pumping the many solvents used to capture CO<sub>2</sub> is uniquely qualified to be the primary pump partner for customers wishing to reduce their carbon emissions.

## Pump Designs

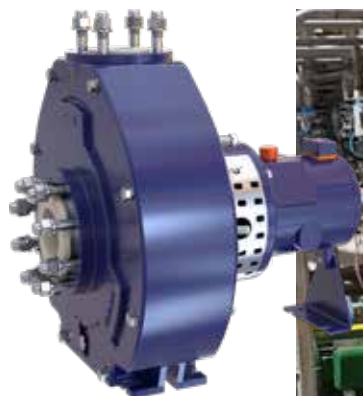
Offers a wide range of pump types to meet the varied and numerous applications in CCS. These include:

- Single stage process
- Single and multistage between bearings, axially split
- Single and multistage between bearings, radially split
- Double case
- Vertical
- Slurry

## Available Standards

Pumps comply with the most stringent industry standards, including:

- API 610
- ASME (ANSI) B73.1/B.73.3/ B.73.5
- ISO 2858
- ISO 5199
- Hydraulic Institute



# CO<sub>2</sub> Capture

## Advanced Solutions to Reduce Carbon Footprints

Combines technical expertise with cutting-edge technology to reduce the carbon footprint of industry through reduced emissions, lower energy use, and greater mechanical and process reliability.

## Technical Services

Technical Services works with plant operators to maximize productivity and minimize greenhouse gas (GHG) intensity. Nearly 200 design and application engineers are stationed on six continents to help to identify and implement proactively identify and implement equipment and system modifications that reduce energy usage and improve reliability while lowering safety, health and environmental (SH&E) costs.

## Technology Advantage™

Technology Advantage combines state-of-the-art data collection and analytical technologies with advanced equipment diagnostic solutions to identify and implement proactive maintenance, upgrades and system modifications that reduce equipment shutdowns, and process flaring. ITT has in-house capabilities to perform lateral critical speed and torsional analysis.



# Goulds Pumps and Rheinütte Pumpen - you

## Providing increasingly crucial technologies

If industrial enterprises and energy providers are to achieve their ambitious climate protection goals, they will need to find a way to isolate, transport and safely store or process the CO<sub>2</sub> they produce. The separation and sequestration of CO<sub>2</sub> is known internationally as carbon capture and storage (CCS), and its subsequent use instead of storage is referred to as carbon capture and utilization (CCU).

The full course of action is a process chain, the links of which consist of carbon capture, compression, transport, and injection for subsequent storage or utilization.

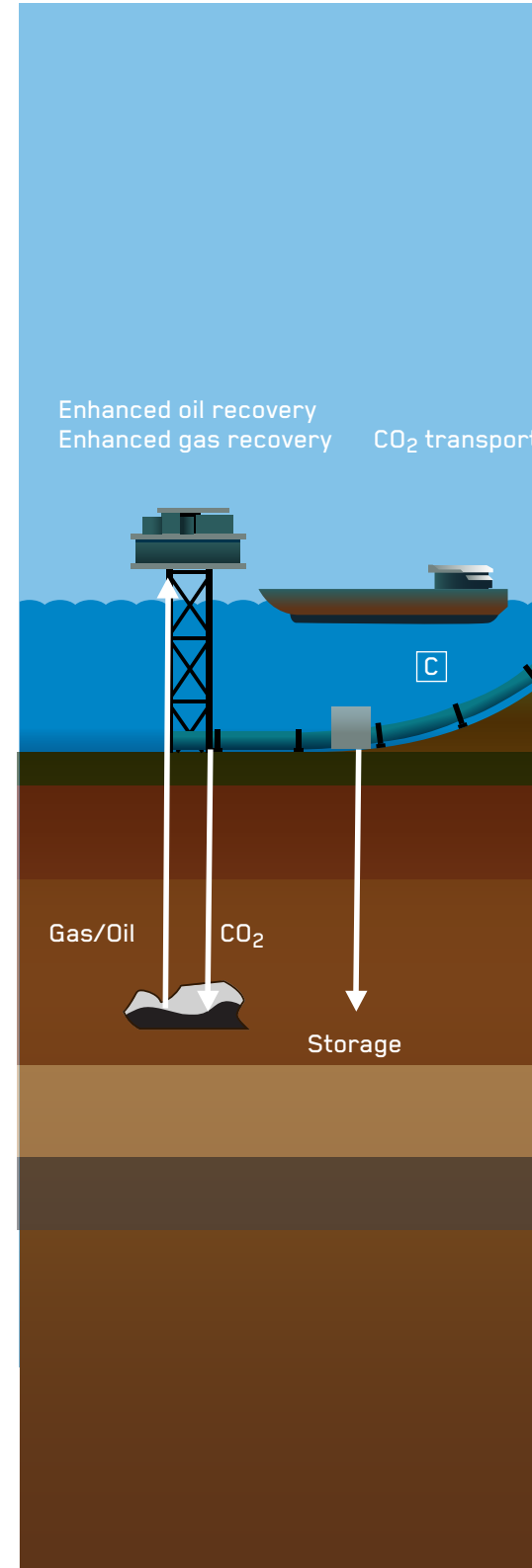
## Perfect products, special consultancy

Our long-standing experience makes us your ideal partner to reliably and efficiently find and implement individual solutions for all points of the process, for all methods of capture and for all types of plant. As a global market leader for pumps and systems, we also make a perfect partner for all operators, consultants and engineering contractors.

