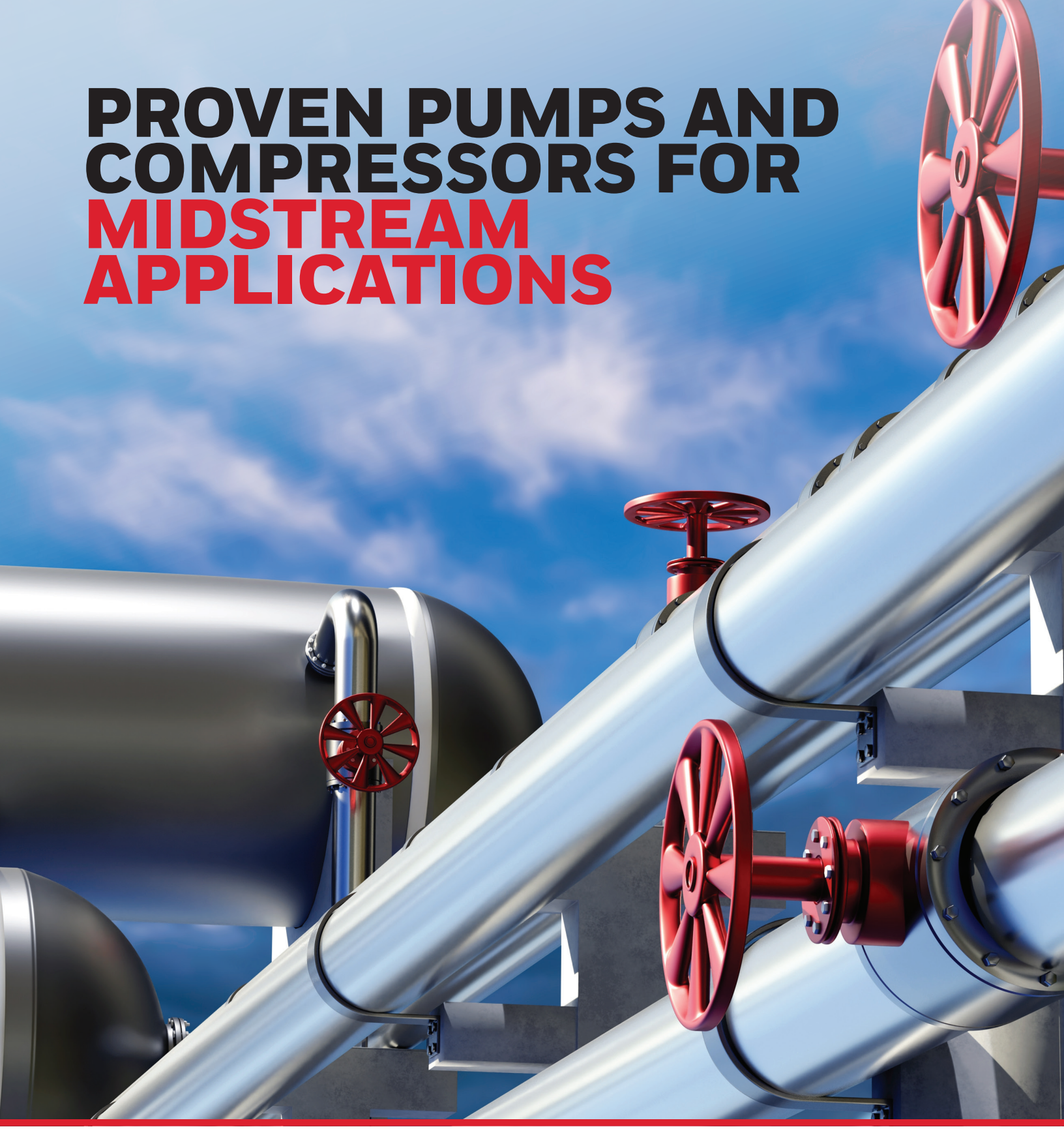
PROVEN PUMPS AND COMPRESSORS FOR MIDSTREAM APPLICATIONS



Honeywell Technologies Sundyne

Sundyne Pumps | Sundyne Compressors | SUNFLO® | HMD KONTRO Sealless Pumps | Marelli Bombas | ANSIMAG

