HygroMatik GmbH
Lise-Meitner-Str. 3
24558 Henstedt-Ulzburg

P. +49 4193 895- 0
F. +49 4193 895-33
hy@HygroMatik.de
www.HygroMatik.com

Low pressure nozzle system

19 Feb 2017

Project: LPS-20000
Notice:

Please note

Exhaust air cooling with droplet separators.

It may lead to reduction of efficiency.

For an alternative solution, please get in touch with your HygroMatik contact.

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Specification LPS

Low pressure nozzle system LPS
Adiabatic air humidification and cooling

Adiabatic modular high pressure nozzle system for energy-saving and hygienic humidification. Designed to maximise efficiency whilst minimising water and energy consumption by applying an infinitely variable and accurate control without post evaporation. This allows for the highest degree of precision.
Hygienically impeccable, certified and successfully providing continuous service around the clock. Utilised in areas such as hospitals and clean rooms.

Hygienic safety by

- using the tried and tested HygroMatik concept, guaranteeing safe and reliable hygiene
- utilising only inert materials
- omitting porous and water-storing components according to VDI 6022
- omitting recirculating water according to VDI 6022
- applying a design that prevents standing water according to VDI 6022
- utilising demineralized humidification water/residual conductivity 5-20 µS/cm
- omitting chemical and biological disinfectants

The LPS does not need hygiene-supporting chemicals in order to ensure a flawless operation. The LPS introduces pure humidity into the air. It is capable of humidifying standard systems and applications that require a very high degree of hygiene. This applies in particular to applications where adding supplements is not permitted.

The LPS hygiene concept includes the following certifications

- VDI 6022, Sheet 1 (07/2011)
- VDI 3803, Sheet 1 (02/2010)
- ÖNORM H 6021 (09/2003)
- SWKI VA104-01 (04/2006)
- DIN EN 13779 (09/2007)
- DIN 1946 TEIL 4 (12/2008)
- SWKI 99-3 (05/2003)

Atomising system

The VortexWall is assembled from inert VortexModules, complete with high-pressure hoses and manifolds. The wall is suitable for all duct dimensions and is equipped with high-precision stainless steel atomising nozzles that are especially designed for this purpose. The nozzles are free from wear, easy to clean, and can be reused infinitely.
The various spray angles, combined with the efficient air/water mixture provided by the VortexModules, generate a humidified airflow across the entire area without creating condensation along the duct walls and ceiling. Thus, the HPS ensures a "dry humidification" along the shortest absorption distance.

According to VDI 6022 and VDI 3803, after the humidification unit, a stainless steel, two-step aerosol separator is installed. The separator can be easily removed and cleaned; it can be reused infinitely and guarantees complete absence of aerosol.

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Low-pressure pump station

Low noise, maintenance-free, reliable rotary vane pump for industrial application including a frequency converter, ready for the connection to demineralised water. The frequency converter provides proportional control across the entire humidification range.
Highest degree of safety ensured by providing

- motor output monitoring function
- monitoring minimum pressure and maximum pressure
- pressure increase depending on the demand
- 10 µm water filter
- water inlet pressure switch (dry run protection)

Optional

- 1-3 load operation – hygienic and efficient in all power ranges
- cooling system

Humidity control

Paring down resources, consistent proportional control including self-monitoring for permanent safety purposes. The PLC control unit is intended for the activation of an on-site enthalpy regulation and is suitable for the connection to all common infinitely variable control signals.

Hygiene rinsing according to VDI 6022 (forced discharge)

After the system has been shut down, all water-carrying lines of the humidification system will be subject to an automatic hygiene rinsing cycle. This option may be selected to start after 1 to 48 hours. The drainage interval and the intensity of the rinsing action are flexible and can be adjusted to meet the operation-specific parameters.

Proper hygienic installation and implementation

We will be happy to provide you with an individual offer for your project. Please contact us.

The following information should be observed/planning tips:

In order to comply with VDI 6022

- watertight duct segment with inspection door, light and cover for sight glass for inspection and service purposes
- properly mounted attachment components for VortexWall and aerosol separator
- all components coming in contact with water must be made of corrosion-resistant material, e.g. stainless steel (at least 1.4301)
- water basin with syphon

Highest degree of efficiency due to

- smooth surfaces and omission of protruding add-ons inside the humidification duct segments
- an absorption distance of 900 mm and an overall installation length of 1500 mm
- distance to the fan at least 1 m
- laminar incoming flow across the entire VortexWall

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Components

Item	Art. no.	Description	Quantity
1	LPS72	Pump station Pump station performance category 72	1 piece
2	LPS-17-XXX *	VortexWall LPS 25 / 15 x 7	1 piece
2.1	E-7800428	Hose Hose PA, 6x4mm	4 m

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Unit data

Type:	LPS72-L1	Humidification output:	60,1 kg/h
Nominal power:	160 W	Efficiency:	60 %
Voltage:	230/1/50 V/Ph/Hz	max. water demand:	102,6 l/h*
Current:	2,1 A	eff. water demand:	100,3 l/h**
Circuit protection	16 A	min. water demand:	57,4 l/h***
Control signal:	0-10 V	Cooling capacity:	37 kW
Weight:	33 kg		

