

Mechanical Face Seals for Seawater, Oil-Sand Separator & High abrasive Applications

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SAP PARTS™ INNOVATIVE SEALING TECHNOLOGY

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INTRODUCTION

BY SAP PARTS™

New Mechanical Face Seals with increased wear and abrasion resistance are developed by SAP Parts™ are one of its kind solutions which can ideally performed in applications used in Sea water , Oil Sand separators, tailing centrifuges , decanters etc.

The high corrosion and erosion resistance properties of the Metal Faces produced by Super-duplex stainless steel accompanied with special FKM of low temperature capability elastomer O-rings, made them perfectly withstand in challenging working condition environments of most abrasive, hot sticky bitumen slurry and cold temperature seawater too.

This new generation Metal Face Sealing product by SAP Parts™ involves highly sophisticated technology for manufacturing that involve “S-Phase” Plasma Nitriding of the surface. The S-Phase, which is also called as expanded austenite, increases the hardness of the surface and case depths up to 25 microns and increased Tribological & Corrosion resistance properties

Sealing Surface Further Coated by High Velocity Oxygen Fuel (HVOF) coating process improves sealing surface properties & dimensions, thus extending product life by significantly increasing erosion and wear resistance, and corrosion protection.

High abrasive environment applications: Sealing System Challenges.

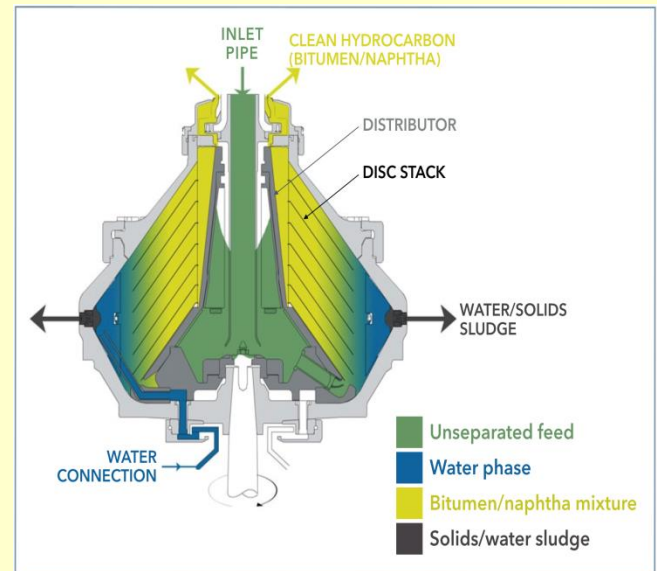
CENTRIFUGE SEPARATORS: The extraction of bitumen and oil from sand using hot or warm water processes produces a slurry waste that is hydraulically transported and stored within surface tailings ponds. One of the major operational and environmental challenges facing oil sands mining is the separation of water from the fine tailings to strengthen the deposits so they can be reclaimed.

Centrifuges are mechanical devices with moving parts that rotate at high speeds, creating high gravitational forces. These high g-forces pull apart the Sea water/solids/hydrocarbon emulsions, leaving behind a relatively clean diluted bitumen product. Due to their rotating mechanical parts, centrifuges are susceptible to a lot of wear and tear.

Despite their shortcomings, centrifuges are very effective in

reducing water content due to the high gravitational forces imparted onto the diluted bitumen. Centrifuge systems have Great challenge of **sealing** the Water-Oil-Sand slurry which is highly abrasive as well as corrosive in nature.

DECANTERS APPLICATIONS: Slurry Pumps employed in Decanters has to handle abrasive sand water slurry as well as chemically active and corrosive bulk sewage sludge leading to frequent failure of **sealing** system and vital assemblies associated with it.



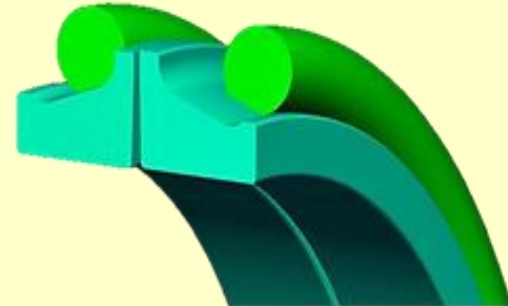
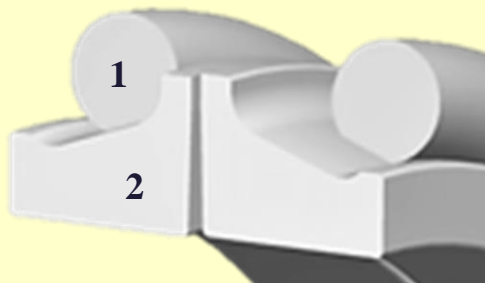
Cross Section of ALPHA-LAVAL X20 Disc Nozzle