SUNDYNE PUMPS & COMPRESSORS FOR MIDSTREAM APPLICATIONS

The global midstream oil & gas market sits between exploration & production (upstream) and refining & petrochemicals (downstream). The primary activities in the midstream sector include transportation, storage, processing and export, which generate nearly a trillion dollars in annual revenue.

The value of the underlying infrastructure in the midstream market is even greater, exceeding $5 trillion USD. The midstream sector is one of the most capital-intensive parts of the global energy industry, because infrastructure is required to connect production fields with refineries, export terminals, power plants and end users. Most industry forecasts estimate a 3% to 6% annual compound growth (CAGR) over the next decade, as LNG exports and Data Centers are increasing the demand for midstream applications.

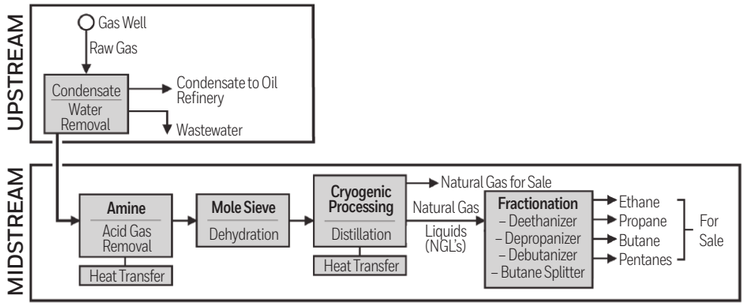
The primary growth driver in the midstream market is Natural Gas, which is a naturally occurring fossil fuel found in underground rock formations, often alongside crude oil. It's one of the world's most important energy sources because it burns more cleanly than coal or oil, and it is widely used for electricity generation, heating and as a feedstock for petrochemicals.

When raw gas exits a well, it consists of mostly methane (CH_4), with smaller amounts of water (H_2O), ethane (C_2H_6), propane (C_3H_8), butane (C_4H_{10}), carbon dioxide (CO_2), nitrogen (N_2) and hydrogen sulfide (H_2S). These elements are separated during processing, and many are sold as by-products.

The process of removing additional heavier hydrocarbons from the gas stream produces pipeline-quality, methane-rich natural gas. Once processed, Methane is distributed to downstream consumers, where it is used as a fuel source for power generation, feedstock for petrochemical processing, or it can be liquefied for export.

Common Midstream Processing Applications Include:

- **Amine Treating**, to remove acid gas.
- **Molecular Sieve Dehydration:** Wet natural gas must be dehydrated to prevent hydrate formation in NGL recovery and to prevent ice from forming in pipelines.
- **Cryogenic Processing & Distillation**, to separate natural gas liquids (NGLs).
- **Fractionation Applications**, which remove carbon atoms and separate heavier hydrocarbons (ethane, propane, and butane) from the gas stream: Once separated, each component is sold as a usable by-product or feedstock.



HYDROCARBON REFERENCE TABLE: ALKANES VS. ALKENES

# CARBON ATOMS	NAME (SINGLE BOND)	DOUBLE BOND	COMMON USES
1	Methane	-	Natural Gas, electricity generation
2	Ethane	Ethene	Feedstock for plastics
3	Propane	Propene	Fuel, Cooking
4	Butane	Butene	Gas blending, Chemical manufacturing (Rubber)
5	Pentane	Pentene	Solvents, foams
6	Hexane	Hexene	Glue, leather, textiles
7	Heptane	Heptene	Solvents, paints, coatings
8	Octane	Octene	Gasoline/Petrol
9	Nonane	Nonene	Jet Fuel, kerosene
10	Decane	Decene	Kerosene and gasoline component
11	Undecane	Undecene	Bug spray, household chemicals

Outlook

The long-term outlook for the midstream sector remains positive because even as the energy mix evolves, the world is expected to rely on substantial volumes of oil and natural gas for decades. In particular:

- Natural gas and LNG are expected to remain key growth areas.
- New investments in LNG export capacity and gas pipelines are driving demand for additional midstream infrastructure.