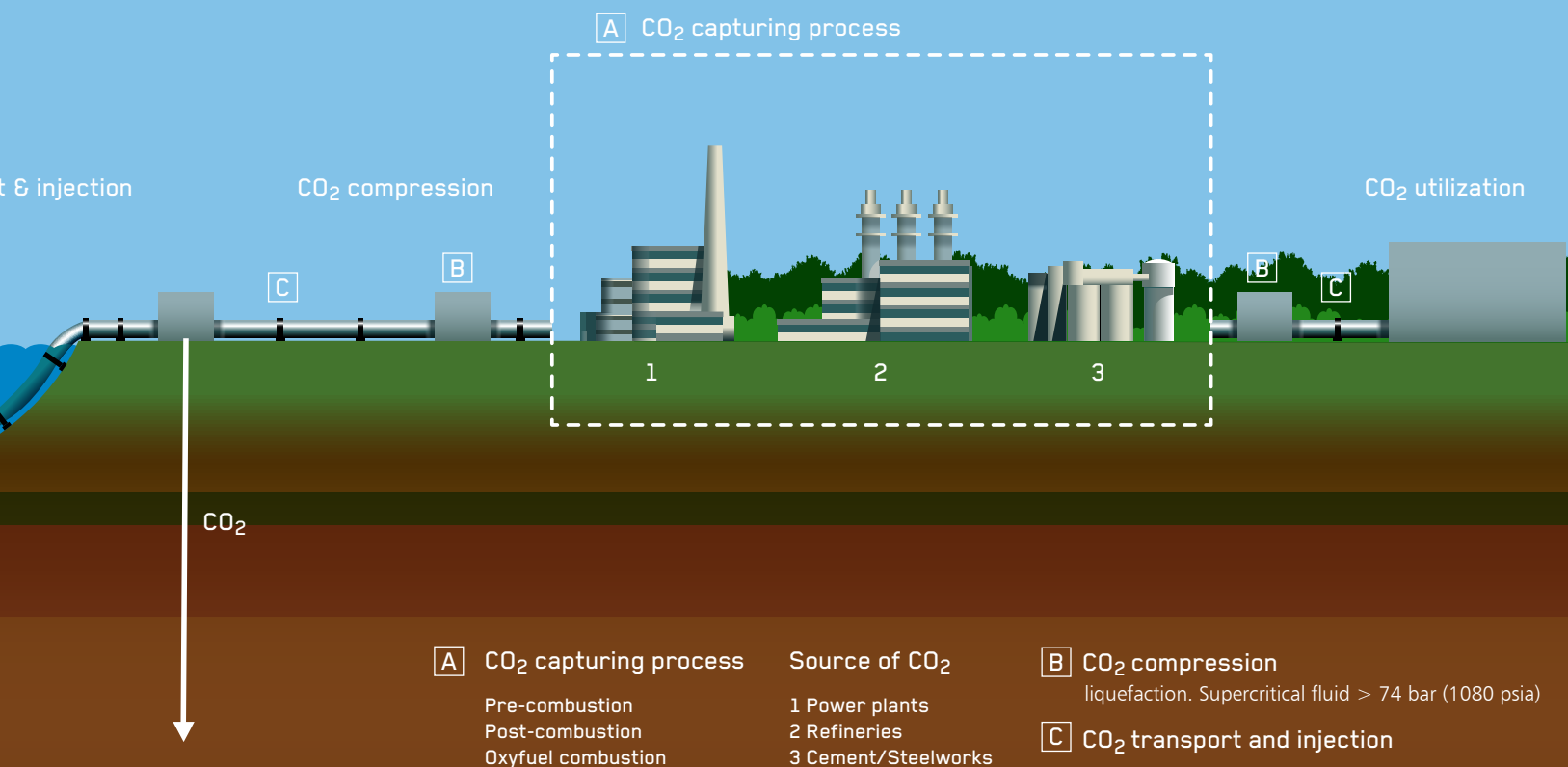
Our full solids non-metallic material offers a strong corrosion and wear resistance in Scrubber systems with optimized sealing solutions for corrosive and solid loaded scrubber fluids.

We have optimum application-specific pump designs that meet the high requirements in the field of flue gas cleaning. Our pumps are characterized by long service intervals, operational reliability, and extremely favorable life cycle costs.

Give us a call today and chat with one of our specialists.



# our partner for CO<sub>2</sub> applications.



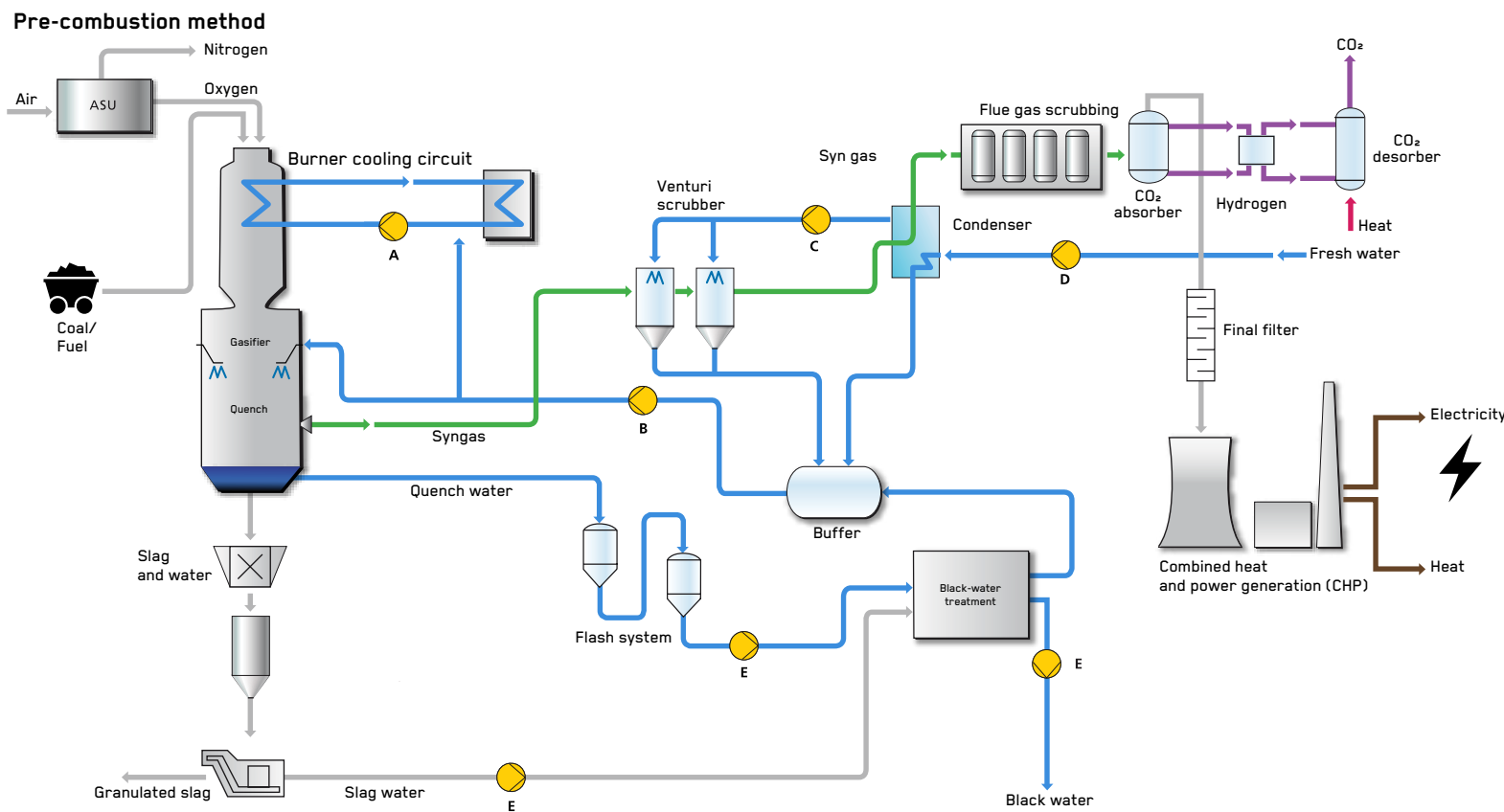
**Capture » Compression » Transport » Injection**

# The Pre-combustion Method

In the pre-combustion method, the CO<sub>2</sub> is captured prior to combustion. This involves subjecting coal to high temperatures and high pressure in a gasifier, hence converting it to syngas consisting primarily of hydrogen and carbon monoxide (CO).

