



**HHD*plus* SERIES**

---

**and HDS SERIES**

---

**REFRIGERATED**

---

**COMPRESSED**

---

**AIR DRYERS**

---



# Compressed Air Treatment Reduces Operating Costs

Hankison International has designed and manufactured energy-efficient solutions for compressed air treatment since 1948. Our mission is to reduce the operating expenditures of compressed air users by removing impurities from their air systems. Utilising environmentally friendly refrigerants, Hankison Air Treatment Stations effectively remove moisture, solid particulates, and oil from compressed air systems.

Compressed Air System Impurities	HHDplus & HDS Series Air Treatment Stations	Reduce General Plant Operation Costs
Moisture (Water)	1 Refrigerated Air Dryers 3°C Dew Point	<ul style="list-style-type: none"> <li>Reduce wear &amp; maintenance costs of pneumatic devices</li> <li>Reduce product spoilage</li> </ul>
Particulates (Rust & Dust)	2 HF Series Grade 9 Separator/Filter 3 micron particulate	<ul style="list-style-type: none"> <li>Reduce work stoppages</li> <li>Reduce rust, scale, &amp; leaks in air lines</li> </ul>
Oil (Liquid & Vapor)	3 HF Series Grade 5 Oil Removal Filter 0.008 ppm (0,01 mg/m <sup>3</sup> )	<ul style="list-style-type: none"> <li>Reduce malfunctions of control &amp; air logic instruments</li> </ul>



## A 3°C Dew Point Specification Saves Energy

All compressed air systems must be evaluated individually to develop a specification for compressed air treatment. The majority of compressed air users specify a 3°C dew point for plant air. This dew point provides dry compressed air at a very low energy cost. Energy costs associated with refrigerated dryers are significantly lower than costs associated with desiccant dryers which satisfy sub-zero dew point requirements.

## Refrigerated Dryers Save Energy

Operating Costs* for different dewpoints			
Air Flow m <sup>3</sup> /hr	Refrigerant Dryer 3°C	Blower Purge Desiccant dryer -40°C	Heatless Desiccant Dryer -40°C
480	£661	£3,138	£3,504
1450	£1,326	£8,609	£10,586
1800	£1,992	£10,308	£13,139
3600	£3,395	£19,122	£26,279
5400	£5,070	£26,577	£39,418

\* Calculations based on 8760 running hours per annum, calculated at 0.052p Per KWhr. Average consumption of standard desiccant dryer is assumed.

# Develop an Air Demand Profile to Save Energy

Compressed air demand in most plants fluctuates significantly. Hankison International offers compressed air users who specify a 3°C dew point two options: the **HHD*plus*** Series and the **HDS Series Refrigerated Air Dryers**. Both optimise energy saving opportunities for various compressed air demand profiles. The chart below will help you determine which solution is best for your application.



## Match Air Demand Profiles with the Optimum Hankison Solution to Save Energy

### HDS Series Energy Saving Refrigerated Dryers

Optimise energy savings for air demand profiles from 0% to 100%.

Digital control PLC allows user to track cumulative energy savings.

Digital Evaporator coupled with an innovative Digital Scroll refrigeration system.

### HHD*plus* Series Refrigerated Dryers

Rugged reliability and value for demand profiles with 75% to 100% total average air flows.

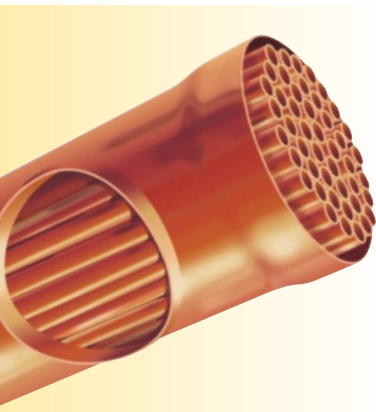
Energy Management Monitor (emm™) PLC with scheduler which turns dryer on and off to optimise energy savings in one or two shift operations.

Air Demand Profile		Hankison Solution
	Large Demand Fluctuations (1 to 3 shifts)	<b>HDS Series</b>
	Steady Demand (1 shift)	<b>HDS Series</b> or <b>HHD<i>plus</i> Series</b> in schedule mode
	Steady Demand (2 shifts)	<b>HDS Series</b> or <b>HHD<i>plus</i> Series</b> in schedule mode
	Steady Demand (3 shifts, 24/7)	<b>HHD<i>plus</i> Series</b>

# Three Hankison Technology Platforms for HHD*plus* and HDS Series Refrigerated Dryers

Since L.E. Hankison patented the Condensifilter™, (forerunner to the refrigerated air dryer) in 1943, Hankison International's engineers have set the industry standard for refrigerated dryer technology.

## 1. Smooth-Tube Heat Exchanger Technology



The ability to design and manufacture high-performance heat exchangers tailored to the application of compressed air has been a Hankison tradition since 1943. HHD*plus* and HDS Series dryers feature Hankison's most advanced heat exchanger technologies.

### Reduce Capital and Operating Costs by using Hankison Smooth-tube Designs

Compressed air poses a unique challenge to heat exchangers in the form of high inlet concentrations of airborne contaminants such as dirt and rust scale. These particles can potentially block the heat exchanger causing costly increases in pressure drop and require the installation of additional pre-filtration.