Bottom Line

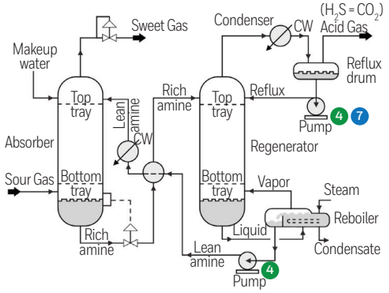
Natural gas is a versatile energy source that's used to generate electricity, heat homes, power industrial facilities and manufacture a wide range of petro-chemicals and fertilizers.

Because it burns more cleanly than coal and is abundant in many regions, it plays a central role in today's global energy system, even as renewable energy continues to expand.

SUNDYNE PUMPS & COMPRESSORS IN MIDSTREAM APPLICATIONS

AMINE TREATING:

Amine gas treating utilizes various alkylamine solutions to remove hydrogen sulfide and carbon dioxide from natural gas. Midstream plants treat raw gas transported from the wellhead to produce sweet gas for further processing.



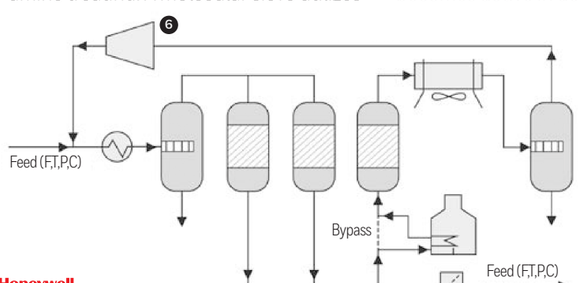
Sundyne Sealless Magnetic Drive API-685 Centrifugal Pumps are commonly used in the reflux and lean amine processes. Sundyne HMD Kontro pumps feature containment shells which eliminate eddy current losses in the pump and reduce energy consumption. With no seals to repair, or replace, maintenance is minimized – and worker/environmental safety is also improved through leak-free operation.

Sunflo High Pressure Pumps are also a popular choice for reflux applications: For some midstream applications which do not require API compliance, more cost-effective pumps are available that still offer similar performance. Sunflo Industrial Grade pumps are the preferred choice for applications with low NPSH requirements. Their small footprint enables them to be deployed in any plant environment. 316 stainless steel construction (with higher alloys available) enables Sunflo pumps to resist corrosion, and Sunflo's Thrust Bearing capabilities enable the pumps to withstand upset conditions and operate reliably round the clock.

MOLECULAR SIEVE DEHYDRATION:

Because Natural Gas condenses to LNG at a temperature of -260°F (-160°C), and water freezes at just 32°F (0°C), wet natural gas must be dehydrated in molecular sieves to prevent ice from forming.

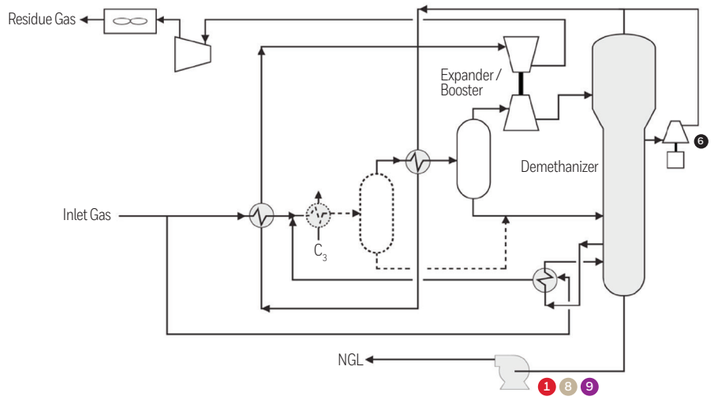
Molecular sieve dehydration units remove water vapor from gas as it enters the midstream process after amine treating. A molecular sieve utilizes porous adsorbent materials to sift and separate water from gas. The basic mole sieve design consists of two (or more) units. One unit operates in dehydration mode with the other in regeneration mode. As the dehydration unit becomes saturated with water vapor, it is automatically switched to regeneration mode while the regeneration unit becomes active in dehydration mode.



