Designing Vacuum Systems

A wide range of vacuum pumps available today present situations in which the user can get confused regarding their optimum selection. Certain pumps can be used as 'stand-alone' solutions to pumping problems while others have to be used in combination along with intermediate essentials such as inter-stage condenser, traps and filters.

To add to all this confusing array of pumps and inter stage accessories, there is a need for their integration and automation, which in turn demands specific instrumentation, control, inter-locking etc. All must be designed to meet the process requirements, fulfill safety considerations and yet allow for easy operation and maintenance. The selection of a vacuum system, thus requires expertise, knowledge and experience with technical trouble shooting skills to stabilize the process, maximizing process efficiency.

Designing a vacuum system

The simplest way to select a good vacuum system is to approach a specialized vendor, capable of providing a packaged vacuum pumping solution. The essential input a professional specialist would require is inlet pumping speed/mass through-put, working pressure levels and process details.

Generally, this basic information is sufficient to design an efficient vacuum pumping system. An experienced vacuum system designer is well aware of the process requirements, which may go through a drastic pressure/temperature change during the process, since most of the batch processes have variable vacuum and temperature requirements changing with the advancement of the process.

A competent designer would design a vacuum pumping system suitable for the specific application meeting the process inputs, allowing suitable compensation to process variations, as would be encountered during the actual process from the beginning to the end of it. The designer would address all the safety, automation and instrumentation issues required to meet the process requirements.

Advantages of professional approach

It is best to let a specialist design the complete vacuum package and guarantee its performance. The major advantages of doing so are:

Optimum sizing of system capacity: The user is fully aware of his process requirements, but may not have the experience and inclination to calculate and select the optimum hardware required. A system vendor, on the other hand, has plenty of experience and generally knows what works best and most economically. The system vendor can also provide the most effective product combination to meet the users' process requirements.

Automation and instrumentation: The actual user has to depend on the system vendor to deliver the proper equipment as in-house maintenance staff have their hands full in just keeping the existing systems in operation. Further, it is impossible and uneconomical to keep all spare parts. The system vendor not only keeps an inventory of essential spare parts, but has the service personnel to do repairs and replacement.

Future upgrades: The system vendor is always improving both the hardware and the software. Over the expected five to twenty years of life of the equipment, such improvements are of vital importance for economics and efficient performance.

Safety issues: The system vendor would guide the actual user on all safety practices and correct use of equipment supplied.

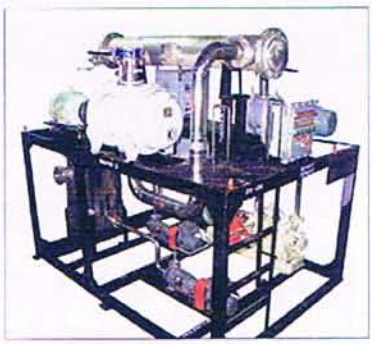
Evaluating a system vendor

The most fundamental rule is to look for 'track record'. What is the vendor's reputation in the market? Does the vendor have ISO and ISI ratings for his product and design ability and, more importantly, are they are up-to-date? Apart from this an across-the-table meeting will quickly firm up one's opinion about the vendor's ability or lack of it. Even if one does not have great engineering abilities, attention to the basic points will help ensure that there are no goof-ups in vendor selection. ■

Source: Everest Blower Systems

It is beneficial to incorporate services of a specialized vendor to design a good vacuum system for pharmaceutical chemical plants.

Typical dry pumping system for solvent recovery with condenser at discharge



A typical vacuum pumping system designed for drying in a pharmaceutical industry

In-house F.A.T. (Factory Acceptance Test) is being conducted to verify design parameters.

PRODUCT UPDATE

Vacuum Booster

Everest has introduced dry mechanical vacuum booster pump, that provides advantages such as improved working vacuums, lower power consumption, prevention of oil back streaming and contamination and an oil-free working environment.

The unit is manufactured on imported CNC machine. The rotating parts are balanced for vibration free operation.

The production range of the booster pump covers capacities from 2,000 LPM to 1,00,000 LPM in single stage and any capacity in parallel configuration with working pressures better than 0.001 Torr.

The product is suitable for vacuum distillation, object metallizing, vacuum impregnation, roll metallizing, semi conductor processing, CFL, tube light and bulb industry, vacuum casting, sputtering, space research and development activities and other applications.

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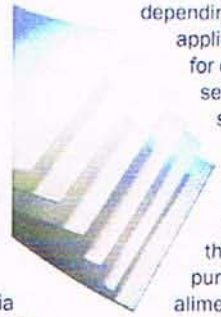
Coolant Filtration Media



Polymer Group Inc (PGI) industrial division has developed filtration media for a variety of industrial sectors including automobile, rolling mills, metal working operations, lubricating works etc.

The company has launched different media for various machining operations. The non-woven media is made from variety of fibres such as viscous, polyester, a combination of viscous and polyester, depending upon the type of application. Different grades for coolant filtration i.e. INT series, INTN series, INTHU series, INTHCL series, are available.

The filtration media finds applications in emulsions, semi-synthetic liquids, solutions, pure oil, wastewater and alimentary liquid.

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Tube Expansion System

Haskel International has introduced an updated Hydro-Swage tube expansion system, viz., Mark V system that expands heat exchanger tubes into tube sheets through the direct application of high internal hydraulic pressure.

The new product is designed for use in fabricating heat exchangers for steam generation, condensation and evaporation. The unit also finds applications in power generation, metalworking, air conditioning, chemical processing, petroleum and oil and paper mills.

The product includes touch-screen electronic controls for set up of all process functions. Heavy duty casters help the machine to roll the system up to the tube sheet face to perform expansion.

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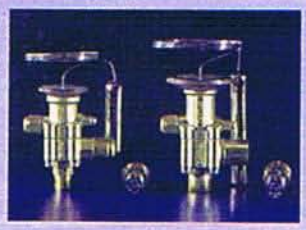
Thermostatic Expansion Valve

Danfoss Industries has launched its new range of thermostatic expansion valves (TE). The new easy-to-mount range of expansion valves comes with a special 'and Match' , which helps provide flexibility. The Mix and Match parts program makes it possible to select the exact valve for different refrigerant, capacity, connection size and support design for engineers to optimize the system. Besides, the product also includes various design features like dual diaphragm and orifice seat assembly.

The new product range covers all applications and is built up of four valve sizes covering the capacity range combined with the orifice program. The valves comprise thermostat expansion valves in stainless steel for smaller and medium sized plants.



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IR Thermometer

Land Instrument, a unit of Ametek, has launched iQ series of industrial non-contact infrared thermometers designed to meet the needs of high-temperature process control applications. The new product features an all-metal design with integrated water cooling and air purge standard and screw terminal and power connections.

The thermometer can be configured using any permutation of four wavelengths, four feature levels and four focus distance to suit a wide range of processing requirements. The product offers alarm relays, digital process control and advanced signal processing that simplifies complex process control applications.

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Synthetic Gear Oil

ExxonMobil has introduced Mobil SHC-branded synthetic gear oil to protect wind turbine gearboxes. The product is suitable for gearboxes used to power wind turbines. It functions extending the interval between oil changes from 18 months to three years or more.

The oil is expected to help reduce maintenance costs, extend oil drain intervals and provide protection for key components, even under extreme weather and load conditions.

The product includes a balanced additive system and provides protection against conventional wear modes such as scuffing and micropitting. The oil also offers oxidation resistance and low temperature fluidity.

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