SPX

Heatless Desiccant
Air Dryers

HHS · HHL · HHE Series

Hankison

Heatless Desiccant Air Dryers

HHS·HHL·HHE Series

Since 1948, sensitive applications requiring clean, dry, compressed air have turned to Hankison for the optimal solution. Utilizing twin towers filled with premium grade activated alumina, Hankison Heatless dryers are available with 3 application specific control systems to meet the needs of industry with economy and performance. Hankison HHS, HHL or HHE Series heatless desiccant dryers provide consistent outlet pressure dew points to −100°F (−73°C).
Microelectronics, food packaging, paper, glass, pharmaceutical, powder painting, hospital laboratories: these industries are a small representative sample of industries utilizing desiccant dryers. They all have one thing in common... they need to save space on the factory/laboratory floor. HH Series' sleek designs and compact footprints help engineers address those needs.

Consistent Outlet Pressure Dew Points: Industry-Leading Desiccant Beds

Premium grade desiccant beads offer enhanced surface area and high crush strength which prolongs bed life

Large desiccant beds ensure 4.8 seconds of contact time...allows wet, saturated air at the dryer inlet to be dried to the required dew point

30% extra desiccant provided to compensate for natural bed aging...ensures top performance over expected 3 to 5 years of desiccant bed life

Large flow diffusers ensure even flow distribution through the bed and eliminate channeling

Towers are sized so that air velocity through the bed won't fluidize the desiccant which prevents bed movement and desiccant dusting

Up-flow drying allows water and heavy contaminants to drop out of the air stream as they enter a tower which protects the bed from contamination. This makes it simple to discharge the contaminants when the tower depressurizes.

Cleanable stainless steel flow diffusers/support screens and separate fill and drain ports for ease of desiccant replacement

Safety Built To Code

Pressure vessels are ASME Certified
(Option : consult factory for the local vessel code.)

Heavy-duty mufflers for quiet operation
- dryers shipped with an extra set of mufflers

NEMA 4 electrical construction is standard

Pressure relief valves are standard

Four Dew Point Options Per ISO 8573.1 Air Quality Standards

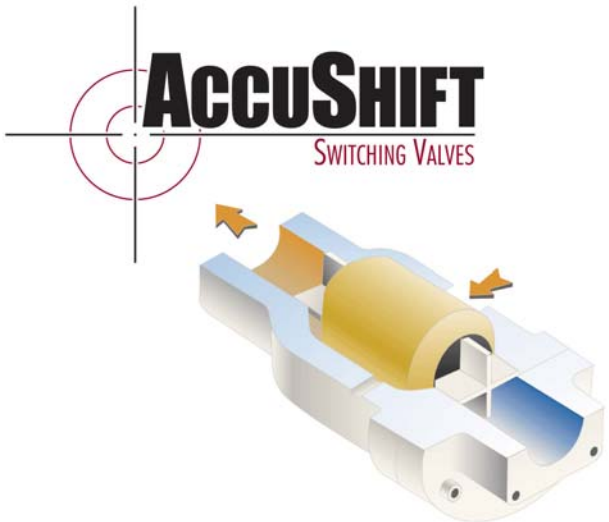
Specifying a pressure dew point is not simple work for an engineer. Hankison Heatless dryer designs allow you to optimize performance and dew points in-the-field to adapt to your environment and meet the following ISO 8573.1 Classes of air quality.

ISO 8573.1 Class	Dew Point		Remaining Moisture		HHS Series	HHL Series	HHE Series
			ppmw	mg/m³			
1	-100°F	-73°C	0.12	0.15	4 min. fixed	4 min. fixed	–
2	-40°F	-40°C	10	12	Demand or 10 min. fixed	10 min. fixed	10 min. fixed
3	-4°F	-20°C	81	97	Demand or 16 min. fixed	16 min. fixed	–
4	+38°F	+3°C	610	730	Demand or 24 min. fixed	24 min. fixed	–

Target The Weakest Link

Flow direction components, such as switching valves and check valves, are typically the weakest link in any heatless desiccant dryer design. Valve diaphragms tear, check valves break and valve stems leak. Wet air and unplanned maintenance results when you can least afford the downtime, too. That is what makes the simplicity and durability of AccuShift Switching Valves so desirable.

