



TKEC INFORMATION BULLETIN RI-007
THE IMPACT OF HIGH HUMIDITY

AIR COOLING

Moisture is a key factor in the growth and amplification of mold, fungi and other microbes. As a result, problems with these organisms can be severe in air-conditioned buildings located in humid environments. The accumulation of moisture on or in the envelope of buildings during the summer is strongly influenced by indoor temperature and outdoor humidity. Mold growth typically occurs on internal surfaces of the external walls or floors, since these surfaces are cooled by the air conditioning system to below or near the dew point temperature of humid air infiltrating into the building envelope.

Moisture enters the building because of (1) leakage of rain into the wall cavities, (2) movement of humid air into the interior because of poor building construction, (3) water vapor diffusion from the humid exterior to the dry interior, and, perhaps most common, (4) entry through the conventional HVAC system when the supply air fan is operated while the cooling coil is cycled off.

Overcooling of indoor spaces results in moisture and mold problems in buildings in climates where the outdoor dew point temperature is at or above about 77 °F. The problems can become severe when the internal surface temperatures drop a few degrees below 77 °F and the likelihood increases that the surface relative humidity will exceed 65%.

Ironically, when building occupants feel clammy because of high humidity, the typical response is to lower the thermostat setting. The result is that the space cools further, most often increasing the relative humidity along with the likelihood of condensation of moisture on supply air ducts, floors, and other building surfaces.

AIR HEATING

Summer isn't the only time when indoor humidity levels and resulting condensation can be a problem. In tightly constructed houses or houses that do not have good fresh air return, humidity levels can rise inside homes even during the heating cycle of winter. Unvented clothes dryers, indoor hot tubs or saunas, humidifiers and other sources of water vapor can build-up in these tight, confined spaces. Amplifying the problem is the fact that windows are kept shut and even sometimes sealed with plastic or storm windows, allowing little fresh air in the building.

Under these high humidity conditions during the winter months, mold growth is often seen around windows or on outside walls where there are cold surfaces. Steamed windows or walls that are damp to the touch are an indication of this problem.

