Ground Contact Constructions

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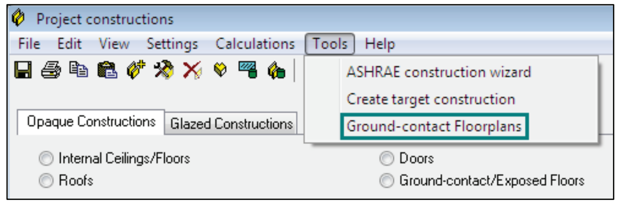
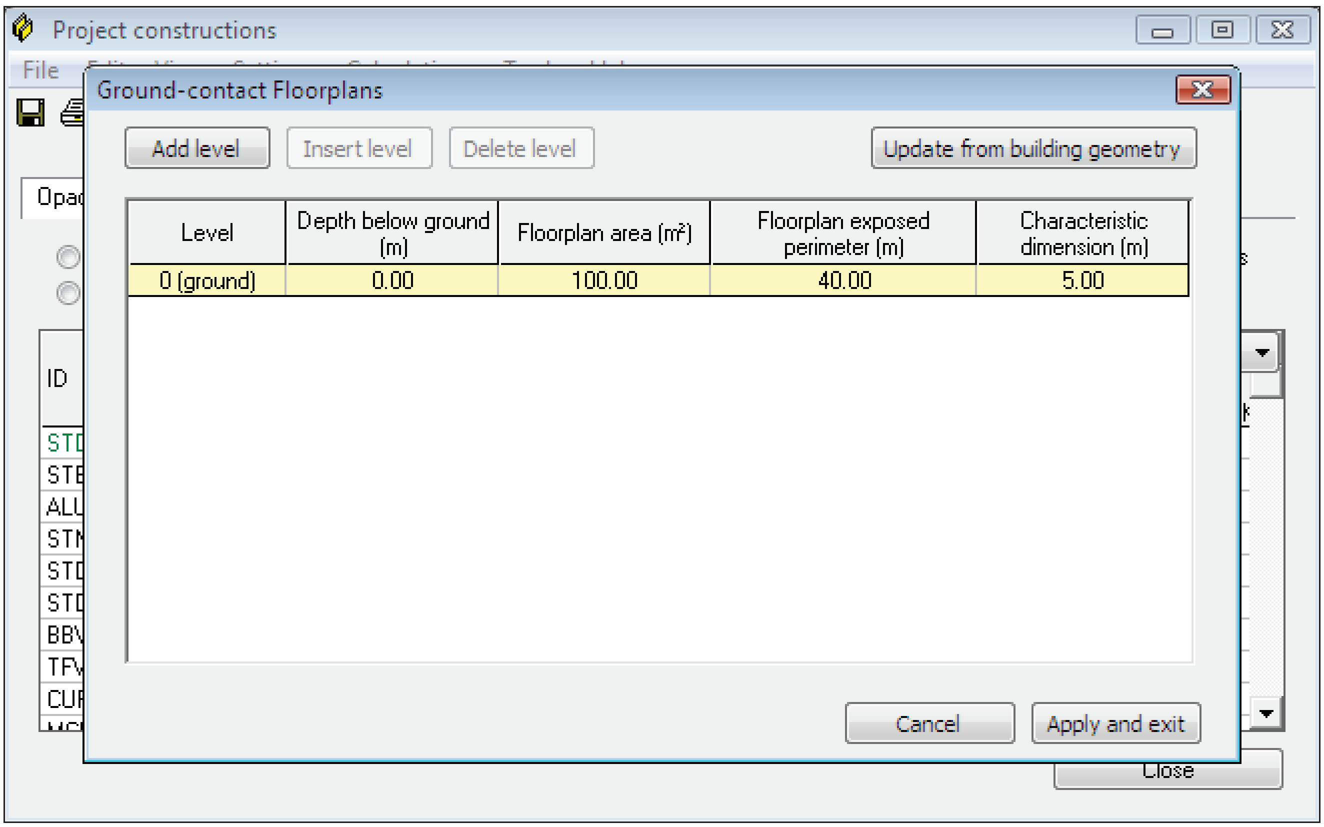
The Apache Constructions Database has been enhanced to assist with calculating U-values of constructions (floors and walls) that are in contact with the ground. Using the current model geometry to identify surfaces that are below or in contact with the ground plane (at level z = 0) Constructions can then be modified to give an accurate U-value calculation.

In CDB select the menu option:
Tools >> Ground-contact Floorplans.





