

# GPA® Mechanical Seals



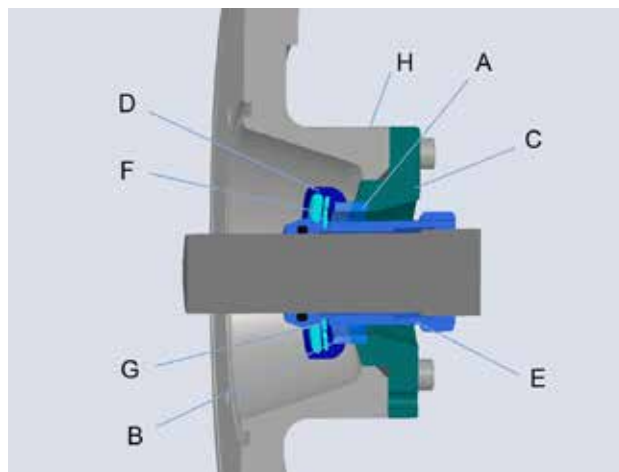
## BENEFITS

Thanks to its unique design, the GPA® is a simple and reliable mechanical seal which can be used with very difficult medias: abrasive, corrosive, clogging, crystallizing fluids. GPA® seals, which require no flushing, are environmentally friendly and reduce operating costs.

## DESCRIPTION

GPA® seals are based on two main components:

- the fixed ring (A) fitted in a housing (C) and mounted on the pump casing (H)
- the rotating seals consisting of a rotating ring (B) fitted in a housing (D) which rotate with the seal sleeve (E) thanks to the drive rings (G). The spring diaphragm (F) ensures a consistent load between the fixed and the rotating rings. The clearance between the outside of the seal sleeve and the inside of the rotating housing has been especially design to prevent any risks of clogging and any damages due to abrasive particles.



## GPA®C Cartridge Design

Technetics Group proposes solid cartridge assembly ready to be assembled on the pump shaft. This cartridge type which is preset at the factory, requires no additional adjustment on the field. No special machining of the shaft is necessary for installation.

## MATERIAL CODE

### MECHANICAL SEAL - IDENTIFICATION

#### GPA® - GPA®C - GPA®CP



- 1 - ROTATING RING
- 2 - FIXED RING
- 3 - SECONDARY O-RINGS
- 4 - CONE SPRING MEMBRANE
- 5 - SUPPORTS AND SLEEVE

## MATERIALS & CODE

Pos. 1/2	U5: Tungsten carbide with cobalt U6: Tungsten carbide with nickel U8: Silicium carbide C4: Siliconized graphite
Pos. 3	P: Perbunan E: Ethylene propylene V: FKM N: Neoprene
Pos. 4	N: Neoprene M5: Neoprene PTFE coated P1: HNBR V: FKM
Pos. 5	D: Carbon steel E: Stainless steel 302 F: Stainless steel 304L G: Stainless steel 316L T: Special alloyed steel W: Chromic oxide plasma coating X: Special coatings

Note: other materials are available upon request.

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## APPLICATIONS

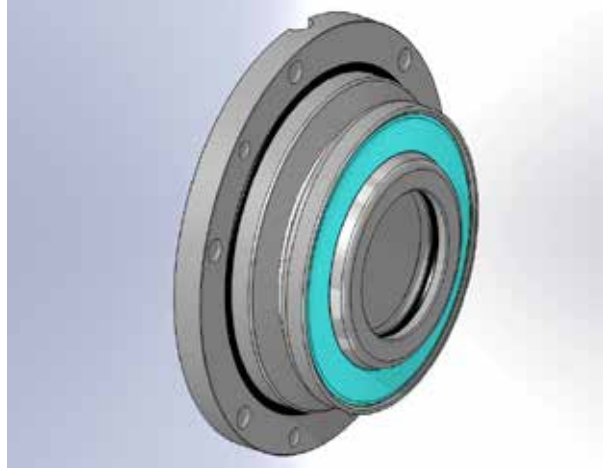
**GPA® seals do not require flushing, are environmentally friendly, and reduce operating costs.**

### ALUMINA PROCESSING AND MINING

In the alumina production process, the bauxite and hydrated alumina in suspension are pumped over long distances by very large slurry pumps. Stuffing boxes are the most common type of barrier between the process and the atmosphere used on these pumps and other rotating equipment such as mixers and agitators.

