



SIHI^{dry} – Dry running vacuum pumps for the chemical and pharmaceutical industries



STERLING FLUID SYSTEMS GROUP
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SIHI^{dry} – Your Application...

Dry running vacuum pumps for the chemical, pharmaceutical & other process industries

Dry running vacuum pumps are used increasingly for a range of applications within the chemical, pharmaceutical and related industries. These vacuum pumps are an integral part of the process and must satisfy a range of demanding requirements.

These include:

- generating low operating pressure
- minimising the disposal costs of any service liquid
- providing “uncontaminated” vacuum, that is free from lubricant and service liquid
- offering the flexibility required for batch process operations
- low life-cycle costs.

SIHI^{dry} meets the need for a simple, robust and reliable vacuum pump that can handle liquid and solids carry-over as well as rapidly changing operating conditions.

Applications

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

Capabilities

- corrosive gases & vapours
- toxic and odorous gases
- explosive gases & vapours
- dust and liquid carry-over
- and many more...



Chemical Industry



Pharmaceutical Industry

SIHI^{dry}





The quiet running **SIHI^{dry}** vacuum pump is a vertical twin-rotor machine that is completely dry, has no mechanical shaft seals, timing gears, or lubricating fluids.

In its standard form, the machine offers liquid and solid handling capabilities. Moreover, the **SIHI^{dry}** can accommodate corrosive gases and vapours, and has superior resistance to heat-accelerated deposition. This basic layout provides the platform for an extensive range of intelligent modules that can be incorporated in order to match dynamic process requirements.

Retaining its simple design, the standard unit can interface with most Distributed Control Systems and also offers single-plug connection to a standard Ethernet if plant monitoring and running history are important.

The six sizes of **SIHI^{dry}** were developed for operation with explosive media, both internally and externally, and offer volumetric flow rates up to 1,000 m³/h.

The Benefits of **SIHI^{dry}** at a Glance

Low Life Cycle Costs

- **no need for service liquids**
 - totally dry principle of operation
 - no gears for rotor synchronisation
 - no waste disposal
- **low energy cost**
 - reduced energy consumption
- **wear free**
 - non contacting rotors
 - no mechanical shaft seals
 - electronic rotor synchronisation
 - no rotor coatings

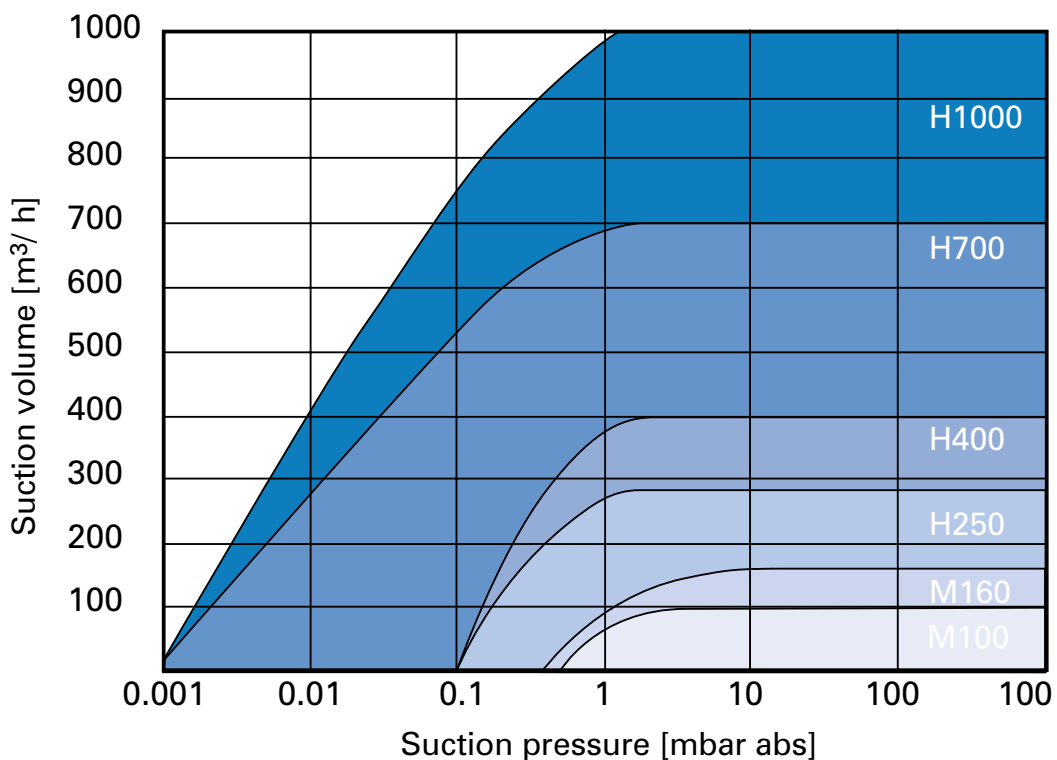
Quiet

- **no gear box**

Robust and Reliable

- **for wet processes**
 - vertical, self draining
 - no stagnant areas in pump casing
 - liquid carry-over / flushing capability
- **for tough operating conditions**
 - optimised rotor clearance
 - torque monitoring
 - liquid flushing during operation
 - cleaning without dismantling pump
- **for explosive gases**
 - low internal gas temperature
 - Ex-rating
 - explosion proof design
 - ATEX certified
- **for thermally sensitive substances**
 - optimum temperature / compression profile
 - uniform temperature profile

