Vacuum and Compressor Systems for the Chemical Process Industry
Proven technology built from experience

Gardner Denver Nash has been serving process industries such as petroleum, chemical and pharmaceutical for more than a century. You can count on Gardner Denver Nash to design and deliver the right solutions for your vacuum pump and compressor system application. As a worldwide leader in vacuum technology, Gardner Denver Nash has the expertise and knowledge to ensure that you receive the best product for your application.

We don't just sell something off the shelf. We take the time to determine what your needs are through a comprehensive analysis of your process. We then design the system to meet your specific requirements beginning with the fundamentals - capacities, vacuum or pressure levels and the unique demands your process will require. We take into consideration your objectives relative to operating costs and initial capital investment. Then, we engineer a NASH® system to satisfy all of your needs.

The Liquid Ring Advantage

Liquid ring vacuum pumps and compressors that use a fluid compressant in lieu of pistons, vanes or rotating lobes are the best choice in most applications. They provide benefits that are not possible with other alternatives.

Gardner Denver Nash easily complies with ATEX requirements because of the isothermal compression that is characteristic of liquid ring pumps. Simply put, NASH pumps run much cooler than other technologies.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to handle carryover</td>
<td>Minimal process problems; Intended for severe mill and chemical duty use</td>
</tr>
<tr>
<td>Long design life</td>
<td>Highest reliability</td>
</tr>
<tr>
<td>No internal lubrication required</td>
<td>No routine maintenance required; less downtime</td>
</tr>
<tr>
<td>No metal-to-metal contact</td>
<td>Constant wear-free performance</td>
</tr>
<tr>
<td>Cool Running,</td>
<td>Ideal for explosive gases and vapor recovery applications</td>
</tr>
<tr>
<td>Minimal temperature rise between inlet and discharge</td>
<td>Simple and reliable operation</td>
</tr>
</tbody>
</table>

Chemicals Handled

Unlike other vacuum pumps and compressors, NASH systems can handle moisture-laden inlet streams; explosive gases; dirty, abrasive or corrosive gas mixtures; and unpredictable streams that change with process variables. Some of these gases and vapors are:

- Acetone
- Acids
- Air
- Alcohol
- Ammonia
- Aniline
- Benzene
- Butadiene
- Carbon Dioxide
- Chlorine
- Freon
- Hydrocarbons
- Hydrogen
- Hydrogen Cyanide
- Hydrogen Sulfide
- Isopropyl Ether
- Ketones
- Nitrous Oxides
- Propylene Oxides
- PVC
- Styrene
- Sulfur Dioxide
- Vinyl Chloride
- Monomer
Versatile product technology expertly applied

Our broad range of products, consisting of liquid ring vacuum pumps, liquid ring compressors and ejectors can be individually applied or combined into packaged systems with additional components to serve a variety of process demands.

Liquid ring vacuum pumps

The NASH liquid ring vacuum pump family provides a wide range of product options. From the top-of-the-line heavy-duty P2620 with a dry air capacity of 23,000 CFM/ 39,000 m³/h to the mid-range Vectra (2,800 CFM/ 4,750 m³/h) and the smaller close-coupled 2BV series, we have the right answer for your individual vacuum requirement.

Gardner Denver Nash knows the technology behind liquid ring vacuum pumps, because it invented the liquid ring principle of operation. Liquid ring vacuum pumps operate at low temperatures and are suitable for handling liquids, steam and condensate. Developed for the toughest applications, these pumps can safely and reliably extract explosive gas and corrosive vapors.

Requiring minimal care and known for extremely low maintenance, NASH liquid ring vacuum pumps provide years of dependable service due to their robust design, rigorous quality, and their fewer and generously proportioned parts. Thanks to their low operating costs and extensive performance range up to 23,000 CFM/ 39,000 m³/h, they excel in any application.

Liquid ring compressors

Gardner Denver Nash offers the widest pressure and capacity ranges of liquid ring compressors worldwide. Together with the impressive NASH HP-9 and the introduction of the 14 over-hung models, NASH’s high-pressure compressor product line provides compression greater than 200 PSIG/ 15 Bar abs and up to 2,500 CFM/ 4,250 m³/h per machine. Low-pressure compressors are available to 30 PSIG/ 3 Bar abs, and as much as 20,000 CFM/ 34,000 m³/h.

Found primarily in petroleum refineries and chemical plants, these rugged and reliable compressors handle highly toxic, explosive and corrosive gases in applications such as flare-gas, chlorine and Vinyl Chlorine Monomer (VCM) recovery.
NASH engineered systems are built to last

Gardner Denver Nash provides the broadest range of vacuum packages to ensure a complete solution for your process needs. For general applications, the readily available 2BV and VectraPaks offer economical vacuum when you need it. For unique and demanding applications, our unparallel engineering staff will custom design a system specifically for your needs. A high quality NASH package provides value in terms of reliability, long life, energy savings and ease of installation.

