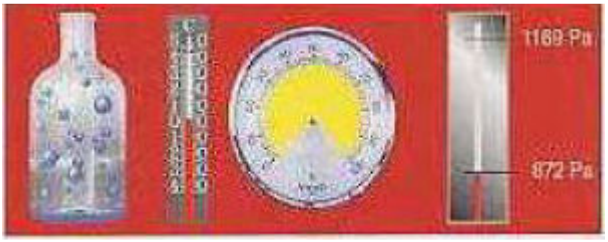
Cooling Examples

Starting Point
We are using the same examples used for warming air, 20°C and j = 50%.

Cooling to 10°C
At 10°C there is still 8.65 g/m³ of water vapor present. The partial pressure p, remains unchanged but now the air can only hold max. 9.41 g/m³ of water vapor, increasing the relative j humidity to 95.2%

Water vapor saturation
At 9.3°C, the air with 8.65 g/m³ of water vapor is completely saturated, j is now 100%. p = 1169 Pa is now the Sättigigungsdruck ps, the saturation limit of 9.3°C dew point is called JT (respectively Theta T)

Water vapor condensation
Further cooling leads inevitably to condensation. At 5°C, the air can only be max. 6.8 g/m³ absorbed water vapor, with the remaining 1.85 g condensed water. The saturation pressure ps is now only 872 Pa



If cooling continued the result would be much worse than with continued warming. At -20°C, 7.8 g water per cubic meter of air would occur!

Universität Duisburg-Essen Institut für Bauphysik und Materialwissenaschaft Univ. :Prof. Dr. Max J. Setzer