AccuShift Switching Valve cores are precision molded out of virgin nylon for quiet, resilient operation. Durable valve bodies provide broad flow paths to reduce pressure drop and eliminate localized abrasion. Internally powered with 1 moving part, this robust design encases the valve core and replaces common switching valves and check valves. Long life AccuShift valves target the weakest link to improve your uptime.



Accurate And Durable Process Valves

AccuShift Inlet and Outlet switching valves automatically shift to the low pressure side of the circuit to control process flow

AccuShift valve life tested to over 500,000 cycles with tough desiccant dust challenge

AccuShift position memory ensures drying continues, even with the loss of electrical power to the dryer

Purge/repressurization valves are normally closed, pneumatic piston actuated, Y-angle poppet valves or premium quality butterfly valves

Three-way pilot operated solenoid valves manage the pilot air flow to direct the purge /repressurization valves

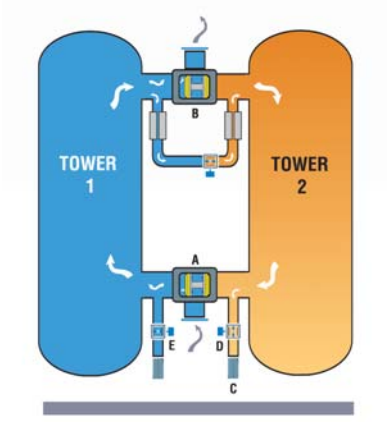
Purge pressure adjustment valve

HHS · HHL · HHE Series Dryers : 3 Application Specific Designs

Empower yourself with 3 select designs to choose from that are engineered to balance economy and performance. Why three? Many applications operate with a large swing in air demands due to variations in production scheduling or shifts of operation. Some applications operate at a fraction of the flow of the compressor due to air system efficiency improvements. Some applications operate continuously at-or-near full capacity. The following table serves as a guide to help determine which design is best suited for your critical application.

How It Works

Moist, filtered compressed air enters the pressurized on-line Desiccant-filled drying Tower 1 through AccuShift valve (A). Up-flow drying enables the desiccant to strip the air stream of moisture. Clean, dry compressed air exits through AccuShift valve (B) to feed the air system. Tower 2 (when in regeneration mode) depressurizes to atmosphere through muffler (C) when valve (D) opens. A portion of dry compressed air (purge air) is diverted before exiting (B), passes through off-line Tower 2 and exits at valve (D) to desorb the moisture from the desiccant. Once desorbed, valve (D) closes and Tower 2 is repressurized. At tower shift-over, valve (E) will open, causing AccuShift Valves (A & B) to shift. Tower 2 will be placed on-line to dry the bed. Operations will switch and Tower 1 will be regenerated.



Standard Instrumentation

Left and right tower pressure gauges

Purge pressure gauge

Moisture indicator – alerts operator of elevated dew point

Throttling valve provides accurate purge pressure adjustment

HHS Series

Automatic SensaTherm Energy Savings

HHS Series with SensaTherm automatically matches purge air use to the demand on the system. This ensures maximum performance as the energy saved goes right to your bottom line. Controller features vacuum fluorescent text display that communicates energy savings, operating mode and service reminders. Select from one of the four pressure dew point settings to optimize your savings for each season.

HHL Series

Selectable Purge Economizer Savings

HHL Series provides user selectable energy savings. Tailor the drying cycles, to match your peak air demand, in 10 percent increments. In addition, this state-of-the-art controller offers four pressure dew point settings to further tune your savings and adapt the system to your environment.

HHE Series

-40°C Dew Point Performance – Pure and Simple

HHE Series presents traditional heatless drying technology. Using a simple timer based controller, these are designed to deliver maximum value to applications that operate at-or-near full capacity. Automatic time controlled bed regeneration cycles offer consistent performance and economy of purchase.