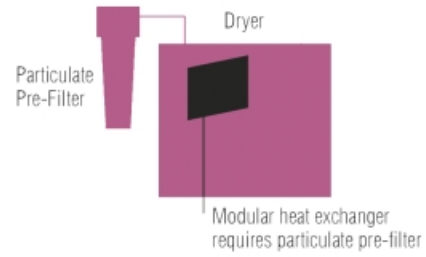
Hankison-design heat exchangers feature smooth-tube, copper heat exchange surfaces which are non-fouling. Airborne contaminants have no place to get trapped and are swept through the heat exchanger by the compressed air.

Hankison heat exchangers do not require pre-filters. Every filter added to an installation adds to pressure drop costs.

Many heat exchangers, originally designed for commercial refrigeration applications, require pre-filtration which increase capital and operating costs. This is because the narrow air paths present many surfaces to which airborne contaminants can adhere themselves to over time.

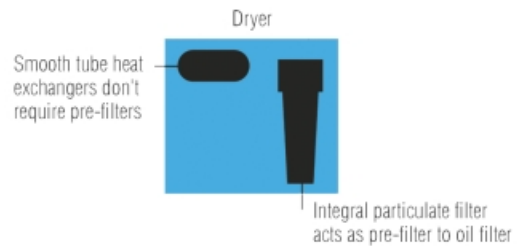
### "Pre-Filter Required" Method

$$4 \text{ psi } \Delta p + 5 \text{ psi } \Delta p = 9 \text{ psi pressure drop}$$



### Energy Saving Hankison Method

$$5 \text{ psi } \Delta p = 5 \text{ psi pressure drop}$$



## Hankison Design Eliminates the need for Pre-filter: Calculated First-Year Savings!

Air Flow m <sup>3</sup> /hr	Pre-filter cost	Pre-filter pressure drop cost <sup>(1)</sup>	Total first year cost of Pre-filter <sup>(2)</sup>
170	£241	£149	£475
425	£402	£374	£885
825	£669	£726	£1,544
1700	£1,599	£1,496	£3,095
3150	£2,485	£2,772	£5,851
5300	£2,989	£4,664	£8,643

<sup>(1)</sup>: Based on a 0.27 (4 psi) pressure drop, 8760 operating hours per annum and at 0.052p per KWhr

<sup>(2)</sup>: Cost includes added cost of replacement elements.

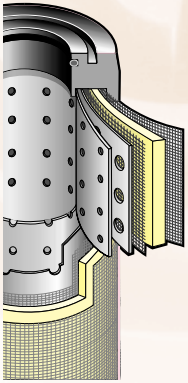
## A reliable 3°C Pressure Dew Point—There is a Difference!

An advanced multi tubes-in-tube design offers three times more surface per unit length than other designs. Splitting the air flow into multiple tubes enhances the heat transfer rate which provides the thermal cooling necessary for consistent 3°C dew points.

Many under-sized modular heat exchanger designs, which have been borrowed from commercial applications, do not provide sufficient thermal cooling. At 1000 scfm, the difference between a 3°C and 15°C dew point can result in 75 gallons of liquid water going downstream...every week. Be wary of performance claims that do not guarantee a pressure dew point (vs. a "lowest air temperature" claim).



## 2. Filtration Technology

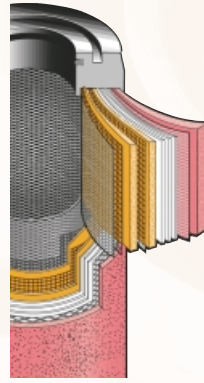
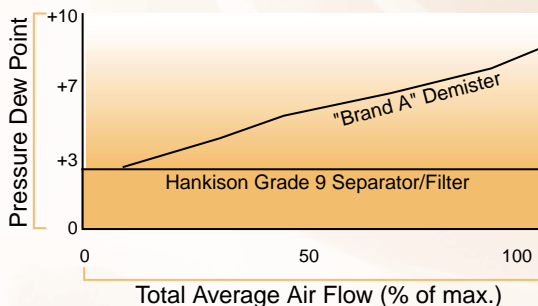


### The Integrated HF Series Grade 9 Coalescing Separator/Filter

Once compressed air is cooled thermally, the condensed moisture must be effectively removed. A poorly designed separator can allow moisture to re-entrain itself into the compressed air stream. It is particularly challenging to

consistently remove moisture at lower velocities (lower loads). The HF Series Grade 9 Separator/Filter effectively solves these challenges by utilising two stages of filtration to remove bulk liquid and solid particulates to 3 micron in size.

- First stage – two stainless steel orifice tubes provide 10 micron mechanical separation
- Second stage – in-depth fiber media captures solid and liquid particles to 3 micron in size



### The Optional Integrated HF Series Grade 5 Coalescing Oil Removal Filter

Space and time-savings can be achieved by integrating an oil removal coalescing filter into larger sized Hankison refrigerated dryers. Instead of having a separate filter vessel and piping installed outside of the dryer... simply integrate it into

the refrigerated dryer. This concept is what we call an "Air Treatment Station." The HF Series Grade 5 high efficiency oil removal filter effectively uses two stages of filtration to remove oil aerosols to 0,01 mg/m<sup>3</sup> (0.008 ppm) and solid particulates to 0,01 micron in size .

