

# Liquid Ring Vacuum Pumps

VHC series

Two-stage pumps in base plate version



## Applications



### Food, Beverage and Cosmetics industries

- » Filling bottles with beer, mixed beverages, mineral water and similar
- » Vacuum cutters
- » General processes such as degasification, extraction, suction and vacuum cooking
- » Curing systems
- » Production of sugar and chocolate
- » Production of emulsions and suspensions



### Chemical & Pharmaceutical industry

- » Distillation and separation of liquids
- » Recovery of condensates, e. g. solvents
- » Drying of bulk solids, e. g. washing powder, fertiliser, salts, plastic granulates etc.
- » Extraction of liquids, e. g. palm oil



### Medical engineering

- » Sterilisation with laboratory and clinical sterilisers



### Plastics production and plastics processing

- » Extruder degasification
- » Manufacturing of EPS moulded parts
- » Drying of plastic granulate
- » Decontamination in PET recycling processes

# Liquid ring vacuum pumps from Speck

Tailored solutions in modular system

- » Two-stage vacuum pumps
- » Can be used universally for compressing practically all gases and vapours
- » Constant suction performance for different applications
- » Mechanical seal, magnetic coupling or packing gland
- » Application-specific selection of materials like grey cast iron, stainless steel or special alloys
- » ATEX certified

Media	dry and humidified gases
Operating liquid	max. 80 °C
Absorbed gas	dry max. 200 °C saturated max. 100 °C
Minimum inlet pressure	33 mbar abs., 5 mbar abs. with gas ejectors
Flow rate	110 - 1600 m³/h

## VHC Series

**Two-stage pumps in base plate version**



Innovative liquid ring vacuum pumps for universal use

### Liquid ring vacuum pumps

are used in many sectors in discontinuous and continuous operation in the three basic processes of extraction, leakage extraction and degasification, for example: extracting dry gases, saturated gases and vapours, extracting contaminated gases

### Application-specific benefits

- » Delivering liquid shares at a constant vacuum
- » Delivering explosive gases, e.g. hydrogenous, inflammable or toxic media
- » Oil-free compression, i.e. no oil in the medium nor in the exhaust air
- » Use of the condensed process medium as operating liquid

# VHC series - benefits at a glance

## Full interchangeability

The VHC series is replacing the previous VH series. The connecting dimensions of the suction and pressure ports, the operating liquid connections, the pump shaft and the pump feet are identical.