Vortex LPS 25 / 15 x 7

Modules in width:	15 pcs.
Modules in height:	7 pcs.
Number of nozzles:	25 pcs.
Weight:	29 kg

Droplet separators

Number:	0 pcs.****
Width:	1195 mm
Height:	1171 mm
Weight:	0 kg

* *max. pressure and max. number of nozzles. (#)*

** *Effective water demand* $= \frac{\text{humidification output}}{\text{efficiency} * \text{density}}$

*** *min. pressure and min. number of nozzles. (#)*

\# *Calculations are based on standard values.*

**** *Elements which follow the humidification, must be suitable for demineralized water and equipped with a drain.*

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Technical specifications

Humidification	Air inlet	Moisture	Air outlet
Temperature:	23,0 °C		16,7 °C
relative humidity:	50,0 %		95,0 %
absolut humidity:	8,7 g/kg		11,2 g/kg
Volume flow rate:	20000 m³/h		19578 m³/h
Air flow speed:	1,9 m/s		1,9 m/s
DeltaX:		2,5 g/kg	
Humidification output:		60,1 kg/h	

Duct (clear dimension) *

Absorbtion distance:	A=	900 mm	Duct width:	C=	2400 mm
Total length:	B=	1500 mm	Duct height:	D=	1200 mm
Pressure drop:		9 Pa			

Vortex LPS 25 / 15 x 7

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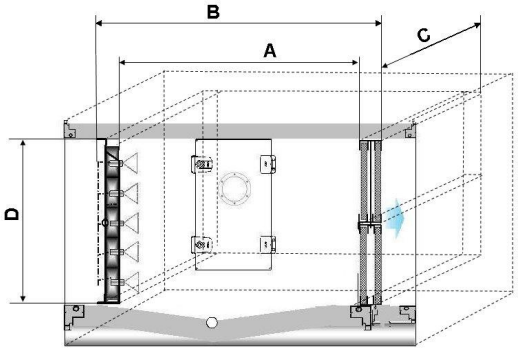

** Please check the specifications we have based the design of your system on. Please contact us if you find deviations. We will be happy to redesign the system for you. The underlined process data are the basis of the calculation.*