- First stage – multiple layers of fiber media and media screen remove larger particles, pre-filtering the air for the second stage
- Second stage – multiple layers of bonded, blended fiber media for fine coalescence captures fine oil aerosols and solid particles

Dryer Model	Coalescing Filter Type	Filter Performance
HHD <i>plus</i> 50-5400 HDS 1450-5400	Standard Grade 9 Filter Separator	<ul style="list-style-type: none"> <li>• Bulk liquid &amp; solid particulates</li> <li>• Oil aerosols to 6,25 mg/m<sup>3</sup> (5 ppm)</li> </ul>
HHD <i>plus</i> 1800-5400 HDS 1450-5400	Optional Grade 5 Oil Filter	<ul style="list-style-type: none"> <li>• Oil aerosols to 0,01 mg/m<sup>3</sup> (0,008 ppm)</li> <li>• Solid particles to 0,01 micron</li> </ul>

## 3. Refrigerant Technology

Hankison selects the HFC refrigerants R-134a and R-404a for the HHD*plus* and HDS Series dryers, designed for industrial applications, based upon the following criteria:

- Environmentally-friendly HFC refrigerants which comply with the Montreal Protocol of 1989.
- Energy efficient at "medium" evaporator temperatures of 1.7°C. Below 3 kw, R-134 with reciprocating compressors provide optimal performance. At 3 kw and above, scroll and digital scroll compressors utilising R-404a provide the optimum pay-back depending upon the user's air demand profile.

Dryer Models	HFC Refrigerant	Refrigeration Compressor-Type
HHD <i>plus</i> 20-1450	R-134	reciprocating
HHD <i>plus</i> 1800-5400	R-404a	scroll
HDS 1450-5400	R-404a	digital scroll

- Ability to maintain stable temperatures (small glide factor) to protect the integrity of the 3°C pressure dew point. R-407c, for example, has a difficult-to-control 13°C glide and is selected for other product lines suited for light industrial applications.
- Wide-spread, long-term availability of the refrigerant at a reasonable cost.

# HDS Series Energy Saving Refrigerated Dryers

Flows from 1.450 m<sup>3</sup>/h to 5.400 m<sup>3</sup>/h

## A New Category: Digital Evaporator Technology

The HDS Series features new, ground-breaking technologies for the refrigerated dryer industry. The new Digital Evaporator continues the Hankison tradition of stable 3°C dew points—while providing tremendous energy savings for a rapid return-on-investment. Unlike anything in the industry, the new HDS Series Digital Evaporator offers energy saving advantages over traditional non-cycling, cycling, and variable speed designs.

## Rapid Return-On-Investment (ROI)

The HDS Series is designed to provide a rapid return on investment by:

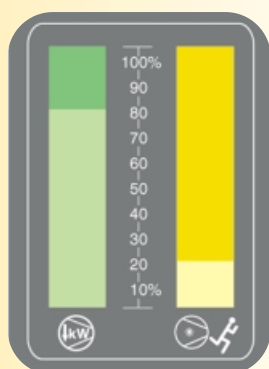
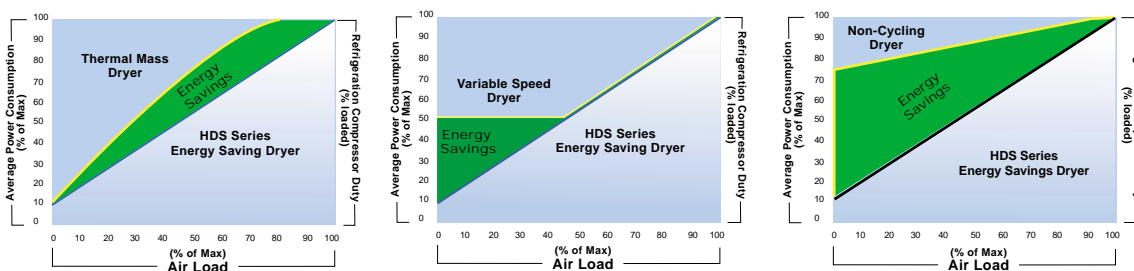
- Reducing the dryer’s energy consumption down to 9% (91% savings) at 0% load
- Precise matching of average air flow (heat load) with the required input kW power...No More...No Less
- Qualifying for energy rebates offered by utility companies
- Maintaining a stable 3°C dew point with no dew point spikes which send water downstream and cause high maintenance and downtime costs

## HDS Series Save Energy Every Year

Average air flow %	% Energy consumption	HDS Series Energy Savings by model							
		1450	1800	2250	2700	3150	3600	4500	5400
100%	100%	0	0	0	0	0	0	0	0
75%	78%	£268	£788	£666	£320	£508	£568	£670	£744
50%	54%	£476	£988	£971	£775	£1,016	£1,138	£1,385	£1,625
25%	33%	£685	£1,188	£1,275	£1,231	£1,524	£1,706	£2,101	£2,504
0%	9%	£894	£1,387	£1,579	£1,686	£2,032	£2,275	£2,816	£3,385

Compared to non-cycling dryers: Assuming 7 bar operation, 35c inlet temperature and 8760 hours per annum operation at 0.052p Per kWh