Stuffing boxes require continuous water flushing for cooling and cleaning, a very expensive process which generates costs quite often overlooked in cost analysis; further the extra flush water must be removed from the pumped media and environment if leaks occur.

Unlike packing often used on pumps in mining industry, GPA® seals do not require any continuous water flushing for cooling and cleaning. This generates significant cost savings in terms of water saving and extra costs to remove flush water from the pumped media by evaporation.



Unlike other mechanical seals, the GPA® does not clog or wear quickly. GPA® seals have acquired an unequalled reputation in alumina refineries throughout the world. The GPA® key features are a simple, sturdy, proven design and cost effectiveness.

### OTHER APPLICATIONS

Other industries facing similar problems related to pumping abrasive, corrosive, clogging, or crystallizing fluids are successfully using GPA® seals for both slurry and liquors. These applications include phosphoric acid for fertilizers, cellulose, pulp and paper, calcium carbonate, coal mining, sugar refining, limestone for cement manufacturing, and mining and processing of zinc, lead, nickel, and gold.

GPA® seals can be adapted to almost all commercially available centrifugal pumps, mixers, agitators, drilling heads and other similar equipment. Our engineering staff is able to direct all modifications required to replace the previous sealing solutions, and the retrofitting of equipment in the field.

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## SCOPE OF APPLICATIONS

APPLICATIONS	PARAMETERS	TYPE/CODE GPA®	PUMPS MANUFACTURER
Alumina refineries Bayer process Slurry - Liquor Alumina liquor	Temp: up to 284°F (140°C) P: up to 10 bar Up 500 g/l solids contents	GPA® / GPA®C U5 U5 E N DW U5 U5 E M5 FW	CANADA Pumps GOULDS Pumps FLOWERVE Pumps : (Jeumont-Schneider-Worthington) KSB Pumps ENSIVAL MORET Pumps WEIR MINERALS Pumps WARMAN® Pumps
Phosphoric acid Gypse and Phosphate	Temp: up to 176°F (80°C) P: up to 6 bar Solids contents: 300 g/l	GPA® / GPA®C GPA®CP U8 U8 V M5 TX	ENSIVAL MORET Pumps FLOWERVE Pumps
Cellulosic Liquors	Temp: up to 176°F (80°C) P: up to 6 bar	GPA® U5 U5 E N DW	WEIR MINERALS Pumps ENSIVAL MORET Pumps
Calcium Carbonate	Temp: ambient P: up to 6 bar	GPA® U5 U5 E M5 FW	METSO Pumps FLOWERVE Pumps
Pulverulent coal	P: up to 6 bar N: 30 rpm	GPA®CP GPEC U5 U5 V M5 D	K-TRON DOSING
Water and coal	P: up to 6 bar N: 1800 rpm	GPA® / GPA®C U5 U5 E M5 FW	WARMAN® Pumps FAPMO Pumps
Mineral treatment (zinc, nickel...)	Abrasive and corrosive solutions (H2SO4)	GPA®CP U8 U8 V M5 TX	FLOWERVE Pumps WARMAN® Pumps
Slurry - Sand Silicium slurries	Temp: ambient P: up to 6 bar Solids content: 100 to 600 g/l	GPA® GPA®C U5 U5 E N DW	ESSA-MICO WEIR MINERALS Pumps NEYRTEC PCM (Moineau pump) LINATEX SIHI Pump ALLWEILER Pumps
Painting Pigments	Temp: ambient P: up to 6 bar	GPA® "chamfered-face" U5 U8 E M5 G	NETZSCH / SEEPEX Pumps BORNEMANN Pumps
Natural gas treatment	Temp: ambient P: up to 6 bar	GPA® / GPA®C U5 U5 E N DW U8 U8 E M5 GW	WEIR MINERALS Pumps SIHI Pumps
Sugar industry	Temp: up to 194°F (90°C) P: up to 6 bar Solids: up to 300 g/l	GPA® / GPA®C GPA®CP U5 U5 E N GW	WEIR MINERALS Pumps FLOWERVE Pumps ENSIVAL MORET Pumps
Industrial powders	Ambient: dry or humid P: 3 bar Temp: up to 212° F (100°C)	GPA®CP U5 U5 E M5 G	GUEDU AGITATOR AGITEC VALOREL

