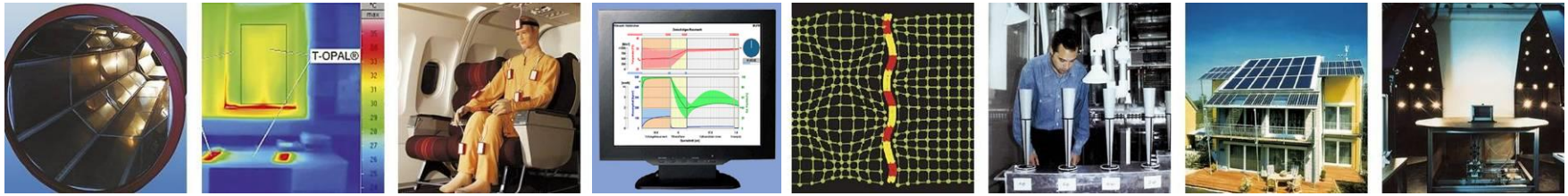


WUFI®

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

Date: September 2017

Fraunhofer IBP

Requirements for a water-repellent treatment

German Recommendation according to WTA-Merkblatt 3-17

("Hydrophobierende Imprägnierung von mineralischen Baustoffen")

- Water-repellent treatments of façades reduce the capillary water absorption. After correct performance, values of **$A < 0{,}1\ kg/m^2\sqrt{h}$** should be achieved.

  → In WUFI® 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.

- A sufficient water vapour diffusion capability must be ensured in order to allow the drying out of water due to imperfections. Due to the water-repellent treatment the **diffusion resistance** of the treated layer **must not be increased by more than 50 %**.

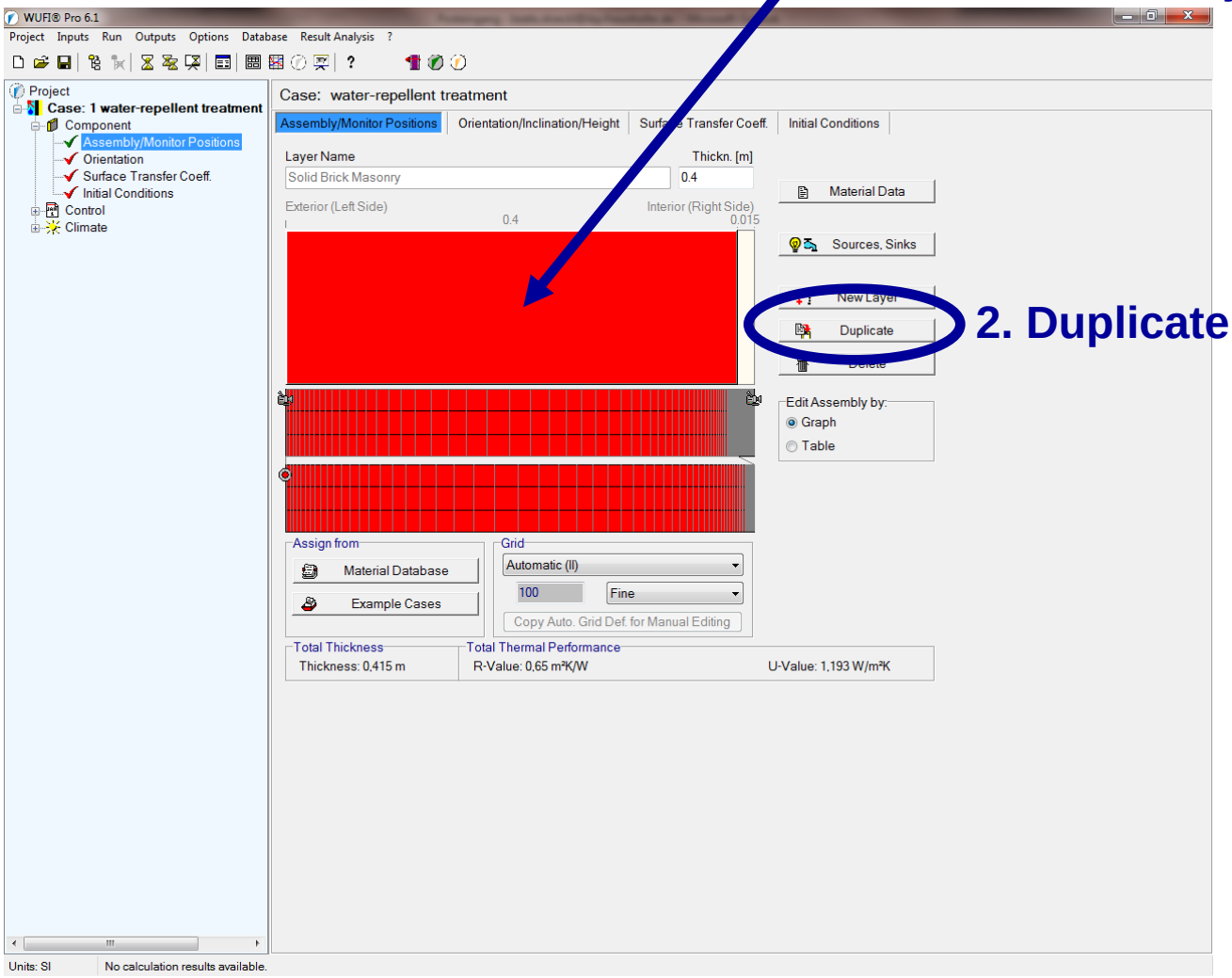
  → μ-value of the surface layer must be adapted separately!