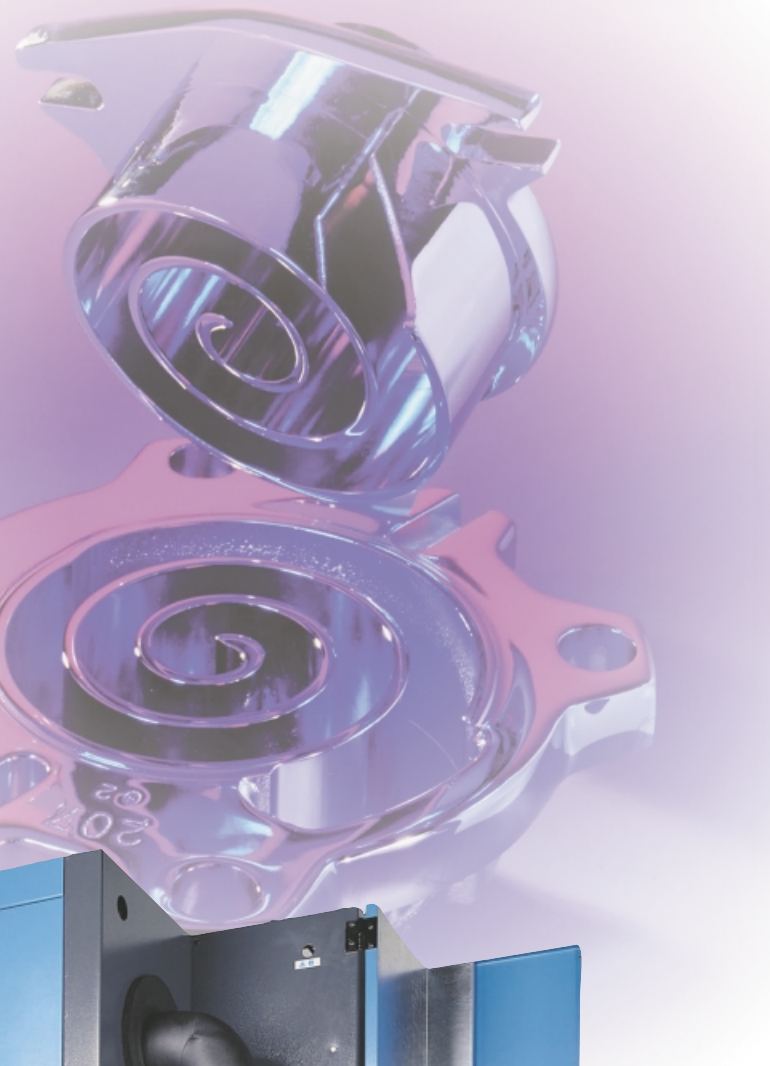
## True Load-Matching Energy Savings



## Features

- Space savings with dryer (no pre-filter required) and after-filters all in one cabinet.
- Integrated HF Series Grade 9 Coalescing Separator/Filter.
- Integrated HF Series Grade 5 Cold Coalescing Oil Removal Filter (optional).
- Electronic “no air-loss” demand drain(s) for integrated separator/filter and for oil removal filter (optional).
- WebAirNet Internet Remote Monitoring ready with RS-232 ports (optional).





## The HDS Series Refrigeration System

The new Digital Evaporator controls the actions of the three core components in the refrigeration system (Digital Evaporator, Digital Control board, Digital Scroll refrigeration compressor) to provide true load-matching energy savings while maintaining a very stable 3°C dew point.

### Digital Evaporator

Technology embedded in the Digital Evaporator recognises varying heat loads between 0-100%, which result from the ever-changing Air Demand Profiles of compressed air users, and communicates dew point status to the Digital Control Board.

The air-to-air and air-to-refrigerant (Digital Evaporator) heat exchangers are uniquely sized and custom made for the HDS Series. They utilise the core Hankison heat exchanger technology (see page 4) of straight, smooth-tube, non-fouling copper which requires no pre-filtration.

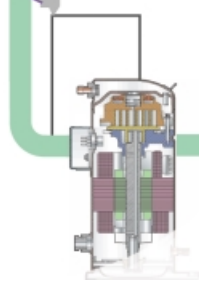
### Digital Control

The control board receives information from the Digital Evaporator and sends signals to the Digital Scroll refrigeration compressor. This determines the amount of cooling energy sent back to the Digital Evaporator. With a 60% air demand, for example, the control board tells the compressor to run loaded 60% of the time...No More...No Less. The display panel has two LED bar graphs which, in this case, would display 60% compressor running and 40% kW energy savings. The board also has all the features of the emm™ Energy Management Monitor of the HHD*plus* Series (see page 8), including the “schedule mode” for automatic start-stop operation.

### Digital Scroll

These innovative refrigeration scroll compressors are capable of running loaded or unloaded. A “power-on” signal equals no capacity (valve open-compressor unloaded) and no energy consumption while a “power-off” signal equals full capacity (valve closed-compressor loaded). Digital Scroll compressors unload by allowing the fixed upper scroll to move axially from the orbiting lower scroll.

Digital Control





# HHDplus Series Refrigerated Dryers

Flows from 20 to 5.400 m<sup>3</sup>/h

The Hankison Performance and Reliability plus Filtration (HHDplus Series) is one of the world's most commonly installed refrigerated air dryers. The Hankison technology platforms of heat exchangers, filtration, and refrigeration (see pgs 4-5), which are CE or CSA and UL certified, represent the best value solution available for heavy-duty air demand profiles. Fully compliant with P.E.D.

