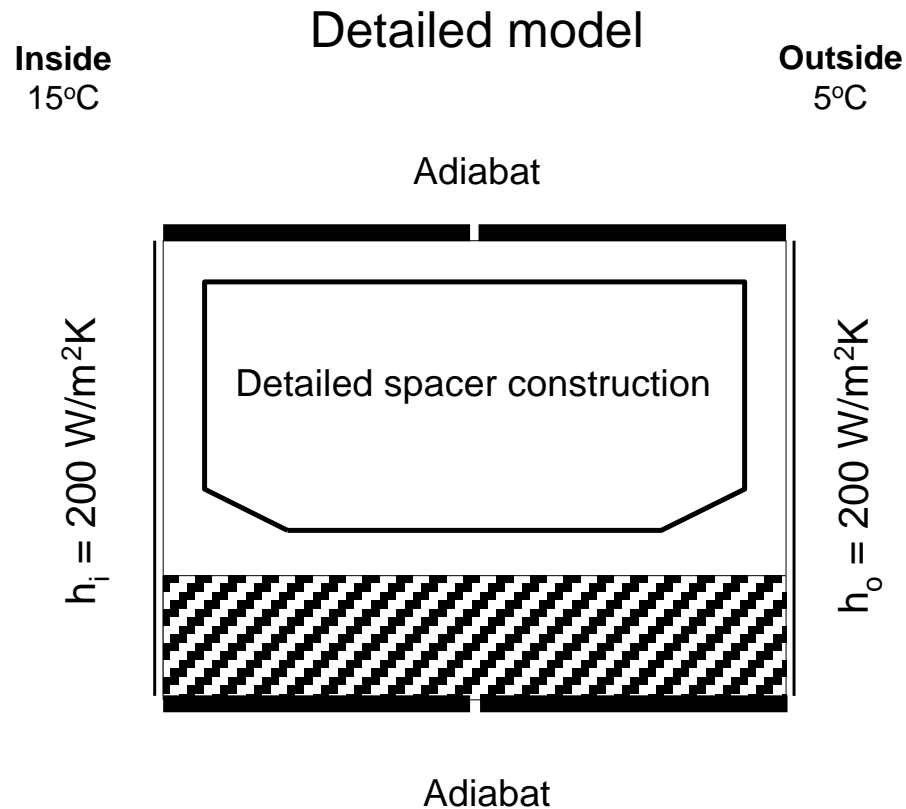


# Two box model

Procedure calculating the equivalent thermal conductivity of the edge construction