Consideration by adjusting the A-value and the μ-value:

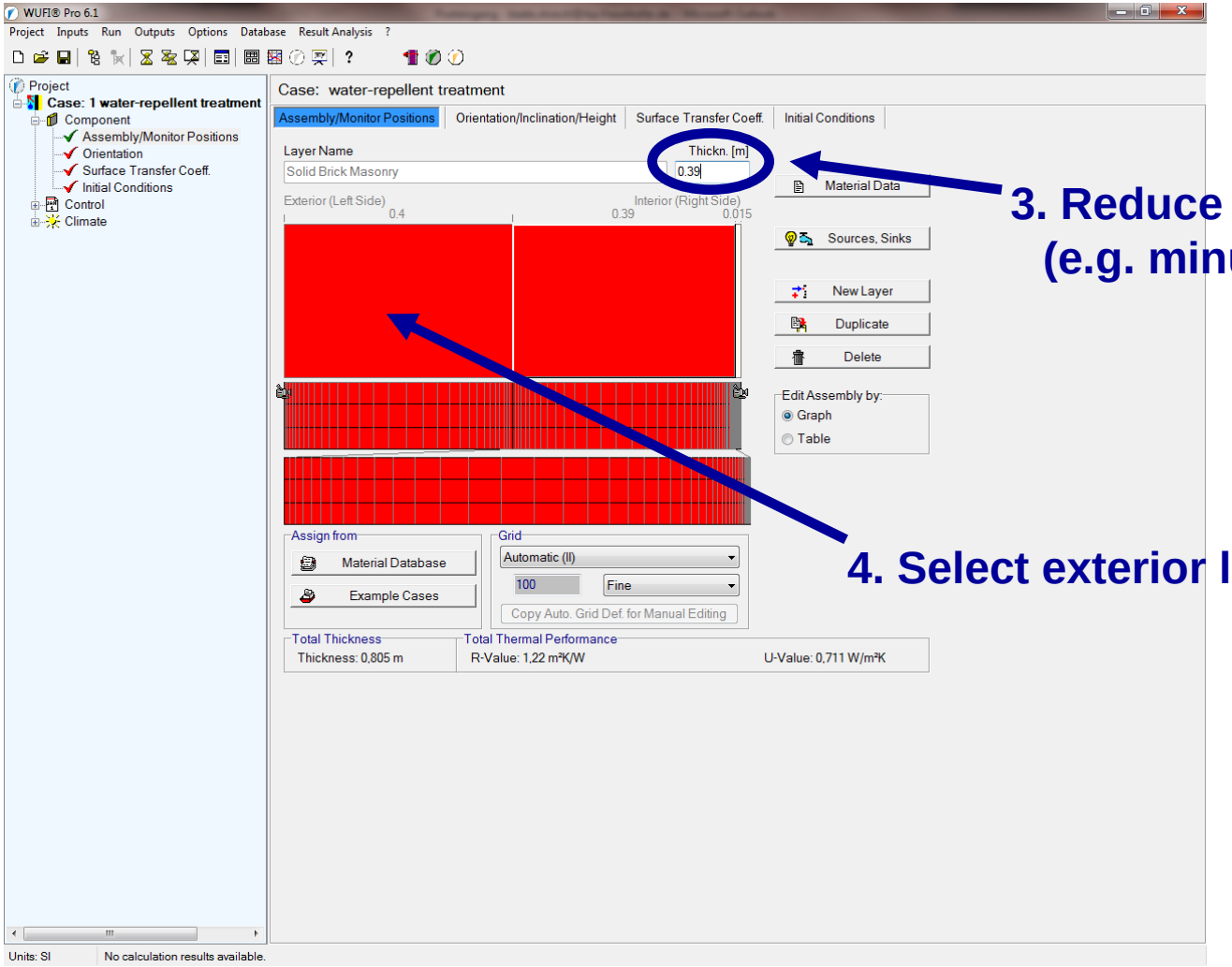
Proceeding:

1) Separate a thin surface layer (0.5 – 1 cm depending on penetration depth of treatment) from the normal wall. 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.
   - Check the “Generate“ boxes at “Liquid Transport Coefficients” for suction and redistribution.
   - Adjust “Water Absorption Coefficient”.
     Be careful with the units: [kg/m²√s] is the A-value in [kg/m²√h] divided by 60!
   - Adjust the “Water Vapour Diffusion Resistance Factor” of the new surface layer.

Proceeding in WUFI®



Proceeding in WUFI®



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

4. Select exterior layer

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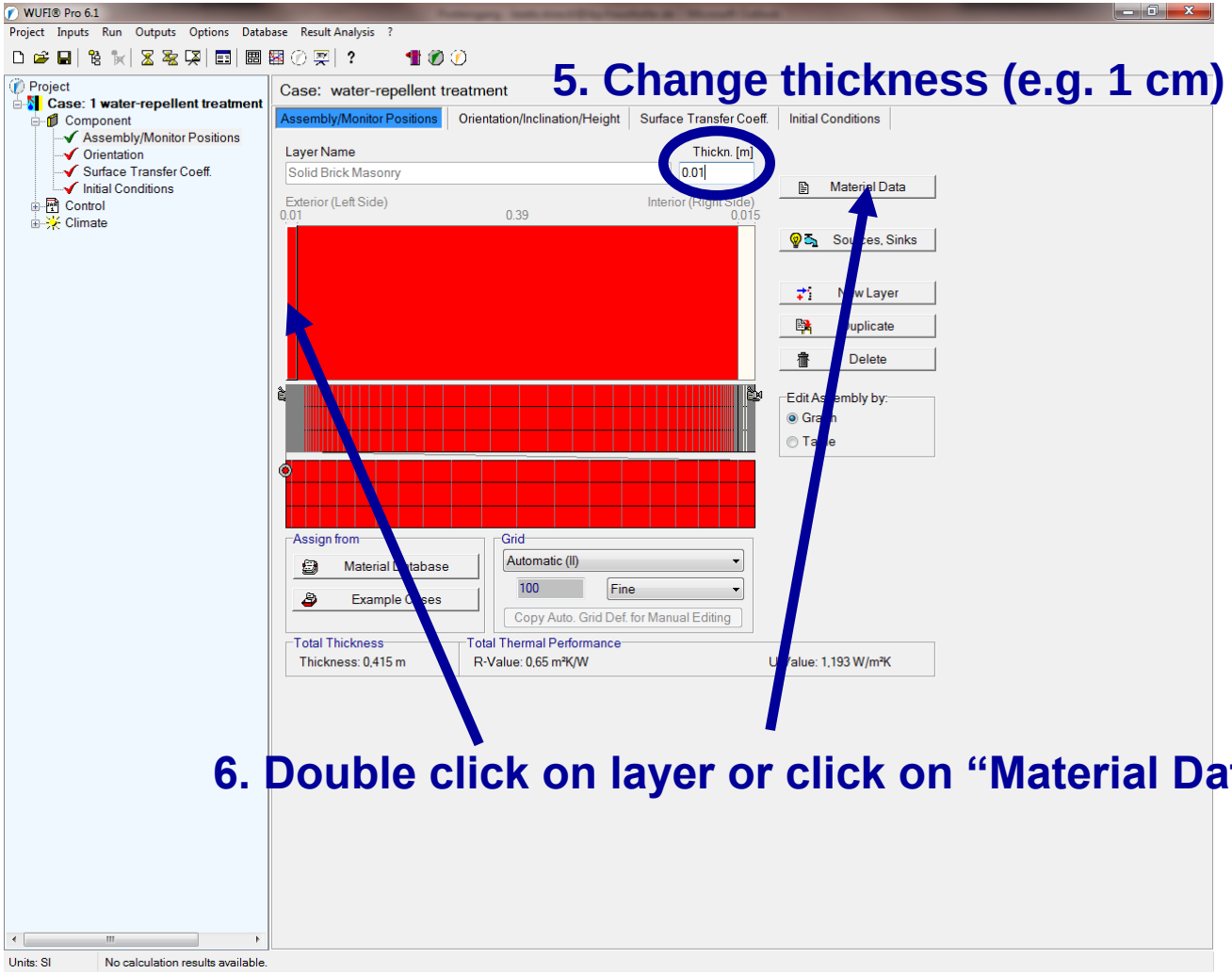
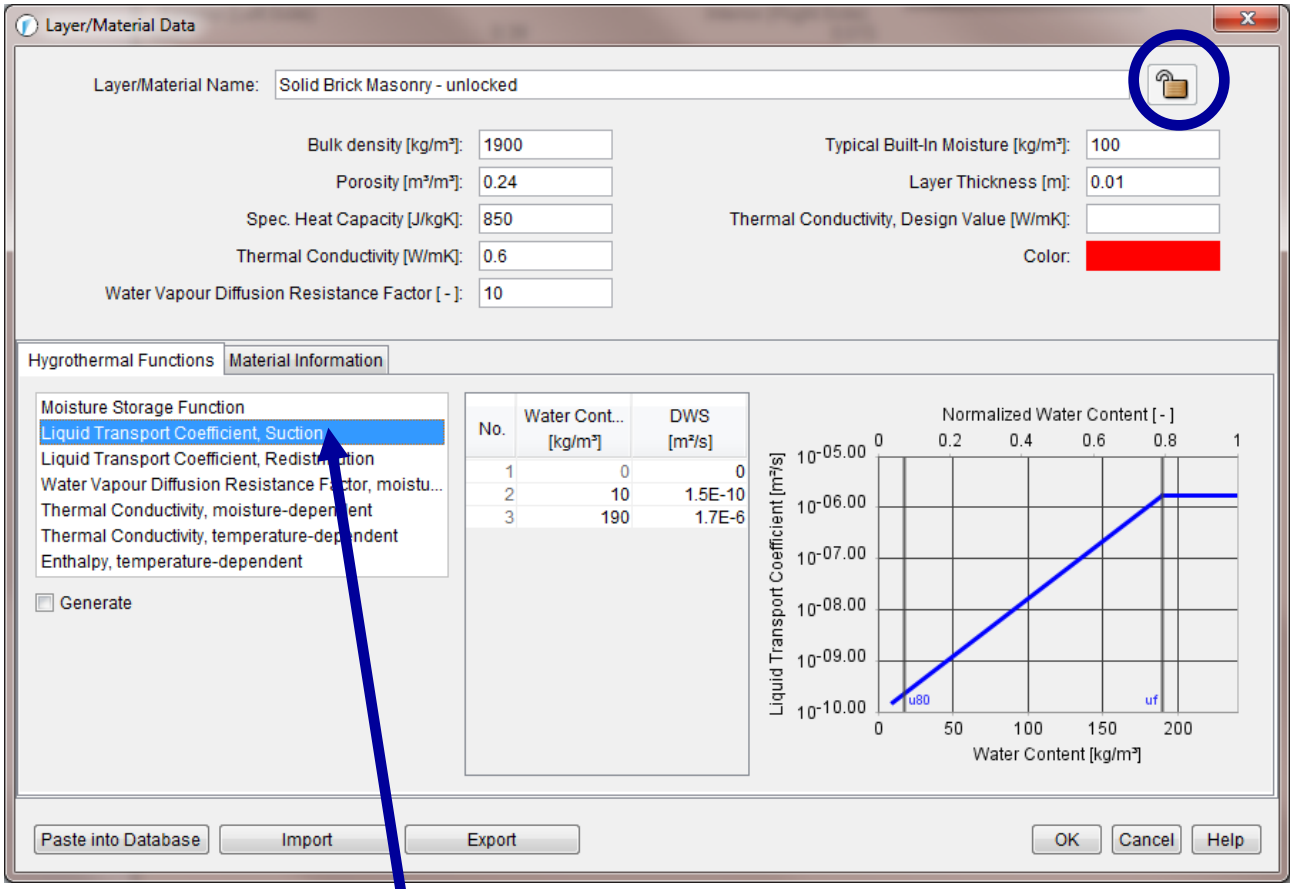


