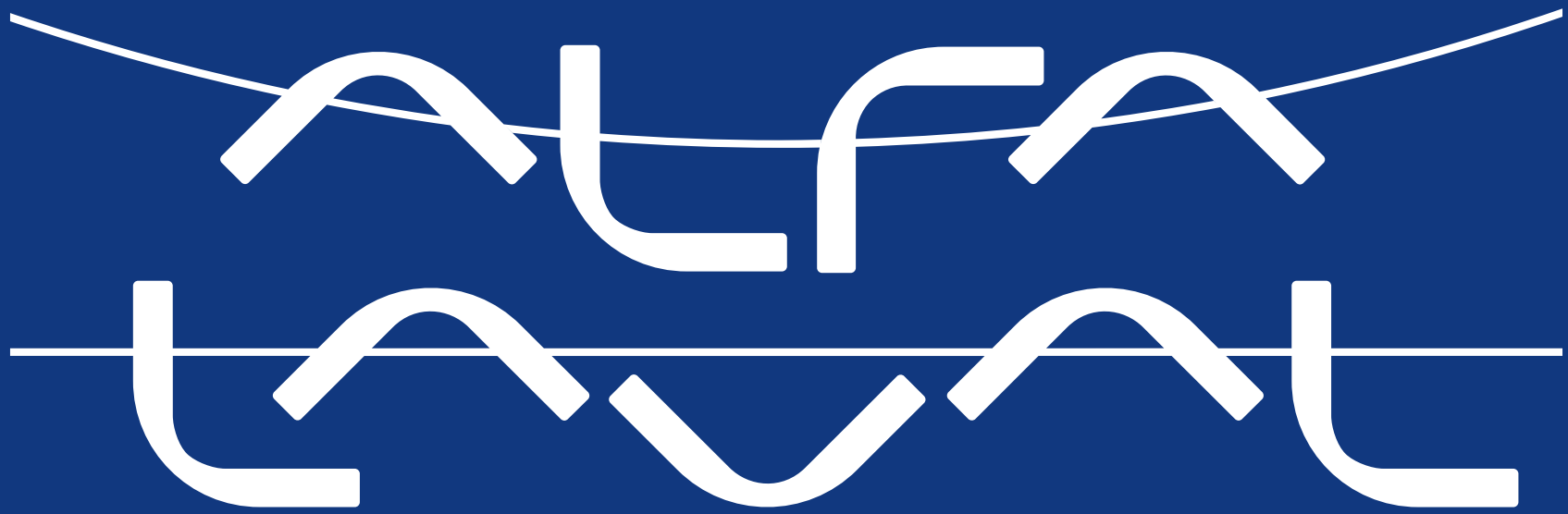

ALFA
LAVAL

Decanters in food production

– The importance of solids transportation

Bjarne Hansen

Kenn Honoré Jepsen

Our purpose

– Advancing better™

We serve most industries

Biofuels
Biotech and pharmaceutical
Chemicals
Crude oil refinery
Engine and transport
Fluid power
Food and beverages
HVAC
Industrial fermentation
Latex
Machinery



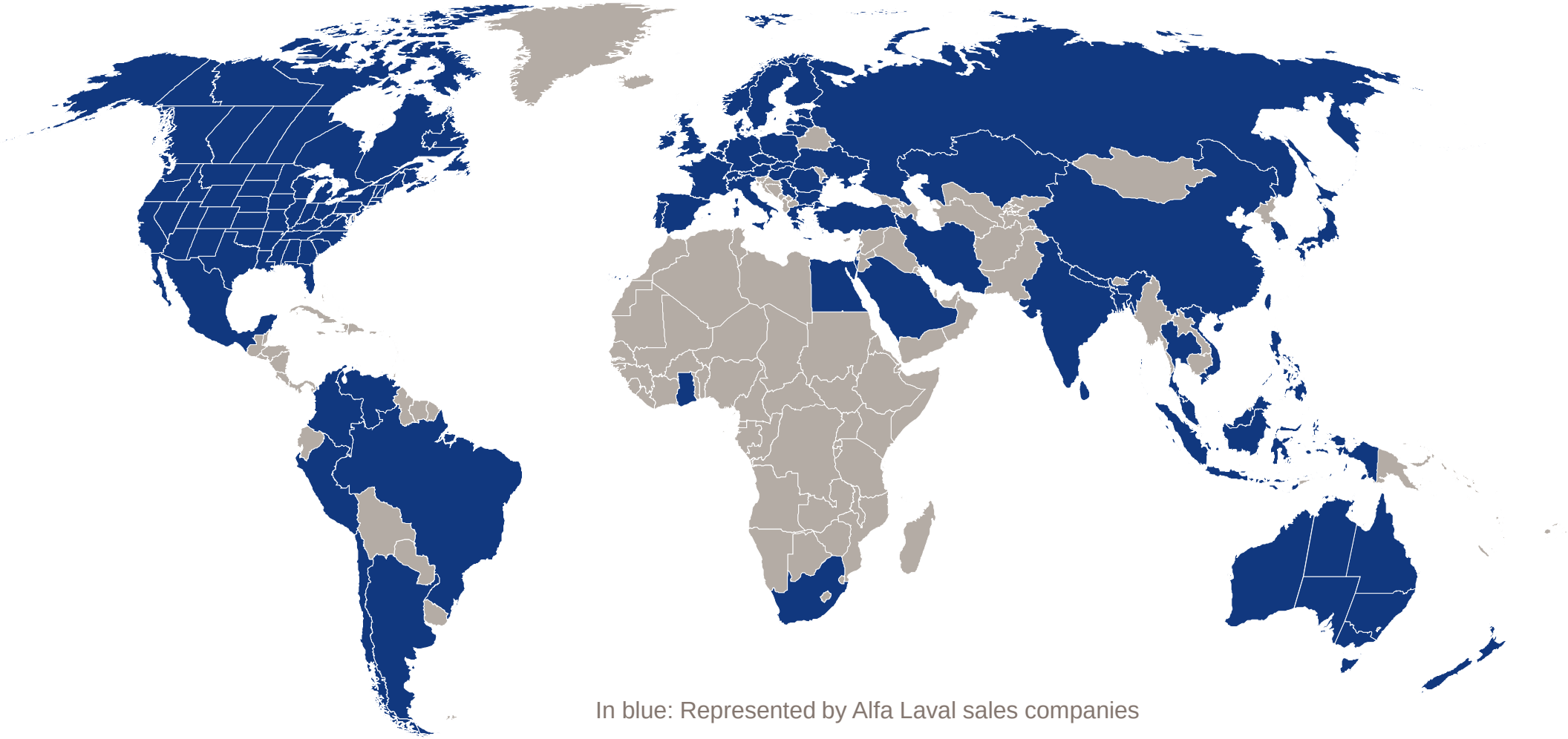




Marine and diesel
Metal working
Mining and mineral processing
Oil and gas
Power
Pulp and paper
Refrigeration and air-conditioning
Semiconductor systems
Steel and coke oven gas
Sugar
Wastewater treatment

A Global company…

…. with strong local presence



In blue: Represented by Alfa Laval sales companies

Key technologies

Our key technologies are adapted to each business unit and offered separately or combined into optimized solutions.

