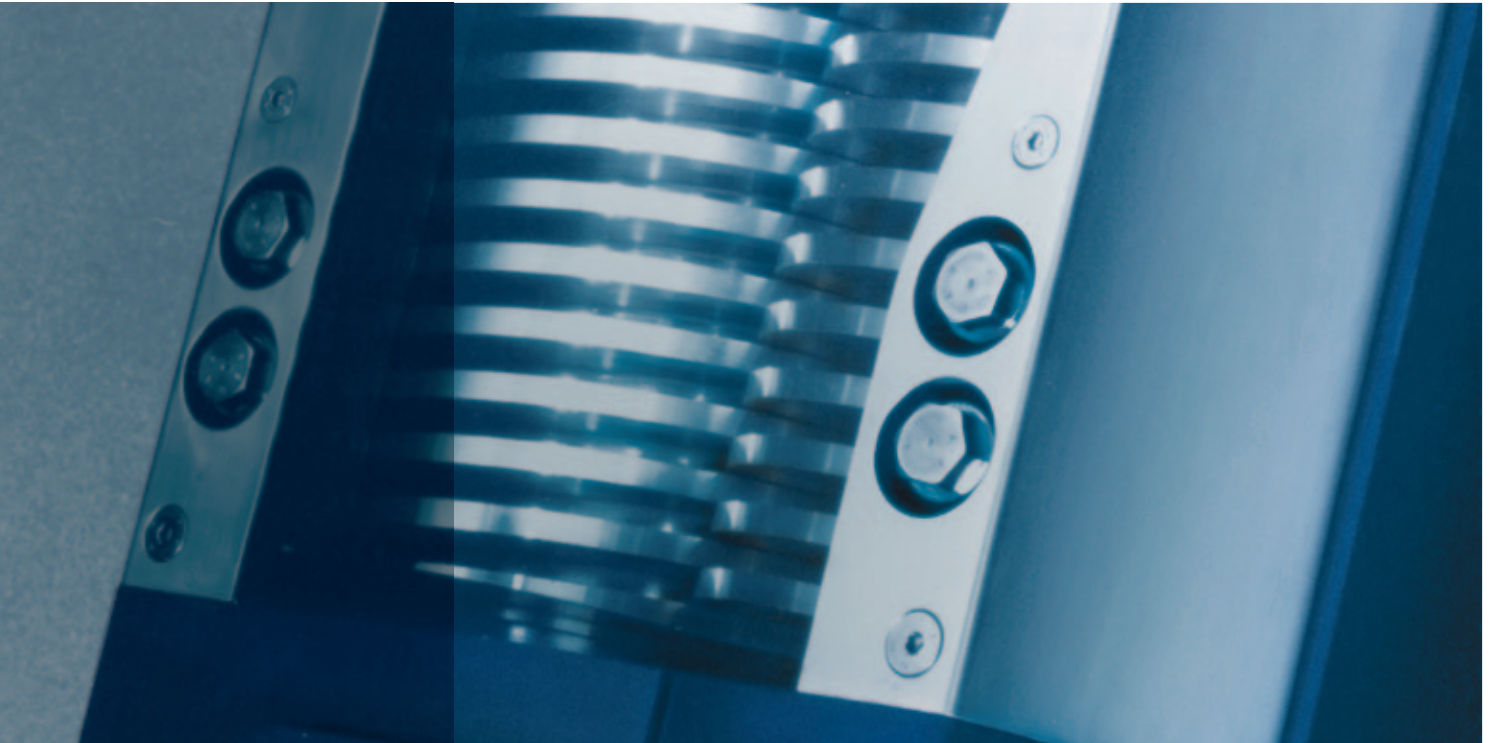



## Dry Running Vacuum Pumps for the Chemical and Pharmaceutical Industry



## SIHI<sup>dry</sup> Simple, Dry and Reliable ...

Simple operation and long-term reliability are at the centre of the SIHI<sup>dry</sup> design. Completely free from oil lubrication, no mechanical seals, and wide internal clearances, underpin the robust nature of this completely dry running vacuum pump.

The result ...

