



**PIOVAN**

*Customers. The core of our innovation*

*Feeding&Conveying*  
**Drying**  
*Dosing*  
*Temperature Control*  
*Refrigeration*  
*Granulation*

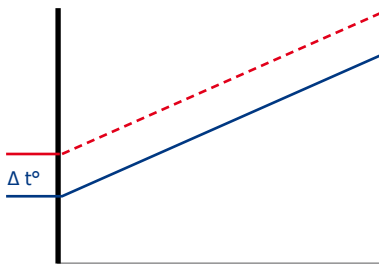
## Piovan Drying Technologies: *Desiccant Bed Dryers*



Dried air is generated by means of a molecular sieves bed which has the property to absorb the moisture released by the material in the drying hopper during the process phase. The molecular sieves need to be regenerated (regeneration phase).



(1) Dryer display



**(2) Safety Functions**

The Piovani microprocessor integrates 2 independent circuits which manage the process air temperature and the safety air temperature. These circuits have their own relay and input for temperature measuring probe.

**Process Cycle (a)**

The molecular sieves absorb the moisture.

**Regeneration Cycle (b)**

When the process cycle is completed, the molecular sieves must be regenerated before beginning another drying process cycle.

**Single desiccant tower and single blower**, process and regeneration phases are alternated. Suitable for low and middle production volume, and Dew Point from -25°C to -30°C.

**Double desiccant tower** which allow a continuous drying process while regeneration phase is performed in parallel.

Double blower version for mid and large production volume with open circuit regeneration (Dew Point -40°C) or closed circuit (Dew Point -60°C) for high performances.

**Benefits**

**(1) Easy utilization**

- All significant working parameters and functioning modalities can be set from the same microprocessor control panel.
- Clear information: the display (available in the operator's language) shows the working temperature, the set point and any alarm or warning message.

**(2) Integrability**

- All models can be equipped with serial interface port for connection to a supervisory system.

**(3) Flexible and modular configuration**

- Flexible and modular configuration: the operator can simply

and easily increase the number of hoppers at any time.

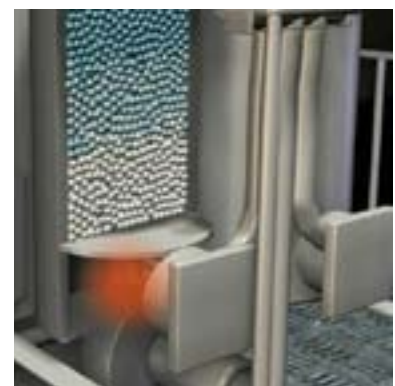
- (4) Precision:** electronic control of the process temperature with self-tuning PID algorithm ensures high precision.

**(5) Thrifty utilization of Energy**

- Intelligent Energy Supervisor: In accordance with the effective requirements of the processing machine, the IES system optimizes and adjusts the energy utilization.
- Intelligent Material Drying: optimizes and adjusts the energy utilization to prevent material thermal degradation or over-drying.



(a)



(b)

# Piovan Drying Technologies: *Honeycomb Wheel Dryers*



The latest evolution in the drying field is performed by means of a desiccant rotor.

Desiccant material (zeolite molecular sieves) is coated on the internal surface of the honeycomb structure guaranteeing a large absorbing capacity and zero dust emission.

Continuous regeneration process and close loop cooling phase for high performance and constant dew point level.

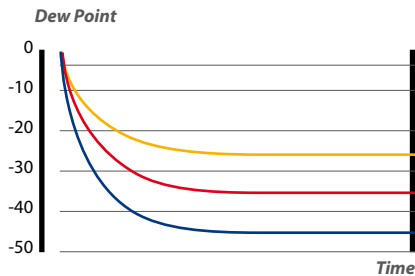
The **functioning mode** of the molecular sieve rotor is divided into three phases:

1. **PROCESS PHASE:** the humid air goes through the rotor, releasing moisture (blue sectors);

2. **REGENERATION PHASE:** the hot air goes through the sector full of moisture (green), so regenerating the sieves at temperatures between 105 and 235°C; the humid air is then exhausted;

3. the process air cools down the regenerated sector, before passing to phase 1 again.





Once reached the set Dew Point, the value is constant, with no fluctuation.

### Benefits

- **Reduction down to 30% of the electric energy usage** by honeycomb rotor solution and the complete recovery of the regeneration air. The excess heat getting out of the honeycomb wheel is used to pre-heat the inlet air.
- **No expense** for the consumption or connection of cooling water or compressed air the unit simply requires electricity for functioning.
- **Duration of usage 50% higher** than traditional models: in average usage conditions the molecular sieve wheel overcomes the 10 years of operation. The wheel system does not require maintenance, because it has no moving mechanical element and the belt turning the wheel does not need to be lubricated.
- **Constant Dew Point**, with no fluctuation, with adjustable values for process optimization.
- **Guaranteed absence of dust and of material contamination.** The Honeycomb Wheel dryers are ideal for application in the medical field and in the optical sector.
- **Complete access** to all the unit's components by simply removing the side panels for maintenance operations.
- **Flexible and modular** configuration: the drying hopper can be installed on the processing machine or beside it, or placed on a trolley. Both single-hopper and multi-hopper versions are available.

