



**SIHI^{dry} - Dry Running Vacuum Pumps
for Chemical & Pharmaceutical Industries**



SIHI Pumps
www.sihi-pumps.com



Applications

- drying
- reactor service
- vacuum distillation
- inert gas blanketing
- product transfer
- general process vacuum
- central vacuum
- and many more

Requirements

- corrosive gases and vapors
- toxic and odorous gases
- explosive gases and vapors
- dust and liquid carry-over
- and many more

Common Problems

- Rotary vane vacuum pumps - failure resulting from contamination of lubricating oil by condensed vapors and solid particles, **plus** problematic disposal of contaminated lubricating oil
- High temperature operation of other dry pump technology in combination with the presence of flammable vapors in the gas stream - leading to risk of auto-ignition and possible explosion
- Liquid ring pump seal liquid vapor pressure limitations leading to cavitation and inability to meet design flows at deeper vacuum levels
- Catastrophic failure resulting from carry-over of particulate and liquid slugs with rotary vane and other dry pump technology
- Complex construction of other dry pump technology - difficult to disassemble, clean and service in the event of product buildup
- Condensation of vapors in liquid ring pumps & condensate contamination in steam ejector systems - leading to environmental waste disposal issues
- Continual maintenance on mechanical shaft seals & oil lubricated gear boxes
- Failure of rotor coatings and loss of capacity with other dry pump technology
- Existing technology extremely noisy during operation

Low Life-Cycle Costs

- **No need for Service Liquids**
 - totally dry principle of operation
 - no oil lubricated gears for rotor synchronization
 - no waste disposal
- **Low Energy Costs**
 - reduced power consumption
- **Non-Wearing**
 - non contacting rotors
 - no mechanical shaft seals
 - electronic rotor synchronization
 - no rotor coatings

Robust and Reliable

- **For Wet Processes**
 - vertical, self draining
 - no stagnant areas in pump casing
 - liquid carry-over/flushing capability
- **For Tough Operating Conditions**
 - optimized rotor clearance
 - torque monitoring
 - liquid flushing during operation
 - cleaning without dismantling pump
- **For Explosive gases**
 - low internal gas temperature
 - explosion proof design
 - Ex-rating - Suitable for T3 or T4 temperature codes

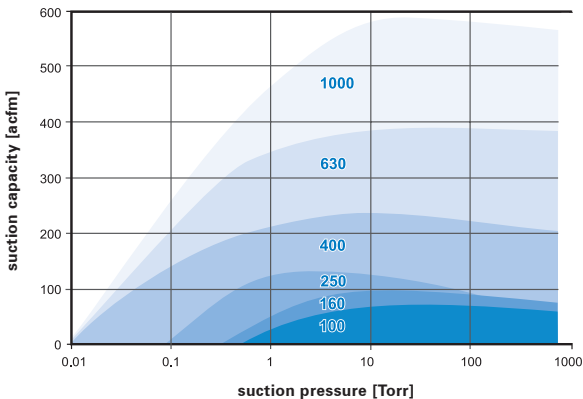
Quiet

- No oil lubricated gear box
- No vibration
- Noise level is less than 70 dB(A)

Your Operations and Maintenance people will tell you that process plant applications are **tough**. **SIHI^{dry}** meets the need for a simple, robust and reliable vacuum pump that **handles** liquid and solid carry-over, as well as rapidly changing operating conditions. The **SIHI^{dry}** is designed with the unique feature of Electronic Overload Protection in every unit.

SIHI^{dry} Dry Running Vacuum Pumps

SIHI^{dry} Performance



SIHI^{dry} Technical Data

Pump Size	100	160	250	400	630	1000
Suction Capacity	65 ACFM	100 ACFM	140 ACFM	235 ACFM	380 ACFM	580 ACFM
Final Pressure	< 1 Torr	< 1 Torr	< 0.1 Torr	< 0.01 Torr	< 0.01 Torr	< 0.01 Torr
Max. Power Consumption	10.0 HP	10.0 HP	10.0 HP	13.5 HP	22 HP	46 HP
Power Consumption @ final pressure	3.5 HP	5.0 HP	3.0 HP	9.5 HP	13.5 HP	25.0 HP
Sound Level	< 54 dBA	< 54 dBA	< 54 dBA	< 64 dBA	< 70 dBA	< 70 dBA