- + Ability to handle highly corrosive gasses and vapours
- + No effluent or waste disposal costs of any service liquid
- + Suitable for explosive  areas
- + Low operating pressures
- + Flexible operation for batch process operations
- + Ease of maintenance and cleaning together with integrated self diagnostics
- + Extremely Quiet
- + Low life-cycle costs

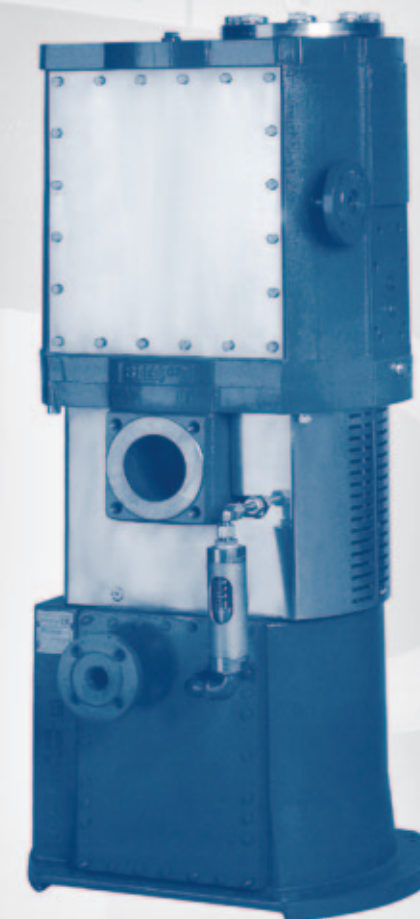
SIHI<sup>dry</sup> satisfies the demand for a robust high-vacuum pump, which can adapt to rapidly changing process conditions which could include explosive, corrosive, and/or thermally sensitive media.

### 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



SIHI<sup>dry</sup> is a vertically oriented and self draining vacuum pump with no mechanical shaft seals. It is an ideal choice for chemically related processes where there is a high possibility of liquids or solids carry-over. This award winning solution can accommodate corrosive gases and vapours, and has superior resistance to heat-accelerated deposition.

The Basic layout provides the platform for an extensive range of intelligent modules which can be incorporated in order to match dynamic process requirements, simple DCS integration, and remote monitoring.

Integrated within the pump is the intelligent drive system that performs ongoing rotor diagnostics, while giving an energy efficient platform for variable speed/pressure control. Moreover, this method of rotor synchronisation permits gearbox-free operation in which to run extremely quietly, and without any lubrication.

Eight sizes of SIHI<sup>dry</sup> were developed for operation with explosive media, both internally and externally, and offer volumetric flow rates up to 1,000 m<sup>3</sup>/h. Dramatic increases to flow and pressure are available with integrated lobular blowers.



### Low Life Cycle Costs

- No need for service liquids**
- + Totally dry principle of operation
  - + No gears for rotor synchronisation
  - + No waste disposal

- Low energy costs**
- + Reduced power consumption

- Wear free**
- + Non contacting rotors
  - + No mechanical shaft seals
  - + Electronic rotor synchronisation
  - + 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**
- + Optimised rotor clearance
  - + Torque monitoring
  - + Liquid flushing during operation
  - + Cleaning without dismantling pump

- For explosive gases**
- + Low internal gas temperature

### Quiet

- + Ex-rating
- + Explosion proof design
- + ATEX certified

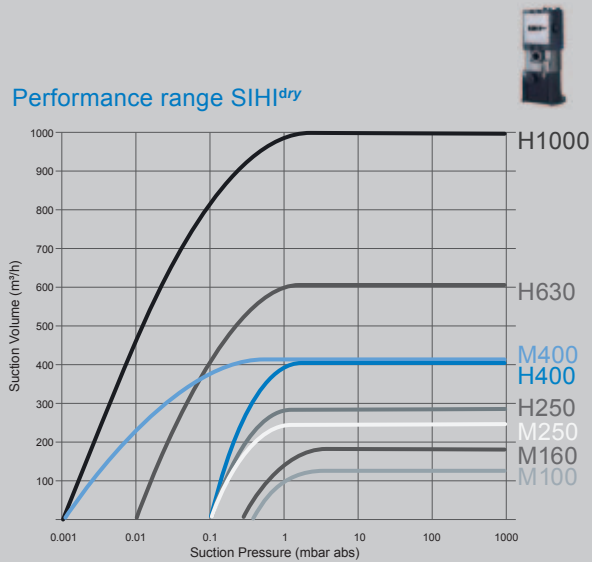
- For thermally sensitive substances**
- + Optimum temperature/compression profile
  - + Uniform temperature profile

