RIGHT HUMIDITY ON DEMAND

Adsorption Dehumidifiers FRP2000 - 9500

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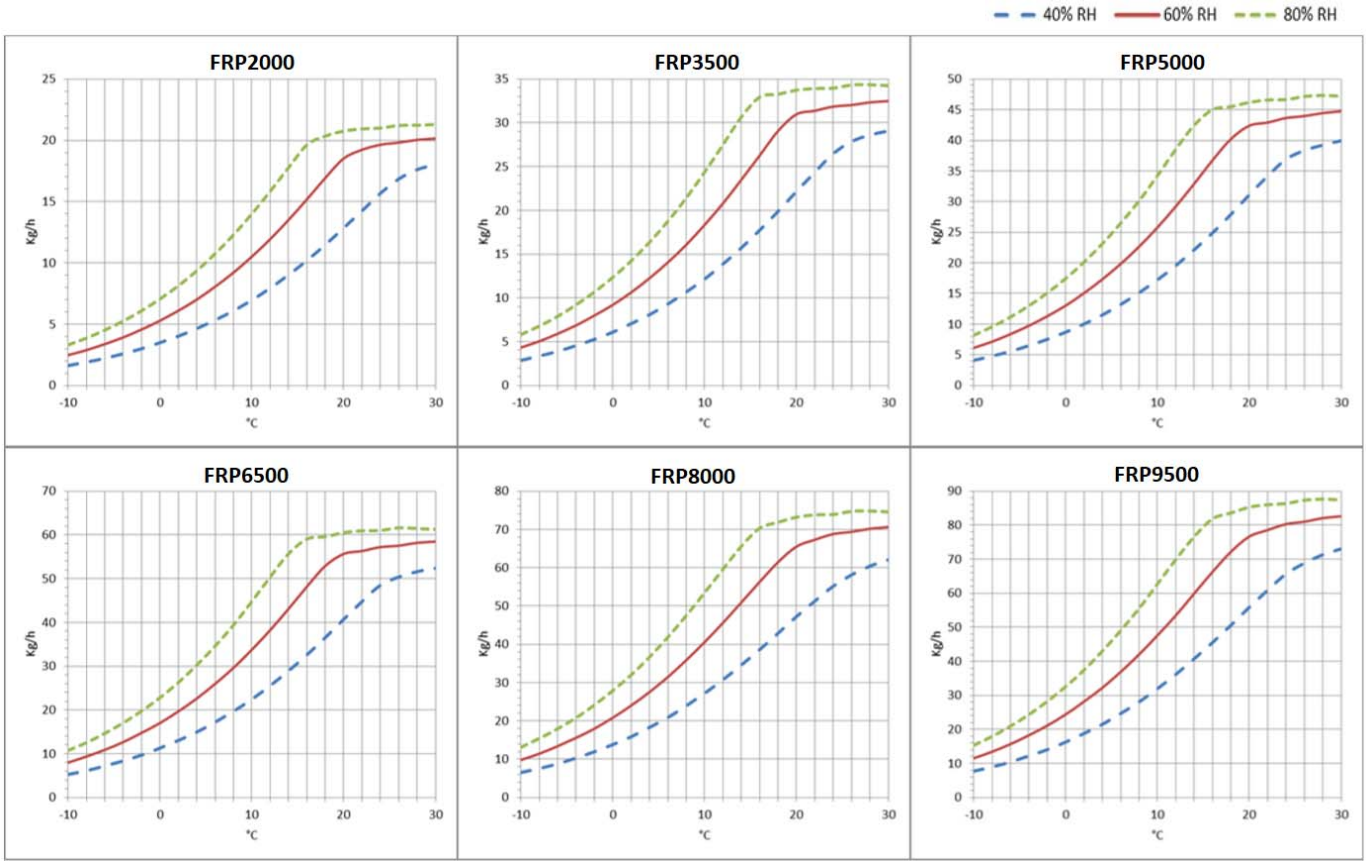
TECHNICAL DATA							
MODEL	**FRP**	**2000**	**3500**	**5000**	**6500**	**8000**	**9500**
Performances							
Dehumidification Capacity *	Kg/h	18,6	31,1	42,5	55,9	66,0	77,1
Fans							
Process air flow	m^3/h	2000	3500	5000	6500	8000	9500
Static pressure	Pa	400	400	400	400	400	400
Fan nominal power	KW	1,1	1,5	2,2	4	5,5	7,5
Reactivation air flow	m^3/h	700	1200	1700	2200	2600	3100
Static pressure	Pa	400	400	400	400	350	350
Fan nominal power	KW	0,75	0,75	1,1	1,5	1,5	2,2
Drive Motor							
Nominal power	W	10	10	10	10	10	10
Regeneration							
Regeneration type		Electrical	Electrical	Electrical	Electrical	Electrical	Electrical
Installed power	KW	25,5	39,6	56,1	72,6	85,8	99,0
Regeneration type		Steam	Steam	Steam	Steam	Steam	Steam
Power output heating	KW	24,2	41,2	58,6	75,5	89,7	106,5
Steam consuption at 6Bar(a)	Kg/h	36	61	86	111	133	158
Temperature rise in the heating coil	°C	100	100	100	100	100	100
Electrical characteristics							
Power supply	Volt/Ph/Hz	400/3/50 ±5%	400/3/50 ±5%	400/3/50 ±5%	400/3/50 ±5%	400/3/50 ±5%	400/3/50 ±5%
Maximum power absorbed standard units	KW	27,4	41,9	59,4	78,1	92,8	108,7
Maximum current absorbed standard units	A	43,9	66,8	93,9	121,8	145,7	172,3
Noise level							
Sound pressure **	dB (A)	60	64	65	66	69	70
Sound power **	dB (A)	88	92	93	94	97	98