HEAT TRANSFER

ENERGY DIVISION
- Brazed & Fusion Bonded Heat Exchangers
- Gasketed Plate Heat Exchangers
- Welded Heat Exchangers

FOOD & WATER DIVISION
- Food Heat Transfer
- Food Systems

MARINE DIVISION
- Marine Separation & Heat Transfer Equipment
- Boiler Systems
- Gas Systems

SEPARATION

ENERGY DIVISION
- Energy Separation

FOOD & WATER DIVISION
- High Speed Separators
- Decanters
- Food Systems

MARINE DIVISION
- Marine Separation & Heat Transfer Equipment

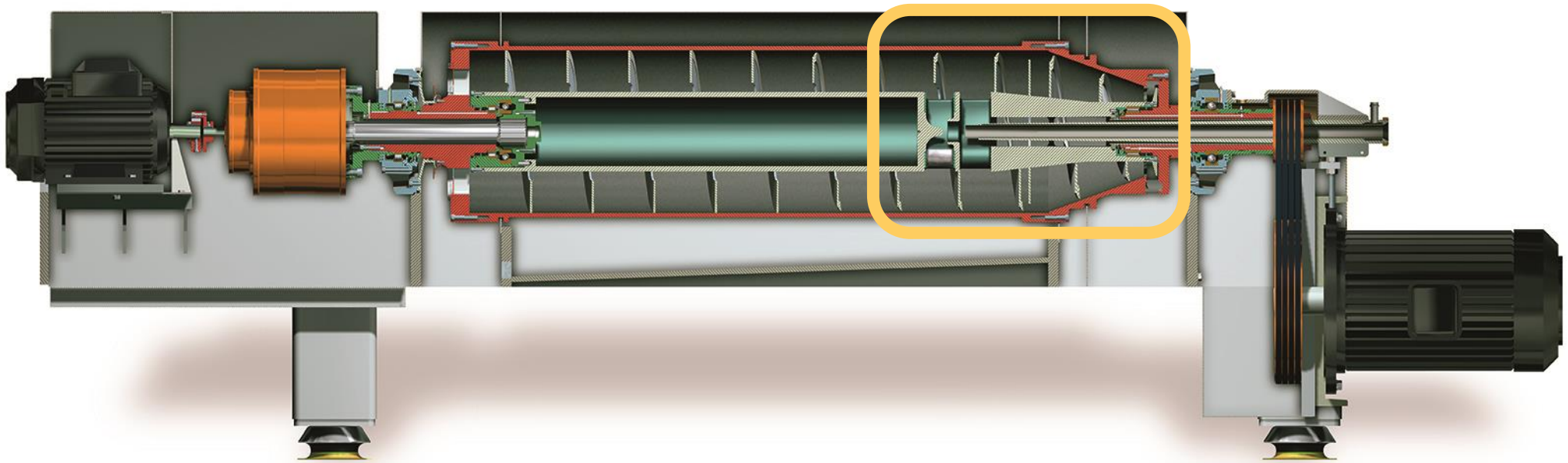
FLUID HANDLING

FOOD & WATER DIVISION
- Food Systems
- Hygienic Fluid Handling

MARINE DIVISION
- Pumping Systems

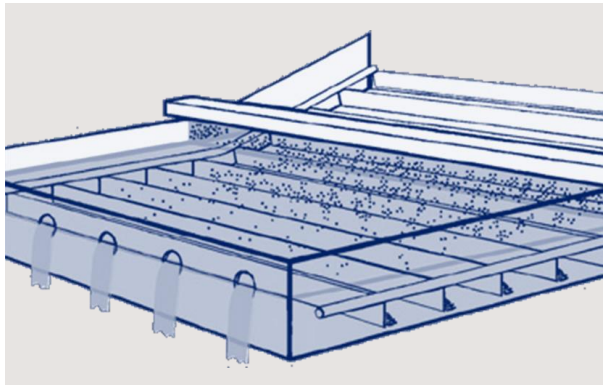
Key technology

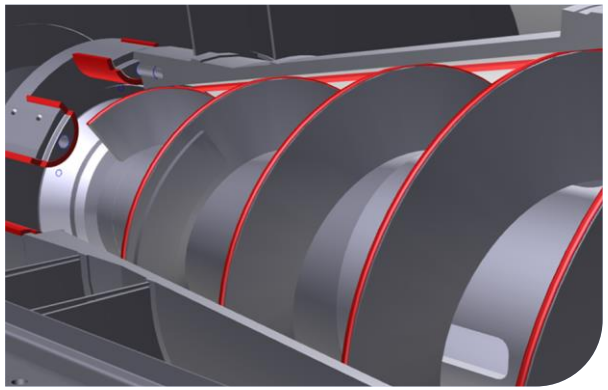
– Decanters



The importance of solids transportation

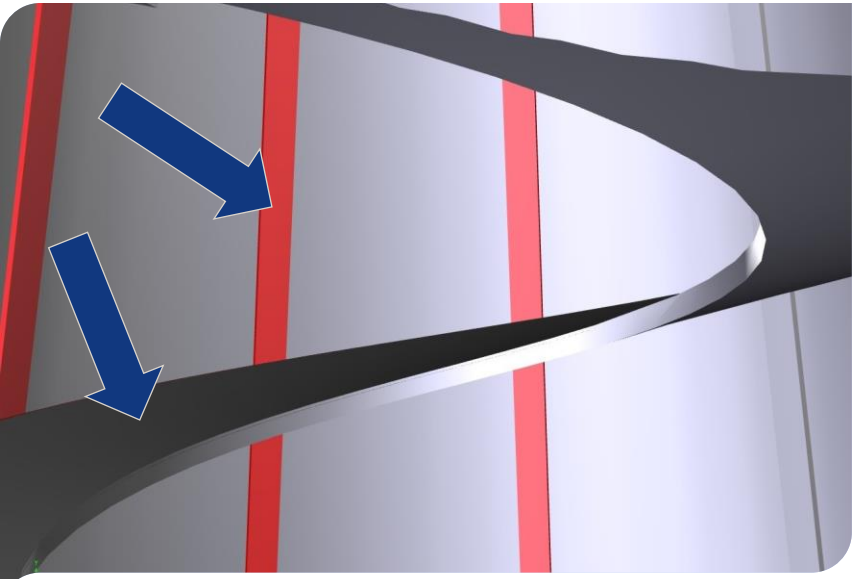
What is solids transportation and why is it important?