Air Demand Profile	Flow Range Nm^3/min	Hankison Solution
Fluctuating Demands (1 to 3 shifts)	21.2 – 152.9	HHS Series
Reduced Demands (1 to 3 shifts)	21.2 – 152.9	HHS Series or HHL Series
Peak Demands (1 to 3 shifts)	21.2 – 152.9	HHS Series or HHE Series

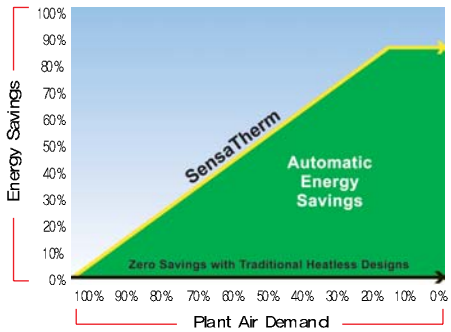
HHS Series, Automatic Sensatherm Energy Savings

Hankison's SensaTherm energy saving purge system mirrors plant air demands to deliver maximum energy savings. When operating at reduced capacity, the on-line drying tower remains active longer, until its full drying capacity is utilized. Desiccant bed temperature changes are constantly monitored within each tower to precisely manage drying times and reduce purge air consumption. SensaTherm measures the increase in desiccant bed temperature (heat of adsorption) during the drying stage and the decrease in desiccant bed temperature (heat of desorption) during the regeneration stage. These temperature changes are accurate indicators of the moisture load on the dryer. This data is interpreted by microprocessor based controls to determine how long a tower stays on-line during the drying stage. Then, the stored heat of adsorption is released during the regeneration stage to improve energy efficiency and prepare the off-line tower for the next cycle. After regeneration, the off-line tower is re-pressurized and purge air consumption ceases in anticipation of the next drying cycle.

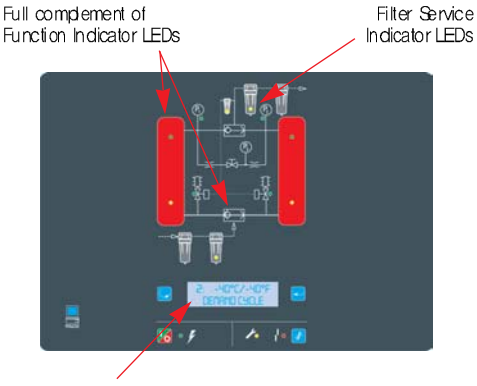
Advantages:

1. Temperature transducers (thermistors) are used as sensing devices – they are simpler, more reliable and rugged than the humidity, pressure and flow transducers others use.
2. Sensors used on the SensaTherm system require no calibration.
3. The system is based on saving the heat of adsorption – towers switch before heat is lost...maximizing purge air efficiency and minimizing the amount of purge air required.

SensaTherm
Automatic Purge Saving System



Maximize your return-on-investment automatically. HHS Series with SensaTherm delivers energy savings in direct proportion to load variations from your plant air demands, making it the Auditor's Choice.



HHS Series Controller Features:

Choice of four operating modes (see page 3 for ISO dew point classes)

SensaTherm Demand mode

Switches for On/Off, Alarm and Service reminder reset

Operational LED lights for power-on, tower status, valve status, and tower pressure

Service reminder LED lights for filters and drains, valves and desiccant. The user selects between a Normal and a Severe service interval

Alarm LED for tower switching failure, filter monitor signals, electronic demand drain alarms on filters

Vacuum fluorescent text display communicates energy savings, operating mode and service reminders

RS-232 communications port is standard

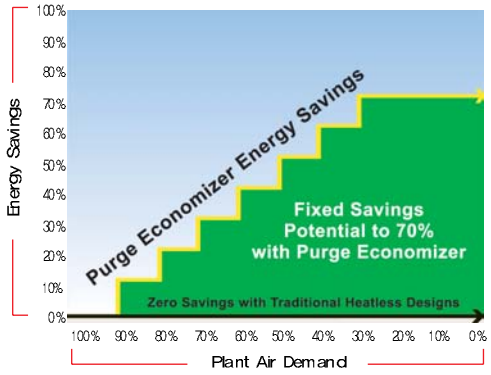
Superior energy savings and advanced communications capabilities make the HHS Series the best choice.

