



Leaflet Concerning the Correct Method of Heating and Ventilation

Dear residents,

for a few years there have been phenomena in many flats in winter like never before. They can be harmful for the inhabitants and lead to damage to the building fabric. On outer walls mostly of bathrooms, kitchens and bedrooms, often also behind large pieces of furniture and pictures, wet patches and mould stains start to appear, wall paper peels off, a musty smell emerges. The first guess being water from without coming in and causing this nuisance is regularly wrong. The moisture mostly comes from within.

The reason for the moisture is almost always that the correct and important try to save heating energy mislead to inappropriate heating and ventilation of these rooms. This can be a disadvantage especially for flats in which measures to lower the heating energy have already been taken. The causal interaction will be explained below. But first here are some suggestions for contemporary and correct heating and ventilation to prevent moisture damages. If you follow these suggestions you serve your health and perhaps save money and trouble for yourself and for us. Moreover you fulfill your obligations in the rental agreement.

1. Heat also those rooms that are not used constantly or in which you prefer lower temperatures.
2. Make sure the temperature at the inner surface of outer walls never substantially sinks below 17°C. This is easier if pieces of furniture especially those standing on closed pedestal bodies do not stand too close to the wall. Only if they are at a distance of more than 10 cm, the necessary circulation of the indoor air is ensured.
3. Be sure, the heat dissipation from the heaters is not blocked by claddings or long curtains.
4. Close the doors of rooms that are less heated. The temperature of these rooms is the task of the heaters inside these rooms. Otherwise with the warming air from the other rooms too much humidity enters the room. Plants with big leaves are better located in fully heated rooms.
5. Possibly part from vessels hanging from your heaters. Together with other effective sources of moisture they increase the risks mentioned above.
6. Pay particular attention to the ventilation of the rooms. This serves not only the purpose of exchanging used air by fresh air but also the removing of water in vapor form, which can be 10, 20 or even 30 liters a day, dependent on the size of the flat and how intensely it is used.

7. Air out your rooms by intense ventilation. During the ventilation heating energy gets lost. This has to be accepted for the benefit of a healthy room climate and to protect the building itself. It is important to minimize the loss of heat and still ensure sufficient ventilation. This is done best if you act appropriately and make the full exchange of air as fast as possible. Therefore open windows and doors fully. If possible create a draught. After 5, but 10 minutes the most you exchanged the used, damp air by dry fresh air that can absorb a lot of humidity after it has been warmed up. The big advantage of this method is that with the used air only little heat gets out. The heat stored in the walls and the furniture stays in the room and helps warming up the fresh air after closing the windows up to the desired temperature. This intensive ventilation should be repeated up to three times a day depending on of the rooms are used. A single ventilation is not enough anymore because today all joints and gaps in the windows are filled. Any permanent ventilation like keeping the window open slightly or halfway costs disproportionately more energy, so you should refrain from it during the heating season.
8. Prevent the heaters from giving off unnecessary heat during the ventilation. Turn the thermostat valves back or even more effective, cover them with some cloth to prevent them from opening because of frost protection when the cold air comes streaming in. Other valves you should close.
9. Make sure that the moisture, which is set free while taking a shower or cooking in relatively short time is immediately let out, to prevent it from distributing in the whole house through the doors.

After reading these suggestions you probably ask yourself "why". To understand the issue some physical and structural engineering knowledge is necessary, that will be explained below.

Air has the natural quality to bond with water. One can say that any air usually contains a larger or smaller amount of it in the form of water vapor. Whether this steam is visible like in clouds or fog or not, depends on the pressure and the temperature of the air. Sometimes this is observable when fog develops after the air cools down at night and disappears after being warmed up by the sun during the day. If the air cools down even more, the steam can turn into water again and fall as dew or frost and is absorbed by the air only after essential warming up, until it is invisible steam again.

From this you can learn two things: The ability of air to contain water vapor is limited. This limit is not set but essentially depending on the air's temperature. Thus one cubic meter of air at 0°C can contain up to 5 grams of water. At 200°C that would be 17 grams and at 300°C already 30 grams of water.

The use of this knowledge for the explanation of our problem is obvious. If air is cooled down in a flat, which is enriched with moisture the temperature may sink below the point where it cannot contain the steam anymore and has to set some of it free as water. This process starts where the air is the coolest, which means on the coolest surfaces in the room. This experience, that everybody knows who ever took a bottle of beer from the fridge, entered a heated building on a cold day wearing glasses or tried to drive away in his car that was parked outside with the windows closed on a winter morning, is directly applicable to the outer walls of a flat. If the outer walls are the coldest surfaces in the room, water will inevitably condense on them, if the humidity in the air is too high in proportion to the temperature, or the temperature of the air is too low in proportion to the amount of water vapor in the air.

Not often do we realize how large the amounts of water are, that are set free in a flat that is used normally and have to be absorbed by the air. Only during one night's sleep one person sets free one liter. Additionally the absorption power of the air is taken up by cooking, dishwashing, bathing, showering, doing the laundry and drying the laundry. Plants evaporate the whole amount of water given to them and on many heaters there are vessels that are constantly refilled to wet the room air that is alleged to be too dry in winter. All this water vapor has to be let out of the flat regularly, if it shall not cause the phenomena described above and slowly wet and destroy the walls.

It is easy to comprehend why these difficulties were much more seldom years ago. Low energy costs lead to heating the rooms more intensively, which made the air able to hold more water vapor. Windows were opened longer, which allowed a steady exchange of humid room air by dry fresh air. Even with the windows closed, permeable gaps and wind made sure that a remarkable air exchange was possible. If the air was still overloaded with water that water was set free at the windows that were single-glazed and were therefore colder than the walls and was then let outside through little holes in the window frames.

Nowadays high heating costs and the growing urge to save energy have led to equipping windows with insulating glass, the inner surface of which is often warmer than the outer walls. The gaps were equipped with tightly closing seals. Ventilation is often inadequate and the heating is often limited to an amount that is only just bearable by the inhabitants.

This overlooks the fact that the seemingly successful saving of energy can be a waste of energy in real. Long before damages become visible the water vapor that entered the wall will condense to water in the outer layers that are much colder, filling the many pores that are otherwise filled with air. A wall that is wet like that, will lead the expensive heat from the heating system outward 30 times faster than a dry one would. This disadvantage will not nearly be compensated by a low room temperature.

If you take some time to consider these causal relationships you will realize, that and why giving due regard to the above-mentioned suggestions will be appropriate to prevent moisture damages to any flat. We wish you much success for your efforts concerning correct heating and ventilation.

Kind regards

Your property management
DICK Immobilienmanagement e.K.