Here the Floorplan parameters are defined and Characteristic Dimension is calculated for the building. Click the “Update building from geometry” button to automatically add Levels for each storey with a floor touching or below ground (Z=0) in the building.

Floorplan – the floorplan at a particular ground or sub-ground level is the polygon formed from the intersection of the building with a horizontal at that level.
Characteristic Dimension is calculated for any particular level as 2 * Af / Pf

Where	Af	is Floorplan Area at that level
	Pf	is Floorplan Perimeter at that level

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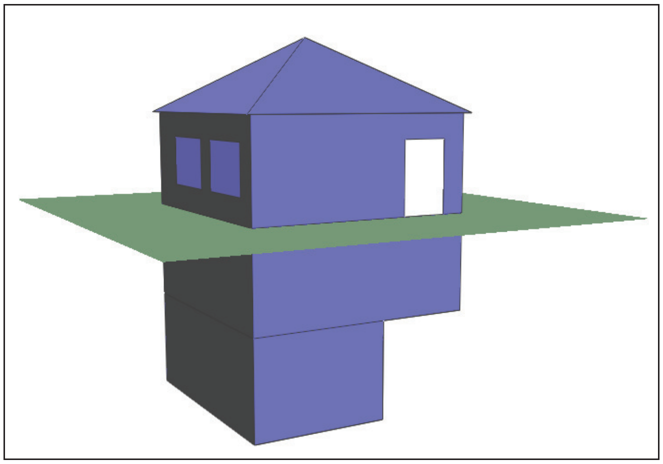
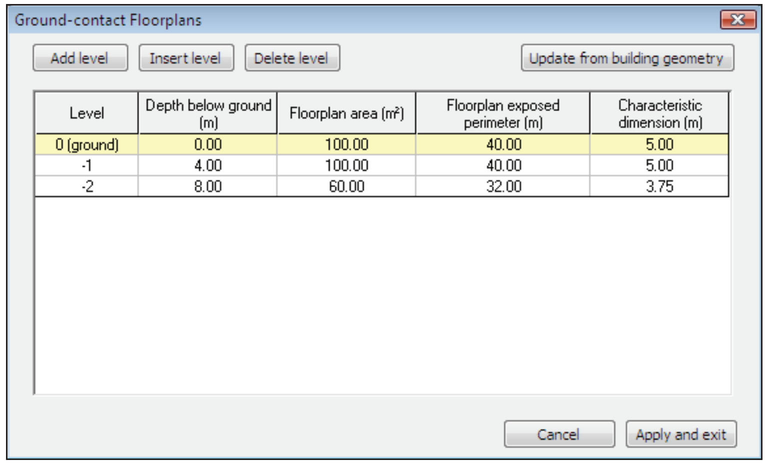
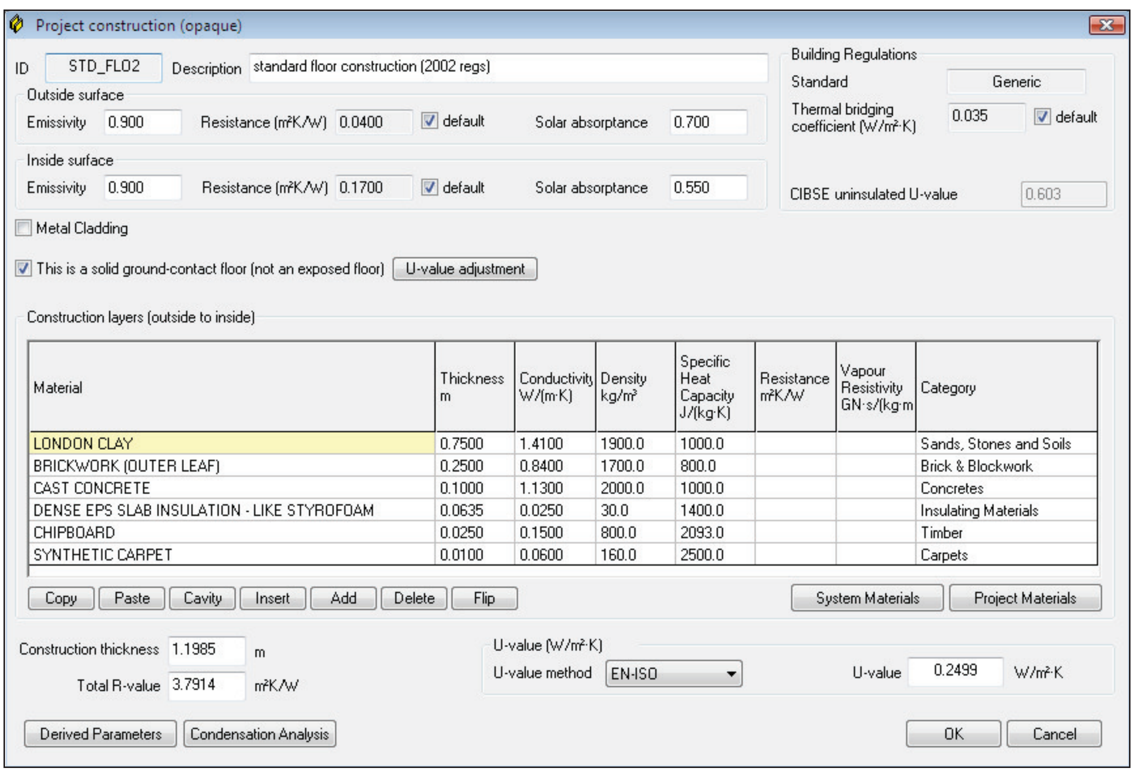