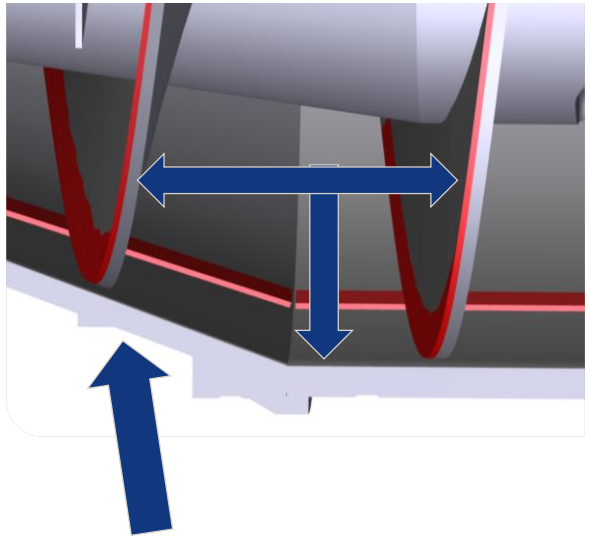




- Solids transportation is the ability to empty the decanter from the heaviest scrollable fraction
- Without this ability, the decanter would become full of solids, stopping the process

How are solids transported

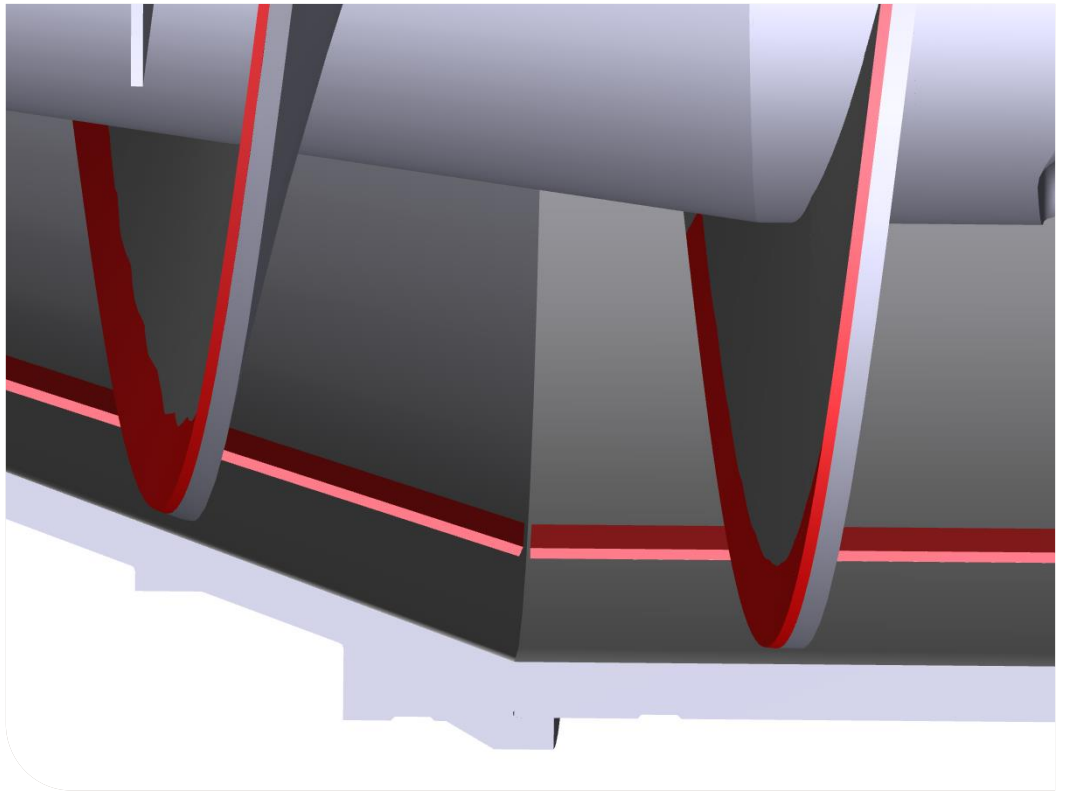




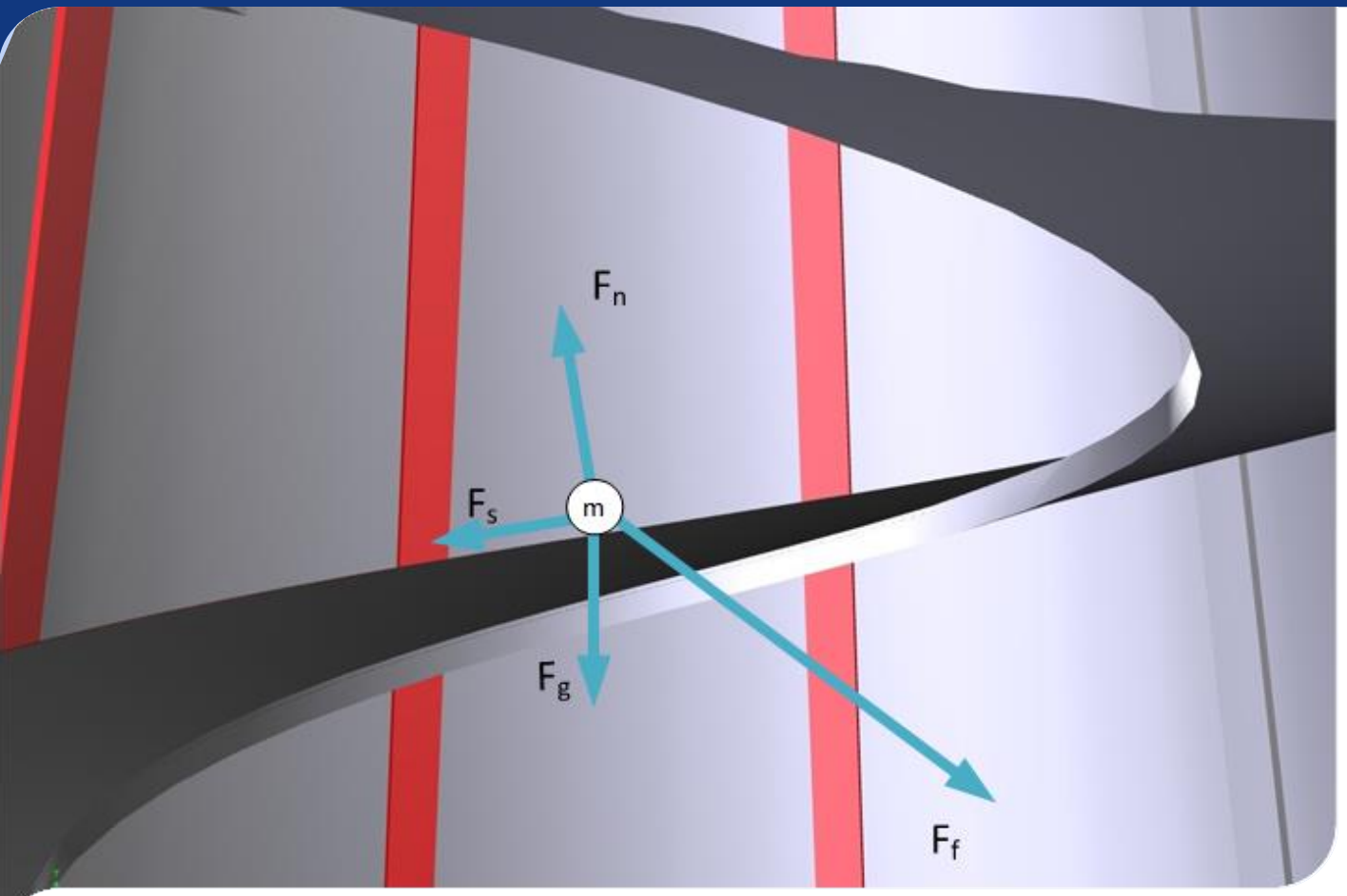
- Beach angle
- G-force
- Flight face friction
- Bowl friction
- Conveyor pitch