Proceeding in WUFI®

7. Unlock material



8. Select “Liquid Transport Coefficient, Suction”

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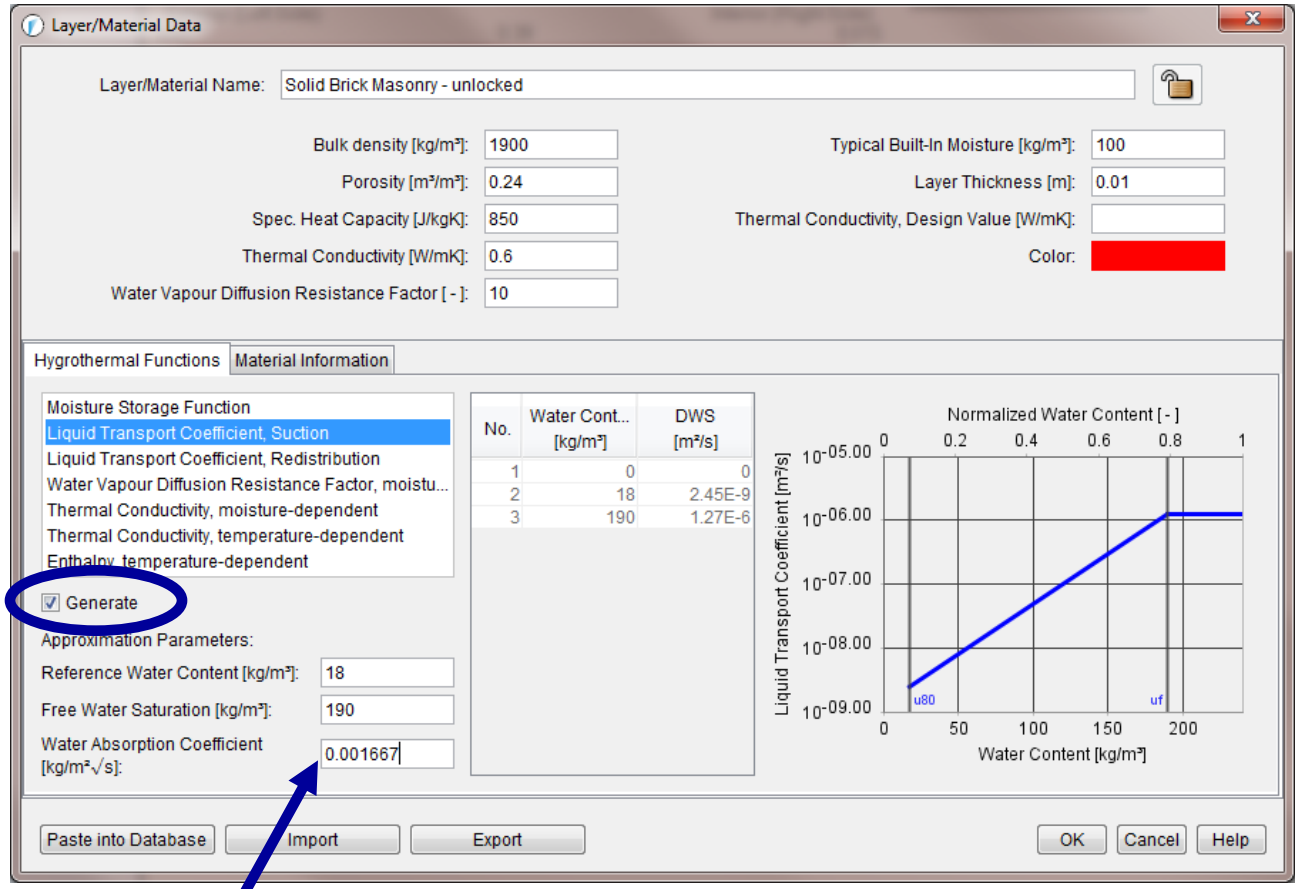