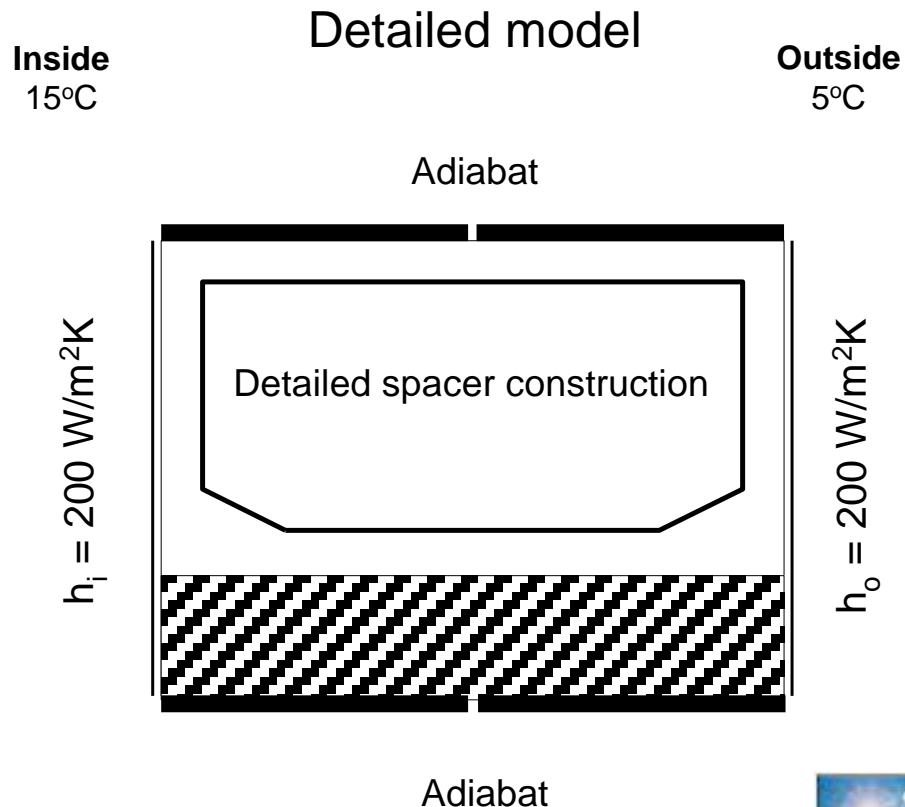


# New method: Two box model

Simplification of procedure calculating the equivalent thermal conductivity of the edge construction

## Step 1:

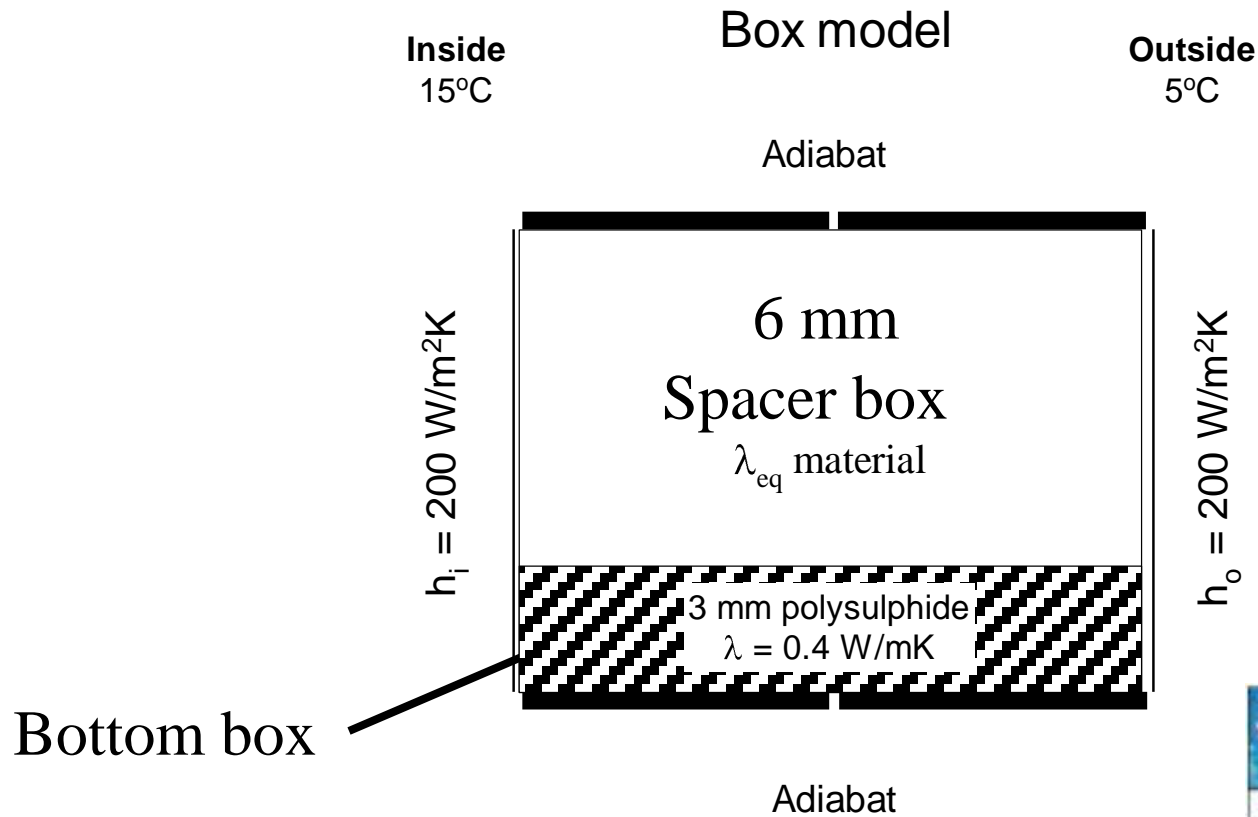
Calculate heat flow through edge construction using boundary as shown here