Performance range

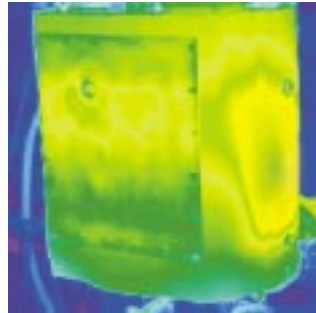


Technical data

Type	SIHI ^{dry}					
	M100	H160	H250	H400	H750	H1000
Size	M100	H160	H250	H400	H750	H1000
Suction volume [m³/h]	100	160	290	400	700	1000
End pressure [mbar]	< 0.7	< 0.5	< 0.1	< 0.02	< 0.01	< 0.01
Power consumption at end pressure [kW]	2.5	3.5	5.0	7.0	19.0	19.0
Sound level as per DIN [dB(A)]	54	54	63	64	70	70

SIHI^{dry} simple, dry and reliable

Optimised Gas 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 temperatures to be maintained above their dewpoints. Conversely, many gases polymerise 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}** achieves this by cooling both the pump casing and the rotors.

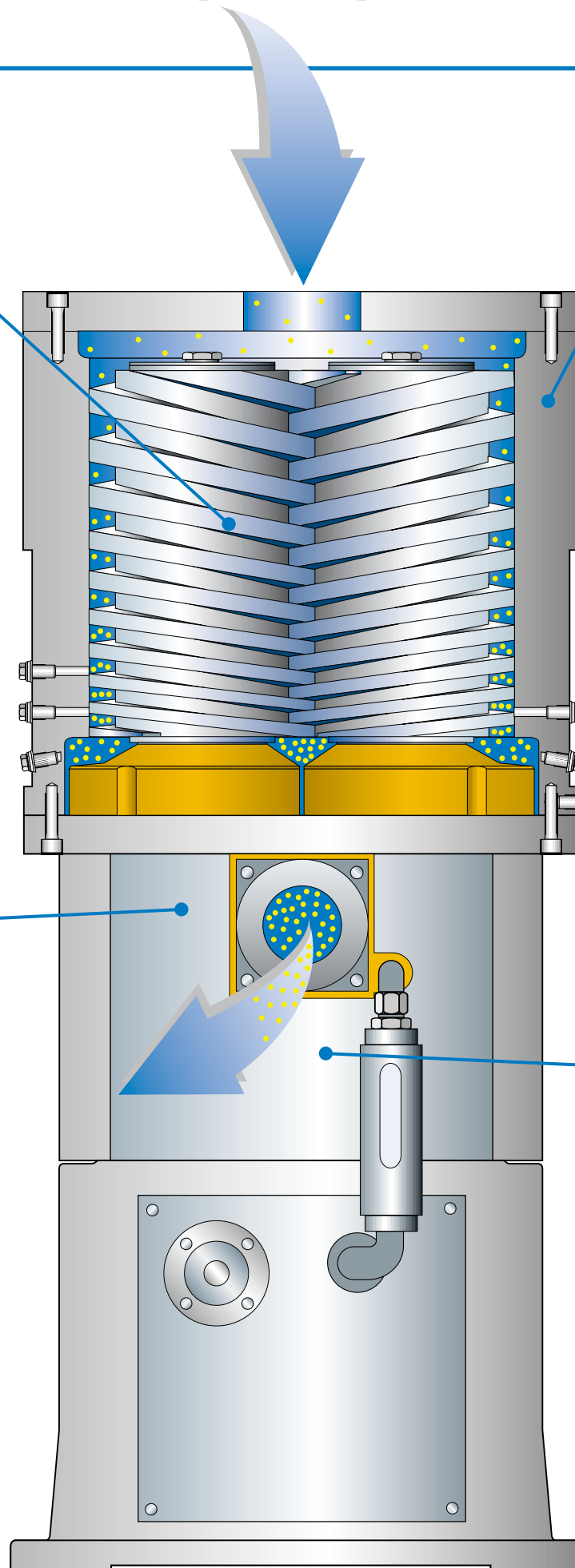
ATEX Certified



The ATEX guidelines on risk assessment were a key element in the development of **SIHI^{dry}**. In contrast to typical dry running pumps, **SIHI^{dry}** was designed in order to eliminate any potential ignition sources in both normal operation and upset conditions. Certified as a Category 2 machine, the standard **SIHI^{dry}** can be used

without flame arresters.

Where potential sources of ignition must be eliminated for occasional upset conditions, Category 1 units are available with EC type-test certification.



Simple to Service and Easy to Schedule

Cleaning the pumping chamber can be undertaken by plant operating personnel. Moreover, removal of the pump chamber can be done without disturbing the bearings. Hence a basic service can be achieved “in situ” 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 cleaning regimes to be incorporated into the process, thereby helping to maximise “uptime”.



Optional Drive Capabilities

The innovative drive concept of **SIHI^{dry}** and its modularity enable it to be supplied as a basic unit for stand-alone operation or as an “intelligent” unit in order to integrate with the customer’s system.

Depending upon the level of automation required, a range of modules are available:

BASIC

This option contains “intelligent” features such as rotor diagnosis, electronic overload protection and fault codes (should problems occur). Rapid fault analysis is available via a simple serial interface.

SIHI^{dry} Intelligent System Management

Remote Monitoring and Control



Optionally, all components within the vacuum system such as valves and sensors can be controlled and monitored by modern field bus technology.

Should problems arise, the integrated data storage unit permits rapid fault diagnosis.

Additionally, all operating parameters can be 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, the pump can run at stand-by speed when there is no demand in order to provide instantaneous vacuum without a need for a warm-up cycle. The **SIHI^{dry}** can simply be 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, stand-by and cleaning protocols without the need for additional logic. Additionally, the vacuum level can be regulated. Moreover, the unit incorporates valves and sensors in order to save further integration costs.