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## Determination of thermal transmittance

(4 appendices)

*This revision of the report is in response to a change of address. The original report is F516398B dated 2005-09-28.*

### Work requested

The client supplied drawings of profile section of panels from Ryterna for calculation of its U-value. Appendix 4 shows the design of the profile sections.

### Calculation

Calculation of the U-values of the sections was performed using the FRAME 5.1 program. Values of the thermal conductivity are shown in appendix 1. The thermal conductivity value of PUR has been assigned on basis of measurements shown in appendix 2.

The air temperature and surface resistance have been taken as  $\vartheta_i = +20$  °C and  $R_{si} = 0.13$  m<sup>2</sup>K/W (0.20 m<sup>2</sup>K/W for inward corners) on the inside and  $\vartheta_e = 0$  °C and  $R_{se} = 0.04$  m<sup>2</sup>K/W on the outside.

### Calculation results

The U-value of a door ( $U_{door}$ ) is calculated according to

$$U_{door} = [A^P \cdot U_{1-DIM}^P + A^W \cdot U_{1-DIM}^W + (\sum (\psi \cdot L))] / A_{door}$$

where  $U_{1-DIM}^P, U_{1-DIM}^W$  = thermal transmittance for the one-dimensional heat flow through the panel and the window, W/(m<sup>2</sup>K)

$\psi$  = linear thermal transmittance for edge sections, perimeter of pass door and window. Additional heat flow compared to the one-dimensional heat-flow through panel and window due to combined thermal effects of panel(s), thermal bridging at the edge and wall position.

$L$  = length, m

$A^P, A^W, A_1^{door}$  = area of the panels, windows and door (wall opening)

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Calculations with a door with width (W) = 3.05 m and height (H) 2.55 m;

<b>Model</b>	<b><math>U_{\text{door}}, W/(\text{m}^2\text{K})</math></b>
TLB 30 Ribbed	1.8
TLB 30 with cassette	1.9
TLB 40 Ribbed	1.6
TLB 40 with cassette	1.6

The calculations are shown in greater detail in appendix 3.

**SP Technical Research Institute of Sweden**  
**Energy Technology - Building Physics and Indoor Environment**

Performed by



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