### Robust bearings

Small spacing of the bearings, lifetime-lubricated deep groove ball bearings

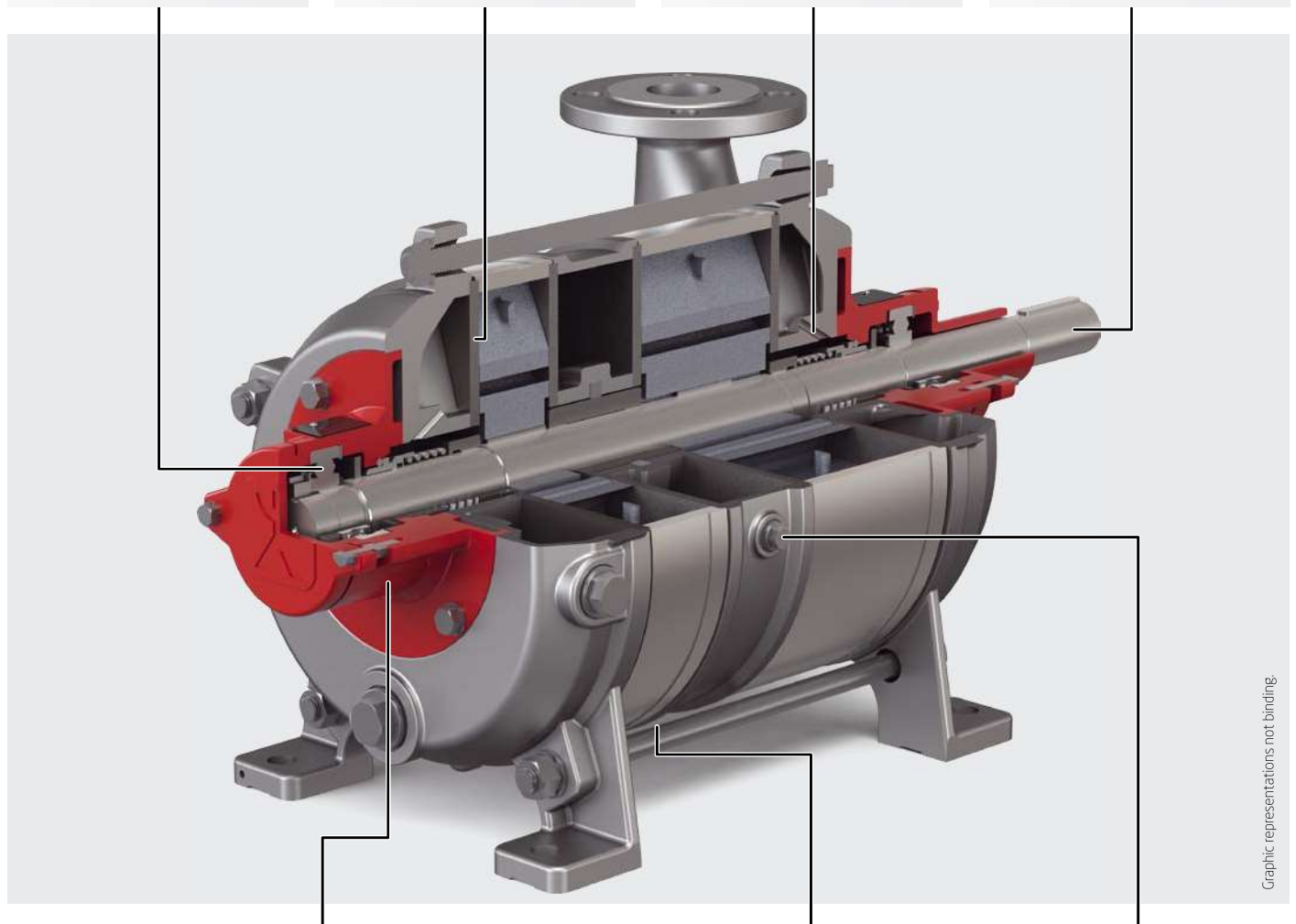
### Inter casings in rust-free material

Made from surface-hardened stainless steel for a longer service life

### Optimal flushing of the mechanical seal

### Pump shaft in stainless steel

For universal use



Graphic representations not binding.

### Compact and closed bearing bracket

Simple and fault-free disassembly and assembly without special tools, problem-free setting of the impeller sets

### Central drainage

Quick and total drainage of the pump

### Pre-set cavitation protection

Safe commissioning and cavitation-free operation

## Tailored, long-lasting and service-friendly solution

**The VHC series from Speck is the natural development of the established VH series. It was designed taking into account the requirements of our customers. The result is a heavily standardised series, that sets new standards in safety, durability and reliability for your system.**

### Tailored solution

The VHC series consists of a comprehensive modular system. With easily configurable options and individual special solutions, we fulfil the highest customer requirements and guarantee safe operation.

#### Mechanical seals

At Speck, you receive a wide range of single and double-action mechanical seals from brand manufacturers with slide rings in A carbon, B carbon, SiC, Cr steel, stainless steel and with O-rings in FKM, EPDM, FFKM, NBR etc.

#### Magnetic couplings

For applications with toxic, corrosive and combustible media, all sizes are also available in hermetically sealed versions with magnetic coupling. Thanks to the magnetic coupling free from eddy current losses used in the VHC, the power consumption is significantly reduced compared with a conventional magnetic coupling.

#### Packing glands

The low-cost solution for simple applications with uncritical media.

#### Application-specific material selection

Speck also offers a wide range of medium-specific pump designs suitable for acids, lyes, hydrocarbons, glycol, glycerine, for example. For the stage sealing, we have a selection of flat gaskets made from various materials, cord packing made from Teflon® or different liquid seals from Eppler® and Chesterton® at our disposal.

#### ATEX / TA Luft (Technical Instruction on Air Quality Control)

The VHC series is type-tested for ATEX in accordance with category 1G (+H2).

The version with magnetic coupling fulfils the strictest requirements of TA Luft (Technical Instruction on Air Quality Control).

### Reliable and long-lasting

The solid and compact design, combined with reliable components, guarantees high operational reliability and a significantly extended service life.

The robust and life-time lubricated rolling bearings, improved flushing of the mechanical seals and the surface-hardened inter casings made from stainless material also help to prolong the service life.

The cavitation protection installed in the pump intermediate stage by Speck enables easy commissioning and safe operation without readjustment and performance losses.

The new design of the VHC series also guarantees safe external cleaning and central complete drainage on the product side. The bearing brackets come closed, splash-proof and optionally also rust-free.

### Service-friendly

#### In operation

The VHC series is characterised by low maintenance costs and high system availability.

Maintenance-free rolling bearings, hardened stainless steel inter casings without valves and the improved flushing of the mechanical seals reduce the maintenance requirements and the operating costs considerably.

#### During assembly

Assembly is much easier and kept as simple as possible thanks to the significantly reduced number of components. The proven and simple segment design has been perfected and enables simple and fault-free disassembly and assembly in just a short time.

#### For spare parts storage

In the consistently designed modular system with 11 sizes, many components are completely interchangeable within a size family. Wear parts like mechanical seals and bearings are identical across several sizes and help to reduce the stored quantities.

