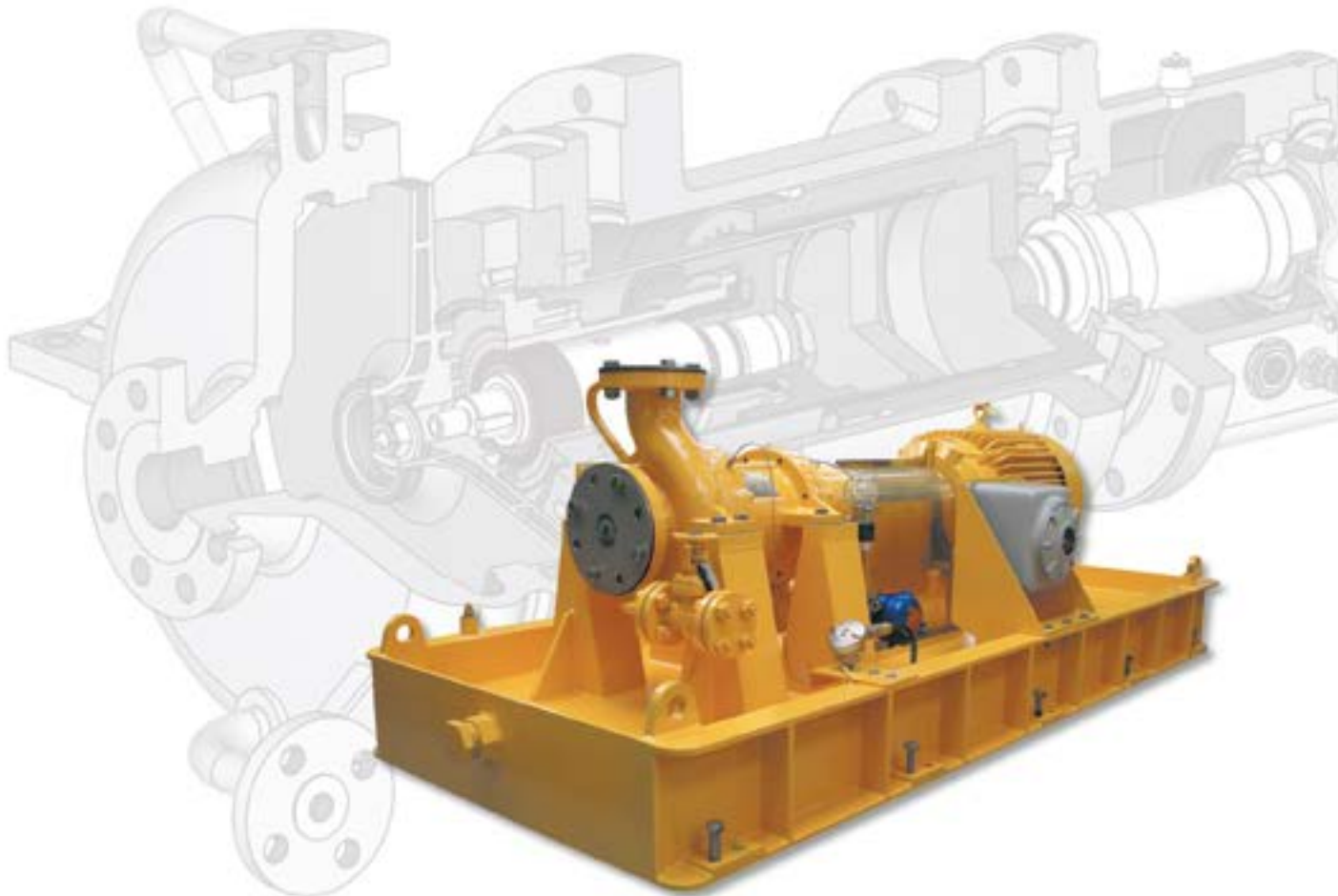


GSP Range

Sealless Metallic Magnetic Drive Pumps
API 685

HMD Kontro



Sundyne HMD Kontro

GSP Sealless Pumps are the API Solution

GSP pumps meet all the requirements of API 685, the sealless pump equivalent to API 610, which is the accepted industry standard for sealed centrifugal pumps. The API 685 standard was introduced in the year 2000 to describe the requirements for magnetic drive, sealless end suction, centrifugal pumps used by the oil, gas, petroleum and heavy chemical industries.



As the originators of the magnetic drive system, Sundyne HMD Kontro manufacture pumps that meet all aspects of the standard. Our API 685 GSP range has been specifically developed to ensure that you do not have to accept limitations or deviations.