The Honeycomb Wheel dryers are equipped with a **microprocessor system** which keeps constant the set temperature.

From the control keypad it is possible to display and set the parameters and the working modes and see warning messages. Once the process temperature has been selected, the microprocessor automatically sets the safety temperature within the whole range of functioning temperatures, thus ensuring the maximum operational safety.

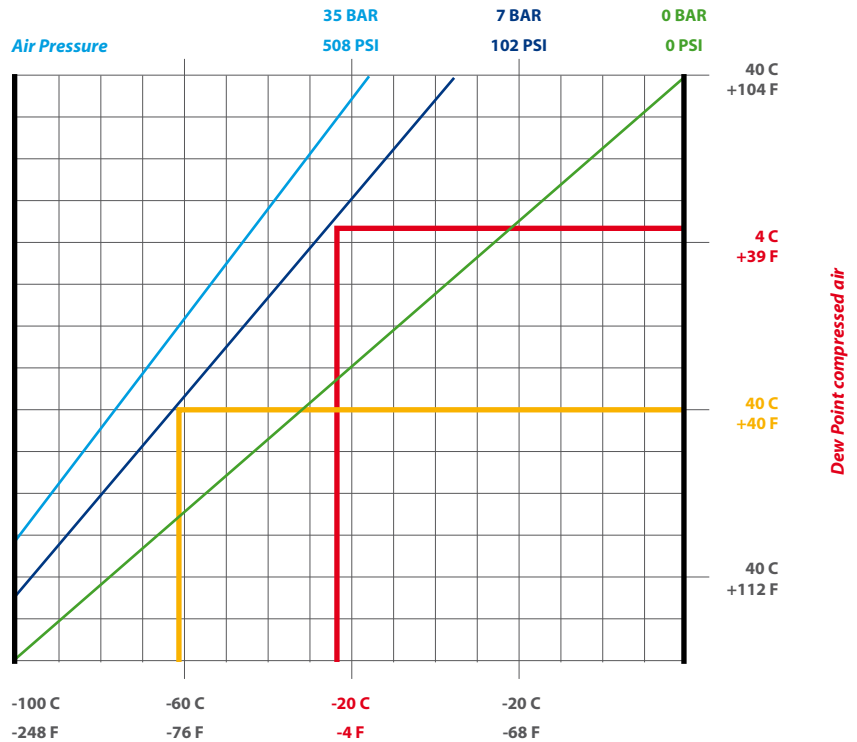


## Piovan Drying Technologies: *Compressed Air Dryer*

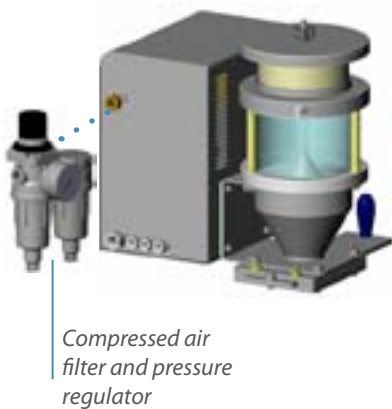
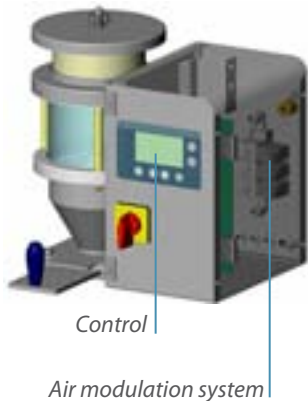
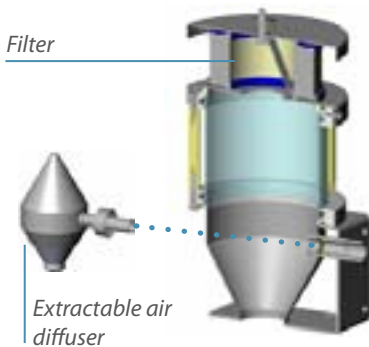
Making use of the compressed air intrinsic characteristics, the compressed air dryer can be used for dehumidifying small volumes of resin. Compressed air dryer are suitable for over the press drying or as active residence hopper avoiding material temperature drops and moisture absorption.



(a) Compressed Air Treatment:  
Air Dew Point values at different air pressures



1 – 3 – 6  
Piovan Compressed Air Dryers:



### Benefits

- **Energy consumption optimization** by the air flow management on 7 levels depending on the material selected and on the material consumption. Energy and Cost saving for electricity and compressed air.
- **Self-adaptation** of the working parameters. Thanks to the Material Database included in the standard, configuration the control automatically regulates the process conditions once the material has been selected and the hourly throughput has been set.
- **Good and correct dehumidification.** The electronic system of the compressed air dryers in-

cludes the Drying Control function. It continuously checks the loading times of the drying hopper and the drying times, and it signals critical events.

