INTO HANDEL LTD

API INDUSTRIAL PUMPS & COMPRESSORS

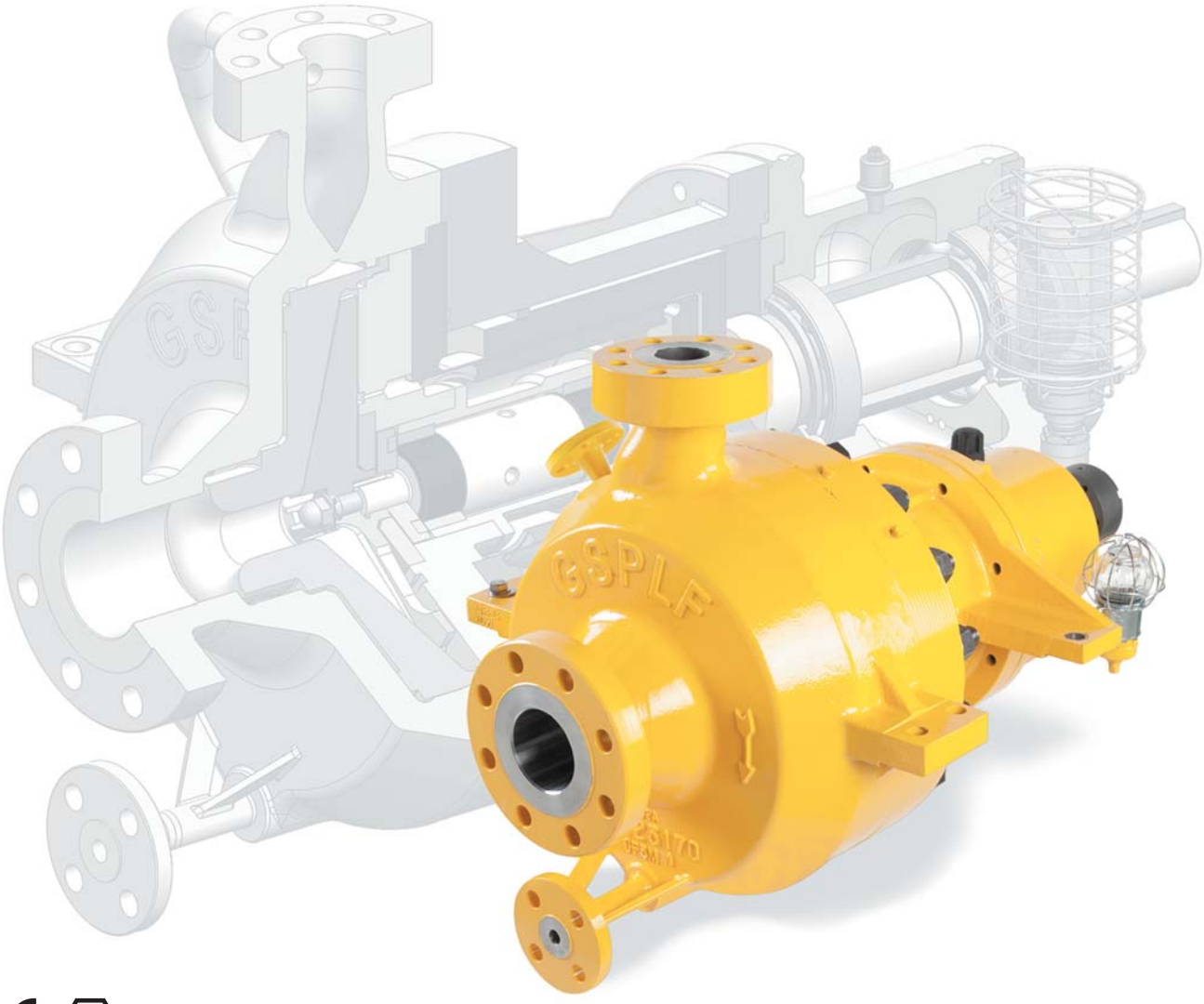
Sundyne

HMD Kontro

GSPLF Magnetic Drive Pumps

Low Flow

API 685 - 2nd Edition



Sundyne HMD Kontro

Making Low Flow More Efficient

The Sundyne HMD Kontro GSPLF (LF for Low Flow) Pump

Combining Proven Low Flow Sundyne Hydraulics with the HMD Kontro Sealless MagDrive

Filling a gap in the market for a low flow sealless pump with a relatively high head capability, the Sundyne HMD Kontro GSPLF combines the proven technologies of Sundyne Barske Wheel hydraulics with the HMD Kontro sealless magnetic drive. The GSPLF meets the requirements of API 685 and is fully ATEX compliant, making it ideal for oil and gas installations plus chemical and petrochemical applications.