No seals means no leaks, much less maintenance, significantly reduced downtime and substantial cost savings. There really is no substitute.



Sundyne HMD Kontro Sealless Pumps are the solution

Sundyne 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.

Sundyne 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 and the greater protection of 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 Sundyne HMD Kontro were at the forefront of development with the GSP pump ranges.

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

With over thirty years' API experience and our seventy year heritage in magnetic drive technology Sundyne 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 15), 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 disassembly.

Paragraph 6.7.1 / 3
 Renewable front and rear wear rings – located with locking pins (tack welded on request).

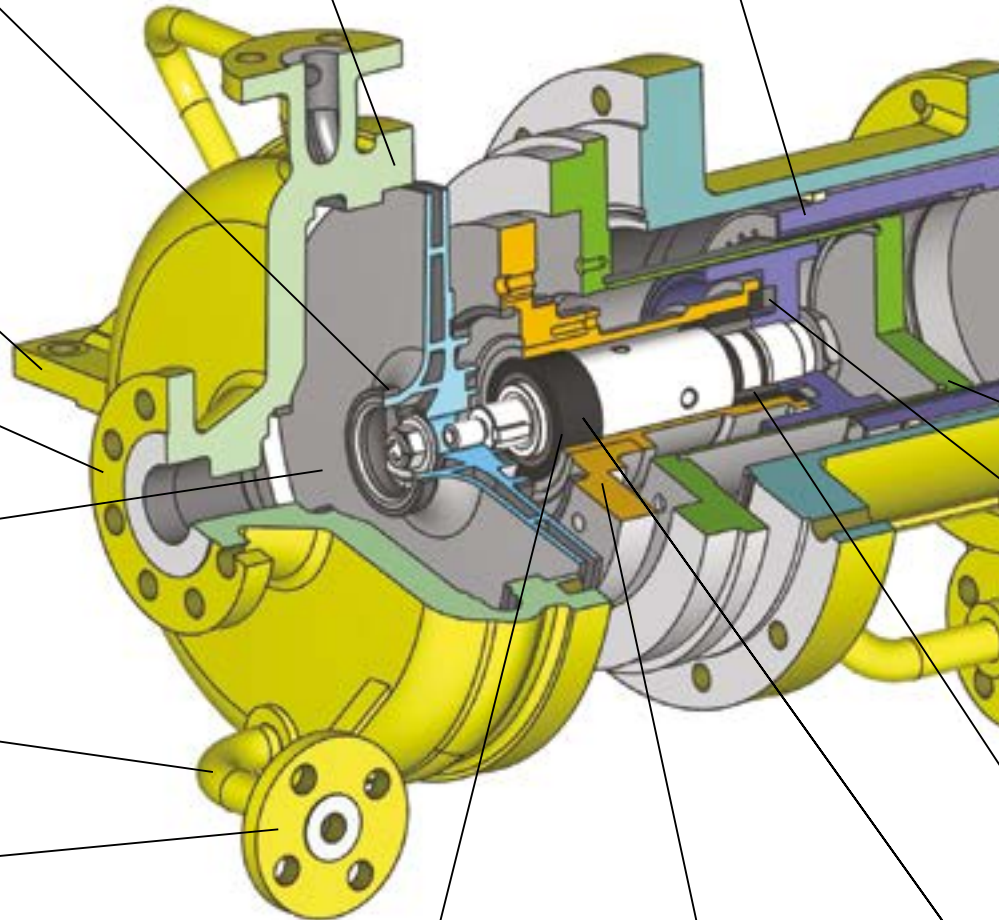
Paragraph 6.2.9
 Centerline mounted casing and coupling housing – provided as standard.

Paragraph 6.2.1 / 6.4
 Flanges and casings – full compliance to nozzle loading requirements.

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

Paragraph 6.3.3.5
 Casing features flanged drain supported in two planes.

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



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.

KEY

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

Paragraph 6.7

Secondary control / containment systems
– full range available on request.

Paragraph 6.9.9.1

Bearing housings supplied with
dimples for vibration monitoring.

Paragraph 9.1.2.1.1

Containment shell – constructed
in accordance with ASME VIII
international standards.