## HHDplus Series Operation and Filtration

### Models HHD20-30

Power-on light

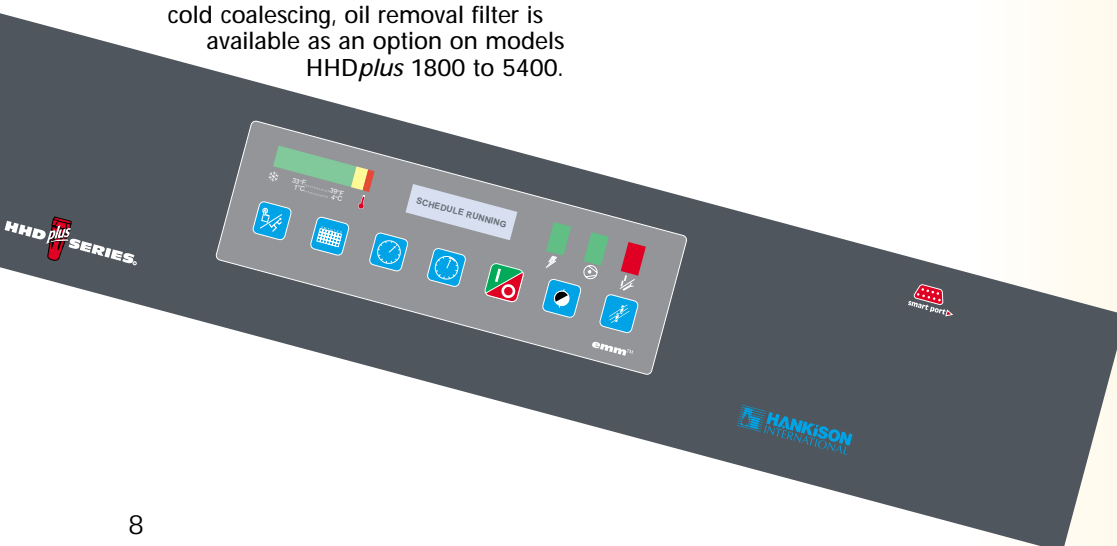
Centrifugal separator

### Models HHD50 to 300

- On/off switch, Power-on light, and dew point temperature indicator-alerts operator to overload condition or refrigeration system fault
- HF Series Grade 9 Filter/Separator

### Models HHD380 to 5400 with the emm™ Energy Management Monitor

- This advanced 24 volt electronic control package has many user-friendly interfaces which can save energy, automate service intervals, communicate in five languages, and add functionality.
  - Energy-saving cycling mode allows compressed air users (see page 2) with one or two-shift operations to schedule the dryer to turn on and off in accordance with their work schedule.
  - Automatic service intervals can be set for predictive maintenance schedules: to ensure that the condenser on air-cooled units is maintained dust-free and to ensure filter element replacement of the the standard HF Series Grade 9 Separator/Filter every 12 months. The HF Series Grade 5 cold coalescing, oil removal filter is available as an option on models HHDplus 1800 to 5400.
- Operator interface with read-outs comes standard in five languages (English, Spanish, German, French, Italian). Up to nine other languages are available. Read-outs include current time, operating status such as manual or schedule running modes, hours to service, and total operating hours.
  - Functionality features include a drain push-to-test button, power-on and compressor-on lights, an operator alert light which indicates that service is required or that there is a refrigeration system or drain fault, dew point temperature indicator
  - Remote monitoring of the emm™, from your computer, possible through the RS-232 "smart port"
  - Standard NO and NC voltage-free alarm contacts and RS-232 "smart port"
  - Ready for WebAirNet Internet Remote Monitoring package
  - Fault condition diagnostics with user-friendly text display
  - User selectable automatic re-start feature after power outages





# The HHDplus Series Air Treatment Station

**Flows from 1.800 to 5.400 m<sup>3</sup>/h**

Space savings can be achieved in your factory by integrating your refrigerated dryer with the required after-filters all in one cabinet.

Benefit from being able to customise your Air Treatment Station to the exact inlet compressed air conditions of your factory. Properly designed full-feature compressors with integrated dryers must, for example, default to the most demanding inlet conditions.

Compare the space requirements of one Air Treatment Center with traditional installations which require a prefilter(s), dryer, and afterfilter(s).

## How They Work

Compressed air, saturated with water vapor, enters the air-to-air heat exchanger (A), is precooled by the outgoing chilled air, and is then directed to the air-to-refrigerant (evaporator) heat exchanger (B) where it is further cooled by the refrigeration system. As the air is cooled, water vapor condenses into liquid droplets which are removed by the Separator/Filter (C) and discharged from the dryer by an automatic drain (D). Air then goes through an Oil Removal Filter (models HHDplus 1800-5400)(E) and as dry, oil-free, chilled air returns through the air-to-air heat exchanger where it is reheated before exiting the dryer.

Space-saving optional HF Series Grade 5 Cold Coalescing Oil Removal Filter eliminates oil aerosols to 0.008 ppm (0,01 mg/m<sup>3</sup>). This new feature can save end users valuable wall space and installation costs.

The heart of the dryer is Hankison's traditional smooth tube heat exchangers, which do not require prefiltration, therefore reducing the total system pressure drop.

emm™ Energy Management Monitor

- programs the dryer for timed auto-start and stop. Saves energy during down time.
- monitors dryer for overload or fault conditions.
- programmable maintenance interval, visual and remote operator alert capabilities.