Sundyne Integrally Geared Centrifugal Compressors are precision engineered to provide pulsation and vibration free operation. Built to meet API standards, they will run continuously for up to 5 years, delivering oil-free process gas with no emissions. Their compact footprint and high efficiency make them perfect for handling mole sieve regeneration and dehydration.

CRYOGENIC PROCESSING:

A cryogenic processing plant (or a stripping plant) cools natural gas to -120°F (-84°C) in order to condense butane, ethane and propane, which naturally occur within the natural gas as NGLs or Natural Gas Liquids.



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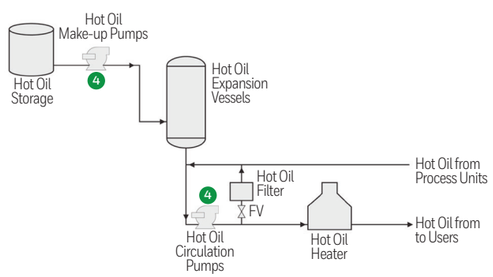
Sundyne Integrally Geared Centrifugal Compressors are widely utilized for regeneration of the demethanizer process. They can run continuously for 5 years, and their unique modular baseplate is easy to install into any process environment.

Sundyne OH2, OH3 and OH5 Process Pumps are widely utilized for reliable, safe and efficient transportation of NGLs once they have been separated from the natural gas. Sundyne pumps are engineered to meet API 610 / ISO 13709 standards and deliver rugged reliability in a compact footprint.

HOT OILS:

Hot oil systems are designed to store and move heat transfer fluids that are required for midstream gas process heating. The heat transfer fluid is normally stored in an elevated and insulated vessel. Sundyne HMD/Kontro sealless magnetic drive centrifugal pumps are utilized to circulate the heated fluid from the storage tank through an electric process heater, gas fired heater, or exhaust heat exchanger.

Worker and environmental safety are paramount in plants processing harsh chemicals. HMD/Kontro's Metallic construction enables the pumps to effectively handle harsh materials, at a wide range of temperatures.



Marelli API-610 OH2 and ISO 13709 compliant Pumps

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Sundyne HMD/Kontro Sealless Magnetic Drive Centrifugal Pumps have a large temperature range and do not leak, making them a perfect choice for handling heat transfer fluids. Metallic construction enables the pumps to effectively handle harsh materials, at a wide range of temperatures. ZeroLoss containment shells increase temperature ranges from -40°C to +150°C, while bolstering the pump's resistance to thermal shock.

WHERE LNG FITS IN THE MIDSTREAM MARKET

When natural gas is cooled to - 162°C/ -260°F, it liquefies and reduces in volume by approximately 600 times, making it easier to transport. Liquefied Natural Gas (LNG) is one of the fastest-growing parts of the Midstream market. The primary purpose of LNG is transportation.

Liquefaction allows natural gas to be shipped economically across oceans where pipelines are not practical. LNG in-and-of-itself is an intermediate product. It facilitates the movement of natural gas from producers to consumers, rather than being a final end-use product.

While some LNG activities overlap with downstream activities, a series of steps – including: gathering, processing, transportation, storage, liquefaction and export – fit directly in the midstream sector.

The following steps are required to Produce, Transport and Use LNG Around the Globe:

1 NATURAL GAS PRODUCTION

Natural gas is extracted from conventional gas fields, shale formations, or offshore gas reservoirs.