Paragraph 6.9.7

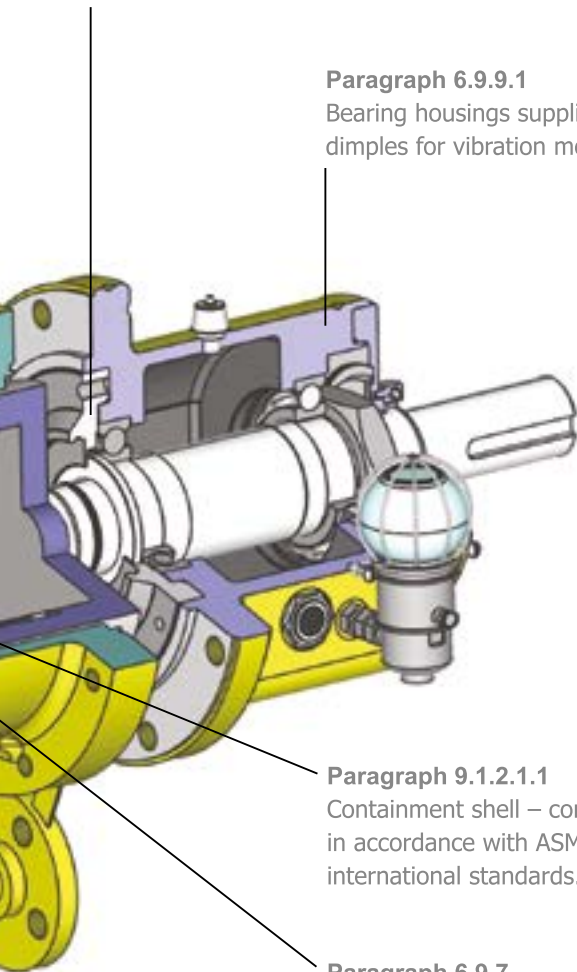
Thrust bearings – designed for
capacity in both directions.

Paragraph 6.9.5

Grooved axial and radial
bearings – for heat removal
and particle flushing.

Paragraph 6.9.6

Two radial bearings
– provided as standard.



The GSP 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 660°F (350°C).

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 600 psi (40 bar).

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-1 and D-2 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 Sundyne HMD Kontro GSP 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 Anti friction 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.

Sundyne HMD Kontro

A history of Complying with API requirements

Sundyne HMD Kontro installed the first API magnetic drive centrifugal pump in 1983 at a major blue-chip oil company in Australia. These were followed shortly by further installations with BP in Norway. At that time the American Petroleum Institute did not have a specific standard that applied to sealless pumps. Therefore the first Sundyne HMD Kontro API pumps were designed to follow the API 610 standard.



As much of the API 610 standard concerns seal and seal support systems, a considerable portion of the specification was not applicable to Sundyne HMD Kontro sealless API pumps. So, in 2000, the American Petroleum Institute launched the API 685 standard for Sealless Centrifugal Pumps for Petroleum, Heavy Duty Chemical and Gas Industry Services.

At this time, sealless technology had become well accepted in the chemical processing industry, but had not been as widely accepted in the refinery and petroleum industries. This was partly due to the lack of an API specification specifically addressing sealless designs.

Since 1983, when Sundyne HMD Kontro adopted the 6th Edition of the API 610 standard and subsequently the new API 685 standard in 2000, many successful Sundyne HMD Kontro magnetic drive pump installations have been implemented with clients worldwide on a huge variety of different applications. As a result, a substantial reference list is available.

The GSP range of pumps is designed to comply with the requirements of API 685 – Sealless Centrifugal Pumps for Petroleum, Heavy Duty Chemical and Gas Industry Services.



Sundyne HMD Kontro

Why

Magnetic Drive Pumps to API 685

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

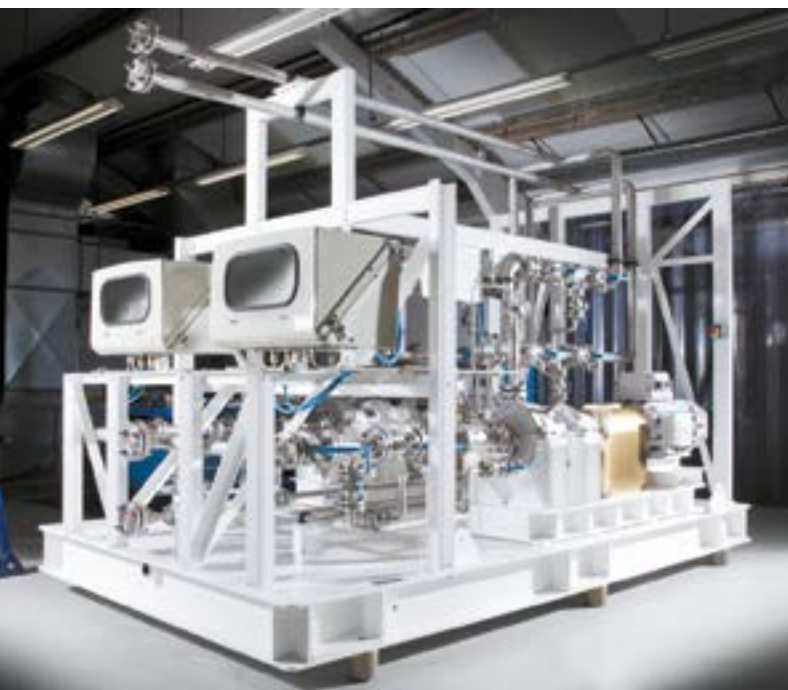
- No seals
- No seal support systems
- Complete fluid containment
- Zero emissions
- Zero contamination of pumped liquid
- Cost effective installation
- No ancillary seal support systems to specify and install
- Longer mean time between failure (MTBF)
- No EPA monitoring required
- Improved operator 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 685 pumps 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