Mechanism of solids transportation

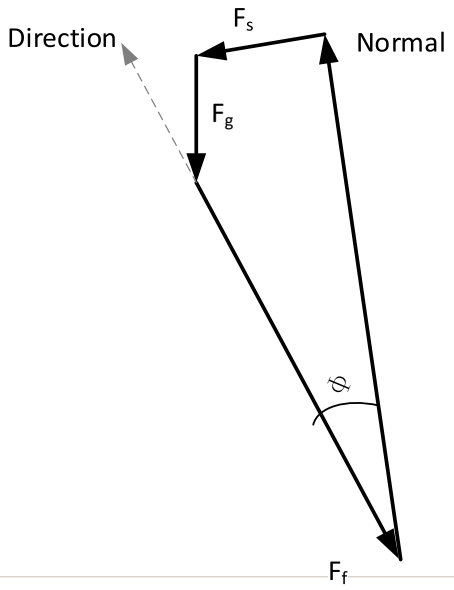
- Sediment formed by the solid particles conveyed onto the conical section and then the beach
- Movement of particles influenced by the angle at the beach
- Forces on the particles affect movement onto the screw conveyor and up onto the beach
- Axial movement is defined by the differential speed and the pitch angle



Mechanism of solids transportation

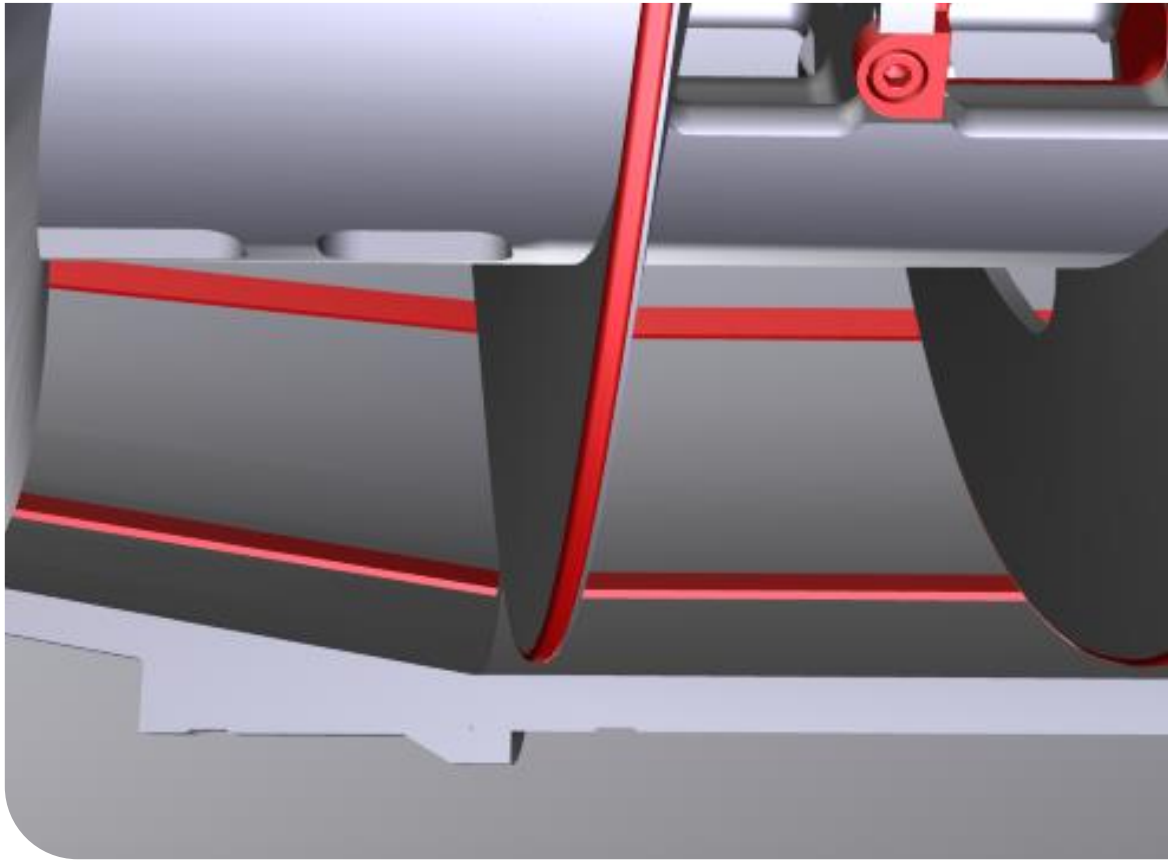


- F_n = “Normal” force
- F_s = Flight Face force
- F_g = Gravity induced force
- F_f =Bowl Friction force