Sundyne has many years' expertise in offering Baske Wheel pumps, designed to provide efficiency in the low specific speed regime i.e. low flow, high head applications. These pumps have an open impeller with straight blades and a tapered conical diffuser to produce the desired performance. Development and testing demonstrates that this combination produces a head factor (ratio of developed head to theoretical head) considerably higher than that of swept-back vane impellers.

By combining Baske Wheel hydraulics with the HMD Kontro sealless magnetic drive, reliability and efficiency is further optimised, ensuring trouble-free plant operation.

An additional advantage of the GSPLF is the flexibility inherent in the diffuser and impeller, which can easily be upgraded should the duty need to be changed without replacing the pressure casing.

Sundyne HMD Kontro has more than twenty-five years' experience in API applications and over a sixty-five year heritage in magnetic drive technology. Indeed, we were the first to develop a sealless pump.

With stricter demands for the safety and welfare of both personnel and the environment being imposed, Sundyne HMD Kontro sealless pumps are playing an increasingly important role. We are continuously developing and extending our range, as improved and innovative magnet drive technology enables us to build more efficient and powerful pumps, widening the application scope of this versatile pump format.

HMD Kontro Sealless Pumps are the Solution

HMD Kontro sealless pumps are designed to completely comply with the requirements of API 685 specifications for magnetic drive, sealless end suction, centrifugal pumps required by the oil, gas, petroleum and heavy chemical industries.

HMD Kontro have been building sealless magnetic drive pump units to API codes since 1983. With increasing demands for the safety and welfare of personnel plus the environment these sealless pumps are playing an ever greater part in maintaining these goals. Improved magnet drive technology has enabled more efficient and powerful pumps to be built, thus increasing the application scope for this technology.

Starting first with API 610 6th edition and then modifying designs to incorporate 7th and 8th edition requirements, we ensured that our sealless pumps met and exceeded the original requirements for sealed units. October 2000 saw the official release of API 685, sealless centrifugal pumps for petroleum, petrochemical and gas industry process service. This standard was dedicated to sealless pumps and once again HMD Kontro were at the forefront of development with the GSP pump ranges.

The standard was further updated in February 2011 and now the HMD Kontro GSP ranges of magnetic drive sealless pumps are designed to the API 685 2nd edition standard.

With over twenty-five years API experience and our sixty year heritage in magnetic drive technology HMD Kontro are in an ideal position to provide your pump requirements for refinery, petrochemical and heavy-duty chemical services. Our range of API 685 pumps is being continuously developed and extended and currently consists of standard centrifugal OH2 units (1.5 x 1 x 6 to 10 x 8 x 21), vertical OH5 units and high system pressure derivatives of both designs.

Paragraph 6.2.7
Pump casings have metal to metal fits with confined controlled compression spiral wound gasket.

Paragraph 9.1.3.5
Magnet rings are fully sheathed to prevent damage during assembly or disassembley.

Paragraph 6.7
Secondary control / containment systems – Full range available on request.

Paragraph 6.6.1
Low specific speed semi-open impeller design with generous clearances.

Paragraph 6.9.9.1
Bearing Housings supplied with dimples for vibration monitoring.

Paragraph 6.2.9
Centerline mounted Casing and Coupling Housing – Provided as standard.

Paragraph 6.2.1 / 6.4
Flanges and Casings – Full compliance to Nozzle loading requirements.

Paragraph 6.5.1 / 2 / 3 / 4
Impellers – Semi-open, single-piece cast with solid hubs. Keyed to the shaft.

Paragraph 9.1.2.1.1
Containment shell – Constructed in accordance with ASME VIII international standards.

Paragraph 6.3.3.5
Casing features flanged drain supported in two planes.

Paragraph 6.9.7
Thrust bearings – Designed for capacity in both directions.