## Energy recovery included

In a downstream shift reaction, the syngas is converted to hydrogen and CO<sub>2</sub> that can be captured. The hydrogen serves as fuel for generating energy in a gas turbine. Referred to as the integrated gasification combined cycle (IGCC), this process is best suited for new plants.



### Goolds Pumps & Rheinhütte pumps

A. Pump for cooling-water circuits (burners)
B. Pump for cooling -water circuits (syngas)
C. Pump for flue gas scrubbing
D. Pump for feed-water and fresh-water applications
E. Pump for black-water treatment





## ANSI, ISO and API Process Pump

model 3196 | model ICP | model 3700i | model IC



## Non-Metallic pumps

model RCNku+ | model RCNku | model NM3196 | model 3198



## Heavy-Duty, Axially Split Between Bearings Pump

model 3600 | model 7200SB | model 3620i/3640i



## Multiphase pumps

model MPC HC



## Multistage/Double Suction

model 3409 | model 3393 | model 3410



## Vertical mixed and radial flow type pumps

model VICR | model VIT | model VIC | model VCW



## Sealless Lined & Non-Metallic

model 3296 | model 3298 | model ICM



## Process Pump

model 3180

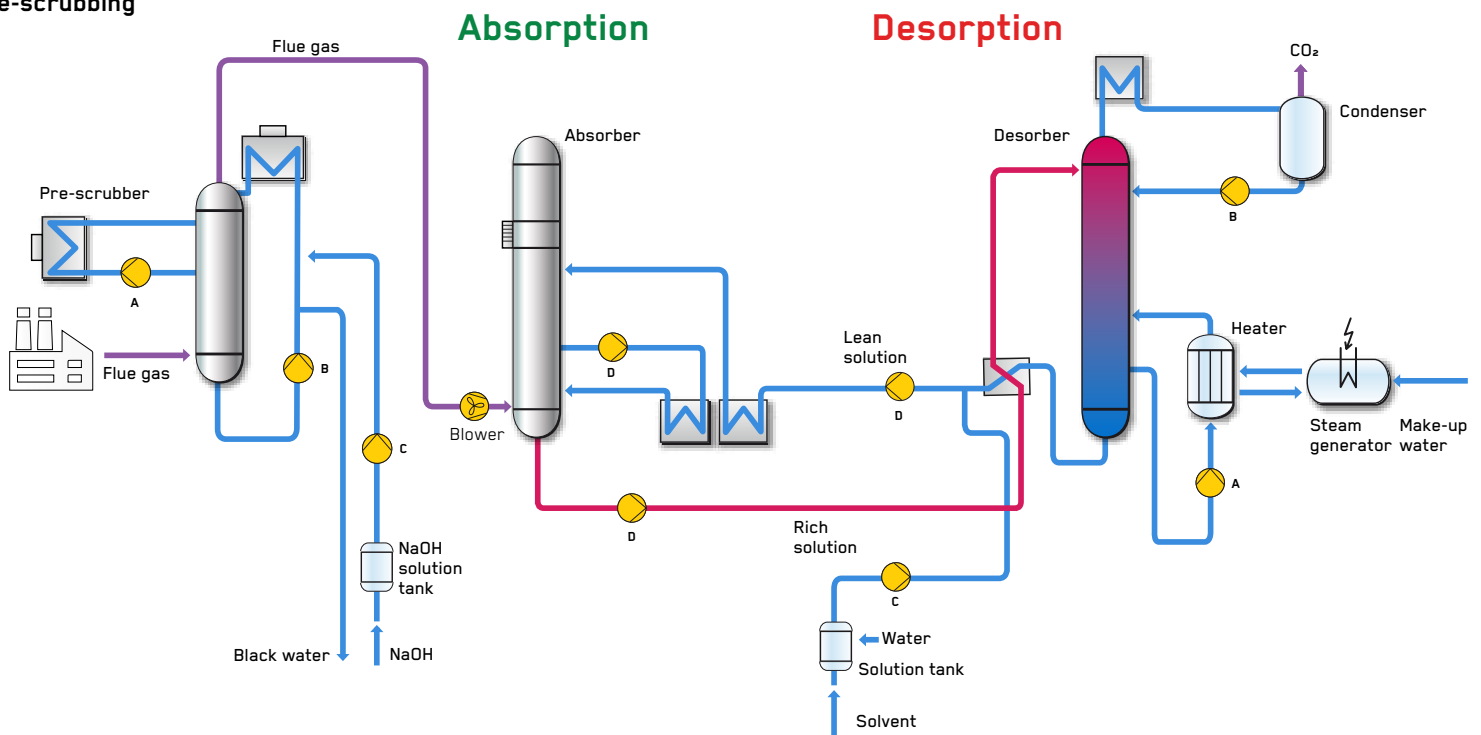
# The Post-Combustion Method

The post-combustion process is a method of separating CO<sub>2</sub> out of flue gas from a combustion process. Several different variants are available, and there are physical as well as chemical methods for scrubbing the flue gas.

## Readily Retrofitted

First, the flue gas is relieved of its ash, sulfur, and nitrogen oxides and cooled. Then, it is put through a scrubber (absorber), where a solvent captures the CO<sub>2</sub>. The CO<sub>2</sub>-laden solvent is then pumped through a desorber, where heat is added to separate the CO<sub>2</sub> from the solvent and make it ready for further treatment. The solvent can then be returned to the process.

