



## Adsorption Dehumidifiers FR120 - 1280

BY FRAL SRL

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## TECHNICAL DATA

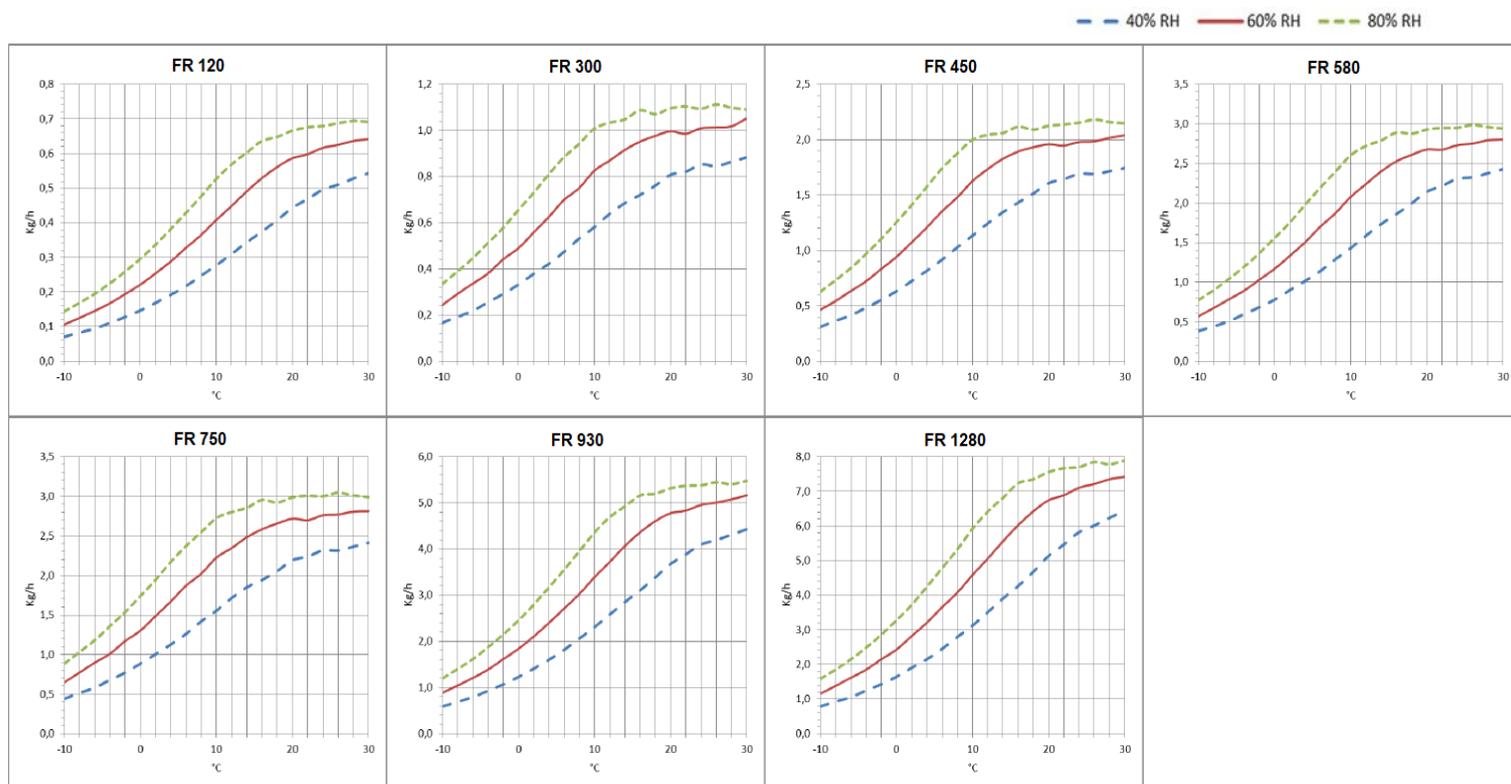
| MODEL                                   | FR                | 120      | 300      | 450      | 580      | 730      | 930        | 1280       |
|---|-------------------|----------|----------|----------|----------|----------|------------|------------|
| <b>Performances</b>                     |                   |          |          |          |          |          |            |            |
| Dehumidification Capacity at 20°C - 60% | Kg/h              | 0,59     | 0,99     | 1,95     | 2,67     | 2,71     | 4,83       | 6,74       |
| <b>Fans</b>                             |                   |          |          |          |          |          |            |            |
| Process air flow                        | m <sup>3</sup> /h | 120      | 300      | 450      | 580      | 750      | 930        | 1280       |
| Static pressure                         | Pa                | 180      | 210      | 300      | 270      | 180      | 160        | 400        |
| Fan nominal power                       | W                 | 52       | 102      | 166      | 166      | 170      | 170        | 500        |
| Reactivation air flow                   | m <sup>3</sup> /h | 30       | 50       | 90       | 120      | 135      | 210        | 270        |
| Static pressure                         | Pa                | 210      | 190      | 320      | 280      | 260      | 250        | 180        |
| Fan nominal power                       | W                 | 80       | 80       | 166      | 166      | 166      | 166        | 166        |
| <b>Drive Motor</b>                      |                   |          |          |          |          |          |            |            |
| Nominal power                           | W                 | 3,0      | 3,0      | 3,0      | 3,0      | 3,0      | 3,0        | 3,0        |
| <b>Regeneration</b>                     |                   |          |          |          |          |          |            |            |
| Regeneration type                       |                   | Electric | Electric | Electric | Electric | Electric | Electric   | Electric   |
| Installed power                         | KW                | 0,9      | 1,3      | 2,6      | 3,5      | 3,5      | 6,6        | 9,9        |
| Temp. rise in the heating coil          | °C                | 80       | 75       | 80       | 85       | 75       | 90         | 100        |
| <b>Electrical characteristics</b>       |                   |          |          |          |          |          |            |            |
| Power supply                            | Volt/Ph/Hz        | 230/1/50 | 230/1/50 | 230/1/50 | 230/1/50 | 230/1/50 | 400/3+N/50 | 400/3+N/50 |
| Maximum power absorbed                  | KW                | 1,04     | 1,49     | 2,94     | 3,84     | 3,84     | 6,95       | 10,58      |
| Maximum current absorbed                | A                 | 4,52     | 6,48     | 14,03    | 17,92    | 17,93    | 12,33      | 17,95      |
| <b>Noise level</b>                      |                   |          |          |          |          |          |            |            |
| Sound pressure **                       | dB (A)            | 42       | 42       | 44       | 44       | 46       | 58         | 64         |
| Sound power **                          | dB (A)            | 70       | 70       | 72       | 72       | 74       | 86         | 92         |