Automatic Energy Savings with HHS Series

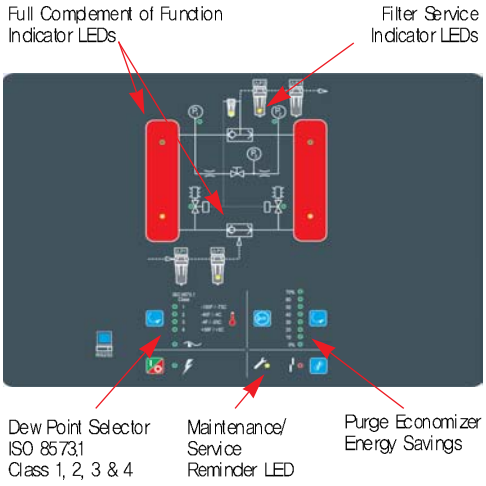
Load	Load Sensatherm Energy Savings*						
	21.2	26.3	31.9	38.2	43.8	59.4	84.9
100%	–	–	–	–	–	–	–
95%	$ 941	$1,167	$1,418	$ 1,694	$1,945	$2,636	$ 3,765
90%	1,883	2,335	2,837	3,389	3,891	5,271	7,531
85%	2,824	3,502	4,255	5,083	5,836	7,907	11,296
80%	3,765	4,669	5,673	6,778	7,782	10,543	15,061
75%	4,707	5,836	7,091	8,472	9,727	13,179	18,827
70%	5,648	7,004	8,510	10,166	11,673	15,814	22,592
55%	8,472	10,505	12,764	15,250	17,509	23,722	33,888
40%	11,296	14,007	17,019	20,333	23,345	31,629	45,184
25%	14,120	17,509	21,274	25,416	29,181	39,536	56,480

*Assumes 5 scfm/HP, 8760 hours of operation per year, $ 0.10 kW/h

HHL Series And HHE Series Desiccant Dryers



Purge Economizer lets you align your purge costs with your air demands to optimize your return-on-investment. Tailor HHL Series dryers to take full advantage of air system efficiency improvements driven by air audit strategies.



Advanced energy saving capabilities and iconic circuit communications make the HHL Series the better alternative.

HHL Series, Selectable Purge Economizer Savings

Reducing the amount of time the dryer spends purging in the regeneration cycle can save energy. Eight settings (0% to 70% in 10% increments) are furnished to allow end users to reduce the purge to match reduced air loads on the dryer. Each energy saving setting has an LED which will illuminate when it is selected. Simply use the supplied switch to select the desired energy saving setting.

HHL Controller Features:

Choice of four fixed cycle operating modes corresponding to ISO 8573.1 Air Quality Classes (see page 3 for ISO dew point classes and cycle times)

Choice of eight Purge Economizer Energy Savings settings with an energy saving selector switch

Switches for ISO Class dew point, On/Off, Alarm and Service reminder reset

Operational LED lights for power-on, tower status, valve status, and tower pressure

Alarm LED for valve switching failure

RS-232 communications port is standard

Service reminder LED lights for filters and drains, valves and desiccant. The user selects between a Normal and a Severe service interval.