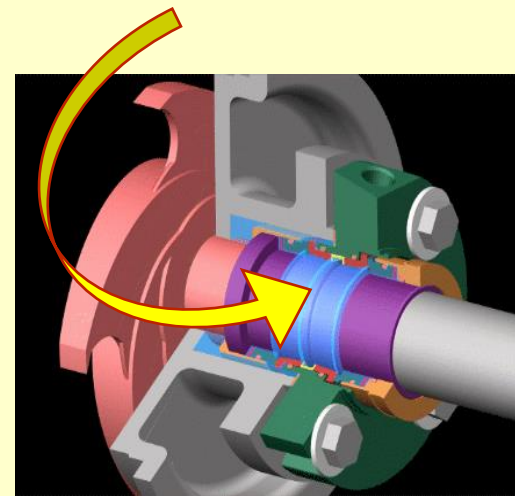
Special Mechanical Face Seal Construction:

For Demanding Application

1. Elastomer O-Rings-(2 Nos.) FKM60
2. Metal Faces - (2 Nos.) Super Duplex Stainless Steel



Mechanical Face Seal-Cross Section



Typical Application of SAP Mechanical Face Seal in Centrifugal pump seal configuration.

SUPER DUPLEX STAINLESS STEEL+FKM

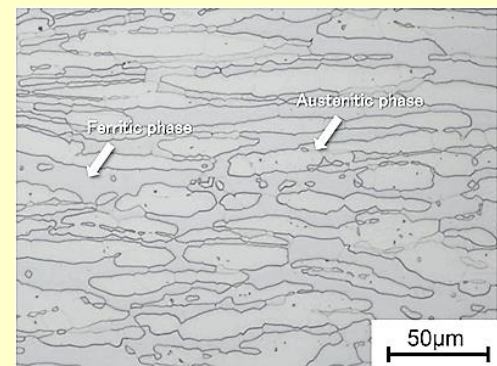
Properties

SAP Parts™ proposed unique Super Duplex grade have a ferritic-austenitic microstructure, with a phase balance of approximately 50% ferrite and 50% austenite. Duplex grades combine many of the beneficial properties of ferritic and austenitic stainless steels. The duplex microstructure contributes to the high strength and high resistance to stress corrosion cracking.

Other characteristic properties of duplex grades include good abrasion and erosion resistance, good fatigue resistance, high-energy absorption and low thermal expansion.

The high mechanical strength of duplex grades is a result of the duplex microstructure and the alloying with nitrogen. This high strength gives opportunities for reducing both weight and cost as a thinner material can be used.

Being highly alloyed and have a corrosion resistance comparable to high performance austenitic steels, the typical applications for SAP Parts™ super duplex steel can be in desalination plants, Oil Sand separators, seawater systems, flue-gas cleaning, storage tanks and pressure vessels.



S-phase Microstructure

Metal Face Seal: Chemical Composition
Super Duplex Stainless Steel

Elements	% Min.	% Max.
Cr	24.00	26.00
Ni	6.00	8.00
Mo	3.00	4.00
W	0.50	1.00
Cu	0.50	1.00
Mn	-	1.00
N	0.20	0.30
Si	0.10	0.80
P	-	0.025
S	-	0.005
Fe	Balance	

FEATURES

Application

- Unique Mechanical Face Seal for Seawater and Harsh environment applications.
- Metal Face Seal Material: Super Duplex Stainless Steel (UNS-3270)
- Surface Treatment: Low Temperature Plasma Nitriding.
- Coating : HVOF WcCrCo2
- Pitting Resistance Engineering Number(PREN) >40
- Hardness: >1000HV
- Elastomer: FKM 60 Low Temp. Capability.
- Medium of Application: Sea water, Oil Sand.
- Temperature Range : -20°C to +200°C
- Working Pressure : Up to 3 bar
- Air Humidity: Between 40% and 90%
- Capable to withstand sea water salinity up to 47000 mg/l.

Elastomer Loaders: FKM 60

Special high compression sustainability Rubber compounds formulated SAP-FKM 60 Elastomers are used for making O-Rings those are proposed for Seawater and low temperature application up to -20°C and high up to 200° are tested for Oil compatibility ASTM oil no.901.



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