\* 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

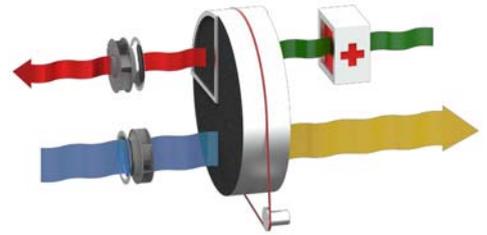
### DEHUMIDIFICATION CAPACITY

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



## PRINCIPLE OF OPERATION

The dehumidifier works by using two air flows; the main one is the air to dehumidify, a second flow - of smaller flow rate - is used to regenerate the dehumidification rotor. Two fans inside the dehumidifier create these two air flows that pass through the rotor in opposite directions. The air to be dehumidified, also called "process air", passes through the silica gel impregnated desiccant rotor. Silica gel is a highly hygroscopic material that absorbs water vapour from the air. As the air passes through the rotor, it transfers its moisture content to the rotor. The dehumidified air is then sent to the production room or process to be dehumidified. The dehumidification process can take place between -30°C and +40°C. During the process the rotor rotates very slowly and is equipped with a drive system with reduction gear and belt. The so-called "regeneration air" is used by the system to remove the absorbed humidity and take it outside: it is heated by a battery inside the dehumidifier, up to about +100°C and passes through the rotor in the opposite direction to the process air and subjects it to a reverse process, for which the rotor gives up its moisture content and its initial absorbing capacity is restored. The regeneration air is expelled lukewarm and humid and must be sent out of the treated environment.



## STRUCTURE

The structure of the dehumidifier is made of galvanized steel painted on the outside. The top panel can be removed for maintenance to electrical components and all other internal mechanical parts. The connections to the dehumidifier can be made with standard spiral channels.

## FANS

The fans are directly coupled to a single-phase AC or EC motor of class IP55, ISO F, Class B. They are accessible for maintenance by removing the upper inspection panel. The process and regeneration fan starts immediately when the dehumidifier is energized and can be adjusted manually by means of a potentiometer located on the front of the structure (available from model AD420 onwards).

## ROTOR

The dehumidifier has a rotor made of desiccant material. The rotor has a honeycomb structure made of corrugated, heat-resistant sheets containing silica gel desiccant material, which creates a high number of axial fluid threads and at the same time a high absorption surface in a small volume. The rotor is constructed to withstand saturated air without being damaged. In addition, the rotor is not damaged if the process or regeneration fan should stop due to malfunction during operation. The rotor is non-combustible and non-flammable.

## TRANSMISSION SYSTEM

A belt drive system controls the movement of the rotor. The belt carries out its pulling action on the outer edge of the rotor and is guided by a pulley on the gear motor. A special device maintains the correct belt tension to prevent belt slippage. The correct direction of rotation and transmission can be checked by opening the top panel. The rotor is equipped with ball bearings. The rotor shaft is made of steel.