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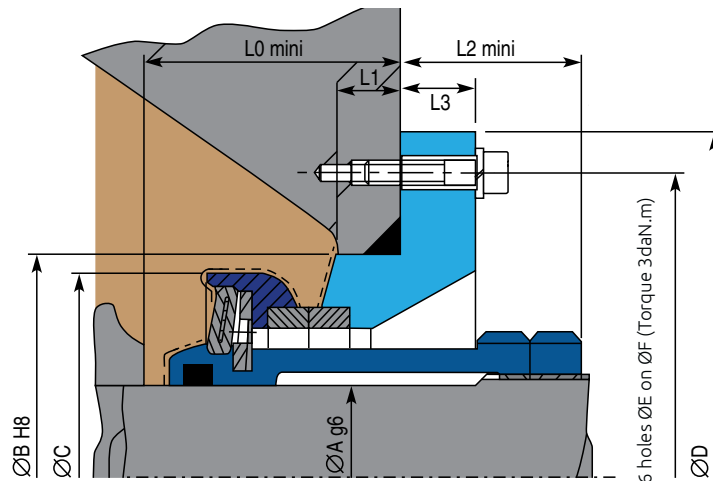
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## GPA® THREADED TYPE STATIONARY RING STYLE 03



### DIMENSION TABLE

ØA inch	Model	ØA mm	ØB mm	ØC mm	ØD mm	ØE mm	ØF mm	L0 mm	L1 mm	L2 mm	L3 mm	Deflection mm	Pitch* mm
3/4"	47 x 55	20 → 32	76	72	124	11	106	48.5	13	32	12	1.5	1
1" 1/4													1.5
2"	72 x 82	33 → 51	108	99	168	13	148	61	15	38	18	2	1.5
3" 1/16	103 x 113	52 → 78	140	135	199	13	180	61	15	39	19	2	2
4" 1/4	132 x 144	79 → 108	185	170	240	13	220	62	16	40	20	2	2
5" 3/8	160 x 178	109 → 137	210	208	290	13	260	72	22	40	20	2	2
7"	211 x 229	138 → 180	280	264	370	17	330	93	25	42	22	2.5	2 / 3

\*Pitch: please consult us according to diameter.

### APPLICATIONS



Altéo Gardanne (France)  
Final sealing performance inspection at 10 bar  
Weir Minerals pump



GPA® with threaded sleeve

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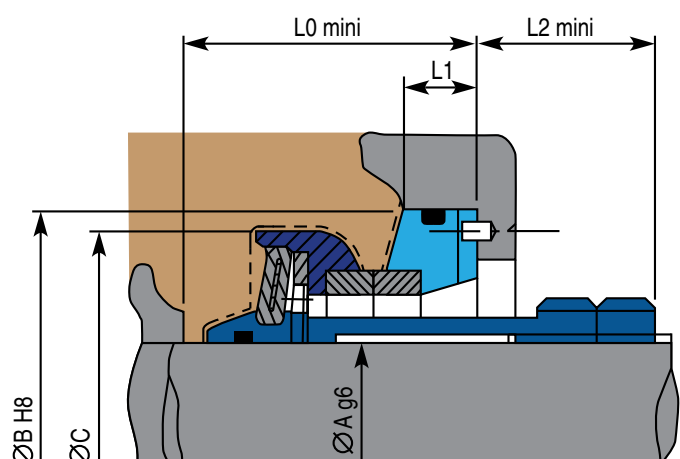
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## GPA® THREADED TYPE STATIONARY RING STYLE 13



**DIMENSION TABLE**

ØA inch	Model	ØA mm	ØB mm	ØC mm	L0 mm	L1 mm	L2 mm	Deflection mm	Pitch* mm
3/4"	47 x 55	20 → 32	76	72	50.5	15	40.5	1.5	1
1" 1/4									1.5
2"	72 x 82	33 → 51	108	99	61	15	48	2	1.5
3" 1/16	103 x 113	52 → 78	140	135	63	17	57	2	2
4" 1/4	132 x 144	79 → 108	185	170	67	18	58	2	2
5" 3/8	160 x 178	109 → 137	210	208	86	34	60	2	2
7"	211 x 229	138 → 180	280	264	105	40	62	2.5	2 / 3

\*Pitch: please consult us according to diameter.