# The two box model

## Step 2:

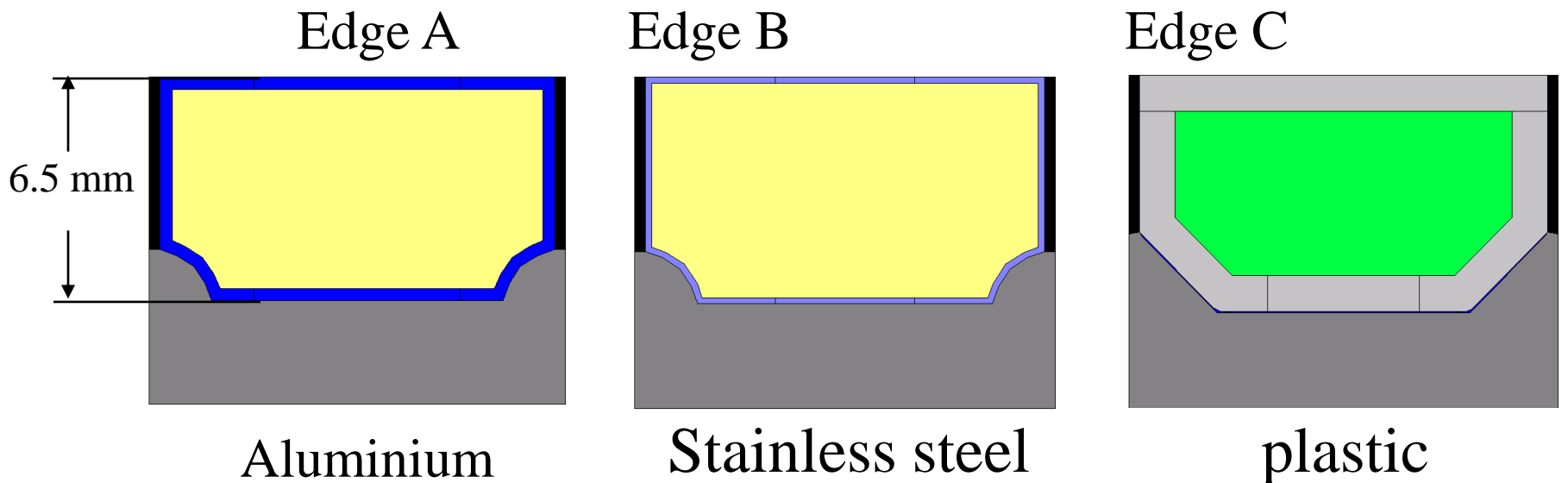
The edge construction is replaced with two boxes. Bottom box is a 3 mm polysulphide ( $\lambda = 0.4 \text{ W/mK}$ ) layer. Fit  $\lambda_{\text{eq}}$  in top box until same heat flow is achieved as in detailed model.



