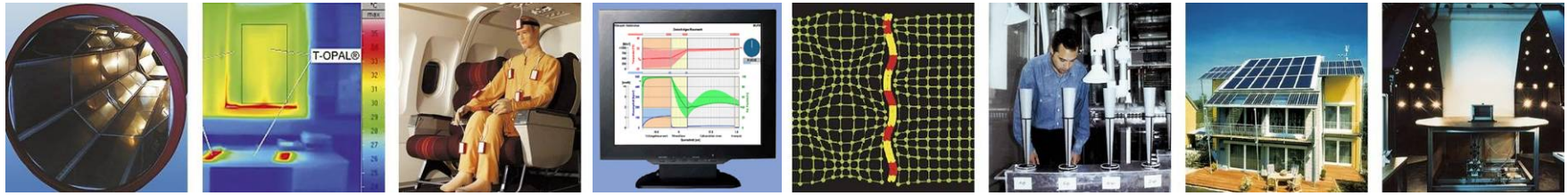


WUFI® - Pro 2012

Modelling water-repellent treatment of a façade by adjusting the A-value

Fraunhofer IBP

Allowing for the effect of water-repellent treatment on façade materials

If the water-repellent treatment of a façade completely prevents the absorption of rain water, it may be sufficient to switch the rain off by setting the “Adhering fraction of rain” to zero.

Usually, however, the treatment only reduces the amount of absorbed rain to some degree. This can be modeled by adjusting the liquid transport properties of a thin surface layer of the façade material, corresponding to the penetration depth of the water-repellent agent.

This approach also reflects the fact that such a treatment usually reduces the drying potential of the treated surface by allowing adsorbed moisture to reach the surface by diffusion mainly, liquid transport being strongly suppressed.

If the treatment also changes the μ-value of the material, it also has to be adjusted separately. Note that the WTA-recommendations* for example only allow a 50% increase of the s_d-value of a surface with a water-repellent treating.

*) WTA-Merkblatt 3-17/D - Hydrophobierende Imprägnierung von mineralischen Baustoffen

Allowing for the effect of water-repellent treatment on façade materials

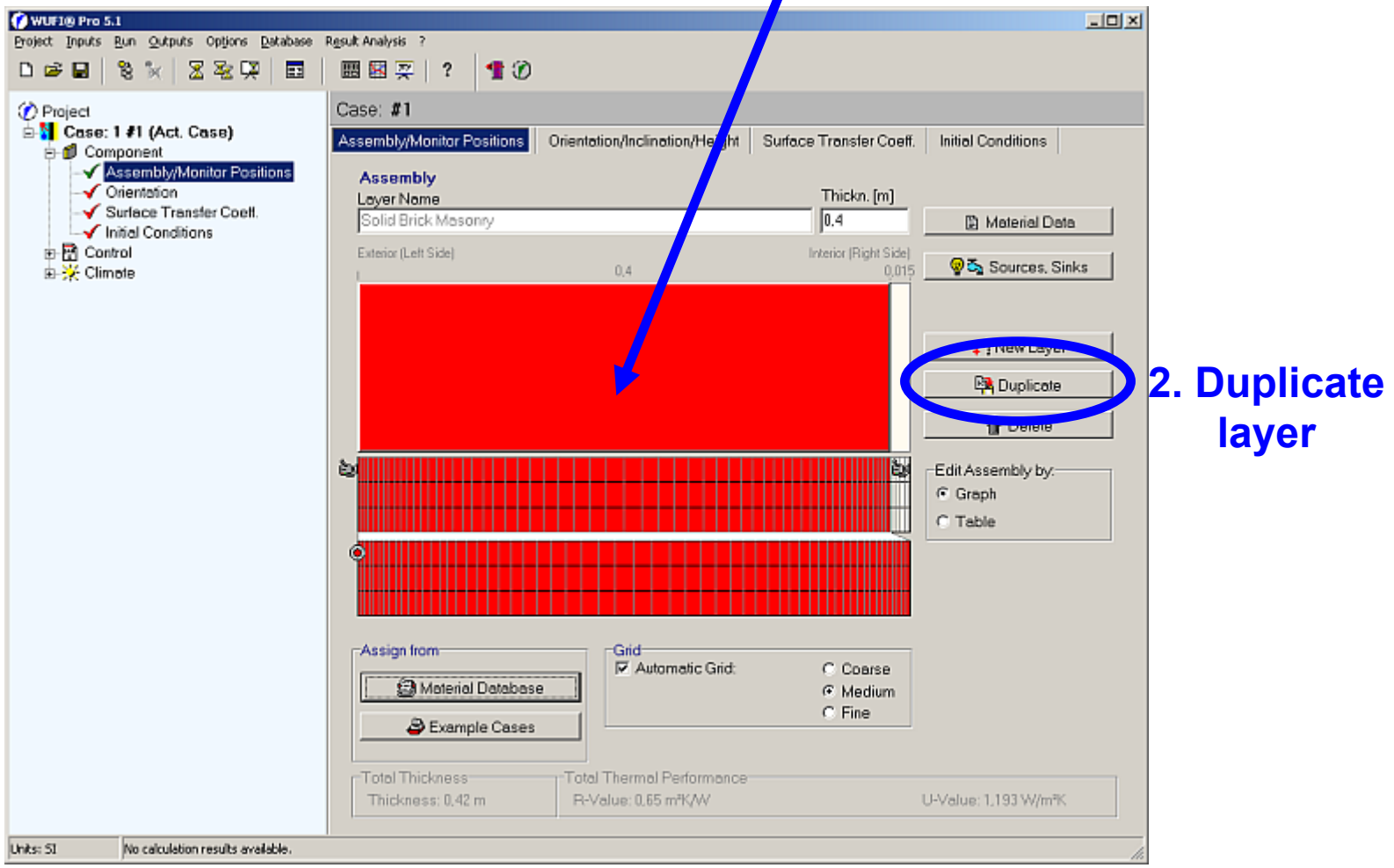
Modification of the A-value without influencing other material properties