### APPLICATIONS



KSB pump



GPA® with threaded sleeve

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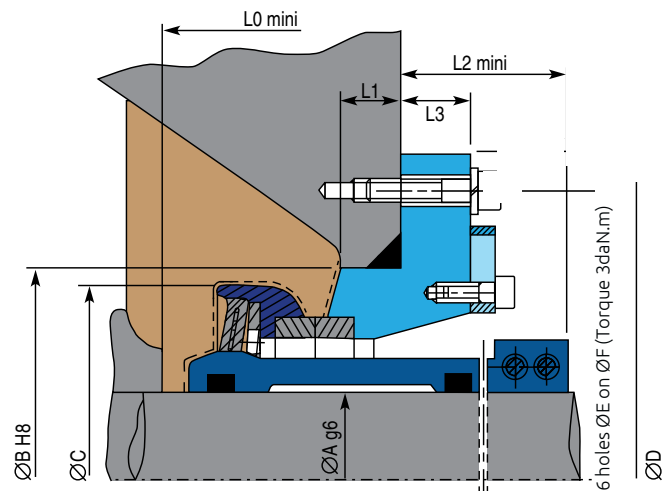
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## GPA®C CARTRIDGE TYPE STATIONARY RING STYLE 03C



### DIMENSION TABLE

ØA inch	Model	ØA mm	ØB mm	ØC mm	ØD mm	ØE mm	ØF mm	L0 mm	L1 mm	L2 mm	L3 mm
3/4"	47 x 55	20 → 32	76	72	124	11	106	48.5	13	32	12
1" 1/4	72 x 82	33 → 51	108	99	168	13	148	61	15	38	18
2"	103 x 113	52 → 78	140	135	199	13	180	61	15	39	19
3" 1/16	132 x 144	79 → 108	185	170	240	13	220	62	16	40	20
4" 1/4	160 x 178	109 → 137	210	208	290	13	260	72	22	40	20
5" 3/8	211 x 229	138 → 180	280	264	370	17	330	93	25	42	22

### APPLICATIONS



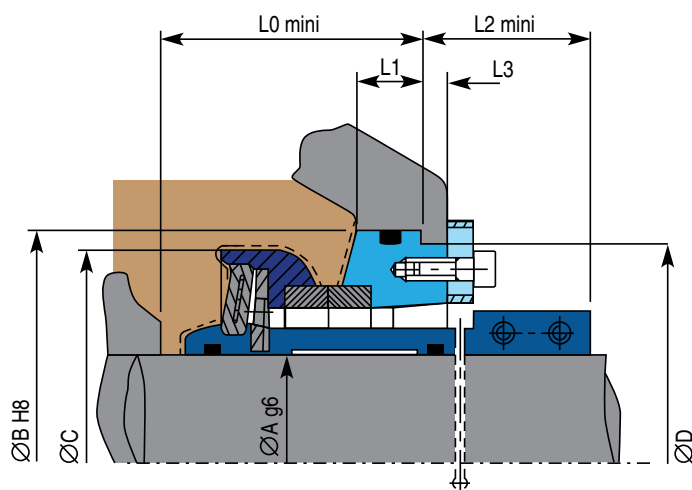
WARMAN® pump

GPA®C cartridge arrangement



GPA®C cartridge type

## GPA®C CARTRIDGE TYPE STATIONARY RING STYLE 43C



**DIMENSION TABLE**

ØA inch	Model	ØA mm	ØB mm	ØC mm	ØD mm	L0 mm	L1 mm	L2 mm	L3 mm
3/4"	47 x 55	20 → 32	76	72	68	50.5	15	25	4
1" 1/4	72 x 82	33 → 51	108	99	102	61	15	27.5	6
2"	103 x 113	52 → 78	140	135	131	63	17	30	6
3" 1/16	132 x 144	79 → 108	185	170	177	67	18	33	6
4" 1/4	160 x 178	109 → 137	210	208	202	86	34	50	6
5" 3/8	211 x 229	138 → 180	280	264	265	105	40	60	8