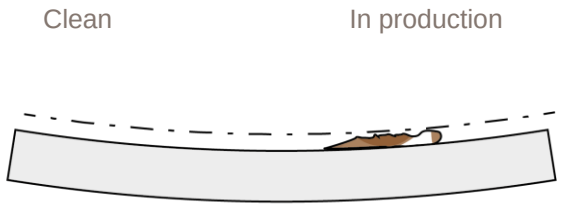


Improving the efficiency of solids transportation

- Minimize the beach angle
- Maximize bowl friction
- Reduce the acceleration force
- Reduce conveyor pitch

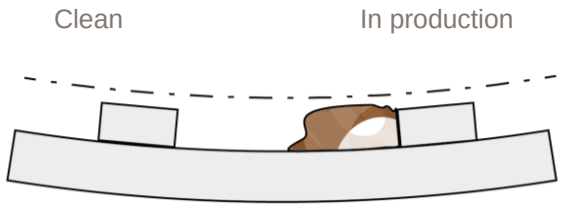


Bowl friction



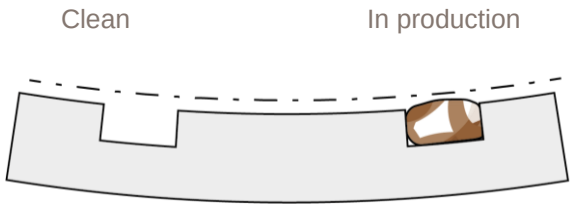
Smooth pattern

Smooth surface
has no friction elements



Rib pattern

Ribs are welded
onto the bowl



Groove pattern

Grooves are machined
into the bowl material

A decanter with good bowl friction will make better use of the available G-force, maximizing separation and dewatering

The importance of decanter cleaning

Cleaning-in-Place (CIP)

Decanter cleaning

The rule of four T's

- **T**ime
- **T**emperature
- **T**urbulence
- **T**iter (concentration)

Cleaning modes

- Flush
- Pre-rinse
- Detergent
- Intermediate and final rinse
- Sterilization/Sanitation

Decanter cleaning

- Cover/Casing inside
- Bowl outside
- Bowl inside
- Conveyor outside
- Conveyor inside
- Feed zone
- Feed tube