***** Elements which follow the humidification, must be suitable for demineralized water and equipped with a drain.*

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HX chart

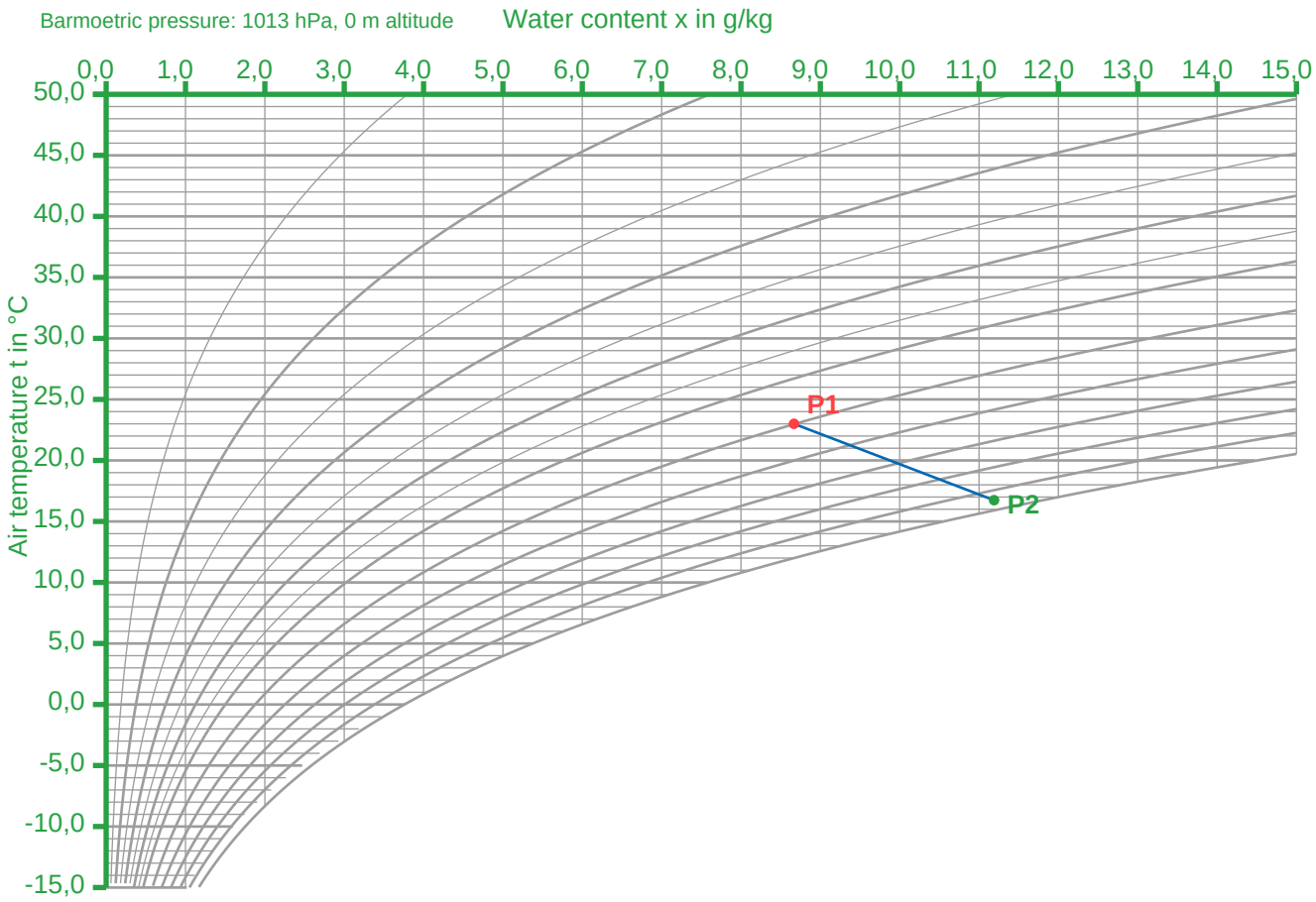

Figure: HX-Diagramm
P1: Air inlet P2: Air outlet

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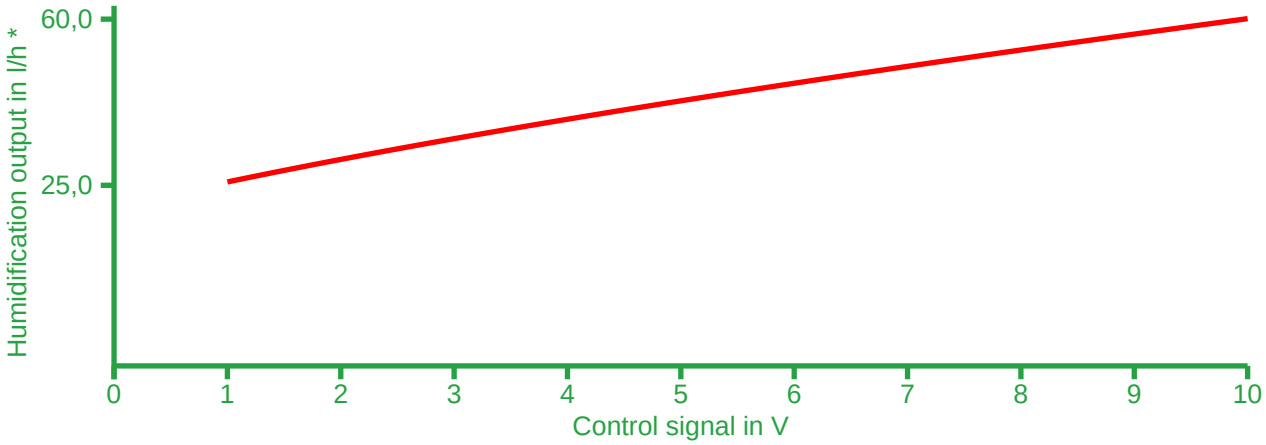
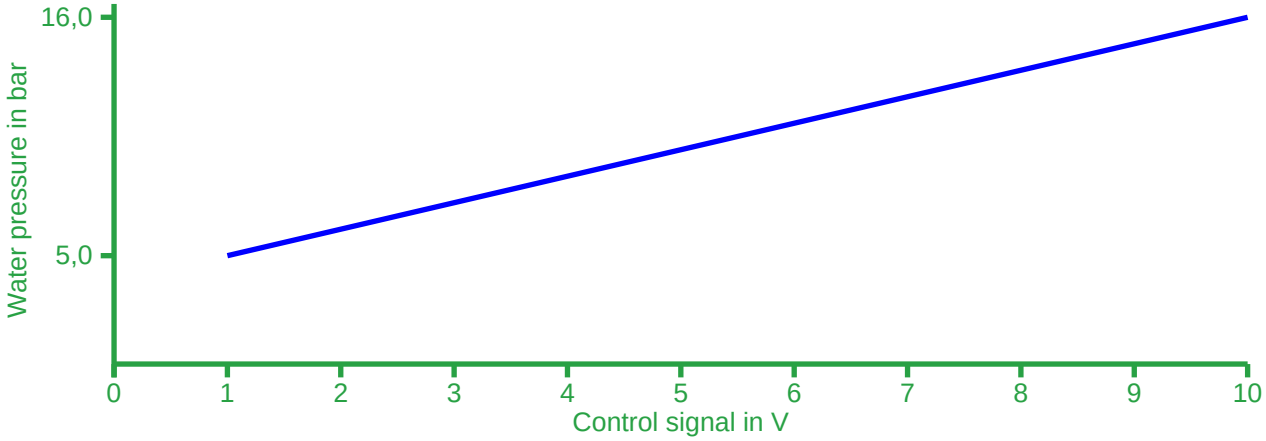
humidification output





** Schematic diagram on the basis of the efficiency at maximum pressure*