Sundyne HMD Kontro

The GSP

Pump Range



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

- Separate mounted design available in thirty hydraulic sizes
- Four basic frame sizes to suit power requirements
- Large degree of interchangeability within frame sizes
- Commonality minimizes spare parts inventory and associated costs
- Centerline mounted design with support brackets on both the casing and the magnetic coupling housing, to minimize vibration and allow for thermal expansion
- Mounted on a heavy-duty fabricated steel drip pan baseplate
- Self-venting and completely 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 are A-8, S-5, D-1 and D-2. 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

Essential Sundyne HMD Kontro Benefits

- High efficiency magnet drive
- Almost zero unplanned maintenance
- Absolutely no leakages
- Environmentally safe
- Options for system pressures up to 100 bar/ 1500 psi (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 600°F / 350°C
- Material options available
- Alpha SiC internal bearings
- Non sparking bump ring for safety
- Sundyne HMD Kontro worldwide service support

Typical Applications Include:

- Oil Refineries
- FPSO (Floating Production Storage & Offtake) Facilities
- Oil Rigs
- Tanker Offloading (Road and Rail)
- Heavy Duty Chemical Applications
- Hot Oil Circulation
- Petrochemical processing plants

Liquids handled by GSP pumps include:

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

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

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

The success of the Sundyne HMD Kontro GSP pump has led us to develop and extend this product line further with the following pumps now available:

GSPV (V for Vertical)

The GSPV range of vertically mounted pumps provides all the benefits of a magnetic drive sealless pump in a compact package. Requiring minimal floor space, the GSPV meets all of the requirements of API 685, making it ideal for chemical and petrochemical, oil and gas applications where space is at a premium, such as offshore installations. Dimensionally the range conforms to BS4082, thus providing a sealless upgrade solution to improve the safety and extend the operational life of existing installations.

GSPVS (VS for Vertical Suspended)

Our vertical sealless suspended pump, which also meets the requirements of API 685 (as applicable to this style of pump) and is fully ATEX compliant, has been designed for use in tank farms, for tank fluid transfer, as well as in refineries and processing plants. The GSPVS pump's modular construction can reach a total assembly length up to 20ft / 6m and uses a flexible jaw coupling to join drive shafts and absorb misalignment, helping to decrease vibration and increase life expectancy.

HPGSP (HP for High Pressure)

The HPGSP sealless pump is at the top end of our range of high pressure pumps for oil and gas, petrochemical and chemical industries. Capable of easily handling system pressures up to 185 bar and higher, dependent upon

temperature extremes, these high pressure pumps are exceptionally versatile yet safe and secure. Built to API 685 specifications, the separate mounted design is available in 13 hydraulic sizes and two basic frame sizes to suit power requirements.

GSPLF (LF for Low Flow)

GSPLF fills the gap in the market for a low flow sealless pump with a relatively high head capability. Combining the proven technologies of Sundyne Barske Wheel hydraulics with the Sundyne HMD Kontro sealless magnetic drive, the GSPLF optimises reliability and efficiency, ensuring trouble-free plant operation. Inherent flexibility allows the diffuser and impeller to be easily upgraded should the duty need to be changed without replacing the pressure casing.

LMV 801S

A vertical variation of the GSPLF, the LMV 801S is dimensionally interchangeable with the LMV 801 mechanical seal pump and will simply 'drop-in' to existing client pipework, making sealless upgrades possible without the need to modify pipe and foundation layout. A 'plug-in' version of the pump is also available.