### Post-combustion method Pre-scrubbing

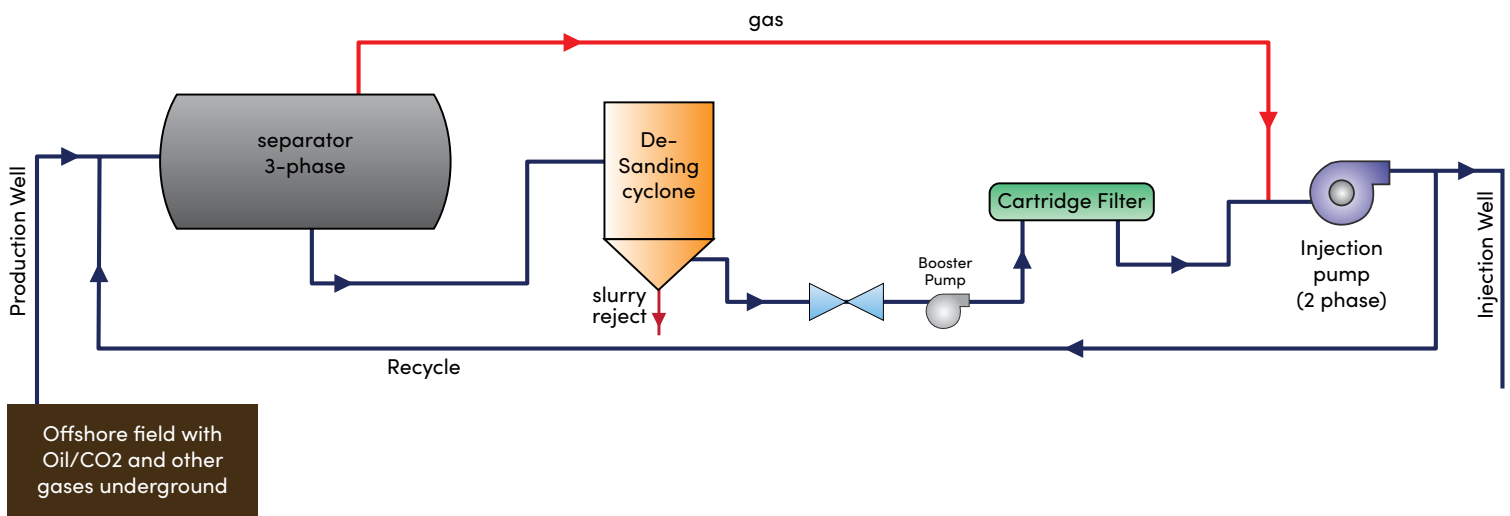


### Goolds Pumps & Rheinhütte pumps

- |                                     |
|-------------------------------------|
| A. Pump for flue gas scrubbing      |
| B. Pump for cooling -water circuits |
| C. Pump for solvent handling        |
| D. Pump for solution transport      |

ITT provides equipment from Production well to the Injection well with Goulds Pumps and Bornemann pumps.

### Sample overview of the CO2 capture to injection cycle



Oil, CO2 and other gases are extracted from the production well into a separator, where the different gases are classified at the gas plant: LNG, CO2, natural gas, others.

CO2 is collected and re-injected down another well at more than 2 Km for storage. Water pressure is regulated above the CO2 zone to contain the gas, monitoring the well conditions.

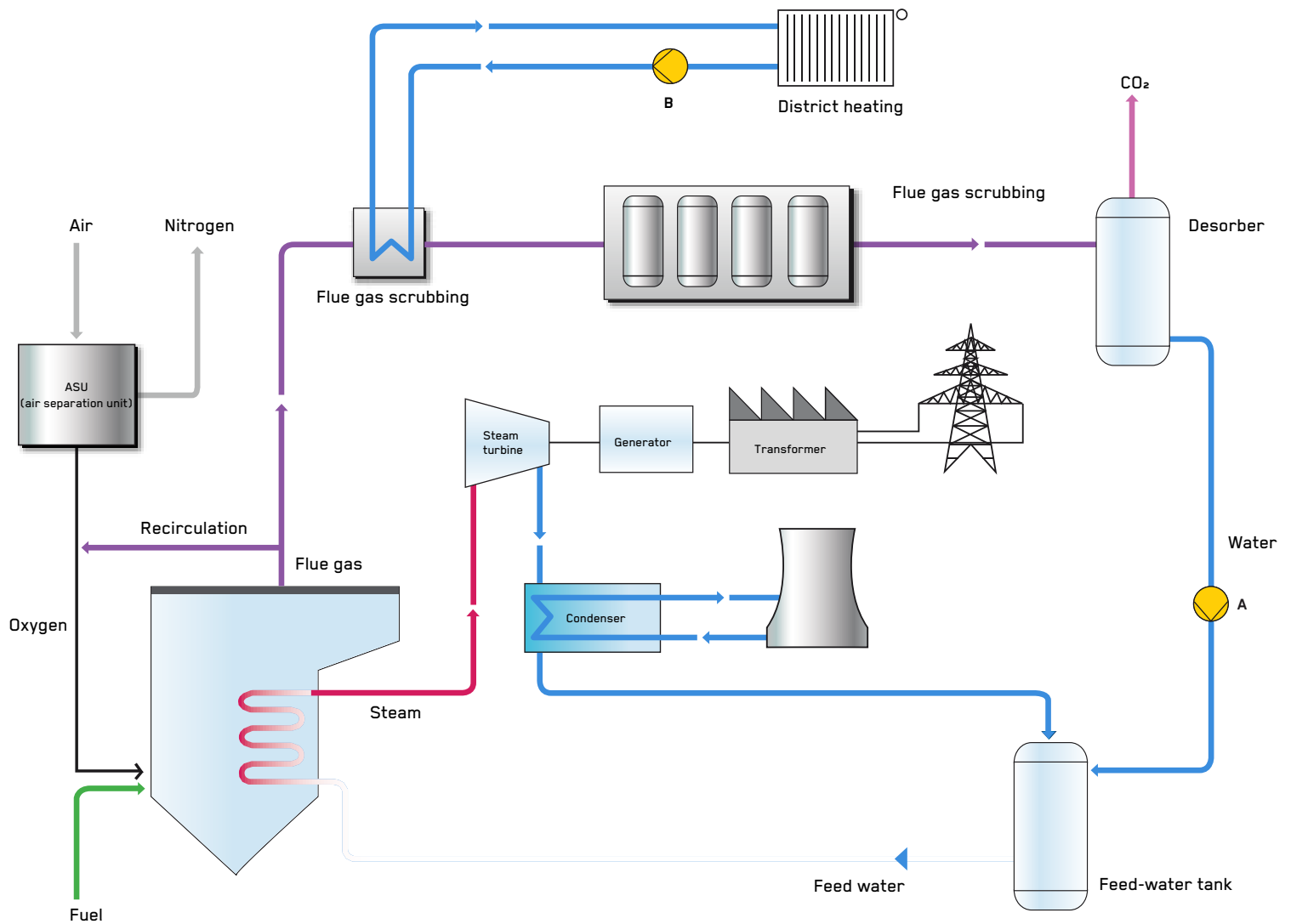
# Application Solutions

			3600	VICR	3393	7200SB
Separation systems	Pre-combustion	Cooling-water circuits (burners)				
		Cooling-water circuits (syngas)				
		Flue gas scrubbing				
		Feed-water and fresh-water applications				
		Black-water treatment				
	Post-combustion	Flue gas scrubbing				
		Cooling-water circuits				
		Solvent handling				
		Solution transport				
	Oxy fuel	Cooling-water circuits				
		District heating				





# OXY FUEL Combustion Capture Process



## Goulds Pumps & Rheinhütte pumps

A. Pump for cooling -water circuits

B. Pump for district heating

# CO<sub>2</sub> Capture

## CO<sub>2</sub> Capture Technologies

The process technologies we provide to capture CO<sub>2</sub> have been well-proven in the gas processing, chemical and petroleum industries for more than 50 years and has been there every step of the way.