Step by step:

1) Split the exterior layer into a surface layer (0,5 – 1,0 cm depending on penetration depth of treatment) and the remaining layer. To do this, duplicate the original layer and then adjust the two thicknesses as needed.
2) Edit the material properties of the new exterior layer:
   - Unlock the material
   - Switch “Liquid Transport Coefficients” for suction and redistribution to “generate”
   - Adjust “Water absorption coefficient”
     Be careful with the units: [kg/m²√s] is the A-value in [kg/m²√h] devided by 60 !!!
   - If needed, adjust the μ-value as well

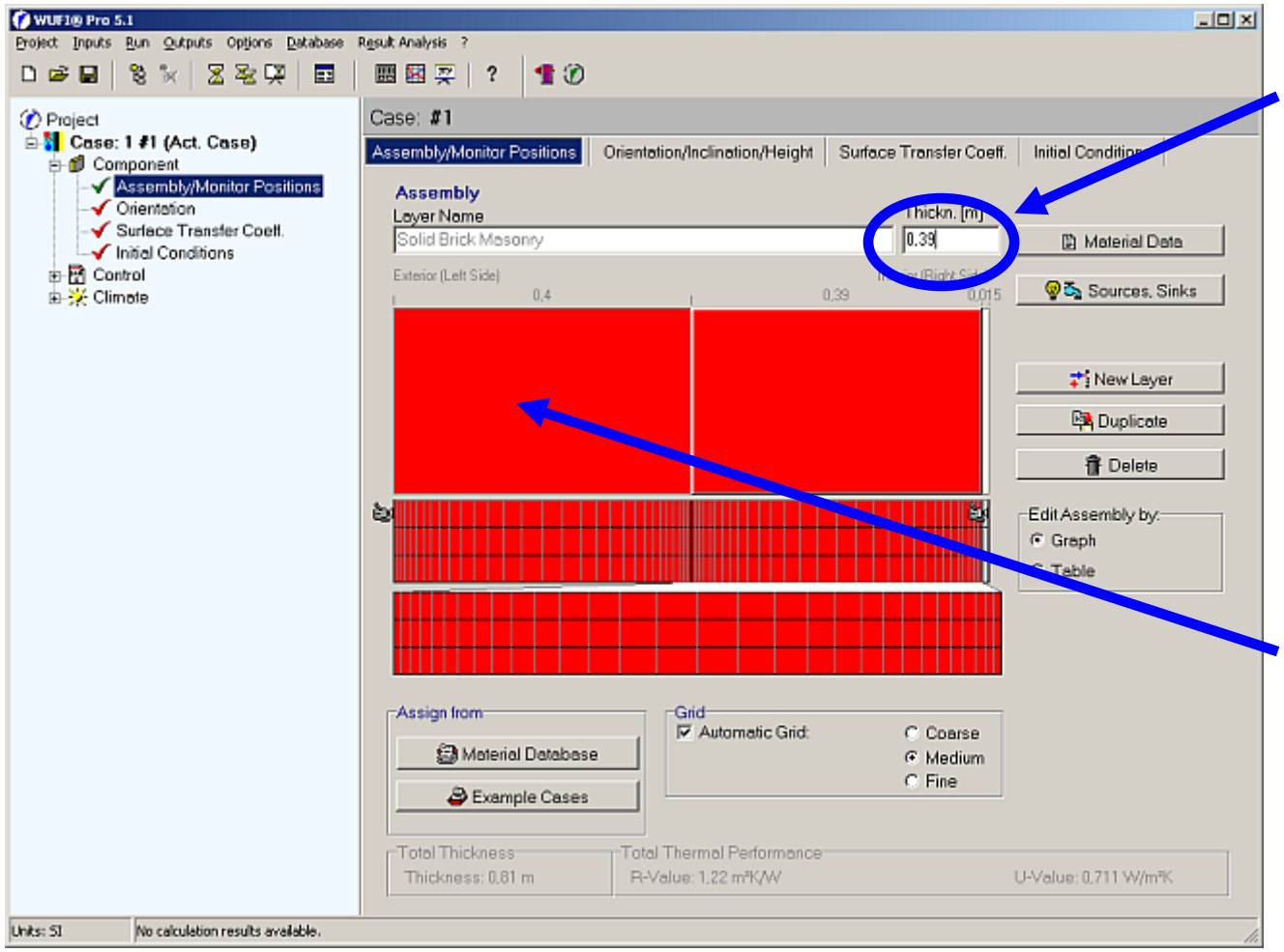
Water-repellent treatment of façades

Existing wall



Water-repellent treatment of façades

Existing wall



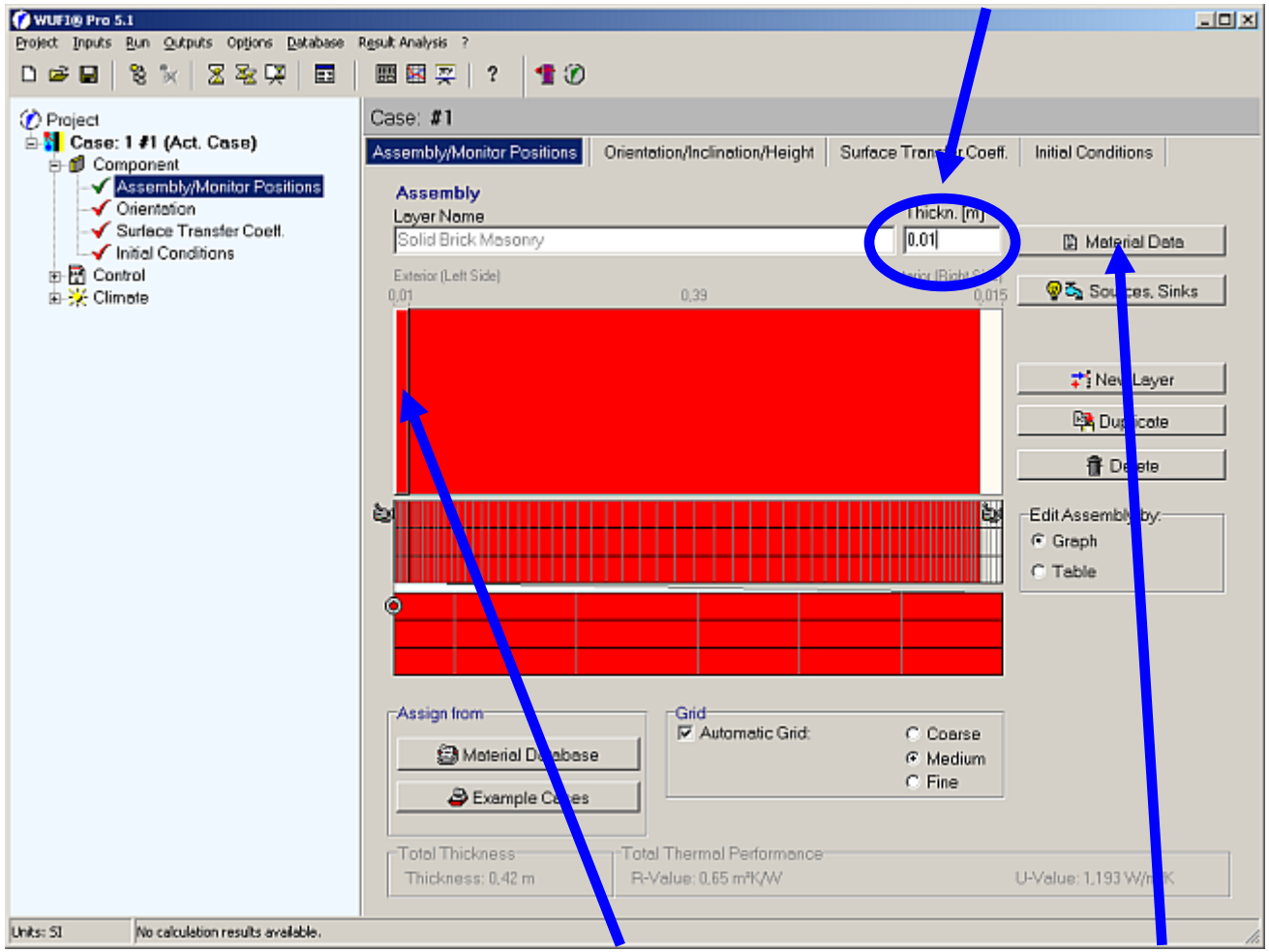
3. Reduce thickness (e.g. thickn. minus 1cm)