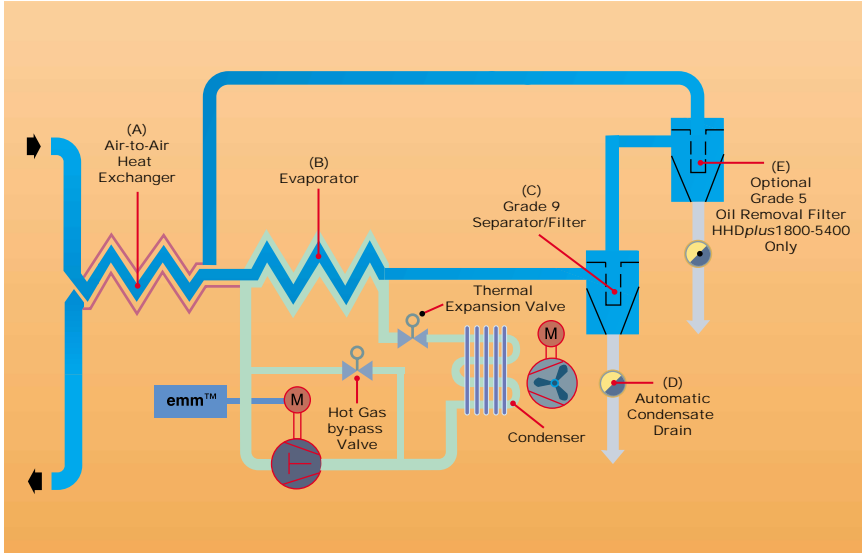
RS232

**Web AirNet**  
Internet Remote Monitoring

Standard HF Series Grade 9 Filter/Separator removes bulk liquids and particulates to 3 micron.

Refrigeration system ensures stable dewpoints with environmentally friendly R-404a refrigerant, low-noise, hermetic, scroll compressors and hot gas by-pass valve automatic control system.

Two Electronic "no air loss" Demand Drains with "time delay" feature, which reduces cycle frequency.



# HHDplus Series Technical Data

Model	Rated Flow +3°C <sup>(*)</sup> [m³/h]	Rated Flow +7°C <sup>(*)</sup> [m³/h]	Voltages [V/ph/Hz]	Power [kW]	Connection <sup>(*)</sup> [R/DN]	Height [mm]	Width [mm]	Depth [mm]	Weight [kg]
HHD20	20	24	230/1/50	0,12	3/8 OD	356	279	394	22
HHD30	30	36	230/1/50	0,18	3/8 OD	356	279	394	25
HHD50	50	60	230/1/50	0,22	R 3/4"	432	432	559	40
HHDp70	70	84	230/1/50	0,24	R 3/4"	432	432	559	41
HHDp100	100	120	230/1/50	0,36	R 1"	506	432	621	48
HHDp150	150	180	230/1/50	0,47	R 1"	548	508	729	64
HHDp210	210	252	230/1/50	0,61	R 1"	548	508	729	72
HHDp260	260	312	230/1/50	0,61	R 1 1/2"	684	603	765	86
HHDp300	300	360	230/1/50	0,88	R 1 1/2"	684	603	765	89
HHDp380	380	456	400/3/50	1,00	R 2"	1019	552	1219	161
HHDp480	480	576	400/3/50	1,46	R 2"	1019	552	1219	166
HHDp600	600	720	400/3/50	1,46	R 2"	1019	552	1219	175
HHDp790	790	948	400/3/50	1,97	DN 80	1324	699	1295	185
HHDp950	950	1140	400/3/50	1,97	DN 80	1324	699	1295	204
HHDp1450	1450	1740	400/3/50	2,93	DN 80	1459	699	1651	261
HHDp1800	1800	2160	400/3/50	4,40	DN 100	2159	1207	1232	780
HHDp2250	2250	2700	400/3/50	5,10	DN 100	2159	1207	1232	789
HHDp2700	2700	3240	400/3/50	5,60	DN 100	2159	1207	1232	839
HHDp3150	3150	3780	400/3/50	6,70	DN 150	2159	1327	1422	907
HHDp3600	3600	4320	400/3/50	7,50	DN 150	2159	1327	1422	953
HHDp4500	4500	5400	400/3/50	9,30	DN 150	2159	1327	1422	1015
HHDp5400	5400	6480	400/3/50	11,20	DN 150	2159	1327	1422	1027

- a. The emm™ Energy Management Monitor control package is standard on models HHDp 380 – HHDP 5400
  - b. Environmental friendly refrigerant on models HHD 20 – HHDp 1450 with R 134a from HHDp 1800 – HHDP 5400 with R 404a.
  - c. Model HHD 20 – HHD 30 with centrifugal separators
  - d. HHD 20 and HHD 30 are equipped standard with Snap trap condensate drain ( max. working pressure 16 bar)
  - e. Model HHD 50 – HHDp 300 are equipped standard with Centriflex-Separator-System HF 9.
  - f. Model HHDp 50 – HHDp 300 are standard integrate with Snap Trap condensate drain (max. working pressure 16 bar), electronic drains optional
  - g. Model HHDp 380 – HHDp 5400 equipped standard with electrical , level controlled drain ( max. working pressure 16 bar)
  - h. Model HHDp 380 – HHDp 5400, if an optional oil removal Filter HF 5 is integrated, a second electrical level controlled drain will be integrated.
  - i. Pressure drop: dryer < 0,2 bar; Filter <0,15 bar = Total pressure drop <0,35 bar.
  - j. Max. inlet temperature: + 50°C.
  - k. All models with CE-Approval (optional UL and CSA-Approval)
- <sup>(\*)</sup> Rated flow capacity in case of + 20°C. and 1 bar absolute, at a air inlet temperature about + 35°C, working pressure 7 bar, dew point +3°C.  
<sup>(2)</sup> In reference to evaporator temperature +2°C. and ambient temperature + 25°C.  
<sup>(3)</sup> BSP and NPT connections, DIN and ANSI flanges available.