With the growing worldwide emphasis on curtailing and regulating GHG, CO<sub>2</sub> capture technologies may soon be applied on a much larger scale to fossil fuel power stations, oil and gas processing plants, and general industrial manufacturing, such as steel mills and cement plants. To comply with GHG limits, the industries will need to install CO<sub>2</sub> capture absorption trains with reliable pumping solutions.

## Experience, Technology, and Support You Can Trust For Your Carbon Capture Needs

With one of the largest installed bases of CO<sub>2</sub> solvent process pumps in the world; we have proven experience meeting highly challenging applications. From initial pump selection or design to aftermarket support, ITT Goulds Pumps and Rheinhütte Pumpen names you can trust for your carbon capture needs:

- The most complete line of process pumps, including high-efficiency units for virtually every CO<sub>2</sub> service
- Customized diagnostics that improve efficiency, reduce downtime and optimize life cycle costs
- Unmatched expertise in a broad range of materials of construction and advanced surfacing technologies, including through hardening, HVOF, and DLD overlays and ceramic coatings
- The largest global service network with unrivaled experience performing hydraulic re-rates and upgrades, regardless of OEM



# ANSI, ISO and API Process Pumps

## 3196



- Capacities to 1,364 m<sup>3</sup>/h | 7,000 GPM
- Heads to 223 m | 730 ft
- Temperatures to 371° C | 700° F
- Pressures to 26 bar | 375 PSIG

### Applications:

- Chemical
- Petrochemical
- Pulp & Paper
- Primary Metals
- Food & Beverage
- General Industries

**Materials:** Ductile Iron, 316SS, CD4MCu, Alloy 20, Monel, Nickel, Hastelloy B and C, Titanium

## ICP



- Capacities to 450 m<sup>3</sup>/h | 1,980 GPM
- Heads to 150 m | 492 ft
- Temperature ranges from -40° C to 280° C | -40° F to 535° F
- Pressures to 25 bar | 363 PSIG

### Applications:

- Hot Water
- Thermal Oils
- Heat Transfer Fluids
- Die/Mold Pre-Heating Systems
- Pilot Plants
- Electronic Heating and Cooling
- Reactor Heating
- Urea

**Materials:** Carbon Steel, 316SS, Alloy 20, Duplex SS, Hastelloy C

## 3700i



- Capacities to 1930 m<sup>3</sup>/h | 8,500 GPM
- Heads to 360 m | 1,200 ft
- Temperatures to 425° C | 800° F
- Pressures from full vacuum to 60 bar | 870 PSIG

### Applications:

- Column Reflux
- Column Bottoms
- Reboiler
- Injection
- Fuel Blending
- Heat Transfer
- Slop Gas Oil
- Heavy Gas Oil
- Stripper Overhead

- Hot Oil
- Column Charge
- Reactor Feed
- Stabilizer Overhead
- Scrubber Circulation
- Tower Bottoms
- Offsite Hydrocarbon Transfer

**Materials:** All API materials, custom materials available

## 3171



- Capacities to 722 m<sup>3</sup>/h | 3,180 GPM
- Heads to 95 m | 344 ft
- Temperatures to 232° C | 450° F
- Pit Depths to 6 m | 20 ft

### Applications:

- Industrial Process
- Industrial Sump Wastes
- Molten Sulfur
- Tank Unloading
- Corrosive and Non-Corrosive Liquids

**Materials:** Cast Iron, Bronze-fitted, Carbon Steel, 316SS, Alloy 20, Hastelloy B and C, Duplex SS



## GVSO



- Capacities to 4000 m<sup>3</sup>/h | 17612 GPM
- Heads to 150 m | 492 ft
- Temperatures to from  
-40 °C to 600 °C | -40 °F to 1112 °F
- Pressures to 40 bar | 580 PSIG

### Applications:

Aggressive, also contaminated fluids, liquefied gases and melts like e.g. sulphuric acid at all concentrations, oleum, molten sulfur, Phthalic acid and molten salts

### Materials:

- 1.0619 (A 216 Grade WCA / WCB)
- 1.4136S (Rheinhütte material)
- 1.4306S (A 743 CF-3 (Type 304L))
- 1.4408 (A 743 CF-8M (Type 316))
- 1.4517 (A890 Grade 1B / A743 Gr. CD4MCuN)
- 1.4529S (A 743 CN3MN (AL-6 XN))
- 1.4581 (A 743 CF-8M (+Nb) / A 351 CF10MC (Type 316Cb))
- 1.7357 (A 217 Grade WC6)
- R30.20 (A 743 CN7M (Alloy 20))
- RH-SX (alloy SX)

## IC i-FRAME



- Capacities to 450 m<sup>3</sup>/h | 1,980 GPM
- Heads to 160 m | 525 ft
- Temperature ranges from  
-40° C to 280°C | -40° F to 530° F
- Pressures to 25 bar | 360 PSIG

### Applications:

- Chemical
- Petrochemical
- Pulp & Paper
- Primary Metals
- Food & Beverage
- General Industries

**Materials:** Ductile Iron, Carbon Steel, 316SS, Duplex SS, Alloy 20, Hastelloy C, Titanium

# Heavy-Duty, Axially Split Between Bearings Pumps

## 3600



- Capacities to 1,930 m<sup>3</sup>/h | 8,500 GPM
- Heads to 2,740 m | 9,000 ft
- Temperatures to 205° C | 400° F
- Pressures to 275 bar | 4,000 PSIG

### Applications:

- Refineries
- Injection offshore platforms
- Pipeline
- Boiler feed
- Descaling
- Mine dewatering
- Process transfer
- Desalination
- Water injection
- CO<sup>2</sup> injection

**Materials:** All API materials, custom materials available

## 3620i/3640i



- Capacities to 4,540 m<sup>3</sup>/h | 20,000 GPM
- Heads to 455 m | 1,500 ft
- Temperatures to 455° C | 850° F
- Pressures to 70 bar | 1,000 PSIG

### Applications:

- Refinery – Tower bottoms, process feed, column reflux, circulation and pump around, process booster
- Power Plant – Boiler feed booster, boiler circulation, ash sluice

