Mold in Living Quarters - Removal and Prevention

Recommendations - Room Ventilation

To avoid mold, living spaces must be regularly heated and ventilated, especially during the heating season. Depending on the age and energetic renovation status of the building (with or without additional thermal insulation of the outer walls), the relative humidity of the room air must be kept sufficiently low by frequent ventilation to avoid the condensation of the room air on cold surfaces of outside walls and window openings. The relative humidity of the heated room air can be best measured by the use of an inexpensive digital thermometer/hygrometer.

The recommended maximum values for the relative air humidity to avoid mold can be met by frequent air ventilation. The purpose of ventilating the rooms is to dispose of the water vapor, which has been evaporated into the air by the use of the living space.

The below table shows recommended values for the relative humidity of the room air. They should not be exceeded (possibly for a short period of time only).

The recommended values for the relative humidity apply to room temperatures between 16°C and 24°C.

Outside Temperature (*)	>16°C	12°C	8°C	5°C	2°C	0°C	-2°C	-5°C	-8°C
Older building (up to 2002)	65%	63%	55%	50%	45%	42%	40%	36%	33%
Older building behind furniture	65%	60%	52%	45%	40%	36%	34%	29%	26%
New building (from 2003)	65%	65%	65%	60%	55%	52%	50%	48%	45%

(*) Average daytime temperature (can be read from the weather report)
The above recommended values are non-binding. For specific cases examinations of the condition of the outer walls and thermal bridges are required to define the appropriate value for the relative humidity.

The value of the relative humidity of the room air depends on the amount of water vapor evaporated into the room air every day by the use of the apartment and the volume of the room air exchanged with the outside air (ventilation). The more often it is ventilated; the lower becomes the relative humidity of the room air.

The recommendation for the compliance with the table values is: "If the measured value of the relative air humidity is higher than the table value, then an additional ventilation of the room is required". This prevents the growth of mold and saves heating costs.

The duration of the "room by room ventilation" or "cross ventilation" depends on the room size, window size and outside temperature.

"Cross ventilation" means that all windows in interior doors are opened. The alternative is to ventilate room by room with the interior doors closed. The ventilation by tilt windows is not recommended in cold weather. It leads to an uncontrolled volume of air and excessive cooling of the window openings.

Recommended values for a sufficient duration of the ventilation process with fully opened windows are:

Season	Cross-Vent.	Room by Room
December to February	3 to 4 Min.	4 to 6 Min.
March and November	4 to 6 Min.	8 to 10 Min.
April and October	8 to 10 Min.	12 to 15 Min.
May and September	12 to 15 Min.	15 to 20 Min.
June to August	from 30 Min.	from 30 Min.

Minimum Number of Daily Room Ventilations

According to German court decisions, 3 or 4 daily ventilations of all rooms of an apartment (normal usage) shall be acceptable to employed persons, who are tenants. Conversely, this means that the user of the apartment has to conduct this number of complete room ventilations every day. This is the tenant's obligation.

If additional water vapor is also evaporated into the room air by (e.g.) many potted plants, an aquarium, drying laundry in the apartment or through intensive occupancy (many people in a small apartment), then this additional moisture must also be disposed of by additional window ventilations.

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Prevention of Mold

If you are absent for a longer period of time during the heating season, the radiator thermostat should be set between the position between "✶" and "1" (minimum temperature of 9 ° C to 12 ° C) to prevent mold. Under no circumstances should the radiator be completely switched off (position "0").

Rooms with Different Room Temperatures

Different room temperatures (e.g. kitchen, bedroom, guest room) can be set. It must be taken into account that the door of the colder room (temperature difference >2 ° C) always remains closed. The cooler room must then also be ventilated separately.

Installation of Furniture in Front of External Walls

Furniture placed close to outside walls reduces the air circulation in the room between the furniture and the outside wall. As a result, the outer wall cools off much more. This may lead to condensation of the room air and the growth of mold on the outside wall and the back side of the furniture.

In order to avoid this problem, especially in older buildings, larger pieces of furniture should be placed at a distance of least 5 to 10 cm to the outer wall. At outside wall corners, the distance on one side of the wall should be at least 20 cm. However, there are court rulings that allow tenants to set up furniture directly on the skirting board. But this is at risk of getting Mold.

If these distances are not successful or cannot be realized, insulating the inside of the outer wall (e.g. with a plasterboard composite panel (3 cm EPS / polystyrene) may help. Alternatively, a base heating may be installed behind furniture (electric heating cable for terrariums or extension of the pipe for the return flow on the radiator).

Ventilation of Rooms and Apartments in the Basement

In summer, hot weather often results in the condensation of the room air on cold surfaces of the basement walls. In order to avoid this condensation and the growth of mold, basement rooms should be ventilated whenever possible at times of the day with low outside temperatures.

The relative humidity in basement rooms should not exceed 65%. If this value cannot be maintained through ventilation, an electrical air dryer may have to be used from time to time.

This applies in particular to basement apartments, which are ventilated during presence for air exchange during the day.

It is important to ventilate the laundry room during the washing process and to dry the laundry. The moist air should be disposed of to the outside directly during and after the work (applies to summer and winter).

Digital Thermometer/Hygrometer to Control the Relative Humidity:

	**Thermo-Hygrometer TFA-Dostmann 95.2019** This decvice Bezug über Amazon oder TFA-Dostmann
	**BRESSER HumiTemp Thermo- und Hygrometer, Grau** Für den Betrieb wird eine CR2032 Knopfzelle benötigt. Bezug in OBI Bau-märkten und Online.

Sources: TFA-Dostmann, OBI

Remediation of Mold Growth

The German Federal Environment Agency recommends the removal of large mold damages (> 0.5 m²) by a company which is specialized in the removal of mold. Smaller damages can be remediated by a craftsman or yourself.

Mold removers based on hydrogen peroxide solutions (H_2O_2) are preferable to products containing chlorides. The mold is oxidized by the application with H_2O_2 and thus demobilized. Since the "dead" biomass can still emit MVOC gases, the mold should be completely removed mechanically.

Mellerud Schimmel-Entferner "**ohne Chlor**"
Mellerud Mold Remover (chlorine free)

Brand: Mellerud - available from home improvement stores (approx. 10.00 EUR)

4 steps for the removal of small-size mold damage:

1. Spray mold growth with mold remover (at least 25 cm around the growth). The wetted surface must be kept moist for at least 1 hour. Check after 20 minutes and spray again if necessary. Please wear rubber gloves and eye protection.
2. Wipe off the wet mold growth with kitchen paper towel and dispose of.
3. Spray mold remover on the dark side of a kitchen sponge and remove the remaining "dead biomass" mechanically with aid of a wet sponge.
4. The dry walls can then be painted. As a precaution, a mineral paint (e.g. silicate paint) or lime paint (e.g. AURO anti-mold paint No. 327) can be used. AURO anti-mold paint no. 327 is purely biological and has no fungicidal additives. Source:

www.auro-online.de/Auro-Anti-Schimmel-Farbe-Nr-327

Silicone joints with mold cannot be cleaned by this method. They need to be renewed.