

What is Dewpoint?

Dewpoint is the temperature at which the moisture in a gas will condense. More specifically, it is the temperature at which the vapor pressure of a gas equals the saturated vapor pressure. As it relates to drying plastic pellets, the gas in question is air. The more parts per million of water particles in the air, the higher the vapor pressure, and consequently, the higher the dewpoint. As the dewpoint of air is reduced, its ability to take in moisture is increased.

The difference between dewpoint and relative humidity as a measurement of moisture in air is that relative humidity changes as the air temperature changes, but the dewpoint stays constant with temperature changes. Dewpoint is a measurement of actual water content. Relative humidity changes with temperature, even with the same amount of moisture in the air, because the density of air changes with temperature.

How does Dewpoint affect drying of my material?

When drying hygroscopic resins such as nylon, PET, polycarbonate, etc., it is necessary to heat the material up to weaken the forces that bind the water molecules to the polymer chains, and create a low vapor pressure around the pellet so the moisture inside the pellet is drawn to the outside. This low vapor pressure is the result of low dewpoint air being supplied to the drying hopper.

How does my dryer supply the low dewpoint air?

Once the moisture has made its way to the outside of the pellet, the low dewpoint air picks it up and carries it back to the dryer. The air is passed through a molecular sieve desiccant that traps the moisture molecules. The moist air that enters the desiccant laden with moisture is now returned to a low dewpoint state. It is then heated to the drying temperature for the material being dried, and recirculated through the drying hopper.

How can I be sure the dewpoint from my dryer is satisfactory?

An optional feature on our dryers is a dewpoint monitor. This is a device that pulls a small sample of air as it leaves the process desiccant tank, prior to heating it, through a sensor. This sensor detects the amount of moisture in the air, and sends a signal to a circuit board that displays the dewpoint of the air. The value displayed is the dewpoint of this air, in degrees. It is reasonable to expect readings of between -20 and -40 degrees F. The lower (more negative) this reading, the better.

If this feature is not installed on your dryer, a portable dewpoint monitor can be connected to a sample port supplied on all dryers, labeled "Dewpoint Check". This port is connected to the same point in the airflow circuit as our dewpoint monitor option would be connected.

What if I find my dryer is not functioning properly?

Refer to the accompanying troubleshooting aid for Conair Carousel/CD dryers.

Conair Carousel/CD Dryers

Dewpoint Troubleshooting:

Under normal operating conditions, the dryer will produce dewpoints in the range of –40 to –20 deg F. Some reasons, which may cause the dryer to not deliver the desired dewpoints, include:

Possible Problem	Solution
1. Control Board/Sensor Malfunctioning – The circuit board or sensor may cause the display to read improperly.	Verify the readings with a calibrated portable dewpoint meter. The Power Miser 1 Deluxe board may need adjusted. Adjust the No. 2 potentiometer.
2. Return Air Temperature – If the return air temperature from the drying hopper exceeds 125 degrees F. 125 degrees is the optimum temperature to economically produce good dewpoints. Note: If the dryer includes a return line cooler, the 125 is downstream of the cooler.	Check the return air temperature. If it is above 125 deg. F, add cooling by use of an aftercooler. If an aftercooler is already installed, reduce the temperature of the cooling water or increase the flow.
3. Low Regeneration Temperature – Should the regeneration temperature fall below the normal setting, the desiccant will not release the moisture adsorbed during the Process Cycle.	Check amperage of regeneration heaters. Replace heaters if necessary. (WARNING: Any electrical checks should be performed by a qualified electrician.)
4. Low Regeneration Air Flow – Should the regen air flow fall below an acceptable level, the desiccant will not be properly re-generated, similar to item 2 above.	Check regeneration filter and clean and/or replace as necessary.
5. Leaks in Process Lines - The Process Cycle consists of a closed loop system. It is important to keep ambient moisture from entering the system thru leaks in hoses, gaskets, or any other entry point. This is especially critical on the return line from the hopper, as this portion of the line is under a vacuum condition.	Check all hoses, gaskets, doors, loaders, or other potential areas where leakage may occur. Replace any defective hoses or gaskets. Once this is done, check the return dewpoint if a portable dewpoint instrument is available. This dewpoint will normally be in the range of –10 to 0 deg F.
6. Improperly Filled Desiccant Tanks – All desiccant tanks used in the dehumidifying drying systems are properly packed at the factory. If tanks are field refilled and not properly vibrated/packed settling may occur, allowing an air-channel by which the process air will bypass the desiccant.	If tanks are field filled, check tanks to ensure they are tightly packed. If, by gently shaking the tank, desiccant can be heard moving about, the tank is not properly packed. Either contact Conair for new tanks or refill using the proper procedures.

7. **Contaminated Desiccant** – Should the desiccant become contaminated, it may form a shell over the outer surface, rendering it incapable of producing good dewpoints. This may occur due to:
- A. Off-gassing from the material in the drying hopper.
 - B. Residence time is too long
 - C. The drying temperature is too high for the grade/type of material being processed.
- Compare the delivery air dewpoint to the return air dewpoint. If the difference is between 30-50 deg F, the desiccant is functioning properly. Verify the proper drying temperatures and residence times are followed. If off-gassing is a known condition with the type of material being processed, consult Conair for the addition of a plasticizer trap.