Methane (CH_4), typically makes up 85–95% of the gas

2 GAS PROCESSING

Before liquefaction, impurities such as water, carbon dioxide (CO_2), hydrogen sulfide (H_2S), and other heavier hydrocarbons are removed, to prevent freezing and corrosion in the liquefaction equipment.

Amine Scrubbing is one of several processes used to remove impurities

3 LIQUEFACTION

Cleaned & purified gas passes through a series of refrigeration stages until it condenses into a liquid. This stage requires refrigeration compressors, cryogenic heat exchangers, pumps and turbines.

Natural gas condenses to liquid state at approximately -162°C/-260°F

4 TRANSPORTATION

Once liquified, the volume of the gas decreases by approximately 600 times, making it more economical to transport. LNG is loaded onto insulated cryogenic tanks, and shipped via LNG carriers to importing countries.

LNG allows countries without pipeline connections to import natural gas

5 REGASIFICATION

After crossing the ocean, LNG is offloaded at regasification terminals. Once it is warmed and returned to a gaseous state, it is compressed and sent to local pipelines, where it is used for electricity generation, heating, and a variety of other uses.

LNG has become a critical part of the global energy system

DATA CENTERS AND THE MIDSTREAM GAS MARKET

Traditional data centers have always consumed significant amounts of electricity. But Artificial Intelligence (AI) data centers need exponentially more power.

- Enterprise data centers built 20-30 years ago typically consume between 5-20 MW.
- Today's large hyperscale cloud-centers require 100–300 MW.
- Even larger hyperscale AI campuses are expected to consume anywhere from 1–5 GW of power, which is equivalent to the power needs of a city.

While data centers consume electricity rather than natural gas directly, much of that electricity comes from gas-fired power plants, because they can be built quicker than nuclear plants, and they provide more reliable, 24/7 baseload power compared to solar, wind or other renewable options.

Behind the meter power generation enables data centers to access midstream natural gas networks in order to produce their own gas-fired power onsite.

For the midstream sector, this requires more pipelines, more gathering & storage systems, more processing plants and more compression.

CARBON CAPTURE PLAYS AN IMPORTANT ROLE IN DATA CENTERS

Natural gas-fired power plants that supply electricity to data centers are increasingly investing in CCUS technologies, to provide reliable 24/7 power while significantly reducing CO_2 emissions.

Sundyne offers a range of pumps & compressors to serve the entire CCUS value chain – including compression, dehydration, transportation, utilization and storage.

Pumps for CO_2 Applications:

- Lean and Rich Solvent Pumps
- Solvent Make-Up Pump
- CO_2 Pump
- Reflux Pump
- Wash Water Pump
- Fuel Pump

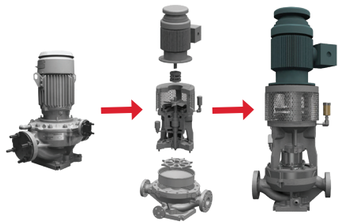
Compressors

- CO_2 Compressor
- Regeneration Gas Compressor
- HP Flash Gas Compressor

24 X 7, GLOBAL AFTERMARKET SERVICES

Sundyne's uncompromising reliability is not just a function of superior design. It's also delivered by high-touch services at commissioning, through planned turnarounds, and at every step of the way to ensure reliable day-to-day operation for years. With manufacturing operations and Authorized Service Centers (ASC) around the globe, Sundyne provides prompt & local support to keep customers up-and-running.