Paragraph 6.1.10
All internal cavities are fully drainable – Optional flush out or steam out connections available.

Paragraph 6.9.5
Grooved axial and radial bearings – For heat removal and particle flushing.

Paragraph 6.9.4
Sleeves – Concentrically located bearing sleeves. Design compensates for relative thermal expansion. Concentrically located with O-rings.

Paragraph 9.1.1.6
Internal Bearings – Not supported by the containment shell.

Paragraph 6.9.6
Two radial bearings – Provided as standard.

KEY

- Pump Casing
- Impeller
- Bush Holder
- Silicon Carbide Bushes
- Silicon Carbide Shaft Sleeves and Thrust Washers
- Containment Shell
- Magnetic Drive
- Bump Ring
- Coupling Housing
- Power Frame

The GSPLF range meets and in many cases exceeds the requirements of API 685. 2nd Edition

Notes

6.1.20 No Cooling required for operating temperatures up to 350 DegC (660 DegF).

6.1.26 / 6.2.11 Rapid & Economical maintenance – Shoulders and dowels to facilitate assembly and disassembly.

6.1.3.4 Temperature and pressure profiles – Heat balance calculations provided.

6.2.2 Pressure Casings, Flanges and Coupling housings rated for 40 Bar (580 psi).

6.3.3.1 No threaded connections to the primary pressure casing. Flanged connections supplied as standard.

6.10 Materials – GSP pumps are available as standard with S-5, A-8, D-1j, and D-2j materials. Other variations are available on request.

6.10.3 Welding in compliance with ASME Section VIII, Div 1, and section IX.

7.6 Special Tools – Not required for maintenance of HMD Kontro GSPLF pumps.

9.1.3.2 All Magnetic Couplings feature mechanically retained and bonded magnets.

9.1.3.3 All units feature a non-sparking bump ring to prevent outer magnet ring contacting containment shell in the event of an external bearing assembly failure.

9.1.4 AntiFriction Bearing Assemblies – Fully compliant rolling element bearings, sized in accordance with requirements.

9.1.5.3 Baseplate – Heavy duty design incorporates continuous welds, leveling screws, lifting lugs, grout locking cross-members and drain connection.

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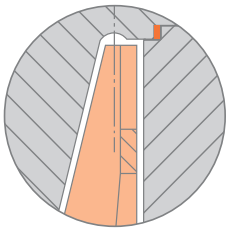
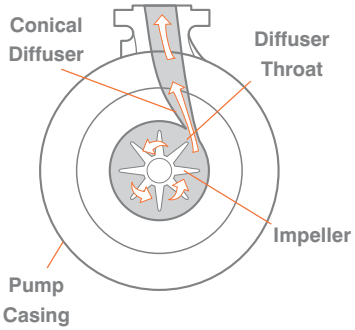
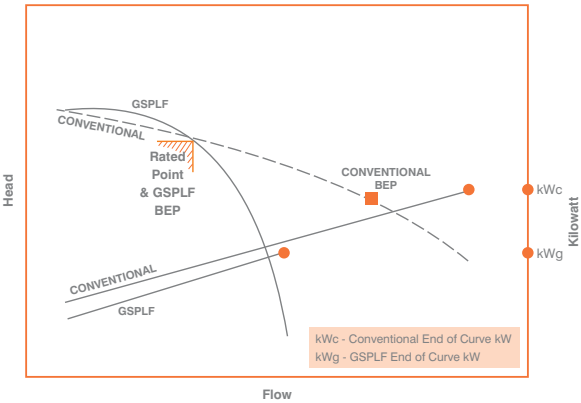
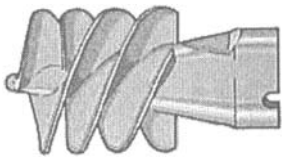
GSPLF Design Features

Low Flow Sealless Magnetic Drive Pumps









Removable Diffuser

- Allows for re-rating of pumps to different process conditions without costly machining.
- Easily converted on site.