# HDS Series Technical Data

Model	Rated Flow +3°C <sup>(*)</sup> [m³/h]	Rated Flow +7°C <sup>(*)</sup> [m³/h]	Voltages [V/ph/Hz]	Power [kW]	Connection <sup>(*)</sup> [R/DN]	Height [mm]	Width [mm]	Depth [mm]	Weight [kg]
HDS1450	1450	1740	400/3/50	2,80	DN 80	2210	1018	1232	733
HDS1800	1800	2160	400/3/50	3,10	DN 80	2210	1018	1232	748
HDS2250	2250	2700	400/3/50	4,30	DN 100	2159	1207	1320	803
HDS2700	2700	3240	400/3/50	5,90	DN 100	2159	1207	1320	857
HDS3150	3150	3780	400/3/50	6,70	DN 150	2159	1372	1422	957
HDS3600	3600	4320	400/3/50	7,50	DN 150	2159	1372	1422	1000
HDS4500	4500	5400	400/3/50	9,40	DN 150	2159	1372	1422	1020
HDS5400	5400	6480	400/3/50	11,50	DN 150	2159	1372	1422	1129

- a. The digital control package is standard  
b. All models with environmental friendly refrigerant R 404a and digital scroll compressor.  
c. All models with a standard level control drain  
d. If an optional oil removal filter HF 5 is integrated, a second electrical level controlled drain will be integrated.  
e. Pressure drop: dryer < 0,2 bar, < 0,15 bar = Total pressure drop < 0,35 bar  
f. Max. working pressure 16 bar  
g. Max. inlet temperature + 50 °C.  
h. All models with CE Approval ( optional UL and CSA Approval  
<sup>(\*)</sup> Rated flow capacity in case of + 20°C. and 1 bar saturate evtl. absolute, at a air inlet temperature about + 35°C working pressure 7 bar, ambient air temperature +3°C..  
<sup>(\*)</sup> In reference to evaporator temperature +2°C. and ambient temperature +25°C.  
<sup>(\*)</sup> BSP and NPT connections, DIN and ANSI flanges available.

**Table - 1 Correction Factors (multipliers) for Inlet Air Temperature and Pressure**

Inlet Pressure (bar)	Inlet Temperature					
	+25 C	+30 C	+35 C	+40 C	+45 C	+50 C
3	1,42	1,00	0,79	0,63	0,51	0,43
5	1,57	1,13	0,92	0,77	0,65	0,56
7	1,67	1,22	1,00	0,84	0,71	0,63
9	1,76	1,29	1,07	0,91	0,78	0,67
11	1,84	1,36	1,13	0,96	0,82	0,73
13	1,90	1,44	1,18	1,00	0,86	0,77

**Table 2 - Correction Factors for Ambient Temperature\***

Ambient Temperature	+25 C	+30 C	+35 C	+40 C	+45 C
Multiplier	1,0	0,94	0,89	0,83	0,78

\* Only for air cooled models. For water cooled models use a 1.15 multiplier if cooling water is colder than 35°C.

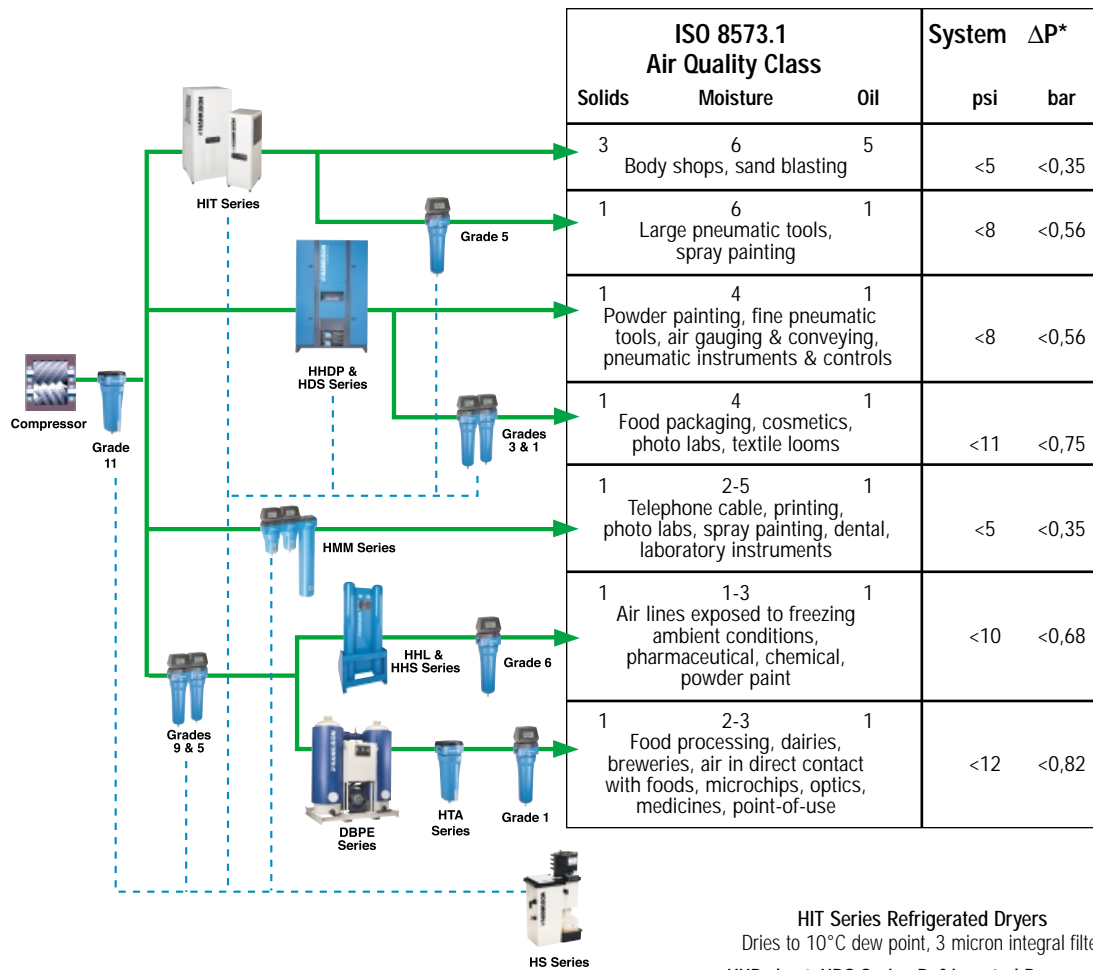
**Table 3 - Correction Factors for Dew Point Temperature**