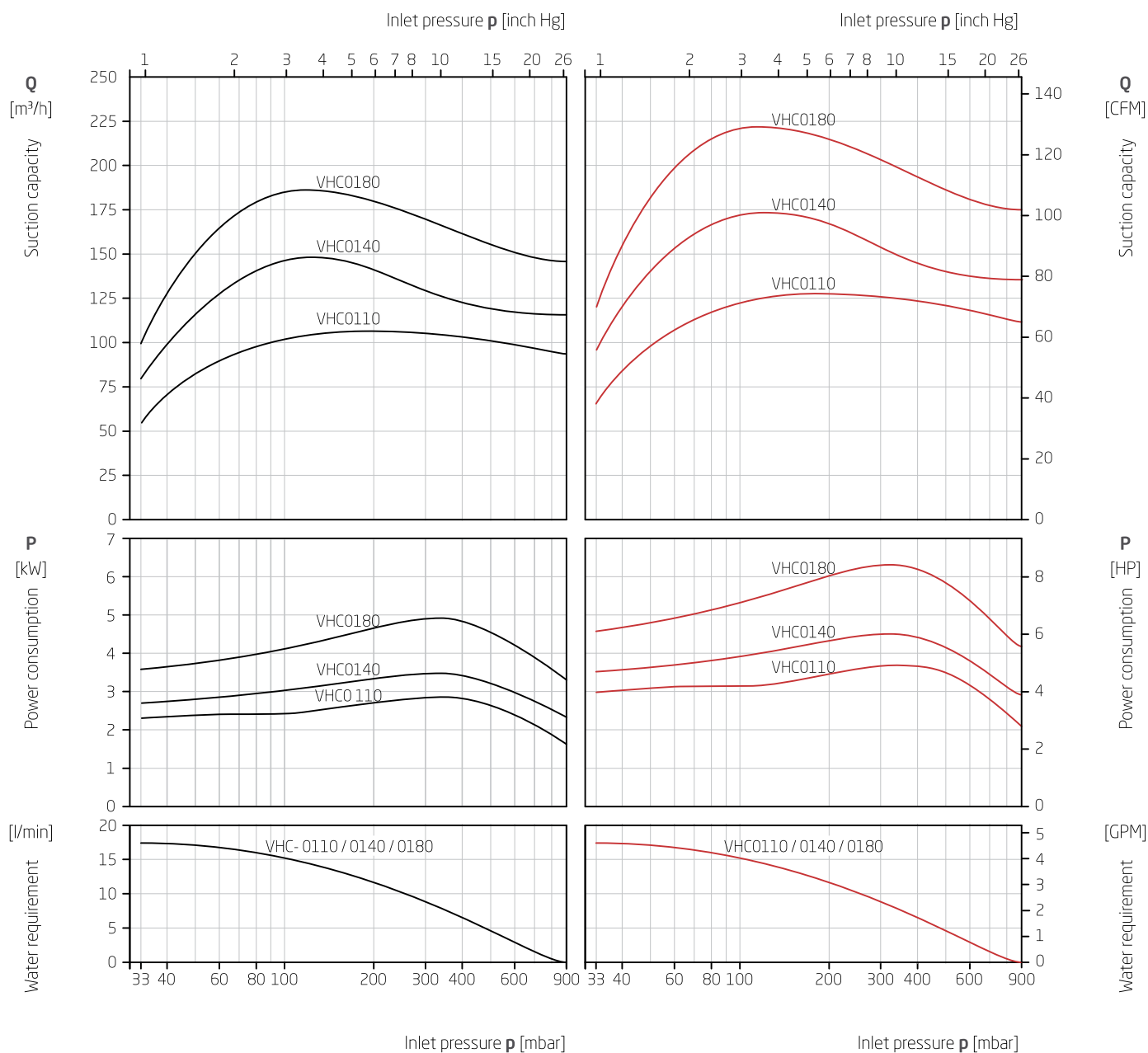


VHC in TA Luft design → pages 12 and 13

# Characteristic curves VHC0110/0140/0180

50 Hz – 1450 min<sup>-1</sup>

60 Hz – 1750 min<sup>-1</sup>



## Suction capacity and power consumption depending on inlet pressure

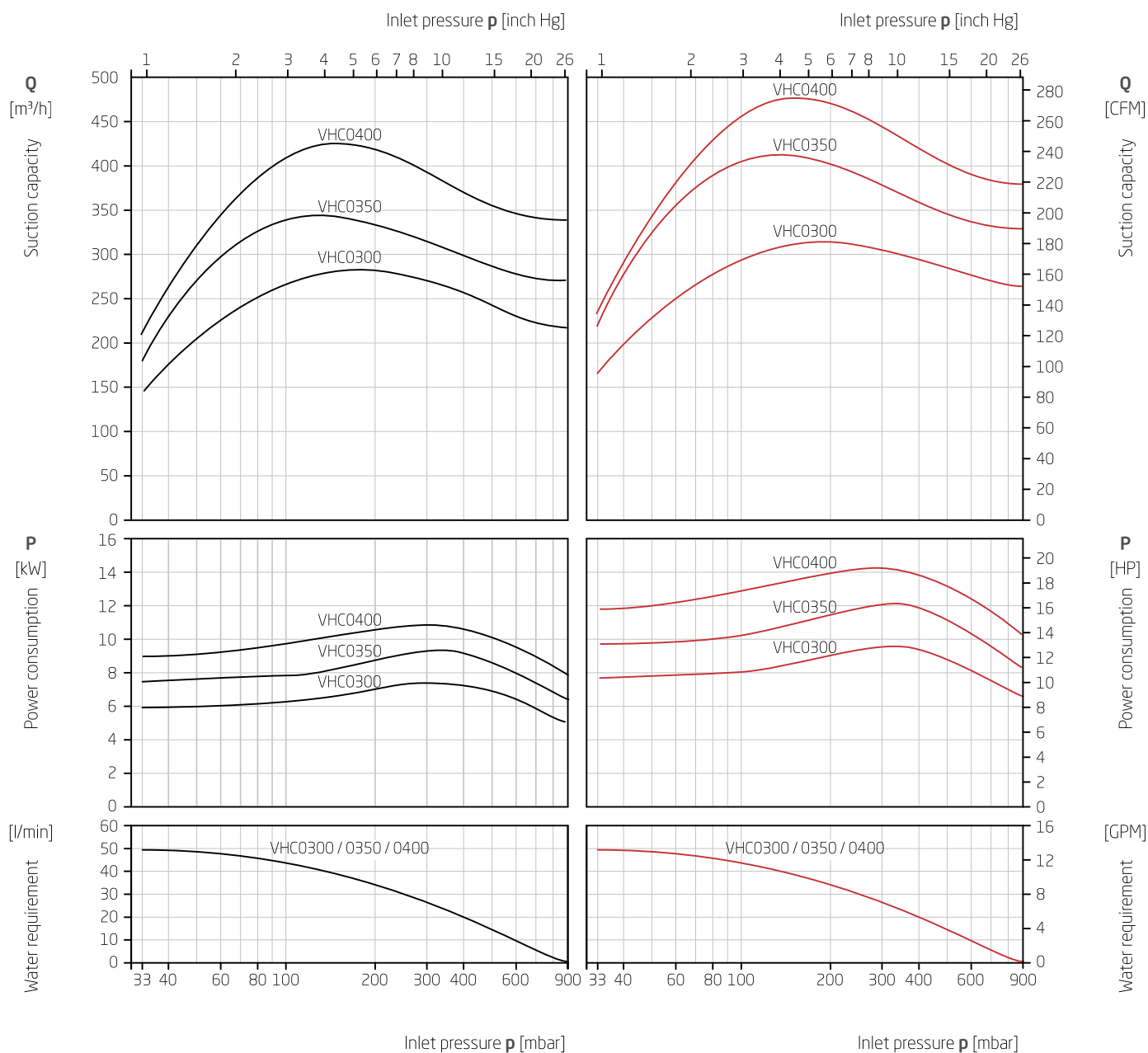
The characteristics are applicable for compression of 20 °C (68 °F) dry air from inlet pressure to atmospheric pressure (1013 mbar / 30 inch Hg a) for nominal speed and drive with three phase motors. Ring liquid is water at 15 °C (59 °F). The tolerance of the suction capacity is -10 % and of the power consumption +10 %.