9. Check “Generate”

10. Enter A-value in [kg/m²√s]
in this case: 0,1 kg/m²√h / 60 = 0,001667 kg/m²√s

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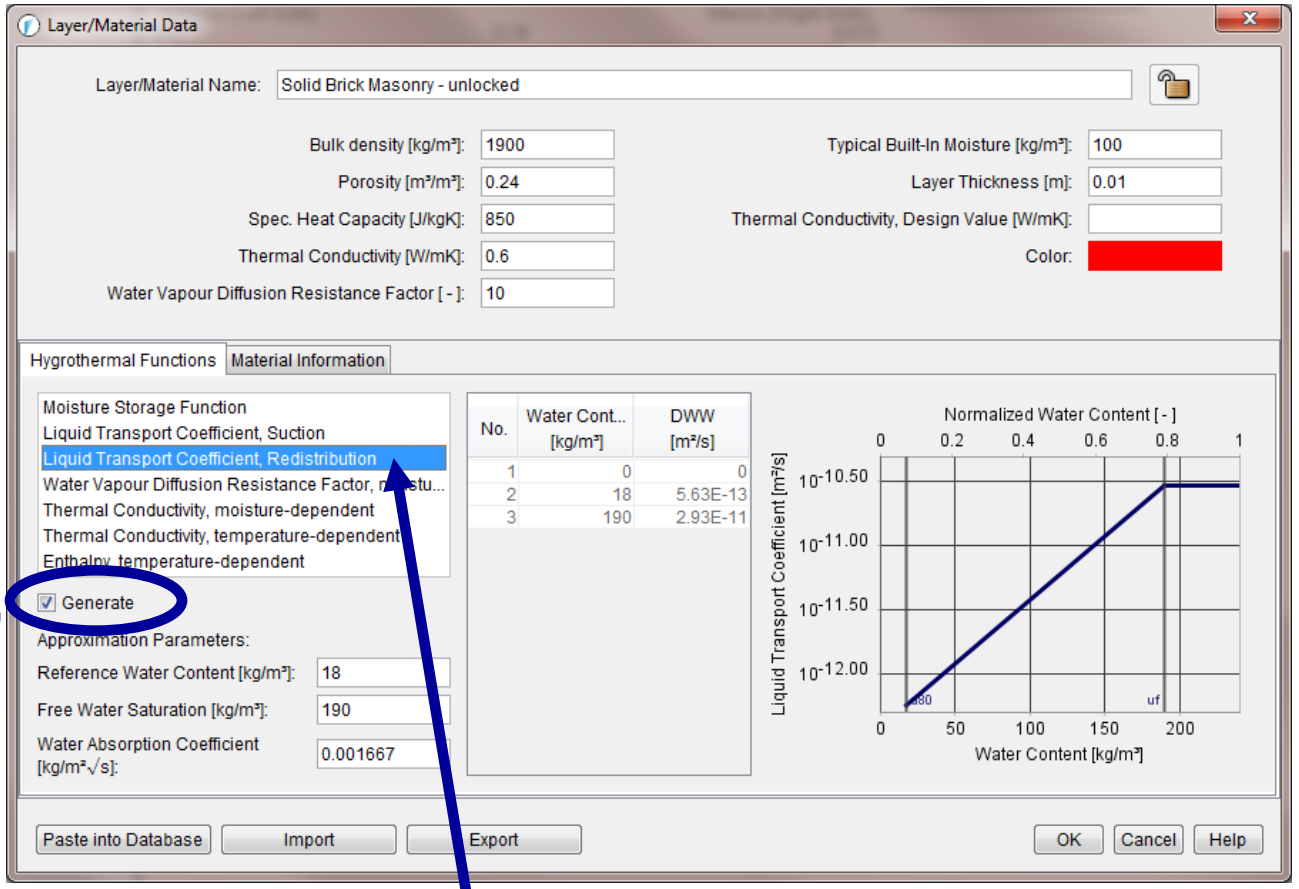