SIHI^{dry} Simply the Best Solution

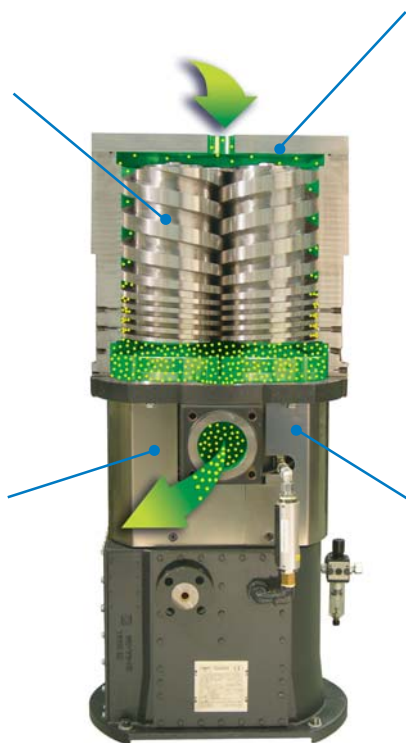
Optimized Operating Temperature

A key requirement for the effective and safe evacuation of corrosive media is the prevention of condensation in the pump. This requires the gas temperature to be maintained above their dewpoint. Conversely, many gases polymerize or “crack” at elevated temperatures. This can lead to deposits in the pumping chamber and seriously compromise pump performance. For reliable pump operation it is necessary to have a stable temperature profile within the operating chamber, avoiding both “hot spots” and quenched zones.

The SIHI^{dry} avoids these common problems and achieves process condition requirements by **cooling the pump casing and cooling the rotors**, a **SIHI^{dry} unique feature**.

Explosion Proof

Designed to Class 1, Division 1 requirements, the explosion proof guidelines on risk assessment were a key element in the development of SIHI^{dry} vacuum pumps. With **non-contacting, non-sparking stainless steel rotors, integral electronic diagnosis and low operating temperatures**, the SIHI^{dry} design successfully eliminates potential ignition sources and the need for flame arrestors.



Simple to Service and Maintain

Cleaning of the pump casing is **easily** performed by plant operation and maintenance personnel. Moreover, removal of the pump casing is done **without disturbing the bearings**. Hence a basic service can be achieved on site in just a few minutes.

Early warning of any upset conditions is possible since the primary pump parameters are constantly monitored.

This enables remedial actions such as **automatic flushing options** to be incorporated into the process, thereby maximizing “uptime”.



Optional Drive Control

The innovative drive concept of SIHI^{dry} and its modular design enable it to be supplied as a basic unit for stand-alone operations, or as an **intelligent** pump system fully integrated to specific process needs.

• Basic

This option contains **intelligent** features such as rotor diagnosis, electronic **overload protection** and **operation codes**. Rapid analysis is available via a simple **serial interface**.



Modern Communication

All components within the vacuum system can be, optionally, controlled and assessed using modern **field-bus** technology. The integrated data storage unit permits **rapid diagnosis** of pump operations. Additionally, all operating parameters are **viewed and monitored** from a personal computer via a local area network (LAN) or Internet. Moreover, this information is available through standard **Internet web browser** software.

- **Dynamic**

In addition to the BASIC model, the DYNAMIC version is available for **variable speed** in order to match specific process requirements. This allows energy to be conserved during times of low vacuum demand. Furthermore, this option allows the pump to run at **standby speed** when there is no demand, in order to provide instantaneous vacuum without the need for a warm-up cycle. The **SIH^{dy}** is controlled and monitored by Distributed Control Systems (DCS).

- **Control**

The CONTROL version provides additional process and operating features to the DYNAMIC version. This integrated pump control provides **warm-up, standby & cleaning protocols** without the need for additional logic. Additionally, the **vacuum level** can be **regulated between 0 to 100%**. Moreover, the unit **incorporates valves and sensors** in order to save further integration costs.

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- Highest level of customer service
- Skilled engineers and designers
- Quality standards operate to ISO 9001
- On time delivery
- Working in partnership with our customers
- Local support structure



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