With different operating conditions characteristic curves change (e.g. differing gas operating liquid conditions, conveying of additional liquids and/or pumping of gas-steam mixtures).

# Characteristic curves VHC0300/0350/0400

50 Hz – 1450 min<sup>-1</sup>

60 Hz – 1750 min<sup>-1</sup>



## Suction capacity and power consumption depending on inlet pressure

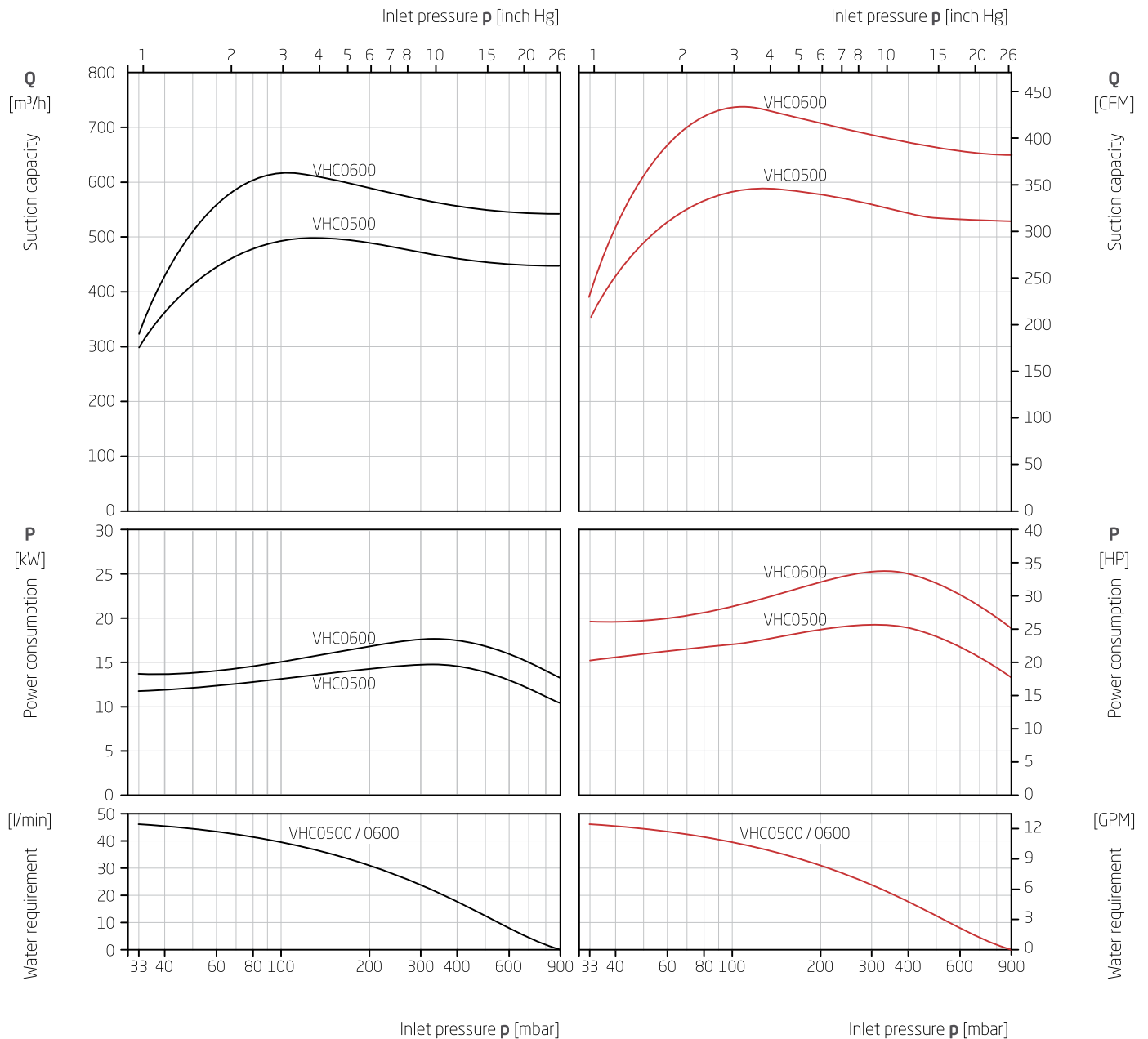
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With different operating conditions characteristic curves change (e.g. differing gas operating liquid conditions, conveying of additional liquids and/or pumping of gas-steam mixtures).