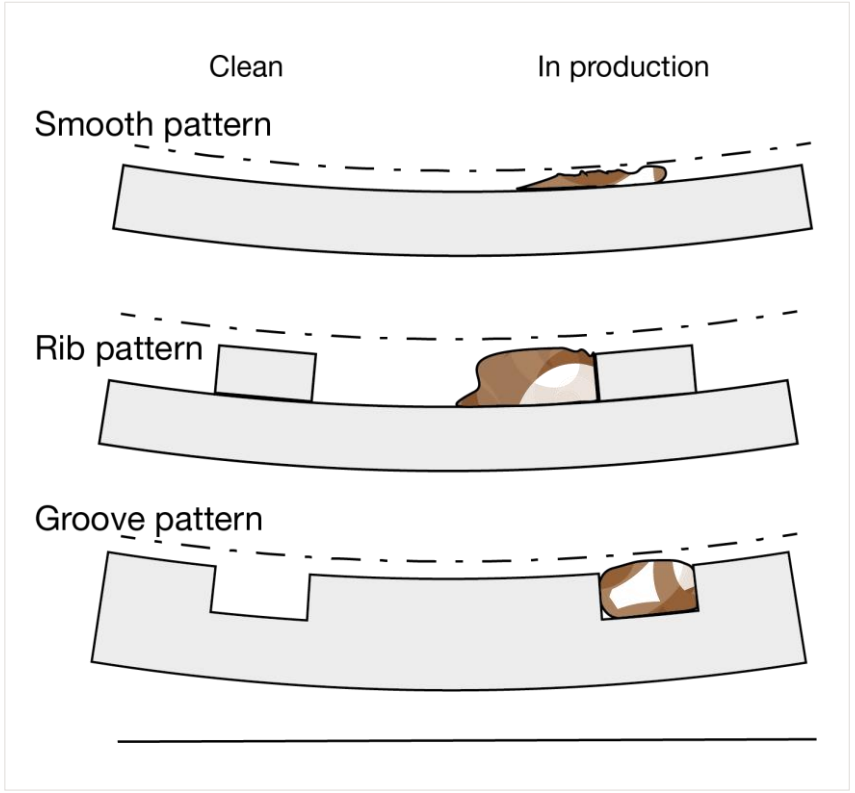
No piping system modifications required

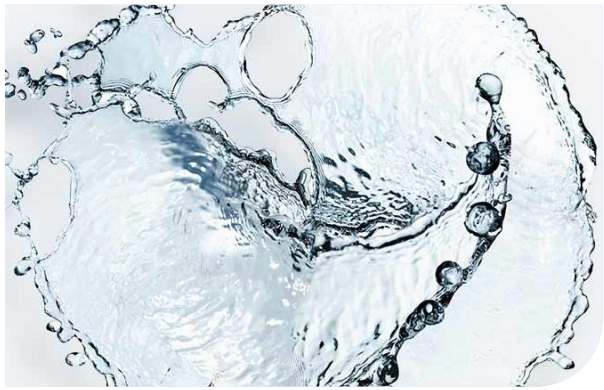
High speed

– And reduced speed

Bowl inside cleaning

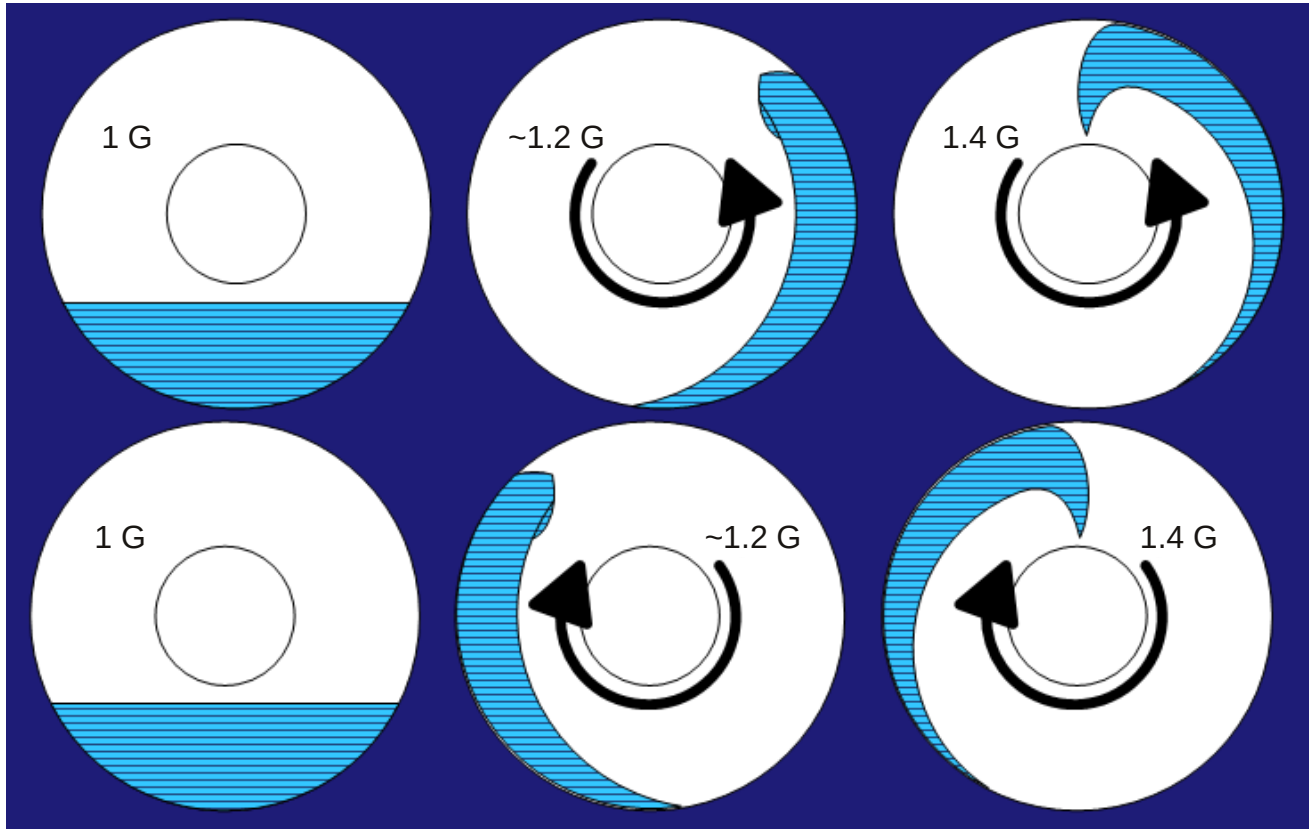
- Smooth surface is easy to clean
- Areas between the ribs are easy to clean
- Grooves can be difficult to clean