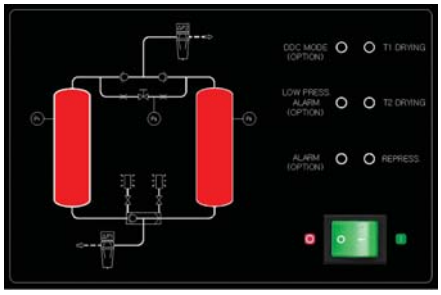
Energy Saving Settings from HHL Series

Load	Purge Economizer Energy Savings*						
	21.2	26.3	31.9	38.2	43.8	59.4	84.9
100%	–	–	–	–	–	–	–
90%	$ 1,883	$ 2,335	$ 2,837	$ 3,389	$ 3,891	$ 5,271	$ 7,531
80%	3,765	4,669	5,673	6,778	7,782	10,543	15,061
70%	5,648	7,004	8,510	10,166	11,673	15,814	22,592
60%	7,531	9,338	11,346	13,555	15,563	21,086	30,123
50%	9,413	11,673	14,183	16,944	19,454	26,357	37,653
40%	11,296	14,007	17,019	20,333	23,345	31,629	45,184
30%	13,179	16,342	19,856	23,722	27,236	36,900	52,715

*Assumes 5 scfm/HP, 8760 hours of operation per year, $ 0.10 kW/h

HHE Series, –40°C Dew Point Performance, Pure And Simple

Engineered to address the need for raw performance and value. This traditional design uses a simple timer to alternate the flow between the two towers filled with premium grade desiccant. While the on-line tower is drying the air stream, the off-line tower purges a fixed amount of compressed air to dry the bed and prepares it for the next drying cycle.



Designed for durability in uncompromising applications, simple visual tower drying indicators make the HHE Series the right choice for those who want reliability without sacrificing pure performance.

HHE Controller Features:

Control Panel overlay with:

- Power On Light
- Left Tower Drying Light
- Right Tower Drying Light
- Lighted On/Off Switch

HHS, HHL And HHE Series Engineered-To-Order

Options

High dew point alarm which includes light and voltage free contacts for remote alarm

Dew point monitor, includes digital display, voltage-free contacts and recorder output

Low ambient packages, epoxy paint, severe environment protection

Oil-free packages with integrated activated carbon towers

Space-Saving Integrated Filtration, NGF Series

Optional pre-filter and after-filter packages, featuring Hankison NGF Series coalescing filters, can be pre-installed at the factory to save time and labor.

- NGF Series Grade H (0.01 micron high efficiency coalescing) pre-filters are recommended
- NGF Series Grade PD (1 micron fine particulate) after-filters are recommended
- NGF Series Grade C (oil vapor) are the recommended for oil-free air

Regeneration Flow Rate

The amount of air used during the regeneration phase consists of the amount used while the purge/repressurization valve is open (purge air) plus the volume of air used to repressurize the tower after the purge/repressurization valve closes. Typically the rate shown is averaged over the cycle time. At 100 psig (7 bar), average air use is 14.4% of the inlet flow capacity (13.7% for purge +0.7% for repressurization) for dryers operating on a 10 minute cycle ; 15.5% (13.7% for purge +1.8% for repressurization) for dryers operating on a 4 minute cycle. Instantaneous flow rate (air flowing while the purge/repressurization valve is open) varies with cycle selection, Energy Savings setting and inlet pressure.

