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## *Water Removal & Drying Services*

### **DEHUMIDIFICATION**

Humidity is the amount of water vapor in the air. The ability of the air to carry water vapor increases with an increase in air temperature. In water damage restoration, we are most concerned with the relative humidity. The relative humidity will help determine how fast materials dry. It relates to how much more water the air can hold at a given temperature. Warm air will hold more moisture than cold air. If we take a column of air that has a relative humidity of 50%, and raise the temperature of the air 10 degrees, the relative humidity will decrease. More than any other factor, the relative humidity helps control the rate of evaporation. Because relative humidity increases as the air temperature decreases, a low temperature will result in less evaporation. In a cold environment, evaporation will be low.

A flooded room with 100% relative humidity will never dry, no matter how many dryers you have running. When the air is at 100% humidity, the same amount of water that evaporates from the carpet will fall back into the carpet. In order to dry materials in this environment, we must reduce the relative humidity.

There are several methods to remove the water vapor from the air. If you live in an area where the humidity is extremely low, you just open all the windows. Since humidity always seeks to balance itself, it will leave the building. If you don't live in a low humidity environment, use a dehumidifier. A dehumidifier is a machine that removes moisture from the air. As it reduces the humidity, the walls, floors, carpet and pad dry at a much faster rate. In basements or natural flood situations, it is a must, for without one, the dryers merely circulate warm, moist air, and little or no drying takes place. Dehumidifiers remove high humidity from the room, and the dry air will pull moisture from floors, pad, walls, and carpet.

### **REFRIGERANT DEHUMIDIFIERS**

There are three types of dehumidifiers on the market today. The most well known, is the standard refrigerant dehumidifier. It works by passing moist air over cold coils. When the saturated air passes by the coils, the air temperature is reduced to the saturation point. The moisture then condenses on the coils and runs into a collector bucket. It is a very simple process and acts just the same as when you have a cold drink and the water condenses on the glass. A portable, high capacity refrigerant dehumidifier can remove about 5 gallons in 24 hours and reduce the humidity to 40% at 80 degrees F. The advantage of refrigerant humidifiers is that they are the lowest cost humidifiers readily available. The main disadvantage is that as the air becomes cooler, the performance deteriorates rapidly. Below 68 degrees, most refrigerant dehumidifiers will stop removing

moisture completely, although the DrizAir 50 will operate down to 55 degrees. The performance of any dehumidifier will vary with changes in temperature and RH.

### **DESICCANT DEHUMIDIFIERS**

Another type of dehumidifier uses a desiccant to remove water from the air. A desiccant is any material that has a high affinity to water, high enough to dry moisture from the surrounding air. There are two types of desiccants: absorbents and adsorbents.

Absorbents go through chemical or physical changes as they absorb water. Salt, sugar, and lithium chloride are all absorbent desiccants. On the other hand, adsorbents do not change when picking up water. They hold moisture on their particle surfaces. Cotton and silica gel are both adsorbents. Most desiccant dehumidifiers use either an absorbent like lithium chloride, or an adsorbent like silica gel as the desiccant material.

A desiccant dehumidifier works by passing the flow of moist air through a perforated cylinder holding the desiccant. This cylinder turns slowly, allowing moist air to pass through the perforations. As this happens, moisture is absorbed. As the material would soon become saturated, it has a system of drying a portion of the desiccant wheel with heat.

## **PRINCIPLES OF DRYING**

Given any drying situation, there are three factors that can be managed for fast successful drying: temperature, air movement and humidity control.

### **AIRFLOW CIRCULATION**

Turbo Dryers are designed to deliver a high volume laminar airflow over or under wet surfaces for speed drying. Airflow speeds the rate of evaporation, helps prevent mold growth, and reduces the risk of secondary damage. Circulating air speeds evaporation by moving the “boundary layer” of saturated air that hangs near wet surfaces. The moist air is whisked away and replaced with dryer air.

### **MOISTURE CONDITION**

The moisture condition of carpet, cushion, flooring and walls along with other structural materials and contents.

### **HUMIDITY CONTROL**

Using Turbo Dryers to speed the rate of evaporation in an enclosed area can cause humidity to escalate. As humidity elevates, air movers become less effective and the rate of drying slows. It is vital that Turbo Dryers be used with adequate dehumidification. For safety, indoor humidity should not exceed 60% Rh. For maximum drying porous materials, indoor humidity should be maintained below 45% Rh. This may require the use of DrizAir Dehumidifiers. Even lower humidity between 25-40% Rh is helpful for drying saturated, dense materials such as walls and floors.