- No gear box**





SIHI<sup>dry</sup> Simple, Dry and Reliable

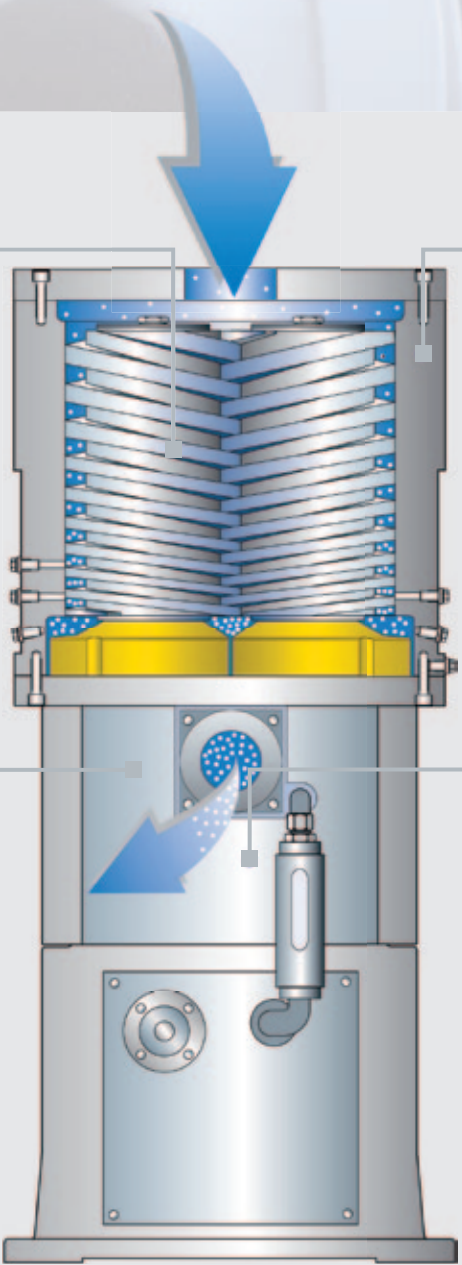


Optimised Gas Temperature

A key requirement for the effective and safe evacuation of corrosive media is the prevention of condensation in the pump. This requires the gas temperature to be maintained above its dew-point. Conversely, many gases polymerise or 'crack' at elevated temperatures. This can lead to deposition inside the pump, which seriously compromises pump performance. For reliable pump operation it is necessary to have a stable temperature profile within the operating chamber, avoiding both 'hot spots' and 'quench' zones. The SIHI<sup>dry</sup> 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<sup>dry</sup>. In contrast to typical dry running pumps, SIHI<sup>dry</sup> 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<sup>dry</sup> 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.



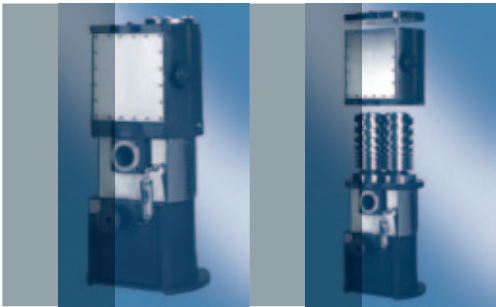
Simple to Service and Easy to Schedule

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<sup>dry</sup> 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.