**Materials:** All API materials, custom materials available

## 7200SB



- Capacity to 600 m<sup>3</sup>/h | 2,200 GPM
- Total Dynamic Head to 2430 m | 8,000 ft
- Temperature to 425° C | 800° F
- Pressure to 275 Bar | 4,000 PSIG
- Operating Speed to 3,600 RPM

### Applications:

- Petroleum refining, production, and distribution
- Petrochemical and demanding chemical processing
- High temperature applications including boiler circulation
- General industrial requiring high temperature or high pressures

**Materials:** All API materials, custom materials available

# Multistage/Double Suction

## 3393



- Capacities to 750 m<sup>3</sup>/h | 3,300 GPM
- Heads to 1,000 m | 3,300 ft
- Temperatures to 177° C | 350° F
- Pressures to 114 bar | 1,650 PSIG

### Applications:

- Reverse osmosis
- Boiler feed
- Cogeneration
- Shower / spray service
- Pressure boosting
- High Pressure Cleaning
- Snow making

**Materials:** 12% chrome, duplex and super duplex stainless steels, Other materials available upon request.

## 3409



- Capacities to 2,725 m<sup>3</sup>/h | 12,000 GPM
- Heads to 259 m | 850 ft
- Temperatures to 120° C | 250° F
- Working Pressures to 2758 kPa | 400 PSIG

### Applications:

- Process – Quench water, Stripper bottoms, Reboiler circulation, Cooling tower
- Pulp & Paper – Primary and secondary cleaner, filtrate, mill water supply Fan pump, Headbox supply, Shower
- Primary Metals – Cooling water, quench and leaching
- Municipal – High lift, low lift, wash water, waste water, raw water
- Power Generation – Cooling tower, Component cooling, Service water, Ash Sluicing, Heater drain
- Marine – Bilge and ballast, cargo, cooling water, fire pump
- General – River water, Brine, Sea water

**Materials:** Cast Iron / Bronze, All Iron, Cast Iron / Stainless Steel, Cast Iron / Ni-Al-Br, All Stainless Steel. Other materials available upon request.

## 3410



- Capacities to 1,817 m<sup>3</sup>/h | 8,000 GPM
- Heads to 174 m | 570 ft
- Temperatures to 177° C | 350° F
- Pressures to 1,724 kPa | 250 PSIG

### Applications:

- Process – Quench water, Stripper bottoms, Reboiler circulation, Cooling tower
- Pulp & Paper – Primary and secondary cleaner, filtrate, mill water supply shower, fan pump
- Primary Metals – Cooling water, quench and leaching
- Municipal – High lift, low lift, wash water, waste water, raw water
- Utilities – Cooling tower, component cooling, service water
- Marine – Bilge and ballast, cargo, cooling water, fire pump

**Materials:** Cast Iron / Bronze, All Iron, Cast Iron / Stainless Steel, Cast Iron / Ni-Al-Br, All Stainless Steel. Other materials available upon request.

# Vertical API and ANSI Pumps

## VICR



- Capacities to 636 m<sup>3</sup>/h | 2,800 GPM
- Heads to 1,372 m | 4,500 ft
- Temperatures to 204°C | 400° F
- Discharge flange sizes from 38 mm to 203 mm | 1.5" to 8"
- Powers to 3,000 KW | 4,000 hp

### Applications:

- Pentane, Propane, LPG and other light hydrocarbons with specific gravities ranging from 0.2 to 1.0
- Hotwater applications such as Boiler feed water

NOTE: Can be built to follow API or ANSI specifications.

## VIT



- Capacities to 15,900 m<sup>3</sup>/h | 70,000 GPM
- Heads to 1,067 m | 3,500 ft
- Pressures to 176 kg/cm<sup>2</sup> | 2,500 psi
- Bowl sizes from 152.4 mm to 1,400 mm | 6" to 55"
- Temperatures to 204°C | 400° F
- Horsepower to 3,730 KW | 5,000 HP

### Applications:

- Cooling Water
- Seawater & River Water Intake
- Industrial Process Pumps
- Utility Circulating Water
- Condenser Circulating Water Pumps
- Fire Service
- Reclaimed Water

**Materials:** Any Machinable Alloy

NOTE: Can be built to follow API or ANSI specifications.

## VIC



- Capacities to 15,900 m<sup>3</sup>/h | 70,000 GPM
- Heads to 1,067 m | 3,500 ft
- Pressures to 176 kg/cm<sup>2</sup> | 2,500 psi
- Bowl sizes from 152.4 mm to 1,400 mm | 6" to 55"
- Temperatures to 204°C | 400° F
- Horsepower to 3730 KW | 5,000 HP

### Applications:

- Pipeline Booster
- Product Transfer, Refinery Blending
- Injection-Secondary Recovery
- Chemical Transfer
- Boiler Feed
- Condensate
- Cryogenics
- LNG Transfer
- Light Hydrocarbons
- Water Services

**Materials:** Any Machinable Alloy

NOTE: Can be built to follow API or ANSI specifications.

## VCW



- Capacities to 91,000 m<sup>3</sup>/h | 400,000 GPM
- Heads to 180 m | 600 ft
- Powers to 7,500 KW | 10,000 hp

**Materials:** Bronze Fitted, All Bronze, SS Fitted, Ni Resist, All SS

NOTE: Can be built to follow API or ANSI specifications.

# Sealless Lined & Non-Metallic

## 3296



- Capacities up to 159 m<sup>3</sup>/h | 700 GPM
- Heads to 213 m | 700 ft
- Temperatures to 280° C | 535° F
- Pressures to 19 bar | 275 PSIG

### Applications:

- Batch Chemical Process
- Rail Car or Tank Unloading
- Specialty Chemicals

**Materials:** 316SS, others upon request

## 3298



- Capacities to 270 m<sup>3</sup>/h | 1,200 GPM
- Heads to 162 m | 500 ft
- Temperatures to 121° C | 250° F
- Pressures to 16 bar | 225 PSIG

### Applications:

- Hydrochloric Acid
- Hydrofluoric Acid
- Ferric Chloride
- Pickling Acid
- Plating Acid
- Plating Solutions
- Chlorinated Brine
- Chlorinated Hydrocarbons
- Sodium Hypochlorite
- Chlorine Dioxide

### Materials:

- ETFE

## ICM



- Capacities to 400 m<sup>3</sup>/h | 1,760 GPM
- Heads to 210 m | 685 ft at 3,500 rpm
- Temperature ranges from -40° C to 180° C | -40° F to 360° F
- Pressures to 16 bar | 232 PSIG