# Characteristic curves VHC0500/0600

50 Hz – 1450 min<sup>-1</sup>

60 Hz – 1750 min<sup>-1</sup>



## Suction capacity and power consumption depending on inlet pressure

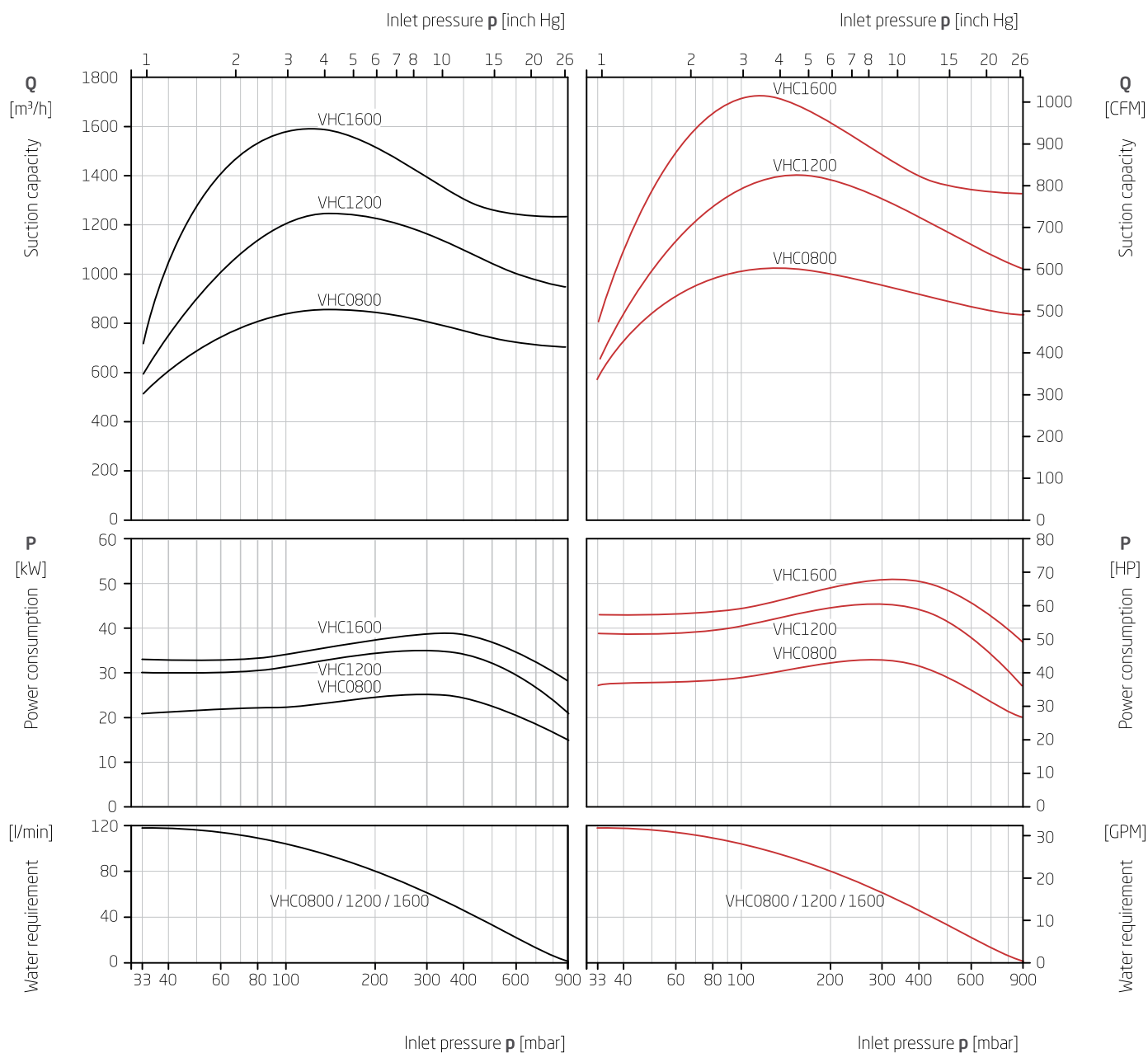
The characteristics are applicable for compression of 20 °C (68 °F) dry air from inlet pressure to atmospheric pressure (1013 mbar / 30 inch Hg a) for nominal speed and drive with three phase motors. Ring liquid is water at 15 °C (59 °F). The tolerance of the suction capacity is -10 % and of the power consumption +10 %.

