

# REMOVING WATER FROM COMPRESSED AIR



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## WATER

Water is in the air, so it's in your compressed air. Depending on the temperature & humidity there will be either a lot or a little water, but there will always be water.



## COMPRESSED AIR

When air is compressed the level of water and humidity increases. Why? Because you need 8 cubic feet of air to generate one cubic foot of compressed air. Increasing the pressure also means increasing the level of water saturation.

## THE PROCESS

In order to obtain dry compressed air we need to trap the **water** (stages 1 & 2) and remove **moisture** from the compressed air (stages 3 & 4).

## STAGE 1: The Tank



Water removal is done in stages. The first stage of water separation is the tank. When compressed air comes out of the pump it is hot (~180°F) that means any water in the air is water vapor. The tank is room temperature so when that hot water vapor makes contact with the inside of the relatively cool tank, it condenses on the inside of the tank. Drain the tank daily or install an [Automatic Timer Drain](#).

## STAGE 2: Air / Water Separator



The next stage of water separation should be a mechanical [Air / Water Separator](#) - looks like an in-line air filter. What it does is directs the incoming air in a spiral and uses centrifugal force to separate out the water in the compressed air. Depending on the temperature of the air, this process should remove 99% of the water in the compressed air. At this point the air may be dry enough for your operation.

**Note:** Install [Point-of-use Filters & Dryers](#), [Air Tool Dryer](#) or a [SUPER-DRY](#) at each station to catch the last remnants of water and dirt in the air lines before it reaches your tools and applications. Refer to page 3 for point-of-use solutions.



### STAGE 3: Refrigerated Air Dryer



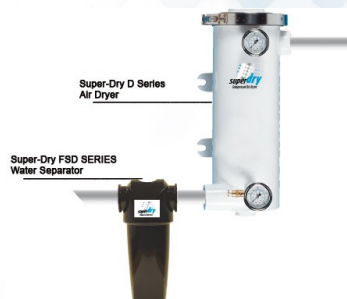
The next stage is to cool the air coming from the compressor. Why cool the air? Because cold air can't hold water. The colder the air the less water it holds. That is why the industry talks about the dew point. *Dew point is the temperature at which the humidity condenses into water droplets.* A refrigerated air dryer cools the air down to 38°F. It is basically a refrigerated coil mated with the air line. This removes the heat from the air line and cools the air in it. The water is diverted by gravity and removed with an [Automatic Timer Drain](#). A [Compressed Air Filter](#) should be placed before the air dryer to protect it.

### STAGE 4: Desiccant Air Dryer



This stage of air drying takes the dew point down to -40°C using a [SUPER-DRY](#) desiccant air dryer. This is very dry and is needed for painting, printing, and instruments. The beads physically absorb the water in the compressed air, so the air must be relatively dry before entering or the beads will become loaded up with moisture very quickly and stop working. There is a [Moisture Indicator](#) on the front of this unit giving you the percentage of relative humidity, when it reaches 80% the desiccant needs to be changed (typically once a year). When excessive oil is contained in the compressed air (ex: old compressor) a [Compressed Air Filter](#) is required up-stream of the [SUPER-DRY](#) desiccant air dryer. Why? Because if the beads are contaminated with oil they will not absorb water (umbrella effect).

### POINT-OF-USE APPLICATIONS



It is also possible to dry the air directly at the point-of-use (ex: paint booth, dust collector, sand blast cabinet, etc.). In this case we need to dry the air in two stages: the separation of the water using an Air / Water Separator, followed by a SUPER-DRY desiccant air dryer.

### AIR TOOLS PROTECTION

An [Air Tool Dryer](#) will deliver dry compressed air to your tools and reduce air tools maintenance due to rusting of the components. It should be installed up-stream of the FRL. Will prevent freezing of nail guns in a cold environment.





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