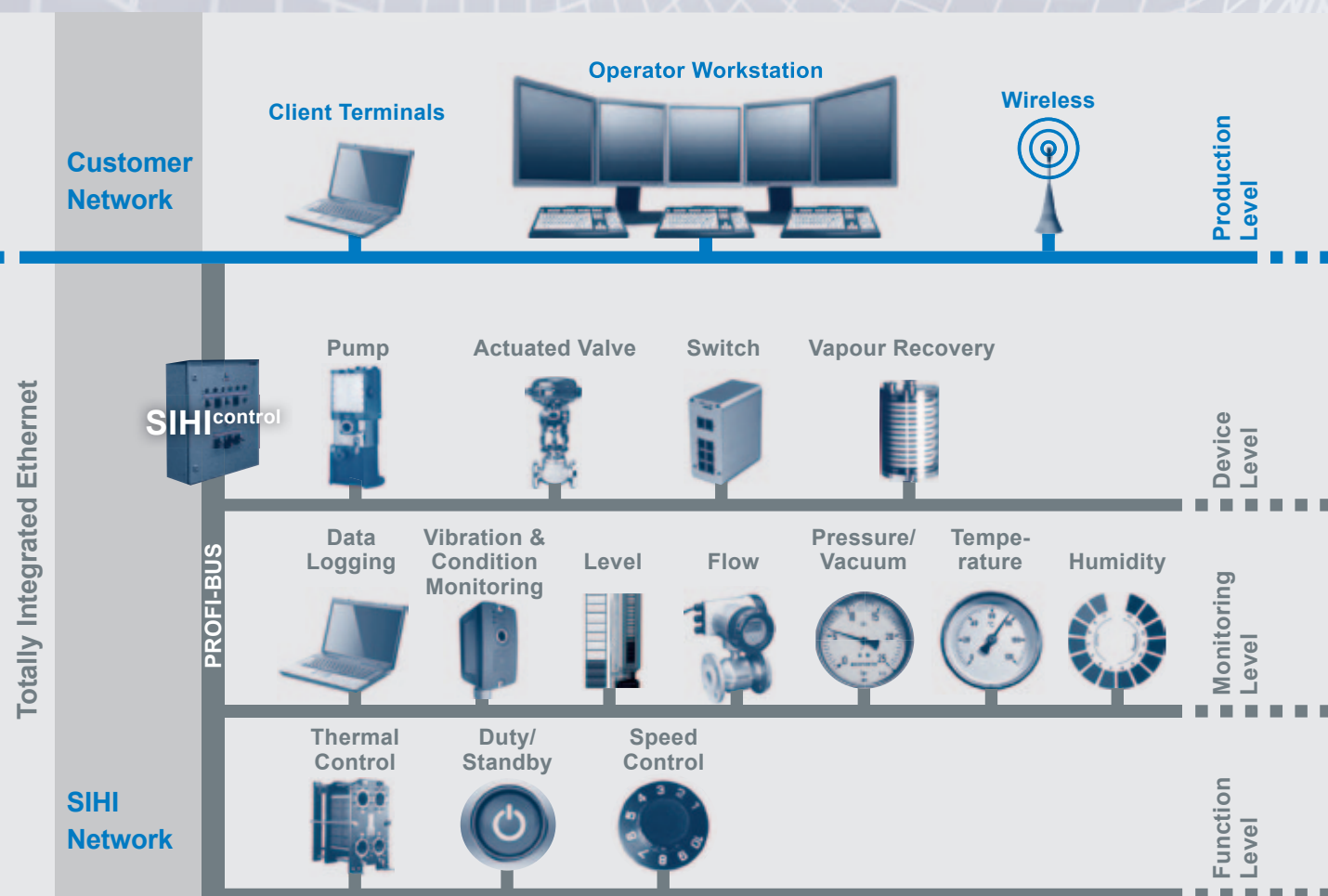
Technical data	SIHI <sup>dry</sup> Size	M100	M160	M250	M400	H250	H400	H630	H1000
	Suction volume (m³/h)	100	160	250	400	290	400	600	1000
	End pressure (mbar)	<0.7	<0.5	<0.1	<0.001	<0.1	<0.1	<0.01	<0.01
	Power consumption at ultimate pressure (kW)	2.5	3.5	2.0	3.5	5.0	7.0	10.0	18.0
	Sound level as per DIN (dB(A))	54	54	54	54	63	64	70	74





# SIHI<sup>dry</sup> Intelligent System Management (DCS)

Your Process Partner Committed to Engineering Excellence



## Modern communication

All components within the vacuum system have the option to be controlled and assessed using 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.