# Test of box model

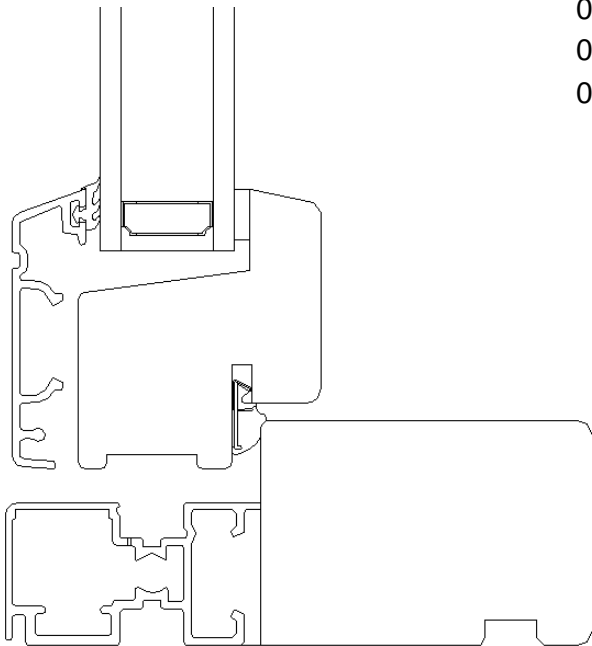
By Jacob B Laustsen, DTU

- Three edge constructions (alu., stainless steel, plastic)
- Four different frame profiles with double glazing