CONVERSIONS



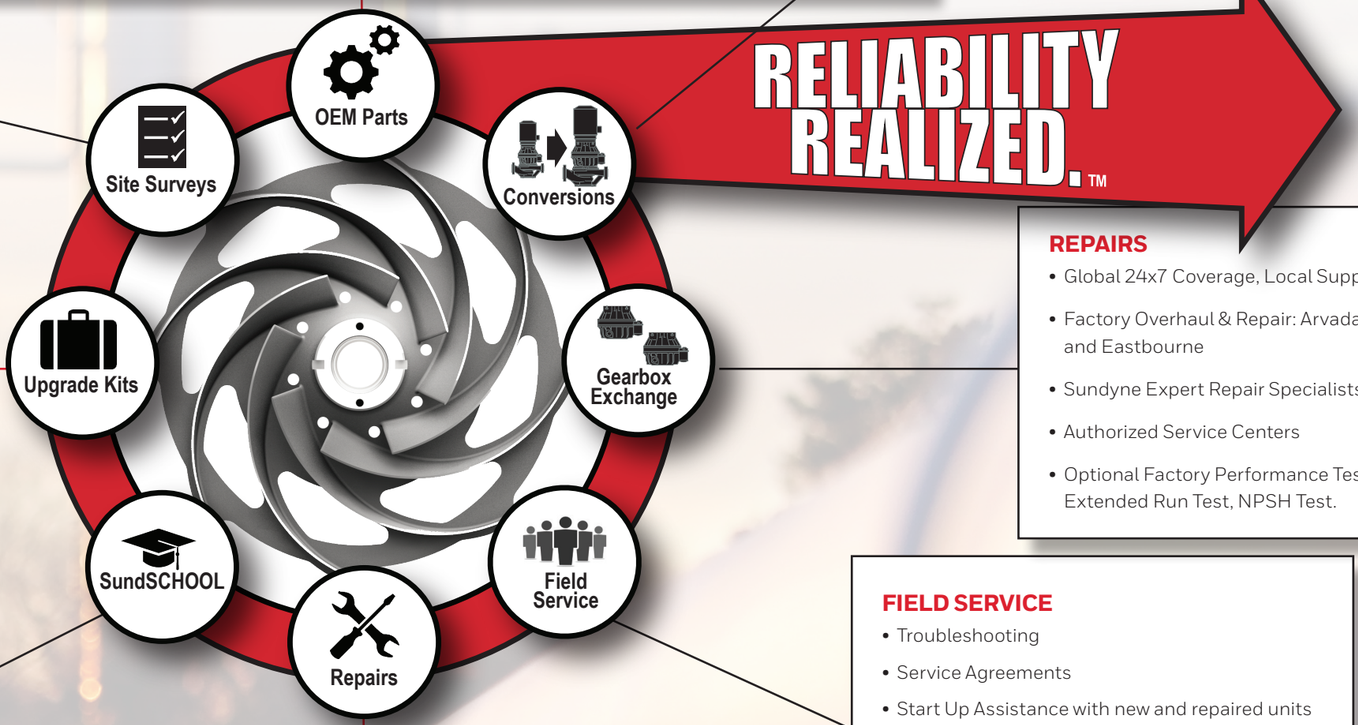
- **801 to 801 CS/S (Cartridge Seal/Sealless):** Convert to sealless or upgrade to API 682 cartridge seal.
- **HMP3/5 Upgrade:** Increased reliability using the latest engineered components
- **Gearbox Upgrades**
- **OH2 Drop In Replacements:** API 610 and 682 options. No shutdown / No Piping Changes!
- **OH2 ReFIT Kit:** Upgrade outdated OH2 to 12th Edition API by reusing existing impeller/casings
- **ReRate Conversions**

OEM PARTS

- Ensure High Quality Standards
- Warranty Protection
- Sundyne Tolerances
- Critical Spares: For quick repairs

SITE SURVEYS

- Free Site Audits by Sundyne engineers at no charge!
- Verify that equipment is running at B.E.P.
- Perform Equipment Health Checks
- Upgrade Options
- Optimize Stock Holding



REPAIRS

- Global 24x7 Coverage, Local Support
- Factory Overhaul & Repair: Arvada, Dijon, Spain and Eastbourne
- Sundyne Expert Repair Specialists
- Authorized Service Centers
- Optional Factory Performance Testing with Extended Run Test, NPSH Test.

