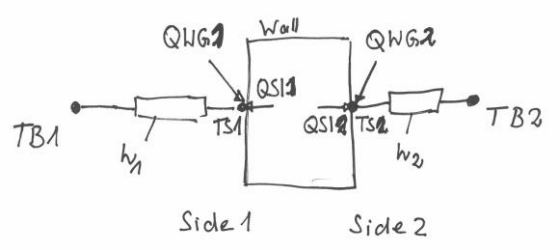
Coupling of Type56 and TYPExxx modelling a construction element

The idea is to model in Type 56 a dummy construction with a high resistance such that no energy flows through the surface from one side to the other. The energy flow from inside the surface to both sides is modelled by the TYPExxx. These heat fluxes on the sides are set as “surface gains” to the surface in Type 56.

TYPExxx modelling a construction element

TYPExxx models the construction element completely. It is coupled to Type 56 by inputs and outputs.



Inputs (from Type56)

- TB1 - boundary temperature on side 1 [°C]
- TB2 - boundary temperature on side 2 [°C]
- h1 - heat transfer coefficent on side 1 [kJ/(hr m² K)]
- h2 - heat transfer coefficent on side 2 [kJ/(hr m² K]
- QWG1 - energy gain on side 1 [kJ/hr]
- QWG2 - energy gain on side 2 [kJ/hr]

If the side is facing “the airnode”:

TB = Tstar	(Tstar = NType 23: star node temperature of airnode)
h = 1/ MAX(REQV * AREA ,0.001)	(REQV = NType 86; AREA = NTYPE 113)
LW Mode = STANDARD:	
QWG = QABSI - QWG	(QABSI = NType 21; QWG = NTYPE 82; These are all gains except the userdefined surface gain)
LW Mode = DETAILED:	
QWG = QABSI + QABSILW - QWG	(QABSI = NType 21; QWG = NTYPE 82; QABSILW = NYPE 110 These are all gains except the userdefined surface gain)

If the side is facing “outside”:

TB = Tamb	(Tamb = ambient temperature = Input 1 of Type56)
h = HCONVO	(HCONVO = NTYPE 107)
QWG = HT * ABS-BACK – QSKY	(HT = NTYPE 116; ABS-BACK = absorption coefficient; QSKY = NTYPE 83; This is absorbed solar gain plus longwave radiation exchange with the sky)

If the side is facing “userdefined boundary condition”:

TB = TBOUNDARY	(TBOUNDARY = boundary temperature as defined in Type56)
h = HCONVO	(HCONVO = NTYPE 107)

It is impossible to define a surface gain on the “userdefined boundary condition” side. Therefore, the temperature output TSO is always TB. It is planned to extend the surface gain definition to the “userdefined boundary condition” side too

Note: Reasonable initial values for h1 and h2 necessary!

Outputs

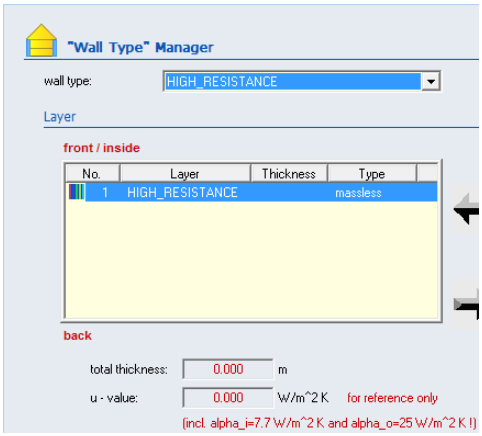
- TSI1 - surface temperature on side 1 [°C]
- TSI2 - surface temperature on side 2 [°C]
- QSI1 - Heat flux on the surface on side 1 [kJ/hr]
- QSI2 - Heat flux on the surface on side 2 [kJ/hr]

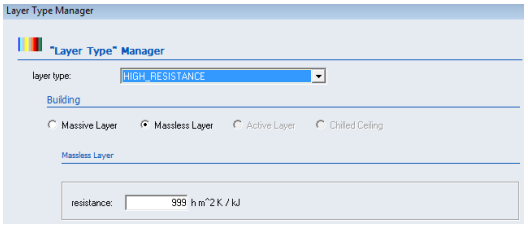
TSI1 and TS2 aren’t connected to Type 56. It is recommended to use these temperatures for checking against the surface temperature calculated by Type 56

QS1 and QS2 are coupled as surface gains to the dummy wall of Type56

Modelling of the dummy surface in Type56

Wall Type definition

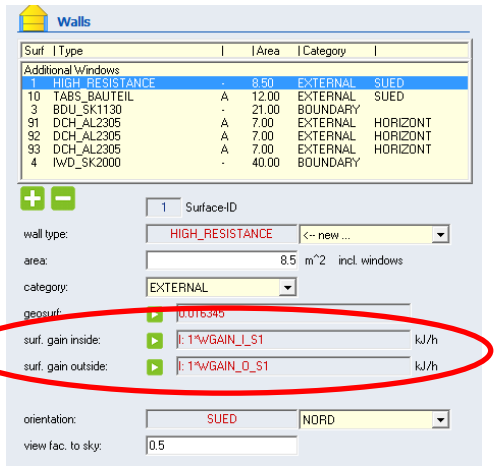




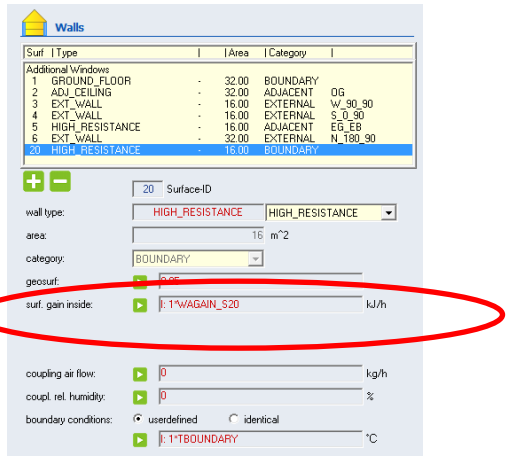
Note: 999 is currently the max. possible value for a resistance. This leads to small error in the energy balance. In general it is neglectable

Surface definition with the required surface gains

"External":



"Userdefined Boundary Conditions":



"Adjacent":