## Understanding the process

- + 100 years of experience
- + Staff trained to communicate at all levels
- + Deep application knowledge

... Solutions with minimal customer effort

## Testing & Documentation

- + Factory and Site Acceptance Tests
- + Certified documentation
- + Witnessed customised testing

... Reduced validation and commissioning costs

## Optimum product range

- + Unique process can be treated with simplicity
- + Reduced cost of design, manufacture, and documentation
- + Predictable site testing and commissioning

... Customised solutions for standard capital costs

## Quality assurance

- + Total Quality Management
- + ISO9000
- + Rigorous health and safety culture

... Long term security

## Design

- + Advanced design tools
- + Highest level of machine efficiency
- + Long lasting reliability

... Reduced energy, maintenance, and environmental costs

## Aftermarket – a local approach

- + Dedication to process uptime
- + Locally positioned service & technical centres
- + Easy access to support, on a worldwide level

... Highest level of customer care

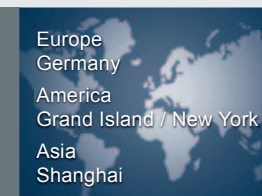
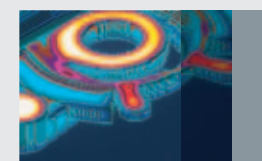
## Manufacturing

- + Centre of excellence structure
- + High level of skill and competence
- + Ongoing people and process development

... Reduced integration costs

## Competence Centre

- + Centralised design, purchasing, production, compliance, and local support
- + De-centralised (local) quotation and project management teams



## Drive Options

The innovative drive concept of SIHI<sup>dry</sup> enables it to be supplied as a basic unit for stand-alone operation, or as an "intelligent" unit for total system integration. Depending upon the level of automation required, there are three standard drive-modules:

### Basic

The Basic version contains "intelligent" overload protection, and rapid fault diagnosis via an error coding platform. Deeper analysis is available via a simple serial interface.

### Dynamic

Coupled to the facility supplied with the Basic variant, the Dynamic execution offers an additional variable speed function. This allows the suction capacity/pressure to be regulated in harmony with the process requirement. Speed can be set by the process PLC output signal of 4 – 20 mA.

### Control

Coupled to the Basic and Dynamic platforms, the Control drive variant offers two additional benefits:

(1) Independent speed variation in which to match a pressure-related setting that can be chosen by the operator, and/or

(2) Logic control and DCS integration of the valves and other add-on devices without device programming.

Examples would include automatic start-up and shut-down sequencing, and/or Clean-In-Place functionality, without the need for external input.

For further address details please visit:  
[www.SIHI.com](http://www.SIHI.com)

150.76101.57.01 E 02/2015 SMH All Rights Reserved – SIHI Group BV

## EUROPE

Sterling Fluid Systems (Austria)  
Wien  
Tel. +43 (0) 1 680 050  
[sales\\_austria@sterlingsihi.de](mailto:sales_austria@sterlingsihi.de)

Sterling SIHI (Belgium)  
Groot-Bijgaarden  
Tel. +32 (0) 2 481 7711  
[sales\\_be@sterlingfluid.com](mailto:sales_be@sterlingfluid.com)

Sterling SIHI (Bulgaria)  
Sofia-Iinden  
Tel. +359 (0) 2 8228311  
[office@sterlingsihi.bg](mailto:office@sterlingsihi.bg)

Sterling Fluid Systems  
(Czech Rep.) Olomouc  
Tel. +420 587 433 651  
[sterling@sterling.cz](mailto:sterling@sterling.cz)

Sterling SIHI (France)  
Trappes  
Tel. +33 (0) 1 34 823 900  
[sales.france@sterlingfluid.com](mailto:sales.france@sterlingfluid.com)