Generous Clearances

- No Wear Rings eliminates potential performance degradation sometimes associated with Wear Ring designs
- Maintains as-build efficiency

Low Specific Speed Best Fit Hydraulics

- Barske hydraulics for optimum efficiency in low specific speed (Ns) applications
- Optimised hardware to fit exact design requirements
- Lower end-of-curve power requirements
- Maximised efficiency

Low Bearing Loads

- Semi-open impeller design reduces radial and axial bearing loads on product lubricated internal bearing system

Optional Inducers for low NPSH

- Superior NPSHr performance
- Suction designed for cavitation free operation

Build Options:

- High Efficiency ZL Containment Shell
- Secondary Control System
- Secondary Containment System
- External Filtration
- Inducers
- NACE compliant Materials
- Vertical (OH5) derivative

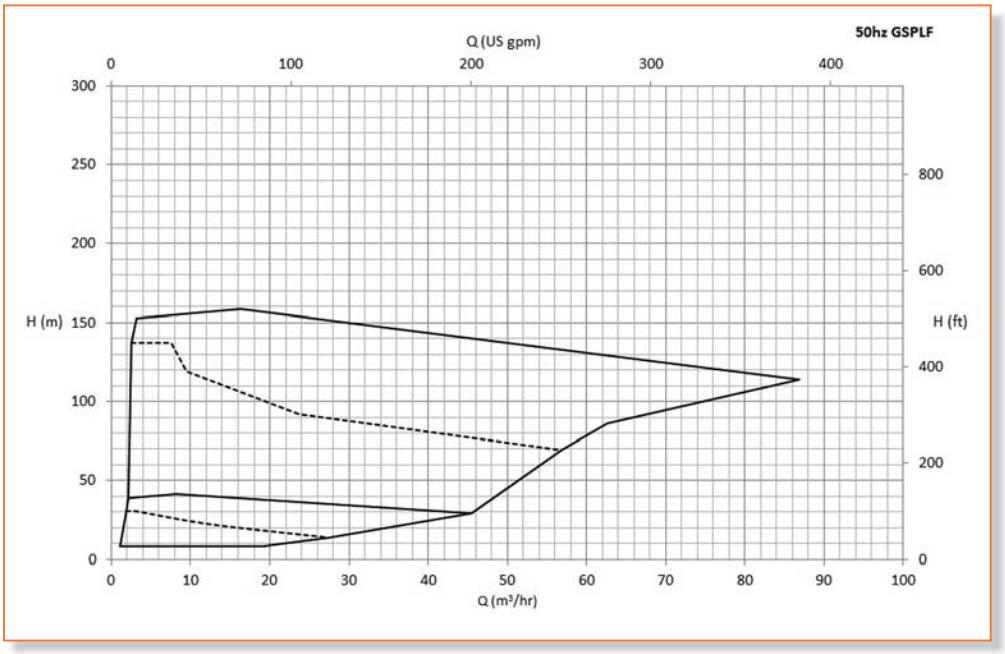
Instrumentation Options:

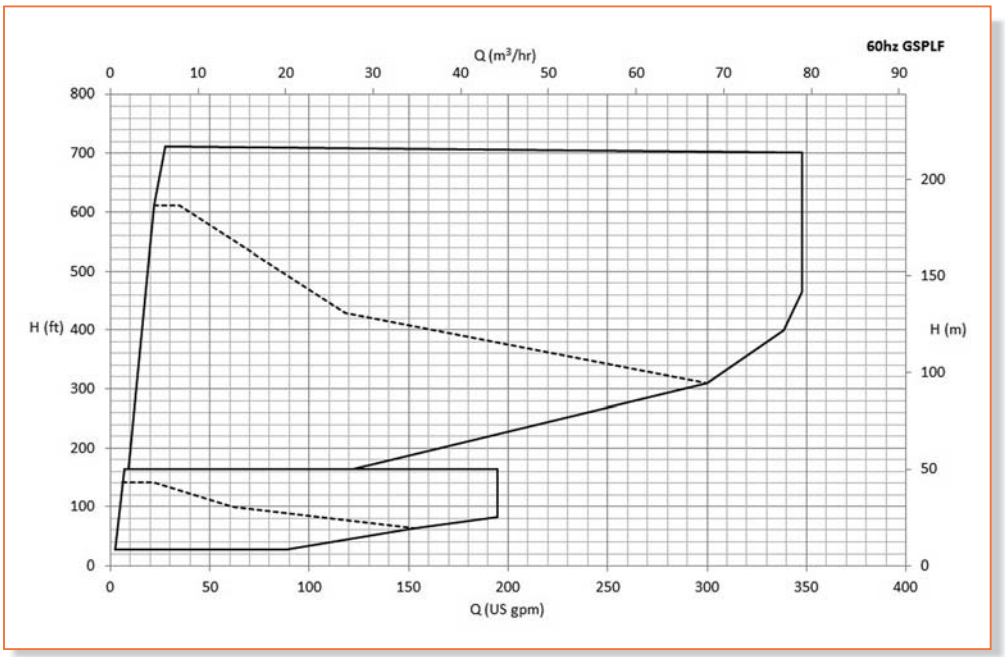
- Power Control Monitor
- RTD temperature sensing
- Secondary Housing monitoring (Liquid or Pressure)
- VapourView™