** Conditions at 20°C 60% RH*
*** Sound pressure level calculated in free field, 10 meters from unit, direction factor Q = 2, according to ISO 961*

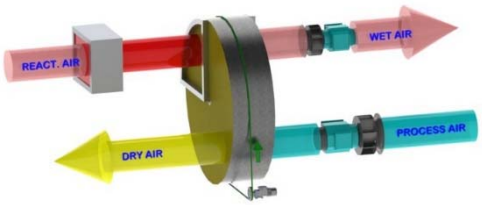
DEHUMIDIFICATION CAPACITY

Approximate capacity in Kg/h with different relative humidity values of inlet process air (RH%).



PRINCIPLE OF OPERATION

The dehumidifier operates with 2 airflows. The main airflow, the PROCESS AIR is what is dehumidified and a second, smaller, airflow is used to regenerate the rotor material. Two high efficiency fan and motor assemblies inside the machine create these separate airflows in opposite directions through the rotor. The PROCESS AIR is taken trough the dehumidification rotor and moisture is taken up by the desiccant material bonded to the rotor structure. Mainly Silica Gel is used, which is a hygroscopic material capable of holding many times its weight in moisture, but always as a vapour and with no free water. As it passes through the rotor, the moisture in the air is absorbed by the Silica Gel and sent from the machine as a dry air stream for onward processing, or direct to a conditioned room as required.



This dehumidification process is reliable between extremes of temperature, from as low as -30°C and as high as +40°C.
During the process the rotor is turned very slowly by a small motor and reduction gearbox, driving a belt with friction contact direct to the rotor surface.
The separate REGENERATION AIR stream is taken through the dehumidifier in the opposite direction, through a heater bank where the temperature is raised typically by +100°C above ambient. This heating increases the capacity of the air to hold moisture and as a result of the vapour pressure differentials between this air stream and the rotor surface, moisture is given back to the regeneration air stream and passed out of the building as a vapour.

The rotor is then ready to absorb more moisture as it is turned and the whole process can continue.

STRUCTURE

The dehumidifier casework is made from painted galvanized steel insulated sandwich panels as standard, or in AISI304 stainless steel if required by the process. The top panel is removeable for maintenance and access to electrical components whilst access to internal components is through the front. Connections for the airflows to and from the dehumidifier would typically be in standard galvanised spiral ducting.

FANS

Fans are directly coupled to single-phase or three-phase motors rated at IP55, ISO F, class B. They are accessible for maintenance by removing a second internal panel so that in operation risk of injury is mitigated. The fans can be controlled by an optional frequency converter to control rotation speed and match performance with specific requirements. As standard, the process fan is set at fixed speed, but it can be configured to run at variable speeds from an external signal, or pressure sensor.

ROTOR

The desiccant rotor installed in the dehumidifier is the best currently available to the market, offering approximately 8% better moisture removal capacity and 25% less air pressure drop than the leading competitor. The rotor has a finely fluted structure manufactiured from corrugated and heat resistant material and offering a huge contact surface area for the process air stream in a very small volume. The fluted and laminar nature of the structure affords a high contact area with the passing air flow to maximise moisture removal.
The rotor is not affected by saturated air and can therefore be used in conjunction with a pre-cooling coil. Additionally, the rotor will not be damaged if either of the airflows stop for any reason. The rotor does not shed particles and will not support the spread of flame (non-combustible).

TRANSMISSION SYSTEM

A belt drive system is used to turn the rotor. This movement is typically between 6 and 12 rph, and uses a powerful direct drive motor and reduction gearbox, operating on a belt with frictional contact with the outer rim of the rotor drum. A belt tensioning system is used to maintain correct belt tension and avoid slip. The rotation of the rotor is visible by removal of the front access panel so correct operation can be determined. The rotor is suspended on ball bearings around a central steel shaft.

REGENERATION AIR HEATING COIL

Electrical. The electric regeneration coil has steel elements, star connected, and divided into 2, 3 or more sequential control banks for power modulation. On demand, a continuous modulation with proportional power control can be used to increase the efficiency of the dehumidifier and save energy.

Steam. Steam regeneration coils are made of 304 grade stainless steel tubes with aluminium fins (options are available for other materials), and include a 2-port valve with modulating actuator to control the steam flow and thus the dehumidifier performance.