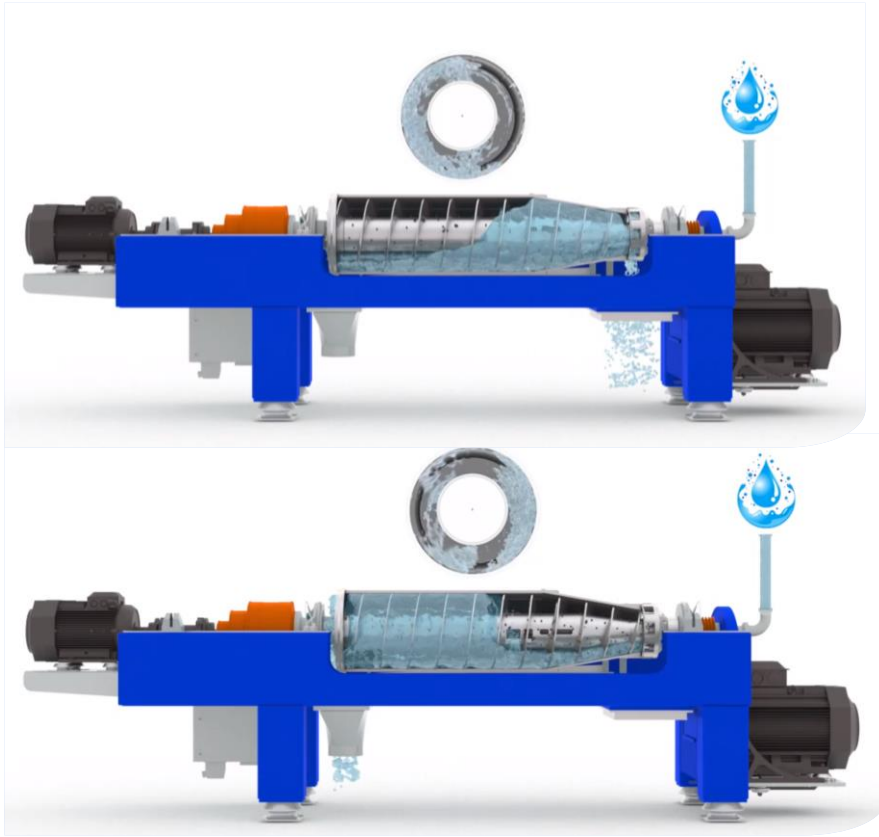




Low speed tumbling

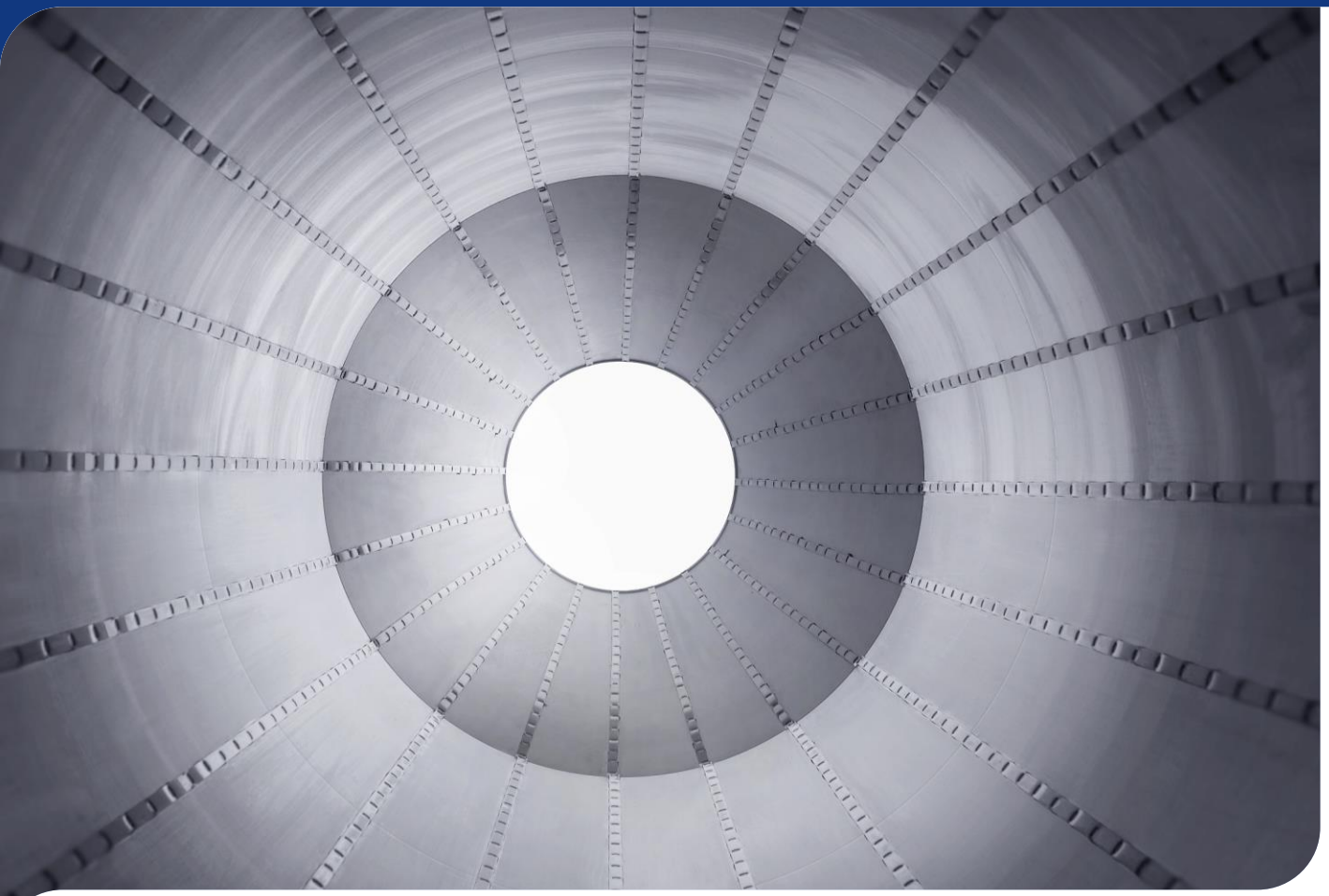
– forward and reverse





A decanter, with good bowl friction design, will be faster and easier to clean – and deliver more production uptime

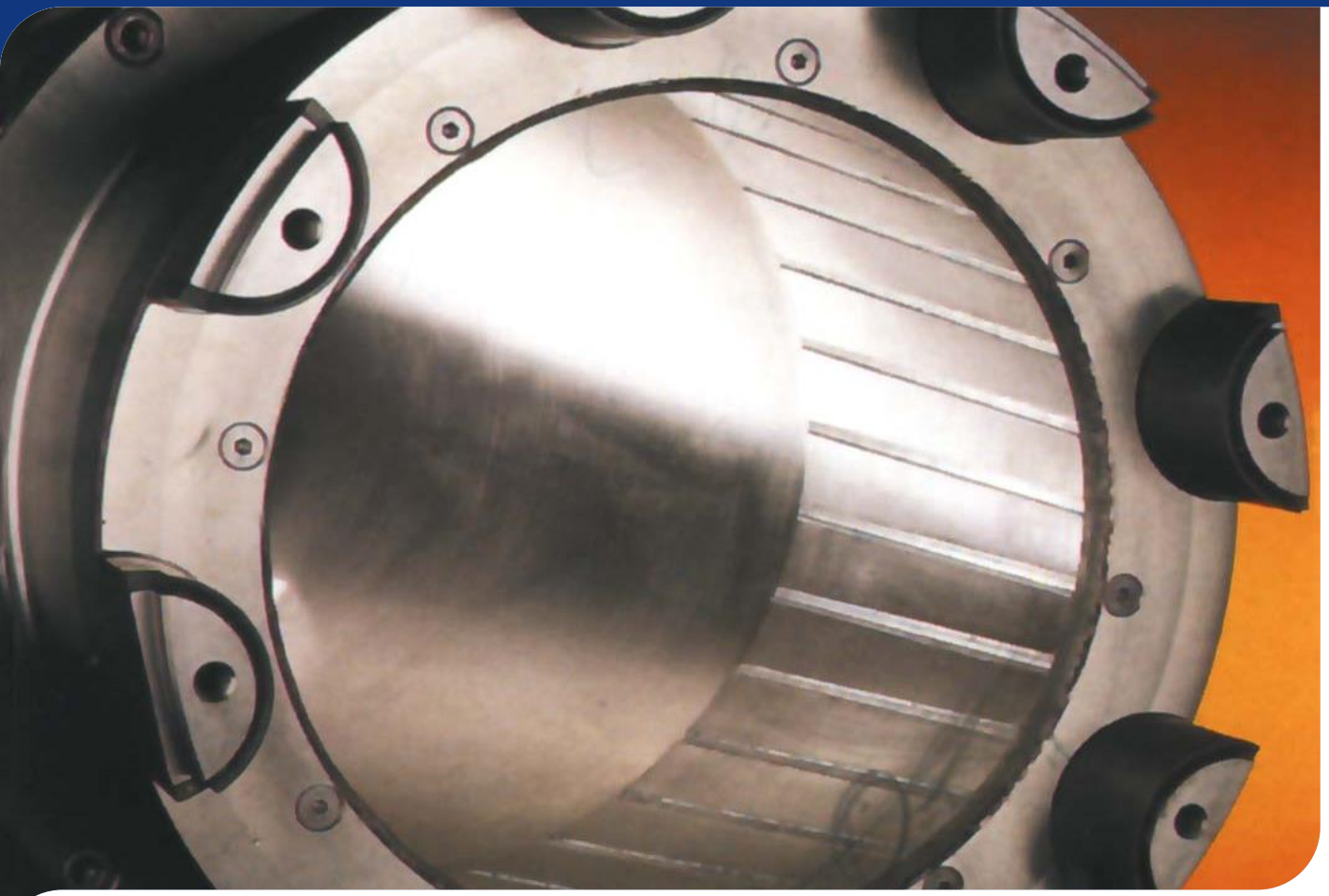
Spot-welded ribs



- Good with compactable solids
- Best bowl friction
- No discolourization
- Poor cleanability (crevices)