GSPLF Hydraulic Coverage

	Head	Flow	Design Temperature[1]	Design Pressure[2]
SI Units (50 hz)	150 m	60 m^3/hr	-40 to 260 °C	40 Bar
US Units (60 hz)	720 ft	380 usgpm	-40 to 500 °F	580 Psi

1. Standard design temperature. Higher and lower limits available on request -100°C (-148°F) to 315°C (600°F)
2. Standard design pressure. Design pressures up to 100 Bar (1400 Psi) available on request.





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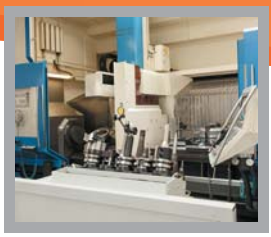
The GSPLF
Pump Range

The GSPLF range comprises of pumps based on the HMD Kontro GS drive, built to API 685 specification, suitable for heavy-duty applications.

- Separate mounted OH2 design
- One frame size to suit power requirements
- Large degree of interchangeability across hydraulic range
- Commonality minimises spare parts inventory and associated costs
- Centre line mounted design with support brackets on both the casing and the magnetic coupling housing to minimise vibration and allow for thermal expansion
- Mounted on a heavy-duty fabricated steel drip pan baseplate

- Self-venting and self-draining
- Conforms to API 685 for sealless pumps and relevant API 610 requirements
- Design ensures safe, leak free operation
- Increased efficiency via low operating costs
- Minimal spares holding and maintenance
- No costly seal support systems to specify, install or maintain
- Reduced specification time and installation costs
- Standard materials of construction per S-5, A-8, D-1j and D-2j. Other variations are available on request
- Silicon carbide internal bearings and spiral wound gaskets
- Various flange options are available as standard
- Full range of secondary control / containment systems available on request
- Wide range of Instrumentation systems available
- Optional vertical OH5 design available
- Choice of metallic or ZeroLoss containment shell



Sundyne HMD Kontro

Why a

Magnetic Drive Pump to API 685

Magnetic drive Sealless pumps offer significant advantages and benefits over conventional sealed designs:

- No seals
- No seal support systems
- Complete fluid containment
- Zero emissions
- Zero contamination of pumped liquid
- Cost effective installation
- No ancillary seal support systems to specify and install
- Longer MTBF
- No EPA monitoring required
- Improved operator safety and protection of the environment

Mechanical seals are widely regarded as the weakest point in any pumping system using them. Over 85% of pump failures involve mechanical seal failure and/or leakage through static seals such as gaskets and/or O-rings and bearing failure.

When planning a new pump installation or an upgrade to an existing installation, often the financial impact of the mechanical seal support system is considerable. Once such a system is installed, further cost implications are caused by the need to comply with local, regional or national environmental requirements, which often involve monitoring the effectiveness of such a system.

By completely eliminating the seal and associated seal support system, the GSP Range of API 685pumps are ideal for handling liquids with the following characteristics:

- Toxic
- Lethal
- Carcinogenic
- Flammable
- Expensive Fluids
- Fluids containing dissolved solids (i.e. Caustic)
- Fluids containing H2S (Sour Water)
- Heat Transfer Fluids (Cold and Hot)
- High Vapour Pressure Liquids