## REGENERATION AIR HEATING COIL

**Electrical.** The electric regeneration battery is of the self-regulating PTC type, to keep the surface temperature constant.

## FILTERS

The dehumidifier has a G3 filter: on the process and regeneration air inlet.

## ELECTRICAL PANEL

The electrical panel is manufactured in compliance with European standards 73/23 and 89/336. Access to the electrical panel is possible by removing the top panel of the unit. The following components are installed in all the units: main switch, ammeter, hour meter and connector for connection of the external humidistat. An energy meter can also be fitted as an option. The panel is also equipped with a switch for manual or automatic control of the dehumidification management and it is possible to configure the mode with continuous operation of the process fan even when humidity is reached (with humidistat connected and in automatic operation).

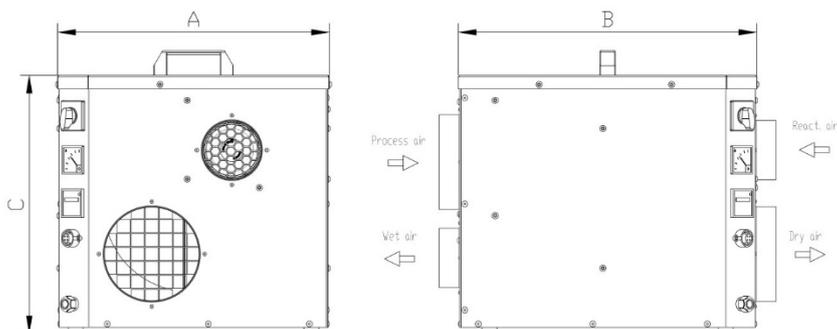
## VERSION

FR... Standard  
FR.../HR Version with heat recuperator for regeneration air (50%-80% recovery).

| Model FR   | Code             | 120 | 300 | 450 | 580 | 750 | 930 | 1280 |
|--|------------------|-----|-----|-----|-----|-----|-----|------|
| Painted steel frame  |                  | ●   | ●   | ●   | ●   | ●   | ●   | ●    |
| Satin-finish stainless steel304 frame  |                  | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Cover box for outdoor installation   | ADKOPB           | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Heat recovery regeneration air   | /HR              | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Process and regeneration air flow rate regulator                                   |                  | -   | -   | ●   | ●   | ●   | ●   | ●    |
| Turbo box for increased pressure available process air                             | ADKTBP           | ○   | ○   | ○   | ○   | ○   | ○   | -    |
| Turbo box for increased pressure available regeneration air                        | ADKTBR           | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Main power switch  |                  | ●   | ●   | ●   | ●   | ●   | ●   | ●    |
| Frame in mirror version  | M                | -   | -   | -   | -   | -   | -   | -    |
| G3 filters process and regeneration  |                  | ●   | ●   | ●   | ●   | ●   | ●   | ●    |
| Filters F5, F7, F9   |                  | -   | -   | -   | -   | -   | -   | -    |
| PLC electronic control and touch-screen terminal                                   |                  | -   | -   | -   | -   | -   | -   | -    |
| Different supply voltage   |                  | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Process air filter clogged   | ALFP             | -   | -   | -   | -   | -   | -   | -    |
| Regeneration air filter clogged  | ALFR             | -   | -   | -   | -   | -   | -   | -    |
| Electronic wall-mounted humidistat 2 steps   | ADKHW+           | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Duct (D) or wall (W) probe temperature / relative humidity range -30+70°C / 0+100% | ADKH1D<br>ADKH1W | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Wall probe (W) temperature / relative humidity range -30+70°C / 10+95%             | ADKH2W           | ○   | ○   | ○   | ○   | ○   | ○   | ○    |
| Mechanical duct or wall humidistat   | ADKMH1           | ○   | ○   | ○   | ○   | ○   | ○   | ○    |

● standard, ○ optional, – unavailable.

## Dimensions



| Model       | FR | 120   | 300   | 450   | 580   | 750   | 930   | 1280  |
|-------------|----|-------|-------|-------|-------|-------|-------|-------|
| A           | mm | 435   | 435   | 490   | 490   | 490   | 611   | 611   |
| B           | mm | 500   | 500   | 640   | 640   | 640   | 680   | 680   |
| C           | mm | 436   | 436   | 490   | 490   | 490   | 720   | 720   |
| Em          | Kg | 25    | 26    | 31,5  | 31,5  | 33    | 22    | 62    |
| Connections |    |       |       |       |       |       |       |       |
| Proce       | mm | Ø 160 | Ø 160 | Ø 200 | Ø 200 | Ø 200 | Ø 250 | Ø 250 |
| Dry         | mm | Ø 125 | Ø 125 | Ø 200 |
| Regeneratio | mm | Ø 125 | Ø 125 | Ø 160 |
| Wet         | mm | Ø 80  | Ø 80  | Ø 125 | Ø 125 | Ø 125 | Ø 160 | Ø 160 |