

## Consequences of humidity

Relative humidity (RH) - without the addition or removal of water - is in inverse correlation to variations in temperature. As the temperature rises, the deficiency of moisture content in the air is extracted from the surrounding materials, for example from the brickwork of a church, or the wood which is the most important construction material of an organ.

If the RH should fall below 40% or rise to above 75%, serious damage to the woodwork of the organ cannot be ruled out. Air that is too dry leads to increased cracking in all wooden components, air that is too moist causes the wood to swell, one of the frequent causes of faults in mechanical components. Moreover, the risk of the formation of mould also increases.

Personal well-being, relative to the climate in a room, bears a direct relationship to the moisture content in the air. So a specified room temperature with sufficient humidity (e.g. 15° C at 55% RH) is found to be as pleasant as a higher temperature but with drier air (e.g. 20° C at 40% RH).

## Special sources of concern for damage to and malfunctions of organs

- Excessive temperatures combined with extreme humidity in the area of the organ
- Irregular operation or inexperienced operators of manually controlled heating systems
- Manual over-riding of the heating programmes (e.g. heating for several days at full power)
- Incorrect ventilation of church interiors

## Recommendations for the heating system

- Modern controls are also obtainable for older heating systems
- Warmth should be concentrated where it is needed (pew heaters, under-floor heating)
- Specialist advice should be sought before any major capital expenditure for heating or climate control

## Recommendations concerning heating and ventilation

- The relative humidity should not fall for a lengthy period below 45%, nor rise above 75%
- In a heated church the base load temperature should be between 8 and 10° C, the operating temperature should be between 14 and 16° C. The ambient temperature in the organ gallery should never exceed 18° C. The difference between base load and operating temperature should never exceed 6° C.
- Full temperature should be reached 2 hours before a service (or before an organ tuning)
- For organ practice low level, localised direct heating may be used (pedal heating, seat heating, air heater, radiator).
- Warm the room up/cool the room down slowly, never faster than 1° C per hour.
- Church interiors can never be warmed up by ventilation without increasing the humidity. It is therefore vital during the spring and summer to prevent the church doors being kept open for hours at a time, as the humidity thereby increases uncontrollably. A more useful solution can frequently be cross venting at night.
- During cold weather, ventilate sparingly, since this prevents the humidity dropping too rapidly.

## Conclusions

Should you come to the conclusion that the climatic conditions in your church merit a detailed examination, the following course of action is recommended:

- Stage one: regularly over a longer period of time measure and record the relative humidity and temperature in the area of the organ or inside the organ (both when the church is both heated and when it is unheated). Use only a well-calibrated hygrometer!
- Stage two: call in the specialists. If required, we can supply you with contact details - naturally without obligation on either side.

Often an electronically controlled ventilation system can help combat the formation of mould that with increasing frequency affects paintings or organic surfaces (such as organ components). This has the advantage that ventilation of the room only takes place at the correct moment for the ambient conditions.