HHS · HHL HHE Series

Heatless Desiccant Air Dryers

HHS · HHL · HHE Series Specification

Model	Flow Capacity (Nm^3/min)	Dimensions(mm)			Inlet/Outlet Connections[1]	Weight (kg)
		H	W	D		
HHS/HHL/HHE 1.1	1.13	1235	884	889	1" PT	166
HHS/HHL/HHE 1.6	1.69	1616	884	889	1" PT	202
HHS/HHL/HHE 2.5	2.55	2047	948	889	1" PT	261
HHS/HHL/HHE 3.2	3.26	1437	1264	1041	1" PT	311
HHS/HHL/HHE 4.6	4.67	1437	1264	1041	1" PT	311
HHS/HHL/HHE 7.3	7.37	1894	1305	1041	2" PT	458
HHS/HHL/HHE 10.4	10.48	1658	1470	1062	2" PT	551
HHS/HHL/HHE 12.7	12.74	1861	1470	1075	2" PT	612
HHS/HHL/HHE 16.7	16.71	2631	1387	1295	2" PT	668
HHS/HHL/HHE 21.2	21.24	2720	1438	1295	2" PT	968
HHS/HHL/HHE 26.3	26.33	2841	1603	1499	2" PT	1095
HHS/HHL/HHE 31.9	32.00	2924	1673	1499	3" FLG	1304
HHS/HHL/HHE 38.2	38.23	3051	1724	1499	3" FLG	1688
HHS/HHL/HHE 43.8	43.89	2980	1876	1499	4" FLG	1890
HHS/HHL/HHE 59.4	59.47	3026	2080	1499	4" FLG	2004
HHS/HHL/HHE 84.9	84.95	3180	2172	1693	4" FLG	4087
HHS/HHL/HHE 116.0[2]	116.10	3158	2537	2227	6" FLG	4500
HHS/HHL/HHE 152.9[2]	152.91	3158	2667	2253	6" FLG	5445

Maximum Working Pressure: 10.3 bar standard. 17.0 bar optional. Units with higher Maximum Working Pressures are available.

Minimum Operating Pressure: 10.3 bar units – 4.1 bar. 17.0 bar – 8.3 bar

Maximum Inlet Air or Ambient Air Temperature: 49℃

Pressure Drop at Rated Flow: Less than 0.34 bar

Available Voltages: HHE – 100–120V/1ph/50–60Hz, HHL/HHS – 100–240V/1ph/50–60Hz and 12–24 VDC, NEMA 4 Standard

Dimensions and weights are for reference only. Request certified drawings for construction purposes.

[1] BSP and DIN flanges available

[2] Supplied with Premium Quality Butterfly Switching Valves

Capacity Correction Factor

Inlet flow capacities are established with inlet conditions os: Inlet air pressure 6.9 bar, inlet temperature saturated at 38℃. To determine inlet flow at pressures other than 6.9 bar, multiply inlet flow at 7 bar from Product Specifications by the corresponding multiplier in Table 1.

Table 1 – Correction Factors (multipliers) for Inlet Pressure

Operating Pressure	psig	60	70	80	90	100	110	120	130	140	150	175	200	225	250
	bar	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	9.7	10.3	12.1	13.8	15.5	17.0
Factor		0.65	0.74	0.83	0.91	1.00	1.04	1.08	1.12	1.16	1.20	1.29	1.37	1.45	1.52

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HEA SERIES PRESSURE-SWING DESICCANT COMPRESSED AIR DRYERS

PROTECTS AIR SYSTEMS EXPOSED TO TEMPERATURES BELOW FREEZING

Produces pressure dew point of -40°C

Delivers dew points of ISO 8573.1 Class 2 (-40°C, -40°F). Labs, Hospitals, Hi-Tech, and Light Industrial installations all benefit with dry air and more floor space.

- Flow rates from 1.5 Nm^3/min to 17.3 Nm^3/min (55 to 600 scfm)
- Highly accurate solid state timer
- Front mounted control panel
- Clean, streamlined piping and utility connections simplify installation
- Automatic operation and stored adsorptive energy result in long desiccant life
- HK Series coalescing filter packages available
- ASME steel vessels, support screens and air diffusers

FEATURES

- **Consistent outlet pressure dew points** - large desiccant beds produce -40°C (-40°F) pressure dew point [equals an atmospheric dew point of -57°C (-71°F)]
- **Minimum purge air usage** - saving the heat of adsorption maximizes the moisture holding capacity of the purge air, minimizing the amount required
- **Long desiccant life** - beds sized to prevent fluidization plus slow and complete regeneration prevent desiccant movement and deterioration
- Heavy duty purge exhaust muffler for quiet operation
- Non-lubricated, soft seated control valves

Highly accurate solid state timer

- Provides increased desiccant life over units operating on shorter cycles
- Allows off-stream tower to fully repressurize before going on-stream...prevents bed movement and loss of pressure downstream

Accurate and durable process valves

- Inlet/outlet shuttle valves automatically shift to the low pressure side of the circuit to control process flow
- Shuttle valve life tested to >500,000 cycles
- Purge/repressurization valves are normally closed, pneumatic piston actuated y-angle poppet valves or direct acting solenoid valve.