With different operating conditions characteristic curves change (e.g. differing gas operating liquid conditions, conveying of additional liquids and/or pumping of gas-steam mixtures).

# Characteristic curves VHC0800/1200/1600

50 Hz – 975 min<sup>-1</sup>

60 Hz – 1175 min<sup>-1</sup>

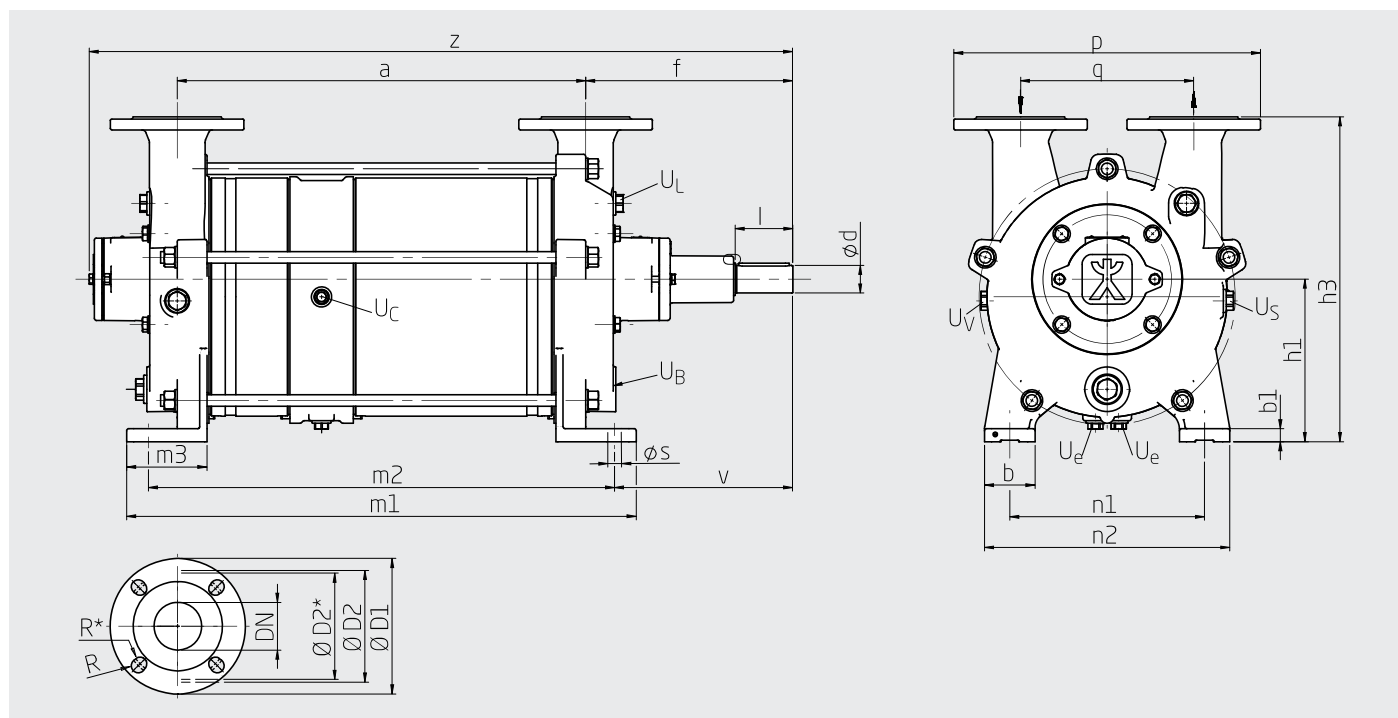


## Suction capacity and power consumption depending on inlet pressure

The characteristics are applicable for compression of 20 °C (68 °F) dry air from inlet pressure to atmospheric pressure (1013 mbar / 30 inch Hg a) for nominal speed and drive with three phase motors. Ring liquid is water at 15 °C (59 °F). The tolerance of the suction capacity is -10 % and of the power consumption +10 %.

With different operating conditions characteristic curves change (e.g. differing gas operating liquid conditions, conveying of additional liquids and/or pumping of gas-steam mixtures).