### APPLICATIONS



KWP pump



GPA®C cartridge type

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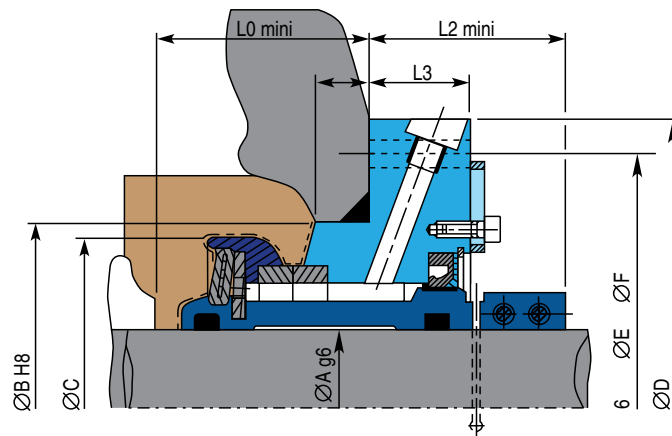
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## GPA®C PROTECTED CARTRIDGE TYPE STATIONARY RING STYLE 03CP



### DIMENSION TABLE

ØA inch	Model	ØA mm	ØB mm	ØC mm	ØD mm	ØE mm	ØF mm	L0 mm	L1 mm	L2 mm	L3 mm
3/4"	47 x 55	20 → 32	76	72	124	11	106	48.5	13	61.5	30
1" 1/4											
2"	72 x 82	33 → 51	108	99	168	13	148	61	15	70	35
3" 1/16	103 x 113	52 → 78	140	135	199	13	180	61	15	81	40
4" 1/4	132 x 144	79 → 108	185	170	240	13	220	62	16	85	40
5" 3/8	160 x 178	109 → 137	210	208	290	13	260	72	22	90	40
7"	211 x 229	138 → 180	280	264	370	17	330	93	25	93	42

### APPLICATIONS



FLOWSERVE Pump used in fertilizer manufacturing. GPA®CP is resistant to phosphoric acid, zinc treatment and flue gas desulfurization



GPA®CP is also suitable to seal mixers or tanks

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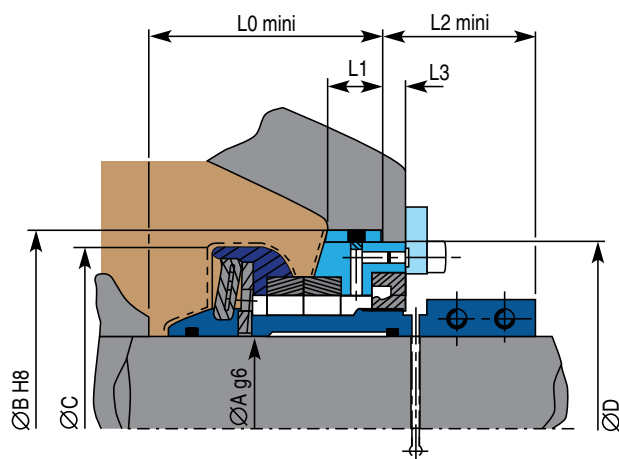
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## GPA®CP PROTECTED CARTRIDGE TYPE STATIONARY RING STYLE 43CP



### DIMENSION TABLE

ØA inch	Model	ØA mm	ØB mm	ØC mm	ØD mm	L0 mm	L1 mm	L2 mm	L3 mm
3/4"	47 x 55	20 → 32	76	72	68	50.5	15	25	4
1" 1/4									
2"	72 x 82	33 → 51	108	99	102	61	15	27.5	6
3" 1/16	103 x 113	52 → 78	140	135	131	63	17	30	6
4" 1/4	132 x 144	79 → 108	185	170	177	67	18	33	6
5" 3/8	160 x 178	109 → 137	210	208	202	86	34	50	6
7"	211 x 229	138 → 180	280	264	265	105	40	60	8

### APPLICATIONS



Arcelor Mittal Blast-furnace Hasler proportioner (assembling phase). Granular coal 6 bar on injection screw.



GPA®C with grease and nitrogen buffer.