- **Open Database**, containing 50 materials complete with pre-defined set values for optimal processing. It can be modified, customized and integrated with new data in line with the customer's production.
- **Maximum possibility of inspection.** In all models, the drying hopper is equipped with removable diffusing cone, for cleaning operations for simple and rapid material changes.

## Piovan Drying Technologies: *Infrared Dryer*



### **Benefits**

- **Faster process** (minutes).
- **Smaller amount of material in process.**
- Reduced start up timing.
- **Simplified** start up procedure.
- **Faster material changes.**
- **Easier maintenance** (no filters, no wax condensers).
- **Suitable** for "not free-flowing" material.

Reduced thermal, oxidative and hydrolytic degradation of PET and polyamides due to the short time in process.

Faster water evaporation from the polymer due to the intensive and deep heating effect.

Thanks to the direct internal heating, an higher speed of diffusion of the humidity from the core to surface of the pellets is reached in the next step of process with dried air circulation.

Infrared Drying is suitable for granular, flakes and even not free flowing materials, for mid and large production volumes.

Typically used for extrusion applications like pellets and regrind material drying, crystallization of flakes for PET bottle or films and crystal-

lization of re-granulated PET scraps after extrusion.

The compact design together with fast processes, small amount of material in process, reduced start-up procedure are the main advantage of this technology.



*Easy access and cleaning for maintenance of drum or for lamps inspection thanks to the movable sliding doors.*



*The user friendly touch screen control displays the current working conditions and provide easy access to the machine/process parameters. It is possible to control the complete process: material feeding, IR drying, post-processing deep drying.*



## Piovan Drying Technologies: *Hot Air Dryers*



### **Benefits**

#### **Flexible configuration:**

- can be installed directly on the injection moulding machines or extruders, or floor/trolley mounted for mobility;
- hot air generator is a separate unit;
- can serve one or more processing machines;

#### **Quality:**

- hoppers are manufactured in stainless steel to avoid risk of contamination and corrosion;
- the accurate construction guarantees no thermal dispersion and homogeneous distribution of temperature inside the hopper.

The hot air generators are ideal for the treatment of non-hygroscopic materials; suitable for applications involving high rates of material consumption.

## Piovan Drying Technologies: *Mould Dryers*

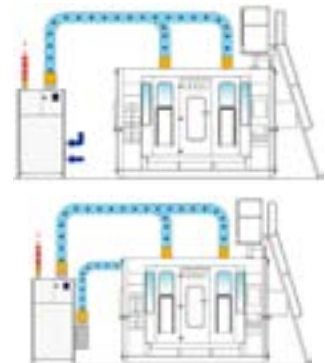


Generator of dry air flow which is blown inside the mould area to avoid generation of condensation on the mould cavities and surface at variation of ambient conditions.

Dry air flow is generated by means of a desiccant rotor. Desiccant material (aluminum silicate) is coated on the internal surface of the honeycomb structure guaranteeing a large absorbing capacity and zero dust emission. Also the continuous regeneration process assure constant dew point level for efficiency improvement and constant production. Air flow Dew Point between 0°C and -10°C.

### **Benefits**

- **Improvement of quality standards** (elimination of defects of parts).
- **Increase of productivity** (reduction of the cycle time).
- **Optimization of the performance** (stable and constant working conditions).



## Piovan Drying Technologies: *Hoppers*



### Benefits

- **Maximum heat energy transfer to the material.**
- **Uniform mass flow resin descent.**
- **Constant and stable drying conditions.**
- **Minimized heat energy wasted to the ambient.**

The hopper design is fundamental for the proper drying process of the resin. In fact it must assure the right drying time, a uniform distribution of the dried air flow from the bottom to the top.

All drying hoppers are constructed of **stainless steel** with a minimum insulation thickness of **60 mm** up to 800 liters or **100 mm** for bigger

models in both the conical and cylindrical parts.

The hoppers and their air diffuser cones are perfectly concentric and are made from stainless steel.

All the internal components are welded smooth.

The smooth surface ensures a better air flow and facilitates the downward movement of the granules.



Win Factory is a standard supervisory software that can self-configure to accommodate application needs, with no specific tasks needed for customizing.

It's able to host all Piovan machines and exploit interaction between them: they are no longer stand alone units, becoming a system.

The dryer's graphic interface shows the temperature of the

desiccant towers, the number of regenerations, the time remaining to complete the regeneration process, it reads and sets the dew point thresholds, and gives the machine start and stop commands through a timer.

Monitoring may be done on-line or off-line, or the data may be saved as history in case time reveals problems associated with drying. All parameters are displayed in graphic format. The curves certify the quality of product dehumidification. For example, if the dew point is constantly kept at good levels, the process has been executed correctly.

Further information on drying functions and details on management modules are available on WinFactory Catalogue.





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