### **DESICCANT DEHUMIDIFIERS**

To assist in the drying process, the heating or air conditioning system of the structure should be regulated. When dehumidifiers are not available, exhaust fans in the attic, kitchen and bathroom can be turned on to remove some humidity. A thermo-hygrometer may be used to determine the indoor relative humidity.

### **DRYING PROCEDURES**

It is possible to dry both the stretched in carpet and synthetic cushion at the same time on many flood jobs. Turbo Dryers are used to force air under the carpet so that a cushion of air floats the carpet off the floor. Along with humidity control, the high volume airflow will usually dry most carpet, cushion, and flooring.

When hardwood flooring is present under wet carpet, strong consideration should be given to removing carpet for drying. Consideration should also be given to removing water damaged carpet cushion when it has a non-porous plastic “skin”, when it shows signs of severe wear or in contaminated situations.

### **DRYING OUT YOUR HOME**

Floodwaters affect a house in 3 ways:

The water damages materials. Wallboard will disintegrate if it stays wet for too long; wood can swell, warp, or rot; electrical parts can short out, malfunction, and cause fires or shock.

Mud, silt, and unknown contaminants in the water not only get everything dirty; they are also unhealthy.

Dampness promotes the growth of mildew, a mold or fungus that can grow on everything.

### **DRY THE CEILINGS, WALLS & FLOORS**

Flood-soaked wallboard should be removed and thrown away. Plaster and paneling can often be saved, but you still need to get air circulating in the wall cavities to dry the studs and sills. Different approaches are used for different materials.

#### **WALLBOARD**

If dirty floodwaters soaked the wallboard at least 4 feet above the floor, take down all the wallboard and replace it. If the water was less than 4 feet deep, remove the lower 4 feet of wallboard. You can fill the gap with new 4ftx8ft wallboard sheets installed sideways. If you have Styrofoam insulation-or no insulation-and the wallboard was soaked with clean rainwater, you can dry the walls without removing the wallboard by using the technique explained below for plaster walls. But you will need to remove wet insulation if it is not Styrofoam.

#### **PLASTER WALLS**

If the plaster or wallboard is clean and in good shape, you can drill or cut ventilating holes in each wall cavity. Place holes low enough so they will be covered by the baseboard after the wall dries out. Open up the wall on both sides of interior walls. For exterior walls, drill or cut holes only on the inside of the house. However, if there is wet insulation, you will have to remove the plaster or wallboard in order to take out all the insulation.

#### **CONCRETE BLOCK**

The cavities in a concrete block wall will drain on their own. The water will not damage the concrete like it will wood or wallboard.

#### **WALL COVERING**

Vinyl wall covering seals the wall and keeps it from drying out. Wallpaper paste is also a favorite home for mold and mildew. For these reasons, you should remove all wall covering that got wet and throw it out. (If vinyl wall covering is loose on the bottom, you may be able to save it by pulling it off the wall up to the flood level. Clean and reapply it after everything dries.)

#### **PANELING**

Carefully pry the bottom of each panel away from the wall. Use something to hold the bottom away from the sill so the cavities can drain and dry out. You can nail them back into shape after they and the studs dry out. However, if there is wet insulation, you will have to remove the paneling in order to take out all the insulation.

**FLOOR**

Air needs to move around flooded floors so they can dry out. This usually means that you must remove the floor covering. Because floodwaters contain mud and dirt, most soaked floor coverings should be thrown away. Keep a piece of all discarded floor covering so the adjuster can tell its value.

Air needs to circulate below the floor to dry it out. If the crawl space of your house is flooded, pump it out. Remove any plastic sheets, vapor barriers, or insulation from underneath the floor. (Be sure to replace them when the floor and foundation are completely dry.)

If a house with a basement was flooded over the first floor, remove finished basement ceilings, or cut or drill holes between the joists to allow circulation. Don't cut or drill near electric lines or pipes.

**CLEANING FLOOR COVERINGS**

Small throw rugs can be saved and cleaned in a washing machine. Indoor/Outdoor carpeting can be hosed off and hung up to dry.

Large area rugs and any rug with foam backing should be cleaned professionally with a high power extraction machine before mildew has a chance to set in.

A wall-to-wall carpet that was soaked should be cleaned professionally with a high power extraction machine before mildew has a chance to set in.

Remove tile, vinyl, or linoleum flooring if it is warped, loose, or has a foam-runner pad (which should be thrown away).