FILTERS

The dehumidifier has two separate G4 filters: one on the process air inlet and the other on the high temperature regeneration air inlet. On request, hi- gher grade filters can be supplied.

PLC CONTROL WITH TOUCH-SCREEN TERMINAL

All standard units are provided with PLC control. The PLC controls the following functions: regeneration temperature regulation, thermal protection, regeneration cool down timing, component start sequence, alarm resets, RH or dewpoint control (dependant on control required) and control of pre and post-cooling or heating. The user interface display can be positioned remotely. The PLC is set for heater control from an external humidistat. On request, it can be adapted for connection to remote BMS systems. Operation with various MODBUS protocols can be discussed with the technical department if this is what is required by the process.

ELECTRICAL PANEL

The electric panel is made in compliance with European regulations 73/23 and 89/336. Access to the electrical panel is from the top after the panel is removed. All units include the following components as standard: mains switch, magneto thermal switches (for fan and electric resistance protection), fan relays, gearmotor relays and electric resistance relays (if any). The panel is also equipped with a terminal block with clean contacts for remote ON- OFF control and clean contact for general alarm.

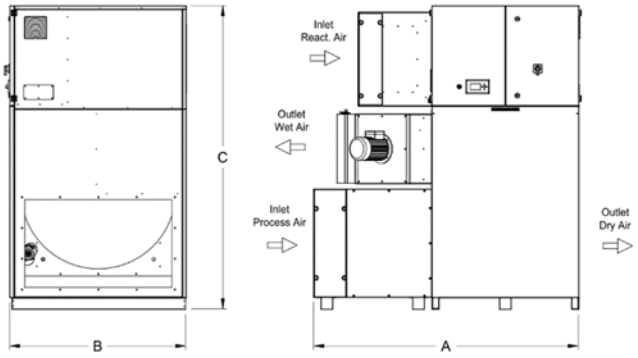
VERSIONS

FRP…	Standard
FRP…/TX	Version with external satin stainless steel frame 304
FRP…/TTX	Version with steel frame completely inox304 interior and exterior satin
FRP…/STC	Construction version, with pivoting wheels

Model FRP	Codice	2000	3500	5000	6500	8000	9500
Painted steel frame		●	●	●	●	●	●
Satin stainless steel frame 304	TX	○	○	○	○	○	○
Frame totally stainless steel304 and satin finish outside	TTX	○	○	○	○	○	○
Construction site version with pivoting wheels	STC	○	○	○	○	○	○
Frame Handed version	M	-	-	-	-	-	-
Filters G4 process and reactivation		●	●	●	●	●	●
Filters F5, F7, F9		○	○	○	○	○	○
Recovery regeneration heat	RCFX	○	○	○	○	○	○
Purge area for low Dew Point	LDP	○	○	○	○	○	○
Pre-cooling water coil	W	○	○	○	○	○	○
Post-cooling water coil	PW	○	○	○	○	○	○
Post-heating water coil	PHW	○	○	○	○	○	○
Proportional 3way-valve for pre/post-treatments (supply only)	3WSF	○	○	○	○	○	○
Proportional 3way-val. for pre/post-treatments (with assembly)	3WCM	○	○	○	○	○	○
PLC electronic control and touch-screen display		●	●	●	●	●	●
Remote terminal	TR	○	○	○	○	○	○
Different power supply voltage		○	○	○	○	○	○
Proportional control PWM regenerationheaters	PWM	●	●	●	●	●	●
Proportional 2way-valve for steam regeneration	2VS	○	○	○	○	○	○
Process fan inverter (VFD)	VFP	●	●	●	●	●	●
Regeneration fan inverter (VFD)	VFR	●	●	●	●	●	●
Process filter alarm	ALFP	○	○	○	○	○	○
Regeneration filter alarm	ALFR	○	○	○	○	○	○
Circular spigot connections for processes/regeneration	CP	○	○	○	○	○	○
Temperature sensor / RH%, Absolute Humidity, DewPoint	ST / H	○	○	○	○	○	○
Serial RS485 ModBus Interface		●	●	●	●	●	●
TCP-IP ModBus Interface		●	●	●	●	●	●
Other protocols and other accessories on request		○	○	○	○	○	○

● *standard,* ○ *optional,* – *not available.*

Dimensions



Model	FRP	2000	3500	5000	6500	8000	9500
A	mm	1610	1710	1710	1810	1810	1810
B	mm	1000	1100	1100	1200	1200	1200
C	mm	1875	1975	1975	2075	2075	2075
Empty weight	Kg	490	550	590	690	710	730
Connections							
Process air inlet	mm	850 x 500	950 x 600	950 x 600	1000 x 600	1000 x 600	1000 x 600
Dry air outlet	mm	850 x 500	950 x 600	950 x 600	1000 x 600	1000 x 600	1000 x 600
Reactivation air inlet	mm	600 x 400	600 x 400	600 x 400	600 x 400	600 x 400	600 x 400
Wet air outlet	mm	370 x 200	370 x 200	370 x 200	370 x 200	370 x 200	370 x 200