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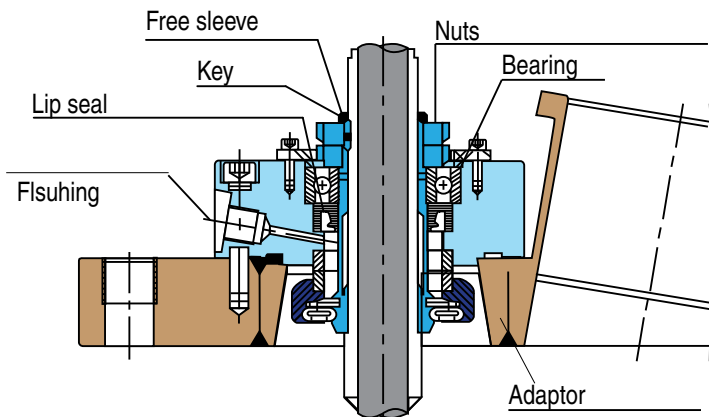
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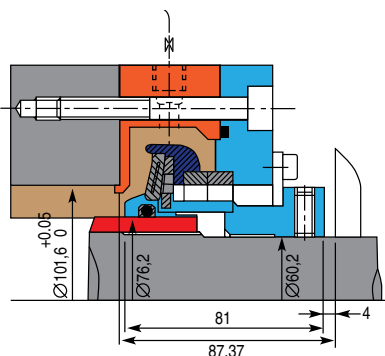
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## SPECIAL DESIGNS (INCLUDING GPEC, EXTERNAL ARRANGEMENT, CHAMFERED FACE GPA®)

### GPEC



### EXAMPLE OF AN EXTERNAL ARRANGEMENT

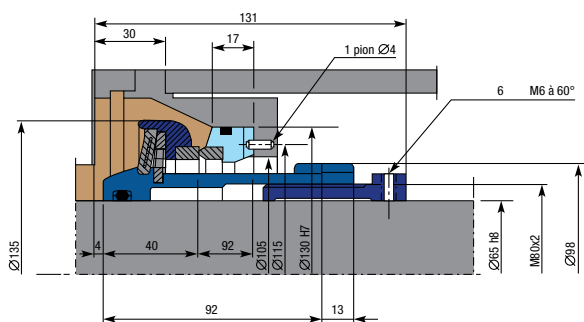


Worthington Pump  
10 LR 15 - In operation

### OPERATIONS CONDITIONS

Product	green liquor
Temperature	210°F (100°C)
Speed	1400 rpm
Density	1.1
Operation	24 hours a day
Suction pressure	1.8 bar (25 psi)
Discharge pressure	Max 6 bar (90 psi)

### GPA® WITH CHAMFERED FACE



### OPERATIONS CONDITIONS

Product	latex / dispersion colours
Temperature	ambient up to 104°F (40°C)
Pressure	2 to 3 bar
Speed	200 to 1000 rpm
Pumps	NETZSCH - BORNEMANN - SEEPEX
Reference	BASF



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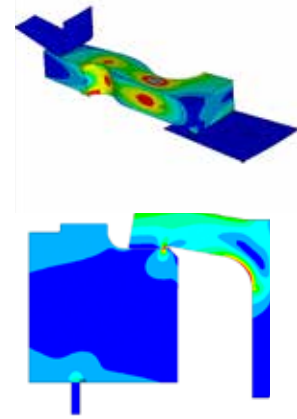
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## INNOVATION AND ADVANCED ENGINEERED SOLUTIONS

Based on his expertise in the dynamic sealing field, Technetics Group develops and sells innovative sealing solutions adapted to the various applications of its customers.

Thanks to its design center, calculation tools and numerical modelization, Technetics Group is not only able to adapt the mechanical seals to your environment, but is also able to design completely new mechanical seals to meet your specific requirements: high viscosity products, abrasive products, high temperature, high speed and high pressure.



Finite element analysis (FEA)



Sealing control test bench



Test bench for slurry applications

## QUALITY AND TEST RIGS

Technetics Group has several instrumented test rigs which allow us to characterize our mechanical seals in extreme working conditions (abrasion, high speed, etc.) reproducing the main service conditions. These tests rigs allow to record the leakage of the mechanical seals and to evaluate their tribological properties.

Mechanical seals from Technetics Group are systematically tested and verified on our test rigs before shipment. These controls can be also performed on field.

## REFURBISHING AND ON FIELD ASSEMBLY

Technetics Group offers a complete refurbishing of the GPA® seals with the same warranty as originally manufactured seals. The refurbishing program is geared towards cost reduction and customer satisfaction.

Moreover, Technetics Group offers to install GPA® mechanical seals by its professional sealing technicians team. This service guarantees a proper installation and adjustment of the GPA® seals, which is a key point for their life time.



**Detailed assembly instructions for each GPA® style are available from our technical department.**

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