4. Select exterior layer

Water-repellent treatment of façades

Existing wall

5. Change thickness (e.g. 1cm)



6. Double click on layer or click on Material Data

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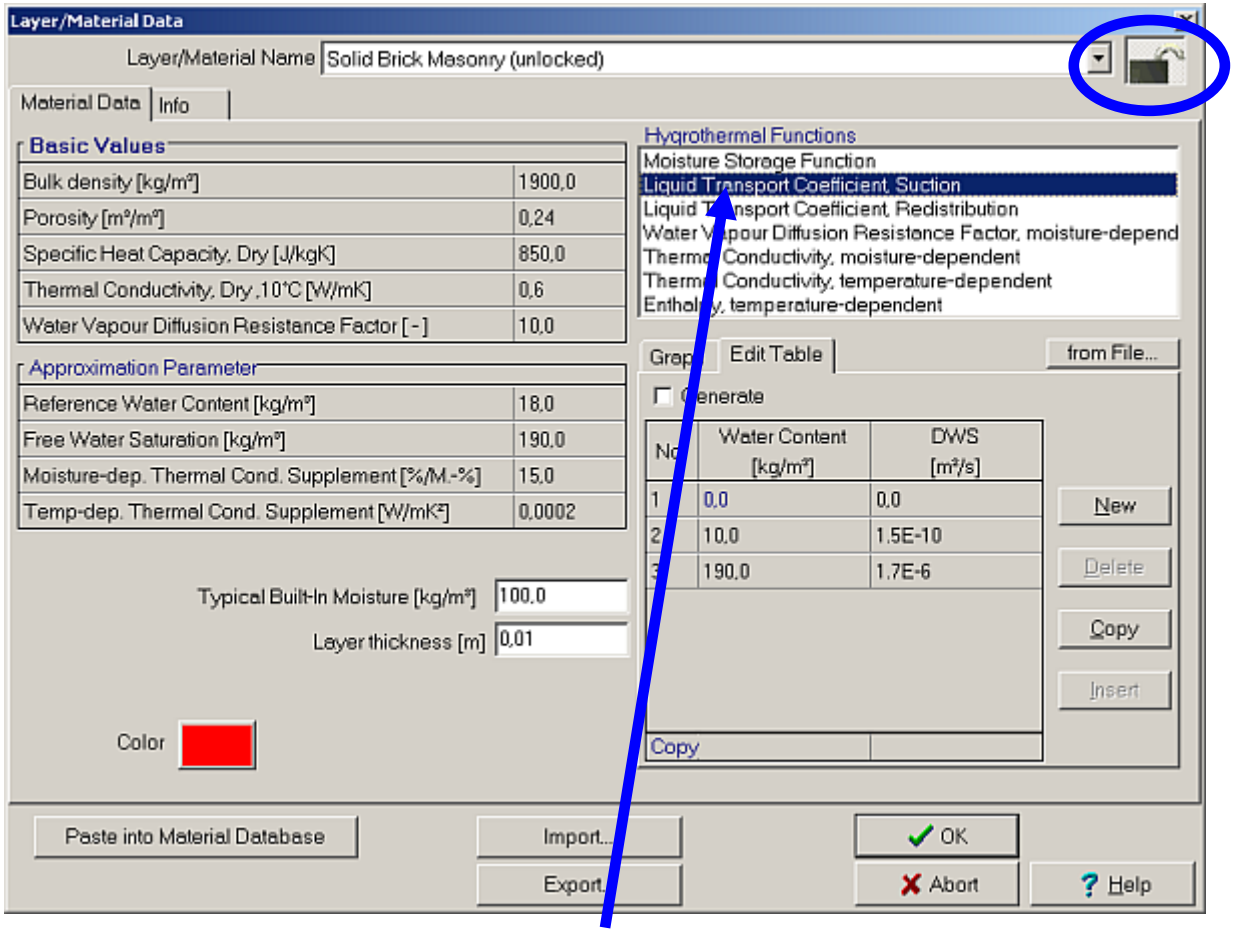
Water-repellent treatment of façades