## Technical data



### Dimensions

Type	a	b	b1	Ød	DN	f	h1	h3	l	m1	m2	m3	n1	n2	p	q	Øs	v	z
VHC0110	239	50	15	28	40	184	160	320	50	335	298	74	200	250	330	180	15	155	531
VHC0140	269	50	15	28	40	184	160	320	50	365	328	74	200	250	330	180	15	155	561
VHC0180	339	50	15	28	40	184	160	320	50	435	398	74	200	250	330	180	15	155	631
VHC0300	335	60	17	38	50	282	212	402	80	435	385	80	240	300	395	230	19	257	743
VHC0350	375	60	17	38	50	282	212	402	80	475	425	80	240	300	395	230	19	257	784
VHC0400	435	60	17	38	50	282	212	402	80	535	485	80	240	300	395	230	19	257	844
VHC0500	500	70	18	38	65	287	225	450	80	640	580	111	270	340	425	240	19	247	902
VHC0600	566	70	18	38	65	287	225	450	80	706	646	111	270	340	425	240	19	247	968
VHC0800	450	98	21	60	100	422	320	595	140	694	620	123	380	480	590	370	19	382	1131
VHC1200	690	98	21	60	100	422	320	595	140	844	770	123	380	480	590	370	19	382	1281
VHC1600	790	98	21	60	100	422	320	595	140	944	870	123	380	480	590	370	19	382	1381

### Connection dimensions

Type	U <sub>b</sub>	U <sub>c</sub>	U <sub>e</sub>	U <sub>L</sub>	U <sub>S</sub>	U <sub>V</sub>
VHC0110	G ½	G ⅝	G ⅝	G ½	G ¾	G ¾
VHC0140	G ½	G ⅝	G ⅝	G ½	G ¾	G ¾
VHC0180	G ½	G ⅝	G ⅝	G ½	G ¾	G ¾
VHC0300	G 1	G ¾	G ¾	G ¾	G ¾	G ¾
VHC0350	G 1	G ¾	G ¾	G ¾	G ¾	G ¾
VHC0400	G 1	G ¾	G ¾	G ¾	G ¾	G ¾
VHC0500	G 1	G ¾	G ½	G ¾	G ¾	G ¾
VHC0600	G 1	G ¾	G ½	G ¾	G ¾	G ¾
VHC0800	G 2	G ½	G ½	G 1 ½	G ¾	G ¾
VHC1200	G 2	G ½	G ½	G 1 ½	G ¾	G ¾
VHC1600	G 2	G ½	G ½	G 1 ½	G ¾	G ¾

### Connection designations

Abb.	Designation
U <sub>B</sub>	Connection for operating liquid
U <sub>C</sub>	Protection against cavitation
U <sub>e</sub>	Connection for drainage
U <sub>L</sub>	Connection for ventilation valve
U <sub>S</sub>	Connection for sensor
U <sub>V</sub>	Connection for drain valve

### Flanges

Size	EN 10921 PN 10			ANSI	
DN	D1	D2	R Ø	RØ	D2 (ANSI)
40	150	110	18	19.1	98.6
50	165	125	18	19.1	129.3
65	185	145	18	19.1	152.4
100	220	180	18	19.1	190.5

## Type codes with seal and materials

	VHC	0600		-53	-15	-000
	VHC	0400	M		-65	-000
Series						
Size						
Design with magnetic coupling						
Mechanical seal (table 1)						
Materials (table 2)						
Counting number						

**Table 1: Mechanical seal**

Code	41	50	53	55
	Carbon, Cr steel, NBR	Carbon, stainless steel, FFKM	Carbon, stainless steel, FKM	Carbon, stainless steel, FKM double PTFE-coated

**Table 2: Materials**

Code	15	35	65
Suction casing, discharge casing, intermediate casing and casing for shaft sealing	EN-GJL-250 Grey cast iron	EN-GJL-250 Grey cast iron	1.4581 CrNiMo cast steel
Inter casing	1.4301 CrNi steel	1.4301 CrNi steel	1.4571 CrNiMo steel
Stage casing	Steel	Steel	1.4571 CrNiMo steel
Impellers	CuSn / RG / 1.4027 / 1.4308* Bronze / red bronze / CrNi / CrNi cast steel*	1.4581 / 1.4027 / 1.4308* CrNiMo / CrNi / CrNi cast steel*	1.4581 CrNiMo cast steel
Shaft	1.4122 CrMo steel	1.4122 CrMo steel	1.4571 CrNiMo steel

\*Precise material specifications on request

## Performance data

Types	50 Hz				60 Hz			
	power consumption		max. suction capacity		power consumption		max. suction capacity	
	[kW]	[HP]	[m³/h]	[CFM]	[kW]	[HP]	[m³/h]	[CFM]
VHC0110	2.9	3.9	107	63	3.7	5.0	128	75
VHC0140	3.5	4.7	145	85	4.5	6.0	174	102
VHC0180	4.9	6.6	186	109	6.3	8.4	223	131
VHC0300	7.3	9.8	283	167	9.5	12.7	314	185
VHC0350	9.3	12.5	342	201	12.1	16.2	411	242
VHC0400	10.9	14.6	425	250	14.2	19.0	475	280
VHC0500	14.5	19.4	501	295	18.9	25.3	590	347
VHC0600	17.6	23.6	616	363	25.1	33.7	739	435
VHC0800	25.8	34.6	862	507	32.7	43.9	1032	607
VHC1200	34.9	46.8	1252	737	45.4	60.9	1407	828
VHC1600	39.2	52.6	1589	935	50.9	68.3	1717	1011