12. Check “Generate”

11. Select “Liquid Transport Coefficient, Redistribution”

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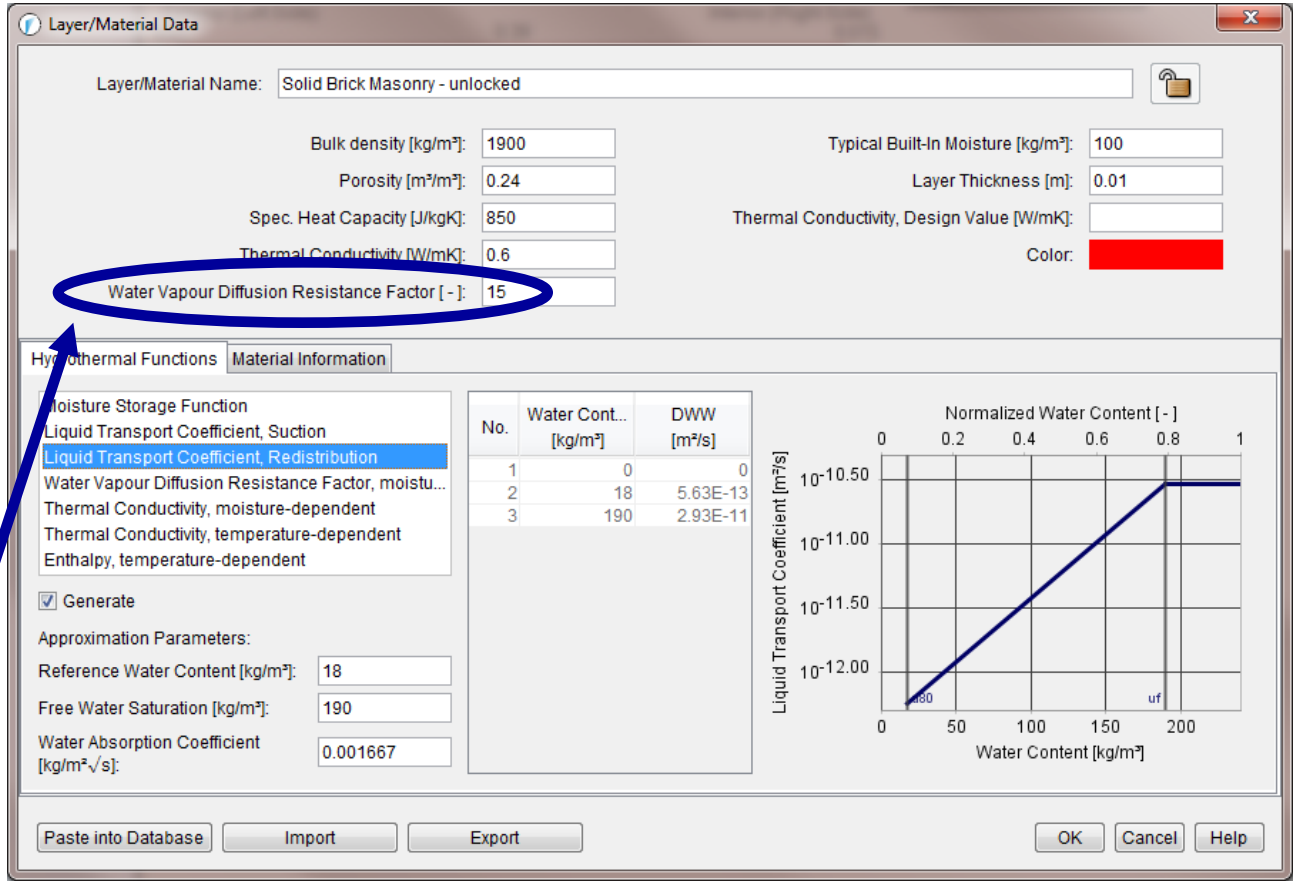
Proceeding in WUFI®



13. Increase “Water Vapour Diffusion Resistance Factor” by 50 % (safe side!) in this case: from μ = 10 to μ = 15