### Applications:

- Batch Chemical Process
- Rail Car or Tank Unloading
- Specialty Chemicals

### Materials:

- Stainless Steel
- Hastelloy
- Ductile Iron
- Alloy 20

# Sealed Lined & Non-Metallic

## NM 3196



- Capacities to 318 m<sup>3</sup>/h | 1,400 GPM
- Heads to 152 m | 500 ft
- Temperatures to 93° C | 200° F
- Pressures to 15 bar | 220 PSIG

### Applications:

- Hydrochloric Acid Unloading
- Ferric Chloride
- Sulfuric Acid Transfer
- Sodium Sulphite
- Sulphate Liquors
- Plating Solutions
- Filter Feed
- Aquarium Water
- Sea Water
- Chlorine Dioxide

### Materials:

- Glass reinforced Vinyl Ester  
(other resins available upon request)

## 3198



- Capacities to 182 m<sup>3</sup>/h | 800 GPM
- Heads to 137 m | 450 ft
- Temperatures to 149° C | 300° F
- Pressures to 16 bar | 225 PSIG

### Applications:

- Hydrochloric Acid
- Hydrofluoric Acid
- Ferric Chloride
- Pickling Acid
- Plating Acid
- Plating Solutions
- Chlorinated Brine
- Chlorinated Hydrocarbons
- Sodium Hypochlorite
- Chlorine Dioxide

### Materials:

- PFA

## RCNKu



- Capacities to 2500 m<sup>3</sup>/h | 11007 GPM
- Heads to 100 m | 328 ft
- Temperature ranges from  
-40 °C to 190 °C | -40 °F to 374 °F
- Pressures to 16 bar | 232 PSIG

### Applications:

- Brine
- Chemical Wastewater
- Chloralkali
- Flue gas scrubbers
- Waste incineration plants
- Hydrochloric acid
- Sea water
- Steel industry
- Sulphuric acid

### Materials:

- PP
- PE 1000
- PE 1000R
- PVDF
- PTFE

# Sealed Lined & Non-Metallic

## RCNKu+



- Capacities to 400 m<sup>3</sup>/h | 1761 GPM
- Heads to 110 m | 361 ft
- Temperature ranges from -40 °C to 130 °C | -40 °F to 266 °F
- Pressures to 16 bar | 232 PSIG

### Applications:

- Brine
- Chemical Wastewater
- Chloralkali
- Flue gas scrubbers
- Waste incineration plants
- Hydrochloric acid
- Sea water
- Steel industry
- Sulphuric acid

### Materials:

- PP
- PE 1000
- PE 1000R
- PVDF

# Process Pumps

## 3180



- Capacities to 9,000 m<sup>3</sup>/h | 40,000 GPM
- Heads to 125 m | 410 ft
- Temperatures to 230° C | 446° F
- Pressures to 16 bar | 232 PSIG

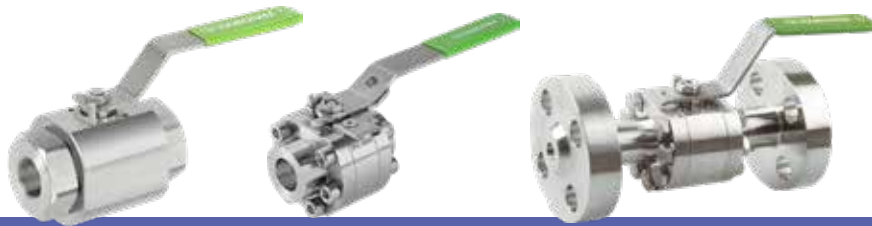
### Applications:

- Paper Stock
- Black Liquor
- Chemical Process
- Wastewater

**Materials:** Al/CD4MCuN, CD4MCuN, 316SS, 317SS, Hast-C, Alloy 20, Super Duplex. Other materials available upon request.

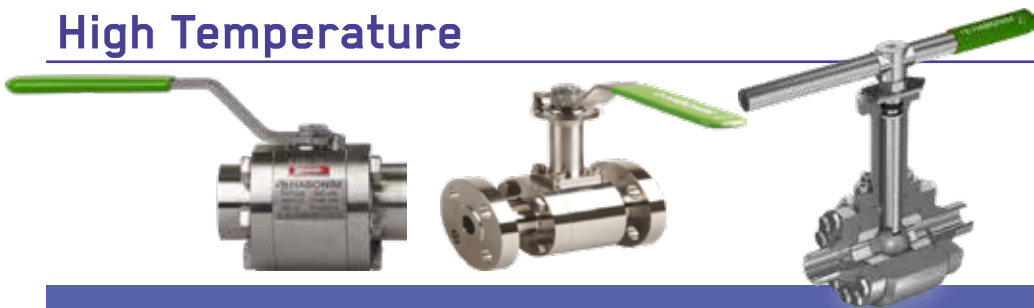
# Habonim Valves

## High Pressure



- Model 28
- Model 27
- Model 24

## High Temperature



- Model Z47
- Model Z73/4

## Industrial



- Model 47
- Model 31/2
- Model 73/4

## Control



- Model N47
- Model N31/2
- Model N73/4



# Valve Application Solutions

VALVES			28, 27, 24	Z47, Z73/4	47, 31/2, 73/4	N47, N31/2, N73/4
Separation systems	Pre-combustion	Cooling-water circuits (burners)	■		■	■
		Cooling-water circuits (syngas)	■		■	■
		Flue gas scrubbing	■		■	■
		Black-water treatment			■	
	Post-combustion	Flue gas scrubbing		■	■	
		Handling, injection	■	■	■	■
		Solution transport	■		■	
	Oxy fuel	Cooling-water circuits				
		District heating				

# Engineered Valves



## Dia-Flo

Dia-Flo® diaphragm valves are an economical solution for various CO<sub>2</sub> Capture applications due to their versatility in body and diaphragm materials. Capable of handling clear fluids as well as slurries, diaphragm valves are well suited for corrosive, abrasive and clogging services. Both Dia-Flo weir and straightway style valves are available with a manual operator or Dia-Flo® actuator (pneumatic or electric).

- Size Range: 1/2" – 12"
- Pressure Rating: 200 PSIG Max
- Temperature: 350F Max
- Materials: Unlined, Plastic/Rubber/Glass Lined, Solid Plastic
- End Connection: Flanged, Weld End, Threaded



## Cam-Tite

Cam-Tite ball valves are engineered to provide the very best performance in demanding hazardous and corrosive applications. The unique non-spherical ball mechanically compresses both upstream and downstream seats to provide a tight, dependable seal independent of line pressure.