## Sizes of the previous VH\* series still available

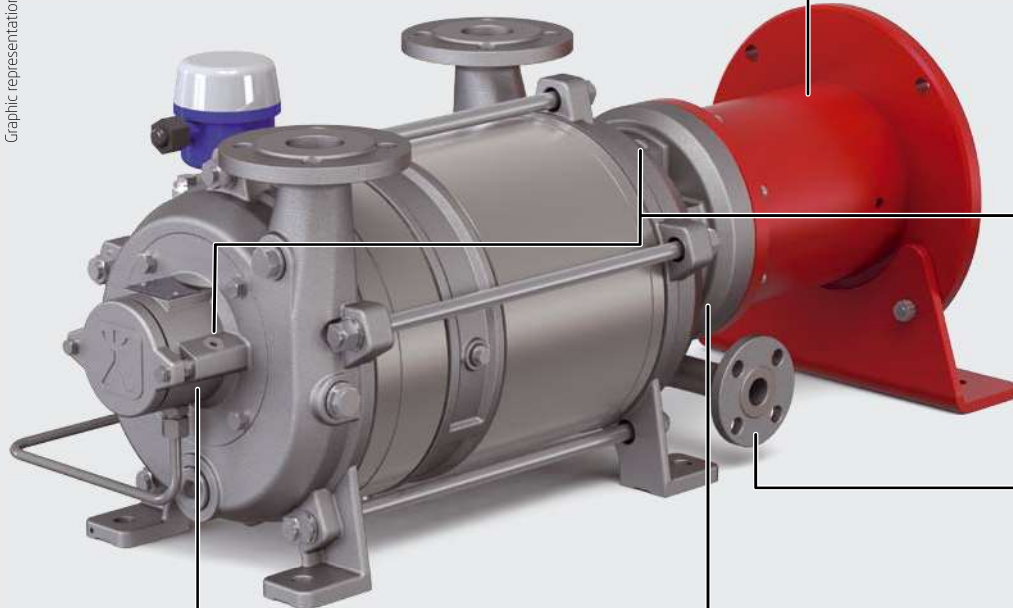
Size	50 Hz				60 Hz			
	power consumption		max. suction capacity		power consumption		max. suction capacity	
	[kW]	[HP]	[m³/h]	[CFM]	[kW]	[HP]	[m³/h]	[CFM]
VH0020	0.8	1.1	21	12	1.1	1.5	25	15
VH0040	1.3	1.8	46	27	1.7	2.3	52	31
VH0060	2.0	2.7	56	33	2.6	3.5	68	40

\* → Brochure "Vacuum pumps in base plate design - series VZ, VH, VU"

# ChemTAL – The VHC version according to TA Luft (Technical Instruction on Air Quality Control)

ChemTAL fulfils all legally specified requirements for air pollution control and offers a wide range of benefits.

Graphic representations not binding.



Bracket with dry-running magnetic coupling without eddy-current losses

Monitoring of the bearings and magnetic coupling - connection for vibration sensor (optional)

Operating liquid connection in flange version

Closed bearing bracket



Pressure overlay connection in the mechanical seal casing

Monitoring of the two mechanical seals with a liquid sensor

**ChemTAL**

## Safe, low lifecycle costs and durable

**ChemTAL is the safe and efficient solution when using toxic, corrosive and combustible media.**

**The design with proven mechanical seals in combination with external rolling bearings and a dry-running magnetic coupling guarantees leak-tightness and safety. The components in contact with the media are made from stainless steel or rust-free special alloys. Various material combinations for the mechanical seals are also coordinated depending on the media to be pumped.**

### High operational safety

ChemTAL is safe, as the entire pump is hermetically sealed and the requirements of the legally specified TA Luft (Technical Instruction on Air Quality Control) are met.

Several monitoring systems guarantee high availability via early detection of possible wear and identification of unsuitable operating modes. Optional vibration sensors monitor the condition of the ball bearings and the magnetic coupling. The two mechanical seals are monitored by a liquid sensor. An additional nitrogen connection on the bearing brackets enables inertisation of the sealing system.

During the start-up process, ChemTAL is resistant to dry running due to the external bearings. Operating liquids with different viscosities can be used based on the process. If damage occurs on the separating can, the ChemTAL can still be used without problems for a specific time. This means that the pump maintenance can be planned in a targeted way.

All series are type-tested for ATEX to category 1G (+H2)

### Low life-cycle costs

ChemTAL requires no seal supply systems, meaning it is extremely service-friendly and is characterised by low maintenance costs.

The magnetic coupling free from eddy current losses used in the VHC results in a tangible energy saving compared with conventional magnetic couplings..

### Long-lasting

ChemTAL has a long service life, as lasting solutions from the VHC series are used for wear parts..