Options to manually override these values are provided to allow user to add/delete levels and edit the Depth, Floorplan Area and Floorplan exposed perimeter values for any level. This gives the user control over the Characteristic dimension for buildings with unusual geometry.

When Floorplans have been defined the Ground-contact Constructions can be modified. In CDB open any Ground-contact/Exposed Floor or External Wall.

The option to define the construction as Ground-contact is available, tick this and click the U-value adjustment button to input further parameters that will be used in the calculation of the U-value adjustment.



The U-value adjustment can be calculated using the EN-ISO 13370 method or F-factor.

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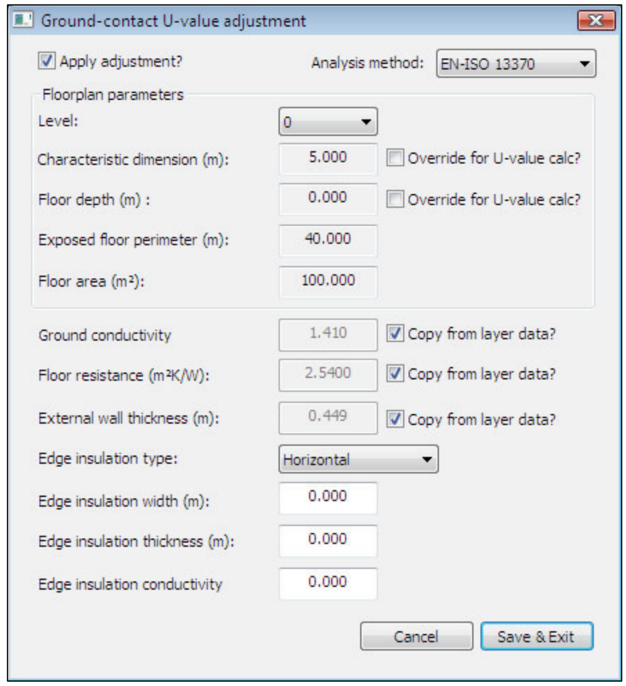
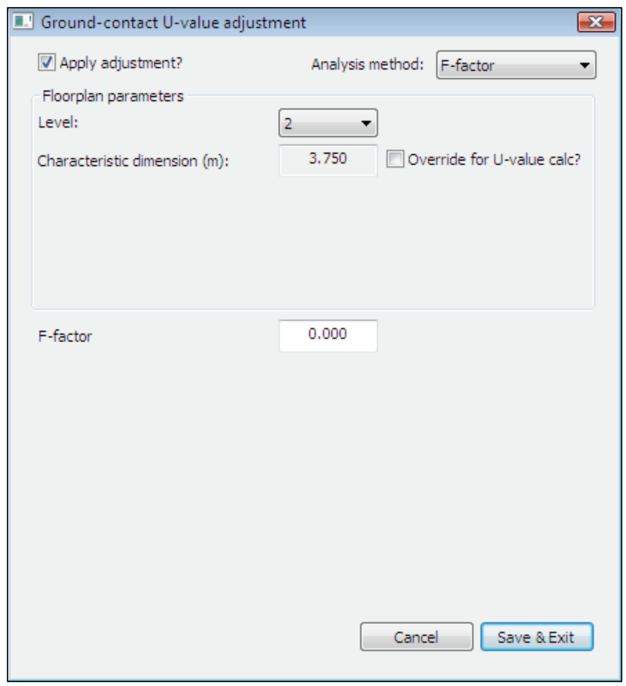
EN-ISO method

EN-ISO 13370 method takes as input ground conductivity, Floorplan characteristic dimension, wall thickness and insulation details and depth below ground level.