Essential HMD Kontro Benefits

- High efficiency magnet drive
- Almost zero unplanned maintenance
- Absolutely no leakages
- Environmentally safe
- Options for system pressures up to 1500 psi/ 100Bar (higher pressures available upon request)
- Fully encapsulated magnets
- Heavy-duty power frame
- ASME VIII containment shell
- High system pressure capability without 'backup' systems
- Standard electric motors utilised
- No cooling required up to 350°C / 600°F
- Material options available
- Alpha SiC Internal Bearings
- Non Sparking Bump Ring for safety
- HMD Kontro worldwide service support

Typical Applications Include:

- Oil Refineries
- FPSO (Floating Production Storage & Offtake) Facilities
- Oil Rigs
- Chemical Processing Plants
- Heavy Duty Chemical Applications
- Petrochemical processing plants

Liquids Handled by GSP Pumps Include:

The following is a sample of some of the typical liquids that the HMD Kontro GSP API 685 pumps have been used for:

Acrylic Monomers
Acrylonitrile
Alkylate
Amyl Acetate
Anhydrous HF
Amines
Aromatics
Benzene
Butadiene
Butane
Caustic Soda
Chloroform
Condensate
Crude Oil
Cyclohexane
Dichlorobenzene
Ethylene
Hexane
Hydrocarbons
Hydrofluonic Acid
Kerosene
Isobutane
Iso-Propyl Alcohol
LPG
MDI
Methanol
MEG
Methylene Dichloride
Methyl Mercaptan
Methyl Naphthalene
MMA
Naphtha
Naphthalene
Pentane
Phenol
Produced Water
Pyridine
Sour Water
Styrene
Sulphuric Acid
TDA
TDI
Thermal Oil
Toluene
Trichloroethylene
Vinyl Acetate
Various Chlorinated
Xylene

The above list is not exhaustive. Please contact us for reference and information for many other liquids successfully handled.

Sealless Savings

Specifying sealless, magnetic drive pumps can save significant costs both in respect of time and money. Indeed, a major feature is that savings can be made before, during and after installation, with reduced running costs.

Having no seal system, and consequently no ancillaries, means that design and engineering time as well as the time taken for procurement is significantly reduced. At the time of installation, commissioning is quicker, allowing faster project completion and there are far less lengthy HazOps (Hazard and Operability) studies to undertake, endure and agree, thanks to the much simpler design of the sealless pump.

Once up and running, sealless pumps really come into their own. Reduced downtime, because of less maintenance and no need for seal changes, contributes to much improved plant utilisation and hence profitability.

The simple design of a sealless pump, together with a proven track record, provides a 'fit and forget' advantage. Not only is maintenance much reduced but also less need to keep spare parts, in particular, there are no seals to stock, and the need for skilled labour overhead is also reduced.

Sealless Safety

With a magnetic drive pump there is no opportunity for leaks or emissions. Therefore, your EH&S (Environmental Health & Safety) personnel will like the fact that you specified sealless.

Because there are no seals, and the resultant leak path, required to lubricate the seal, there is no need for EPA monitoring and much less risk to operational personnel on your job site.

No requirement for support systems and the fact that no barrier fluids need to be used means much reduced possibility of accidents and emissions. It also reduces liabilities and can hence also help to lower insurance costs.

Overall, sealless pumps represent better operator safety, a cleaner working environment and reduced potential for legislation and litigation.

Sealless Service

Although our pumps only require minimal maintenance, that does not mean there is no after sales service from HMD Kontro. Quite the opposite in fact.

Our own After Sales team, together with our partners around the world, can help to optimise the performance and through life experience of using HMD Kontro pumps. From assisting with installation and commissioning, including ensuring smooth contract execution and swift provision of all the appropriate documentation, through to optimising your spares inventory and operating efficiency using the benefit of our experience.

Extending MTBF (mean time between failure) and providing you with the appropriate parts to effect fast maintenance and quick replacement where necessary, will significantly assist in reducing downtime and minimising through life costs, which are already inherently low with an HMD Kontro pump.

To learn more about why sealless is so suitable for your application, please contact us, either directly or through your country partner, which can be found on www.sundyne.com. We look forward to helping sealless be of service to you.

Existing Users Include:

Apache
Aramco
BP
British Gas
Conoco Phillips
Chevron
Esso
Exxon Mobil
Jiskoot
LukOil
Maersk
Marathon
OMV
Petrobras
Petronas
Pemex
Repsol
Sasol
Shell
Solartron
Statoil
Sunoco
Talisman
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