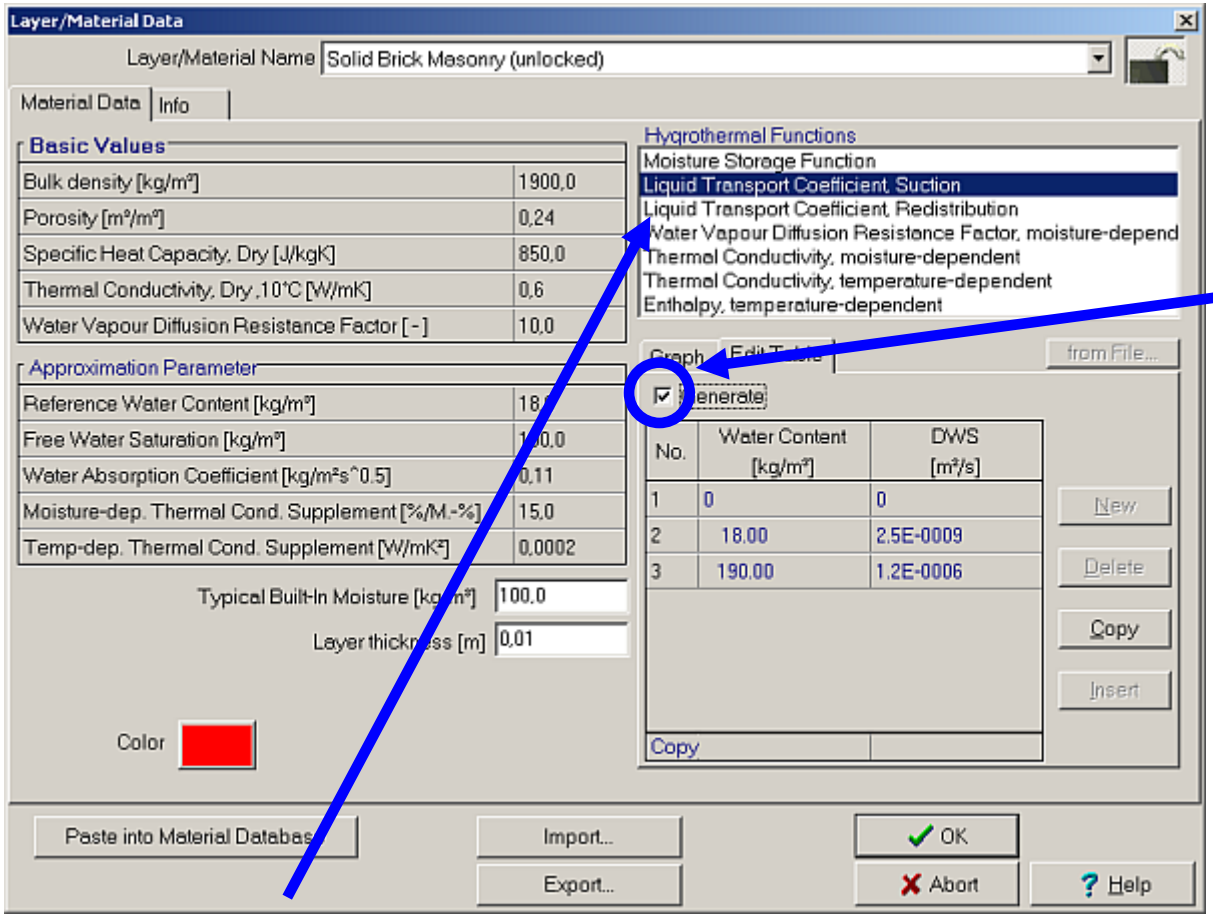
Existing wall



7. Unlock material

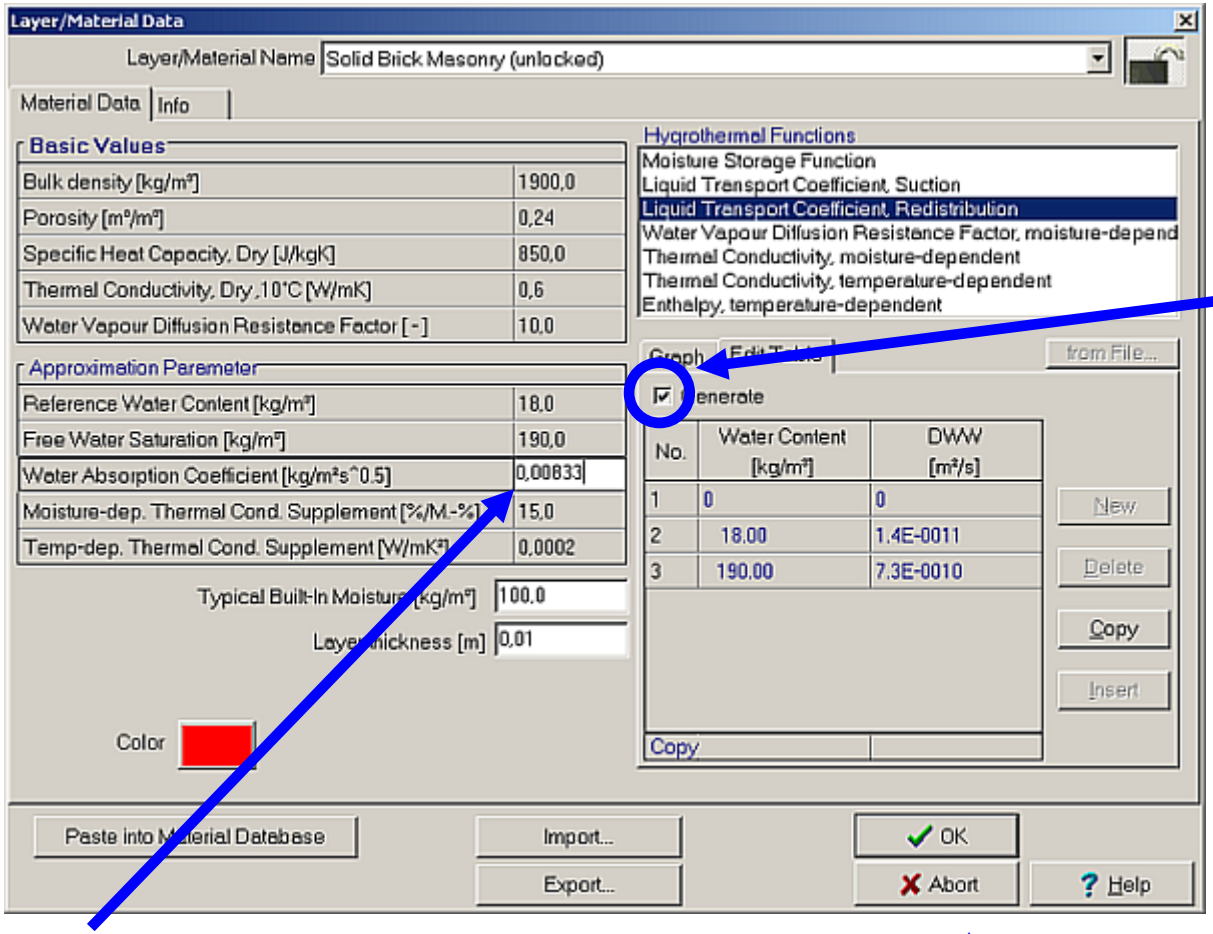
8. Select Liquid Transport Coefficient, Suction

Existing wall



Water-repellent treatment of façades

Existing wall



11. Check Generate

12. Enter A-value: In this case: 0,5 kg/m²√h / 60 = 0,00833 kg/m²√s

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