



The most common place for condensation to form in an indoor pool is on the inside surfaces of windows or skylights. For these surfaces, our objective is to design the air delivery system to completely blanket the glass areas with a flow of warm dry air that is supplied by the dehumidification system to prevent condensation and dripping.

Let's provide an easy example to understand. You go out to your car in the middle of winter and it is covered in sleet or ice is frozen on the windshield (condensation basically has frozen there). What is one of the first things you do? You start the car, turn on the DEFROST and go back inside for coffee!

Why? Once the car warms up—the defrost moves a flow of warm air up the window and melts the ice, and dries the windows—and subsequently that condensation disappears. It can't ice up (or form condensation on it) again as long as warm air is moving across the glass surface area.

It is the same principle in a pool room. When the outdoor temperature is lower than the indoor pool room temperature (cold meets warm) you will experience condensation on the interior surfaces of the natatorium if the proper air delivery system is not installed.

### **What kind of glass can be used?**

- **Single pane glass is NEVER recommended for natatoriums** - This is primarily due to low U-Value that causes windows to reach dew point temperature and condensation to occur at a much faster rate. If single pane is installed; clients may still find condensation even with blanketing the glass with warm air from the dehumidification system.
- **Double pane, low-e glass** - This is always recommended for use in windows/door walls, along with high quality skylights. Many companies discourage the usage of skylights claiming they will always create a problem. It is not the skylight that creates the problem; the problems occur when:

- a) the air delivery system is not designed properly and/or
- b) there is no air movement into or across the skylights

DXair does not discourage you from skylight usage; instead we provide information on moving the proper air flow to all glass surfaces and into skylights to prevent condensation. We do want to make you aware that deeply recessed or boxed in skylights can be more difficult to work with than surface mounted skylights—and DXair will address this with you in the design-building stages.

- **Triple pane glass** - This is generally not necessary nor recommended as there is no added value/benefit or savings between double and triple pane glass.

All windows, door walls, French doors, skylights should be tight sealing against air infiltration, and any metal frames around doors/windows must have thermal breaks (thermal break means that the frames are insulated). Wood and vinyl clad windows can also be used.

**Doors and windows to other rooms should not be left open to the pool room.** Open windows and doors to a pool room introduce moisture and chemicals which migrate and permeate into areas non-related to the pool room. The two environments must be maintained separately at all times.

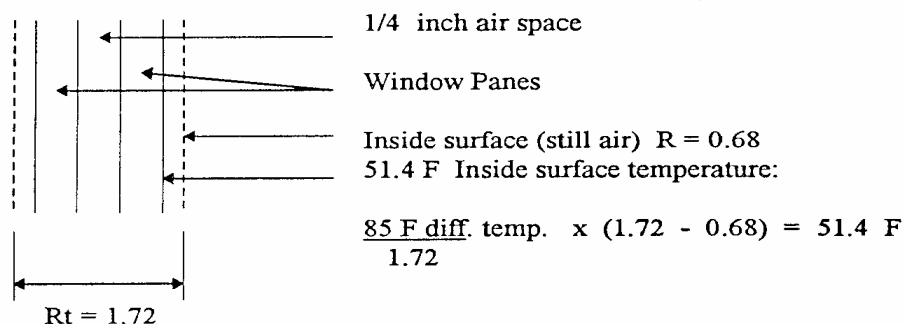
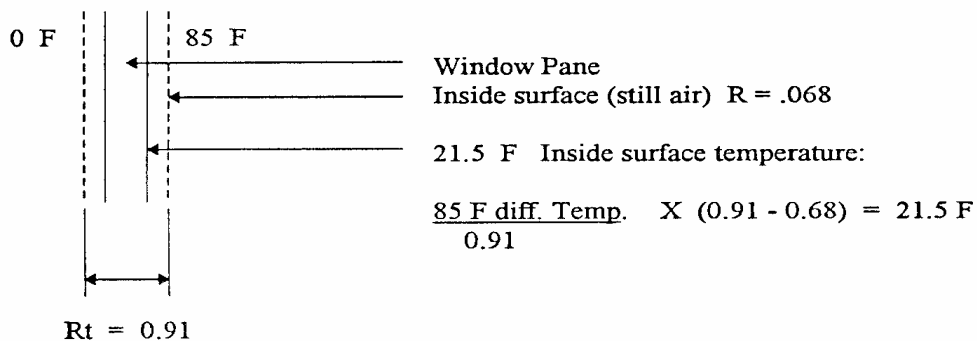
**RECOMMENDATION:** The use of ceiling fans in a pool room offers many benefits such as:

- They can move warm air to skylights when ductwork cannot adequately reach them
- They help break up stratification at the ceiling level

Follow the NEC codes for installation (minimum 7 feet above the water). Ensure paddles are installed under the ceiling fan blowing upward to circulate skylights. Ceiling fans in a pool room should remain running at all times.

### Window Information for Swimming Pool Enclosures

The following illustration demonstrates how to determine the actual inside surface temperature of a window pane based on a given indoor and outdoor temperature:





Based on the preceding illustration, it can be seen that even a double pane window cannot prevent condensation if the dew point temperature of the room is 64.5° F. as the inside surface temperature in the illustration is only 51.4° F.

In order to prevent condensation, the inside surface temperature of the glass must be raised, which is an even more obvious challenge with single pane glass. Raising the inside surface temperature of the glass is normally done by installing most of the supply air outlets of the dehumidification system near the windows. The supply of warm, dry air will then effectively prevent condensation.

In case a retrofit installation does not allow proper air distribution over the window surfaces, local blowers can be installed to raise the glass surface temperature.