F-Factor

F-factor method takes as input the Floorplan characteristic dimension and an F-factor.



Both methods rely on the Level being chosen so that the correct parameters (Characteristic Dimension etc) are used.

When the parameters are defined tick the “Apply adjustment” checkbox then Save and Exit to apply the U-value adjustment to the construction in the form of additional layers in the Construction Layers (identifiable as the U-value correction layer).

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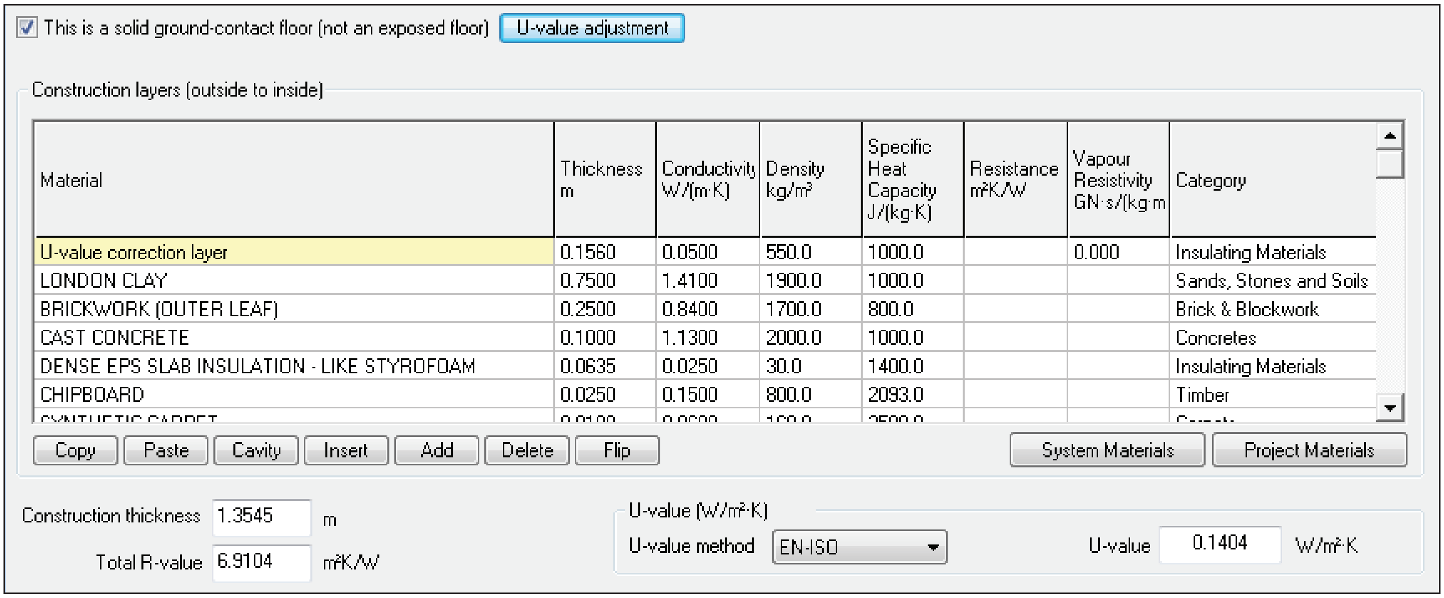

Material	Thickness m	Conductivity W/(m·K)	Density kg/m³	Specific Heat Capacity J/(kg·K)	Resistance m²K/W	Vapour Resistivity GN·s/(kg·m	Category
U-value correction layer	0.1560	0.0500	550.0	1000.0		0.000	Insulating Materials
LONDON CLAY	0.7500	1.4100	1900.0	1000.0			Sands, Stones and Soils
BRICKWORK (OUTER LEAF)	0.2500	0.8400	1700.0	800.0			Brick & Blockwork
CAST CONCRETE	0.1000	1.1300	2000.0	1000.0			Concretes
DENSE EPS SLAB INSULATION - LIKE STYROFOAM	0.0635	0.0250	30.0	1400.0			Insulating Materials
CHIPBOARD	0.0250	0.1500	800.0	2093.0			Timber