Front mounted control panel

- Power on light
- Lighted on-off switch
- Active tower indicator lights

HK Series coalescing filter packages

- Type H oil removal prefilter to 0.01 micron
- Type D dry desiccant afterfilter (1 micron)

ASME code vessels, support screens and air diffusers

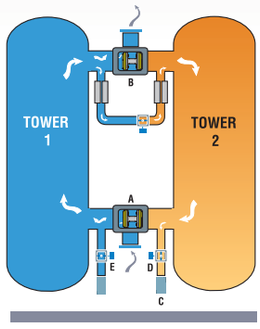
(top and bottom of vessels)

- Easily removed for cleaning
- Filters out gross contaminants...protects valves
- Prevents channeling
- Completely assembled, piped and wired
- Shipped with full charge of desiccant
- Only hook-up of utilities is needed to operate

HEA SERIES
PRODUCT FEATURES AND SPECIFICATIONS

HOW IT WORKS

Moist, filtered compressed air enters the pressurized on-line desiccant-filled drying Tower 1 through Shuttle Valve (A). Up-flow drying enables the desiccant to strip the air stream of moisture. Clean, dry compressed air exits throughShuttle Valve (B) to feed the air system. Tower 2 (when in regeneration mode) depressurizes to atmosphere through muffler (C) when valve (D) opens. A portion of dry compressed air (purge air) is diverted before exiting (B) and passes through off-line Tower 2 and exits at valve (D) to desorb the moisture from the desiccant. Once desorbed, valve (D) closes and Tower 2 is repressurized. At tower shift-over, valve (E) will open, causing Shuttle Valves (A & B) to shift. Tower 2 will be placed on-line to dry the bed. Operations will switch and Tower 1 will be regenerated.



HEA SERIES PRODUCT SPECIFICATIONS

Model	Flow Capacity[1]	Unit	Power Supply	Inlet/Outlet Connections	Dimensions			Weight
	Nm^3/min	kW		inch	H mm	W mm	D mm	kg
HEA 1.5	1.56	0.05	220-240 V 1 PH 50-60 Hz	PT 1"	1193	720	700	45
HEA 2.8	2.89				1725	720	700	95
HEA 4.6	4.63				1637	820	700	125
HEA 5.7	5.79			PT 2"	1905	825	700	175
HEA 7.9	7.96				1765	975	800	225
HEA 10.1	10.13				1653	1055	800	326
HEA 13.7	13.74				1783	1125	800	517
HEA 17.3	17.36				1745	1235	800	761

[1] Rated Flow Capacity - Conditions are 38°C inlet temperature, 6.9 bar(g) inlet pressure, 100% relative humidity, 38°C ambient temperature

OPERATING CONDITIONS

HEA Models	Max. Inlet Air Pressure barg	Min. Inlet Air Pressure barg	Max. Inlet Air Temp. °C	Min. Inlet Air Temp. °C
HEA 1.5 - 17.3	9.7	4.4	49	4

CAPACITY CORRECTION FACTORS

Maximum inlet flow capacities at various pressures: To determine maximum inlet flow at inlet pressures other than 6.9 bar (100 psig), multiply inlet flow from the Product Specifications Table by multiplier from Table 1 that corresponds to system pressure at inlet of dryer.

Table 1: Correction Factors (multipliers) for Inlet Pressure

Operating Pressure	psig	60	70	80	90	100	110	120	130	140
	bar	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	9.7
Multiplier		0.65	0.74	0.83	0.91	1.00	1.04	1.08	1.12	1.16

SPX HANKISON

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Improvements and research are continuous at SPX Hankison. Specifications may change without notice.