UPGRADE KITS

- **Reliability Assurance Kits:** For simple overhaul/repairs.
- **Reliability Upgrade Kits:** Upgrade your Gearbox to the latest design.
- **Wet End Kits**
- **Critical Spares Kits:** Class I, II, & III

SUNDSCHOOL

- Maintenance & Operations Arvada, CO USA Factory
- Maintenance & Operations Dijon, France Factory
- On-Site Maintenance & Operations School

FIELD SERVICE

- Troubleshooting
- Service Agreements
- Start Up Assistance with new and repaired units
- 24x7 Global Support
- In field repairs when possible
- Maximize Up Time

GEARBOX EXCHANGE

- Up to 30% Exchange Credit!
- Convenient Streamlined Maintenance Planning
- Lower Lead Time = Greater Uptime
- New gearboxes include all the latest design improvements
- Re-Rate for Better Reliability: During the exchange, Sundyne Engineers can re-rate and establish a new B.E.P.

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Aftermarket Services

WHY SUNDYNE PUMPS & COMPRESSORS FOR MIDSTREAM APPLICATIONS?

Growing demand for LNG exports, power generation, and AI-enabled data centers is accelerating investment in new gas processing and transportation infrastructure, creating opportunities for proven midstream technologies. A report published by the University of Houston suggests that more than

$1 trillion in new midstream infrastructure investment will be needed by 2052 to support expanding LNG exports, increasing electricity consumption from data centers and artificial intelligence, and broader energy market needs. The report evaluates infrastructure requirements under both current-policy and lower carbon scenarios through 2052.New plants and processing facilities must leverage the industry's best technology – such as Sundyne's pumps & compressors –

which have proven their reliability for decades in many of the world's largest refineries and processing facilities.

INDUSTRY LEADING TECHNOLOGY

SUNDYNE SEALLESS PUMPS

are designed from the frame up to meet stringent API, ANSI and ISO guidelines, thus eliminating unwanted emissions and protecting plant personnel and the environment. Built around a streamlined, modular design philosophy, Sundyne pumps allow for fast, self-contained preventative maintenance, thereby maximizing uptime and keeping the midstream chain operating seamlessly.

SUNDYNE INTEGRALLY GEARED CENTRIFUGAL COMPRESSORS

meet all API specifications and are designed to provide pulsation- and vibration-free operation for up to 5 years of continuous operation with no emissions.

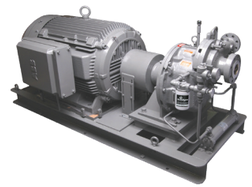
Sundyne compressors are ideal for skid packaging due to their unique modular baseplate, which is easy to install into any process environment.

SUNDYNE LMV AND HMP PUMPS

are optimized for low flow-high head applications. They offer the best efficiency in the low flow range with a proven track record of high reliability. A single impeller in an LMV pump spins at high speed to produce the same head as a multistage pump running at synchronous speed. To achieve even higher heads, two or more integrally geared stages run in series in Sundyne HMP pumps. The compact design reduces installation costs, and the simplicity limits the number of spare parts while making maintenance easier.

MARELLI PUMPS

leverage a track record of more than 60 years in centrifugal pump design, development, manufacturing and service. Marelli pumps are designed for extreme reliability and a wide range of flow rates, to accommodate the most stringent customer specifications.



SUNFLO PUMPS

are fit-for-purpose, industrial grade pumps designed for low flow – high head applications. The design leverages the knowledge and experience of Sundyne's API integrally geared pumps. A single impeller runs at high speed to produce high heads in a very compact and reliable design. The close coupled configuration eliminates alignment issues and simplifies installation while reducing footprint. The Sunflo cartridge shaft assembly comes complete with all the rotating parts and enables quick and easy servicing of the pump in-place.

FOR MORE INFORMATION PLEASE VISIT
WWW.SUNDYNE.COM AND
FILL OUT THE CONTACT US FORM.
A SUNDYNE REPRESENTATIVE
WILL RESPOND PROMPTLY.

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