Hybrid systems

NASH hybrid systems, combine different vacuum producing technologies to provide maximum efficiency and effectiveness for a wide array of applications. Benefits of a hybrid system include lower operating costs and reduced capital equipment investment; higher capacity, and higher vacuum levels at an economical advantage.

Engineered to Order Systems

When it comes to vacuum and compressor technology, each industry has its own requirements. Gardner Denver Nash offers a high level of expertise in the design and manufacture of systems designed to meet your specific process needs. These systems are ready for operation, easy to integrate into process automation, help to minimize installation & operating costs, and most of all are designed to meet the requirements of the most demanding applications.

Complete performance testing & worldwide service and support

Our quality standards are rigorously enforced, and as a final safeguard prior to leaving the factory, all NASH equipment is subjected to 100% performance testing. All Gardner Denver Nash manufacturing facilities worldwide are ISO 9001 certified. In addition, the development and design of all NASH products are in accordance with ISO 9001 standard.

Gardner Denver Nash provides full support from the initial system design through the installation and start-up. If equipment ever needs to be serviced, repaired or rebuilt, our service centers are located strategically around the world to respond quickly to your needs.
Complete application solutions

Our goal at Gardner Denver Nash is to provide long life, reliable, low maintenance and energy efficient solutions to processes like: evaporation, distillation, vacuum filtration, gas compression, VOC recovery, solvent recovery and drying.

Explosive Gas Compression

A typical arrangement for handling explosive gases, this compressor system keeps acetylene cool and saturated with water, which is used as the seal liquid. By doing this, the risk of explosion is minimized.

Polymerization Reactor

To eliminate plugging from polymer carryover, NASH ejectors are driven with ethylene glycol vapor. Liquid ethylene glycol is then used as the vacuum pump seal liquid and also to cool the direct contact condensers. This eliminates process contamination from water, steam and air.

VCM Recovery

In one of several batch monomer recovery systems, unreacted vinyl chloride is first transferred into the evacuated holding tank. A NASH vacuum pump scavenges gas out of the PVC and delivers it to the compressor inlet at or near atmospheric pressure. The single-stage compressor then compresses the gas for condensation and storage as a pressurized liquid.

Seal Liquid Options

Water is an excellent seal liquid and is most often used due to its availability and convenience. There are many situations, however, where alternative seal liquids may yield important process advantages or where even trace amounts of water cannot be tolerated in the product.

In these instances, NASH vacuum pumps have demonstrated their versatility by successfully operating with a variety of other liquids. These liquids include:

- Acetic Acid
- Acetic Anhydride
- Acetates
- Acetone
- Alcohols
- Caustic Soda
- Chlorinated Hydrocarbons
- Gasoline
- Glycols
- Hexane
- Hytor Fluid
- Kerosene
- MEK
- Oils
- Sulfuric Acid
- Toluene
- Xylene
- and many others

We produce a complete range of products and systems for industries including:
- Chemical
- Mining
- Petrochemical
- Petroleum
- Water Treatment
- Pharmaceutical
- Steel

VOC Recovery

Vacuum tumble-drying performed in batch processing requires a gradually increasing vacuum to draw out solvents at the maximum sustainable rate. Often times this same solvent can be used as the pump seal liquid and motive vapor in the ejector to operate the process. Contamination is eliminated and pure solvent is recovered.
GARO Compressors

Highly rugged and reliable compressors that can handle highly toxic, explosive and corrosive gases
Specifically developed for applications such as flare-gas, chlorine and Vinyl Chlorine Monomer (VCM) recovery
Capacity of 2,200 SCFM with pressure to 200 PSIG
Capacity of 100 to 3,400 m³/h with pressure to 15 bar abs
Single and two stage models available

Vectra

Liquid ring vacuum pumps and compressors
Available in feature rich budget designs (XL or GL)
Designed to handle high back pressure requirements
Capacity of 115 to 2,860 CFM with vacuum to 29” HgV
Capacity of 195 to 4,860 m³/h with vacuum to 31 mbar abs

2BE3/P2620

Large liquid ring vacuum pumps with superior corrosion resistance
Top discharge capability which eliminates need for trench
Self-recirculating seal water, reducing need for external seal water source
Capacity of 4,000 to 23,000 CFM with vacuum to 29+” HgV
Capacity of 6,800 to 39,000 m³/h with vacuum to 31 mbar abs

TC/TCM

Integral 2 stage liquid ring pumps with improved performance at vacuum levels down to 0.8” HgA / 27 mbar abs
Designed to handle large amounts of liquid carryover without difficulty
Capacity of 100 to 2,200 CFM with vacuum to 0.8” HgA
Capacity of 170 to 3,740 m³/h with vacuum to 27 mbar abs

Steam Jet Ejector

Sizes range from one-inch (25 mm) to 78-inch (2 meters) inlets
Capacities range from 20 CFM to 20,000 CFM
Capacities range from 34 m³/h to 34,000 m³/h
Multi-stage system pressures as low as 0.001 HgA