Sterling SIHI (Germany)  
Itzehoe  
Tel. +49 (0) 4821 771 01  
[sales@sterlingsihi.de](mailto:sales@sterlingsihi.de)

Sterling Fluid Systems (Hungary)  
Veszprem  
Tel. +36 (0) 88 406 633  
[info@sterlingsihi.hu](mailto:info@sterlingsihi.hu)

Sterling Fluid Systems (Italy)  
Monza, Milan  
Tel. +39 039 282 41  
[sterlingitaly@sidro.it](mailto:sterlingitaly@sidro.it)

Sterling SIHI (Netherlands)  
Beverwijk  
Tel. +31 (0) 251 263 232  
[info@sihi.nl](mailto:info@sihi.nl)

Sterling Fluid Systems (Poland)  
Warszawa  
Tel. +48 (0) 22 335 2480/81  
[sterling@sterling.pl](mailto:sterling@sterling.pl)

Sterling Fluid Systems (Romania)  
Bucuresti  
Tel. +40 (0) 21 610 7188  
[office@sterlingsihi.ro](mailto:office@sterlingsihi.ro)

Sterling SIHI (Spain)  
Madrid  
Tel. +34 91 709 1310  
[sihi@sihi.es](mailto:sihi@sihi.es)

Sterling Fluid Systems (Switzerland)  
Schaffhausen  
Tel. +41 (0) 52 644 0606  
[info@sterling.ch](mailto:info@sterling.ch)

Sterling Fluid Systems (UK)  
Altrincham, Cheshire  
Tel. +44 (0)161 928 6371  
[uksales@sterlingfluid.com](mailto:uksales@sterlingfluid.com)

## ASIA

SIHI Pumps (Singapore)  
Singapore  
Tel. +65 656 283 00  
[info.singapore@sihipumpsasia.com](mailto:info.singapore@sihipumpsasia.com)

SIHI Pumps (Malaysia)  
Selangor Darul Ehsan  
Tel. +60 3 8942 6877  
[info.malaysia@sihipumpsasia.com](mailto:info.malaysia@sihipumpsasia.com)

SIHI Pumps (China)  
Shanghai  
Tel. +8621 621 880 68  
[info.china@sihipumpsasia.com](mailto:info.china@sihipumpsasia.com)

SIHI Pumps & Services (Thailand)  
Chonburi  
Tel. +66 38 079 877  
[info.thailand@sihipumpsasia.com](mailto:info.thailand@sihipumpsasia.com)

SIHI Pumps (Taiwan)  
Taipei County 251  
Tel. +886 2 2618 2065  
[info.taiwan@sihipumpsasia.com](mailto:info.taiwan@sihipumpsasia.com)

SIHI Pumps (Korea)  
Seoul  
Tel. +82 2 553 2592  
[info.korea@sihipumpsasia.com](mailto:info.korea@sihipumpsasia.com)

## AMERICAS

SIHI Pumps Limited (Canada)  
Guelph Ontario  
Tel. +1 519 824 4600  
[mail@sihi.com](mailto:mail@sihi.com)

SIHI Pumps Inc. (USA)  
Grand Island, New York  
Tel. +1 716 773 6450  
[mail@sihi.com](mailto:mail@sihi.com)

SIHI Ltda. (Chile)  
Quilicura, Santiago  
Tel. +56 2 756 5900  
[ventas@sihichile.cl](mailto:ventas@sihichile.cl)

SIHI do Brazil (Brazil)  
Campinas  
Tel. +55 19 2512 2127  
[info@sihi.com.br](mailto:info@sihi.com.br)

SIHI Pumps (Colombia)  
Bogota  
Tel. +57 1 364 92 64  
[info@sihi.com.co](mailto:info@sihi.com.co)

SIHI (Peru)  
Lima  
Tel. +51 1 421 7411  
[ventas@sihiperu.com.pe](mailto:ventas@sihiperu.com.pe)

**BLUECOMPETENCE**

Alliance Member

Partner of the Engineering Industry  
Sustainability Initiative

**STERLING**

**HALBERG**

**LaBour**

**DARWINS**

*Pumping Technology For A Better Future*