Dew Point Temperature	3°C	7°C	10°C
Multiplier	1,0	1,2	1,3

For other standard conditions than rated, use the correction factor from tables 1,2 and 3.

Example: What is the capacity of a model HHDp 210 when the compressed air at the inlet to the dryer is 9 bar, 30°C inlet temperature, 30°C ambient temperature, and dew point of 10°C is desired?

Answer: m³/h(flow capacity from the specification table) x 1,07 (correction for inlet temperature and pressure from table 1) x 0,94 (correction factor for ambient temperature from table 2) x1,3 (correction factor for dew points from table 3) = 275 m³/h.



ISO 8573.1 Air Quality Class			System ΔP*	
Solids	Moisture	Oil	psi	bar
3	6	5	<5	<0,35
Body shops, sand blasting				
1	6	1	<8	<0,56
Large pneumatic tools, spray painting				
1	4	1	<8	<0,56
Powder painting, fine pneumatic tools, air gauging & conveying, pneumatic instruments & controls				
1	4	1	<11	<0,75
Food packaging, cosmetics, photo labs, textile looms				
1	2-5	1	<5	<0,35
Telephone cable, printing, photo labs, spray painting, dental, laboratory instruments				
1	1-3	1	<10	<0,68
Air lines exposed to freezing ambient conditions, pharmaceutical, chemical, powder paint				
1	2-3	1	<12	<0,82
Food processing, dairies, breweries, air in direct contact with foods, microchips, optics, medicines, point-of-use				

### Compressed Air Quality acc. to ISO 8573-1

Class	max. Number of Particles per m <sup>3</sup> Partical Size d (µm)				Particle size (µm)	Particle Concentration (ppm/mg/m <sup>3</sup> )	Pressure Dew Point (°C)	Residual Oil Content (mg/m <sup>3</sup> )
	≤0,10	0,10 <d ≤0,5	5 <d ≤1,0	0,1 <d ≤0,5				
0	specified acc. to application and better than class 1				-	-	-	-
1	-	100	1	0	-	-	≤ -70	≤ 0,01
2	-	10,000	1000	10	-	-	≤ -40	≤ 0,1
3	-	-	10000	500	-	-	≤ -20	≤ 1
4	-	-	-	1000	-	-	≤ +3	≤ 5
5	-	-	-	20000	-	-	≤ +7	-
6	-	-	-	-	≤ 5	≤ 5	≤ 10	-
7	-	-	-	-	≤ 40	≤ 10	-	-

**HIT Series Refrigerated Dryers**  
Dries to 10°C dew point, 3 micron integral filter

**HHDplus & HDS Series Refrigerated Dryers - Air Treatment Stations**  
Dries to 3°C dew point, 3 micron integral filter and optional 0,01 mg/m<sup>3</sup> (0.008 ppm) oil removal filter

**HMM Series Membrane Dryers**  
Dries from 10°C to -40°C dew point  
No Oxygen Loss

**HHL & HHS Series Heatless Desiccant Dryers**  
Dries to -70°C dew point

**DBPE Series Heated Blower Purge Desiccant Dryers**  
Dries to -40°C dew point, 0% purge

**HS Series Oil Water Separator**  
Separates to 10 mg per litre (10 ppm)

- HF Series Filters**
- Grade 11 - 99% bulk water removal
  - Grade 9 - 99% bulk water removal, 3 micron particulate
  - Grade 7 - 1 micron particulate
  - Grade 6 - 1 micron desiccant afterfilter
  - Grade 5 - 0,01 mg/m<sup>3</sup> (0.008 ppm) oil removal
  - Grade 3 - 0,001 mg/m<sup>3</sup> (0.0008 ppm) oil removal
  - Grade 1 - oil vapor and 0,004 mg/m<sup>3</sup> (0.003 ppm) oil removal
  - HTA - 1 micron particulate, high temperature filter

*Global Leader in Efficiently Treating Compressed Air*



**HANKISON GmbH**  
D-47445 Moers  
**HANKISON UK LIMITED**  
Bedfordshire MK45 2QW  
**HANKISON IBERICA S.L.**  
E-08110 Montcada I Reixac