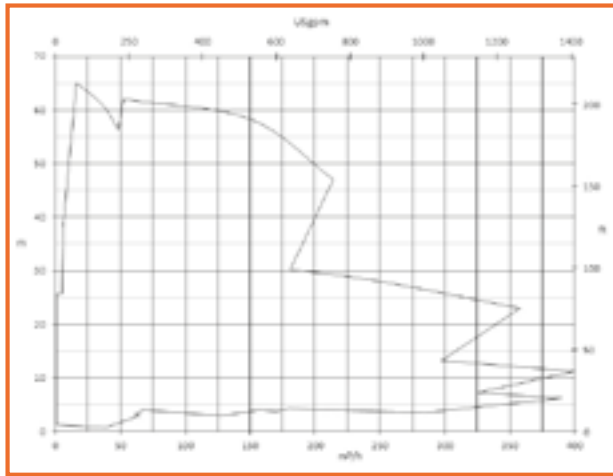
Hydraulic Coverage

Frequency	Head	Flow	Temperature	Pressure
60Hz	1250 ft	4250 USgpm	-150 to 660°F*	580 psi**
50Hz	260 m	800 m ³ /h	-100 to 350°C*	40 bar**

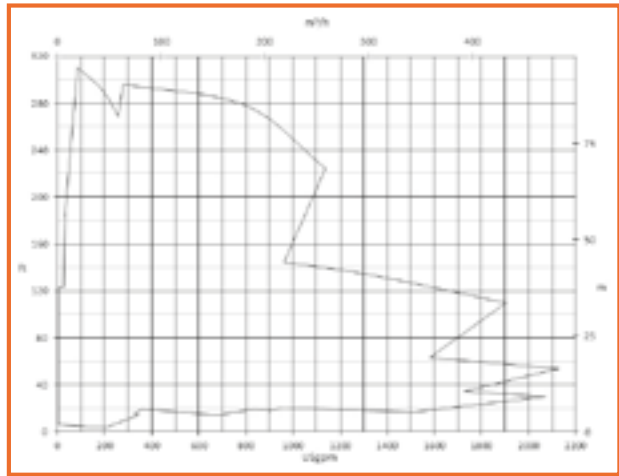
* 840°F / 450°C Upon request. ** Higher pressure ratings upon request

Internal Pressure / Temperature Profiles Available. Optional Instrumentation Packages available

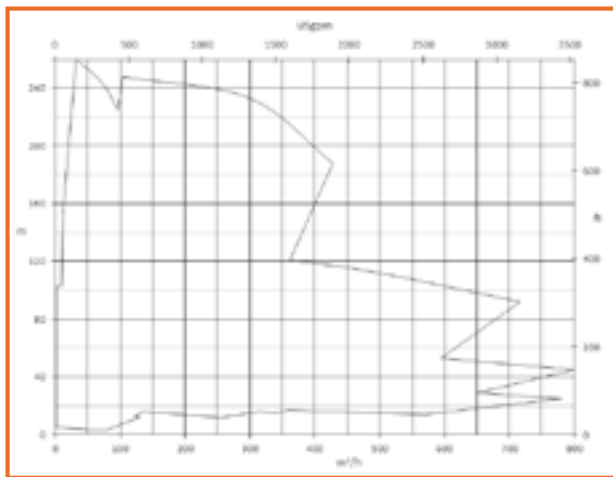
1450 rpm



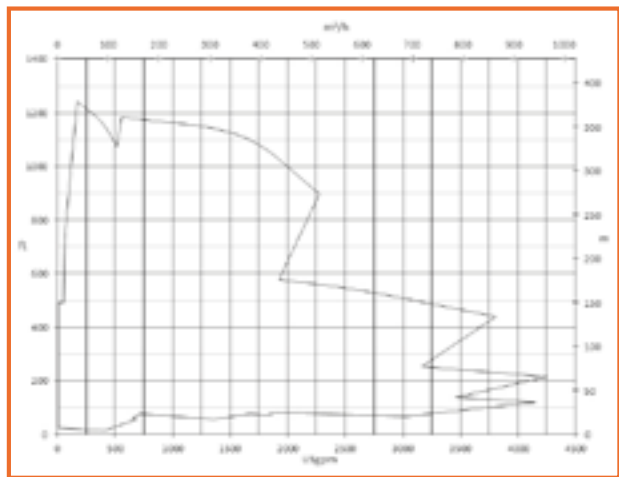
1750 rpm



2900 rpm



3500 rpm



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 utilization 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 there is less need to keep spare parts, in particular, there are no seals to stock, and the need for skilled labor overhead is also reduced.

Sealless Safety

With a magnetic drive pump there is no opportunity for leaks or emissions. Therefore, your 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 Sundyne 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 Sundyne 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 minimizing through life costs, which are already inherently low with an Sundyne 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
Texaco

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