- Size Range: 1/2" – 6"
- Pressure Rating: 150#, 300# & 600#
- Temperature: 550F Max
- Materials: Carbon Steel, Stainless Steel, Alloy 20, Monel, Hastelloy C, Nickel, Titanium, Inconel
- End Connection: Flanged, Weld End, Threaded

### Benefits:

- Minimizes pressure on seats to reduce cold flow and extend seat life.
- Eliminates the problem of "breakaway torque" in valves that must rest in the open position for long periods.
- Assures positive sealing regardless of line pressure or pressure differential.
- Eliminates seat damage caused by the leading edge of the ball port cutting into the seat as the ball closes.



## Cam-Line

The unique Cam-Line trunnion ball valve was designed to overcome problems inherent in conventional lined plug and ball valves (high operating torque and stem leakage). The design objective was to produce a lined quarter-turn valve that is easy to operate with positive shut off at high and low pressures. To provide a reliable stem seal design, every Cam-Line valve comes standard with a low emission stem seal packing design.

- Size Range: 3/4" – 6"
- Pressure Rating: 250 PSIG Max
- Temperature: 250F Max
- Materials: Ductile Iron / ETFE Lined
- End Connection: Flanged

# i-ALERT<sup>®</sup>

## Remote Monitoring Solution

### Zero Unplanned Downtime

Sensor | App | Gateway | Diagnostics | Ai Platform



## Monitor

Tracks vibration, temperature & run-time hours 24/7/365.

## Alarm

Takes high resolution data when an alarm condition occurs and stores it for later analysis.

## Trend

Captures data every 30 seconds - 60 minutes and has up to 170 days of hourly on-board storage.

## Analyze

Diagnose machine faults with vibration tools  
Fast Fourier Transform (FFT) & Time Wave Form Analysis.

## Environment

Rated for any industrial environments; Water & dust resistant.  
Intrinsically safe with a 2-3-year battery life (use dependent).

- Class1 div1
- ATEX Zone 0 AEx ia IIB Ga (Groups C & D)

## Wireless

Sync data via Bluetooth 5.0 or i-ALERT Gateway enabled smartphones and tablets.

## Online Monitoring & Diagnostics

Monitor and manage your i-ALERT enabled machines in one place - i-ALERT Ai Online Platform with automated diagnostics. This subscription service requires no software to download or dedicated hardware to run.

[www.i-alert.com](http://www.i-alert.com)

# Monitor & Control

## PumpSmart

### PS220

## Smart Control and Protection



The industry award-winning and patented pump control logic delivers real-time control and protection of your pumps while also providing valuable process insight. By protecting against pump failure due to process upsets, PumpSmart keeps your operation running longer and reduces unplanned repair activities and expense. By right-sizing your pumps to your system, we can reduce not only your energy consumption, but also wear & tear on your process systems.

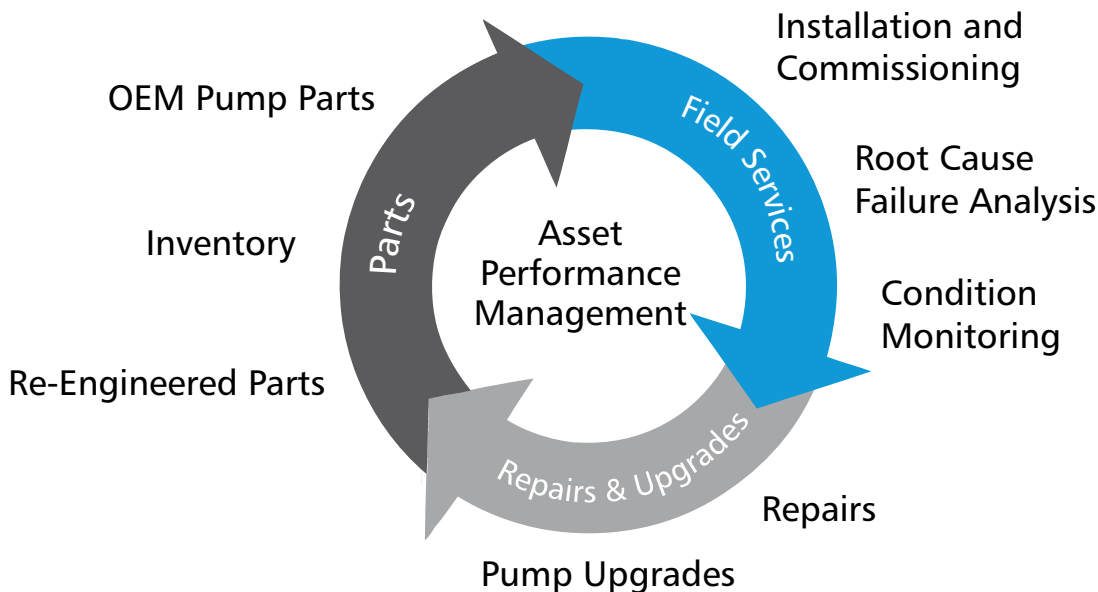
## Features:

- **Smart Flow**  
This patented feature allows PumpSmart to accurately control a process flow WITHOUT a flow meter.
- **Pump Protection**  
Provides the operator the ability to set protection for low flow, no flow, run-out and cavitation.
- **Flow Economy**  
Calculates process efficiency by flow of product versus energy consumption (gpm/kW).
- **Multi-Pump Control**  
Provides control for up to four pumps in a parallel for automatic lead/lag changeover, redundancy back-up and synchronized torque control while still communicating to a field bus or DCS system.
- **Options and Engineered Solutions**  
Available in a low-harmonic configuration guaranteed to meet IEEE519 harmonic specifications for industries requiring low-harmonic distortion on the utility line.

[www.pumpsmart.com](http://www.pumpsmart.com)

# Reliability has no quitting time.

Building on centuries of pump design experience, **PRO Services** provides an array of services focused on reducing equipment total cost of ownership (TCO) and increasing plant output, including condition monitoring, predictive maintenance contracts, field service, engineered upgrades, inventory management, and overhauls for pumps and other rotating equipment.



<https://www.ittproservices.com/About/Service-Locations>



ITT Brands

240 Fall Street  
Seneca Falls, NY 13148  
Phone: 315.568.2811  
Fax: 315.568.2418  
[www.gouldspumps.com](http://www.gouldspumps.com)

ITT RHEINHÜTTE Pumpen GmbH  
Rheingaustraße 96-98  
D-65203 Wiesbaden  
T +49 611 604-0  
[info@rheinhuette.com](mailto:info@rheinhuette.com)  
[www.rheinhuette.de](http://www.rheinhuette.de)

ITT Bornemann GmbH  
31683 Obernkirchen  
Germany  
Tel: +49 5724 390-0

ITT Engineered Valves  
33 Centerville Road  
Lancaster, PA 17603, USA  
Tel: +1 (717) 509-2200

Habonim  
[www.habonim.com](http://www.habonim.com)