Smooth bowl

– Shown here as a hybrid

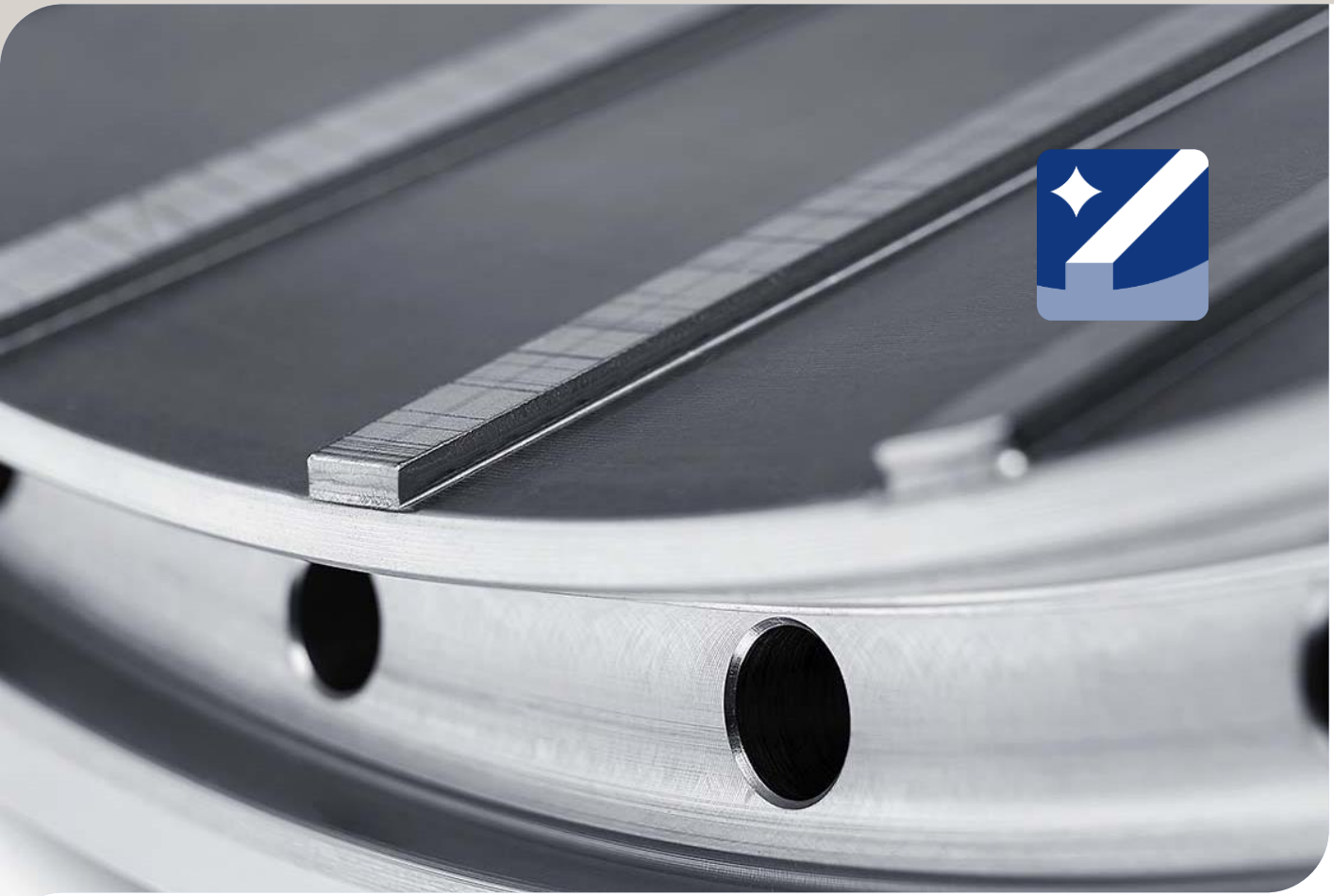


- Good with ‘thin’ sludge
- Excellent cleanability
- Low discolourization
- Acceptable in bowl friction

Grooved bowl

- Good with abrasive sludge
- Good cleanability
- Some discolourization
- Good in bowl friction

Seal-welded ribs – Alfa Laval SaniRibs®



- Good with compactable solids
- Best bowl friction
- Low discolourization
- Very good cleanability

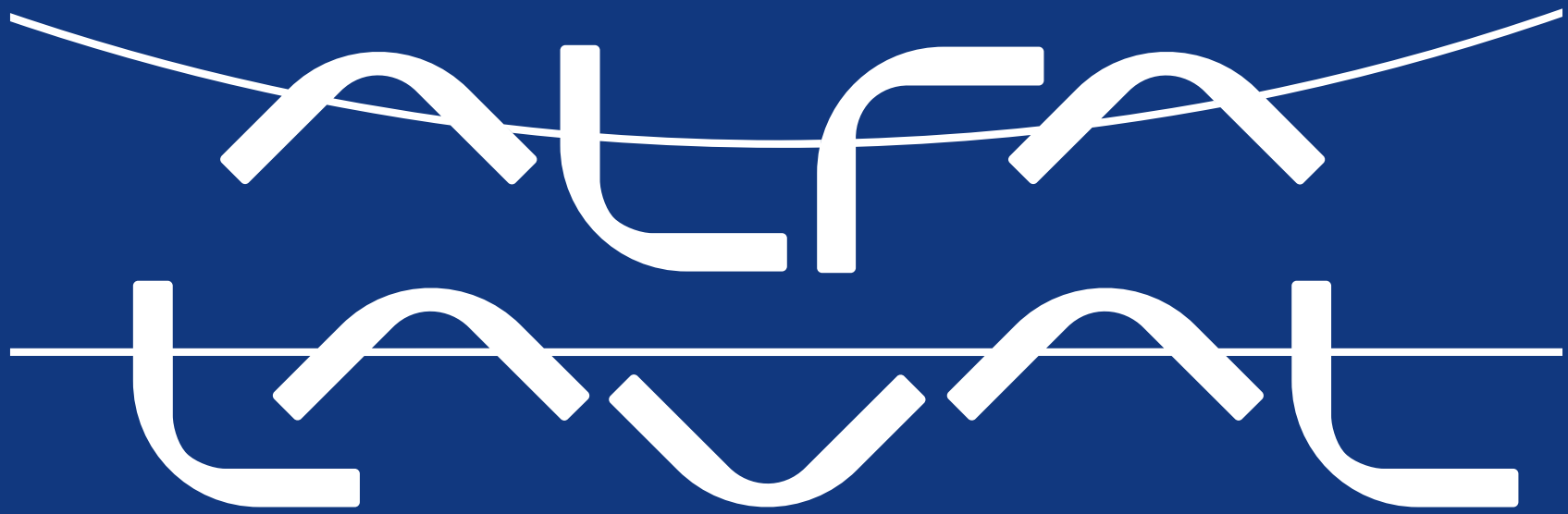
Want to learn more?

Visit

alfalaval.com/saniribs

or contact your local Alfa Laval office. Find us at alfalaval.com or via LinkedIn


QUESTION
ANSWER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