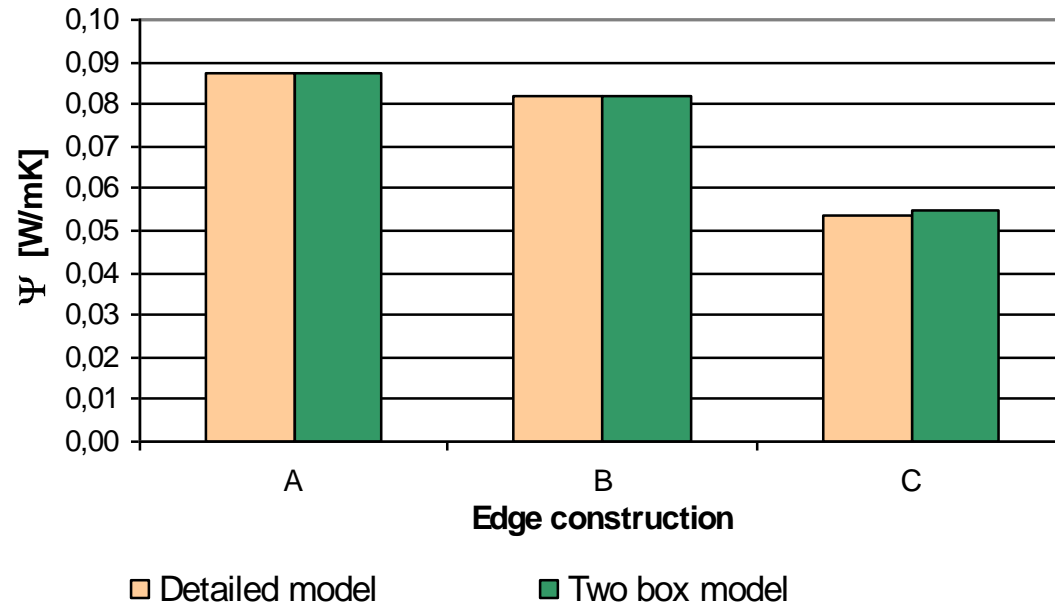


# Test with double glazing

**Frame:**  
Wood  
Aluminium

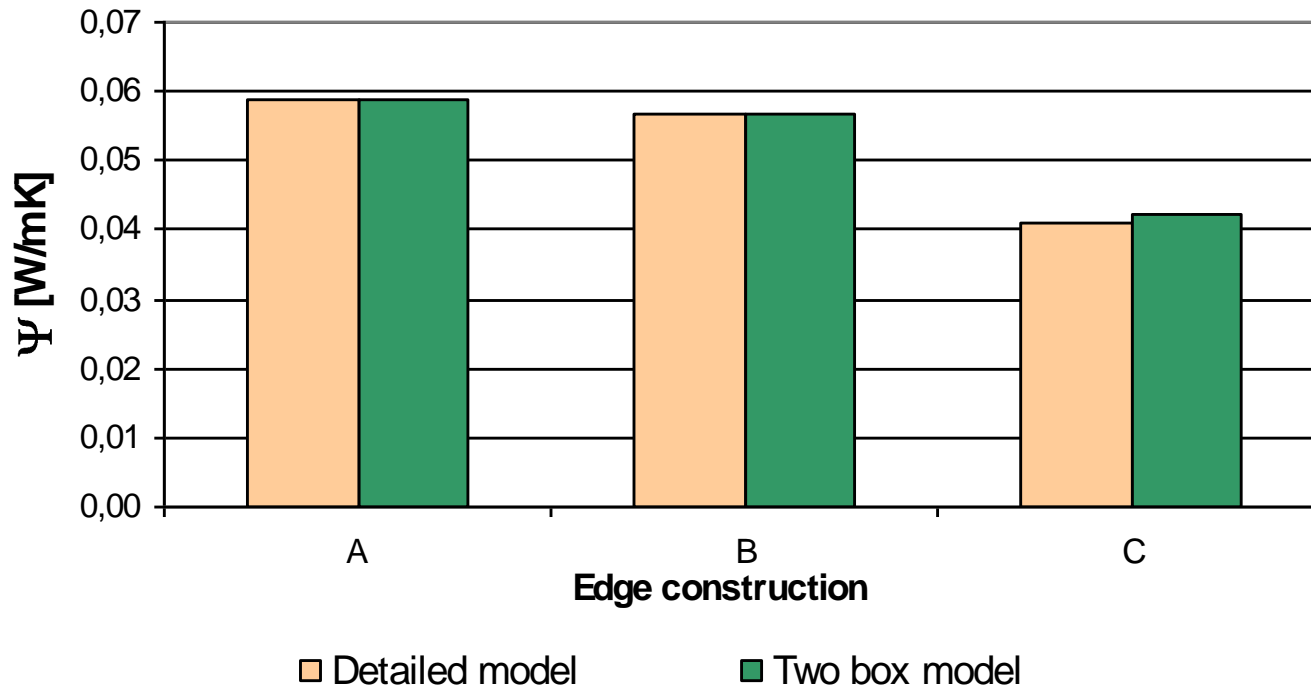


Linear thermal transmittance  
Frame 1. Wood/Alu

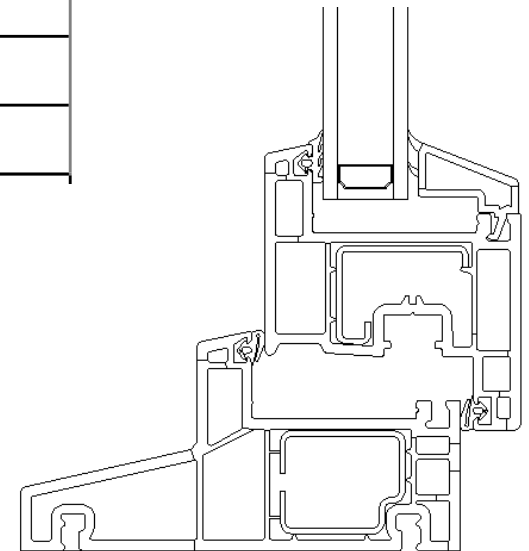


# Test with double glazing

Linear thermal transmittance  
Frame 2. Plastic



**Frame:**  
Plastic



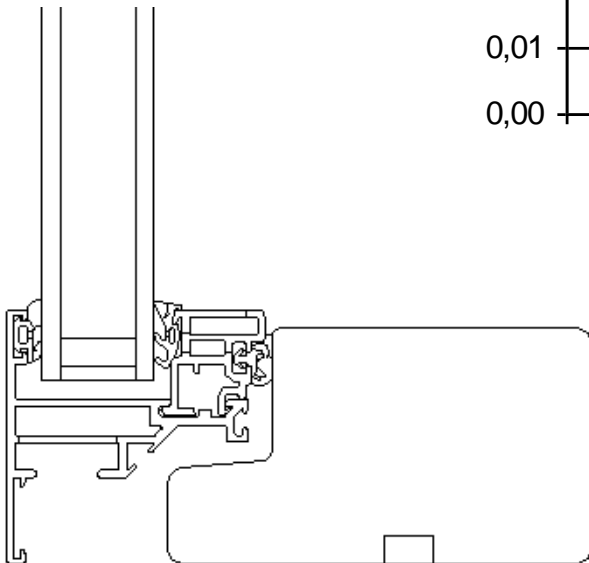
# Test with double glazing

## Frame:

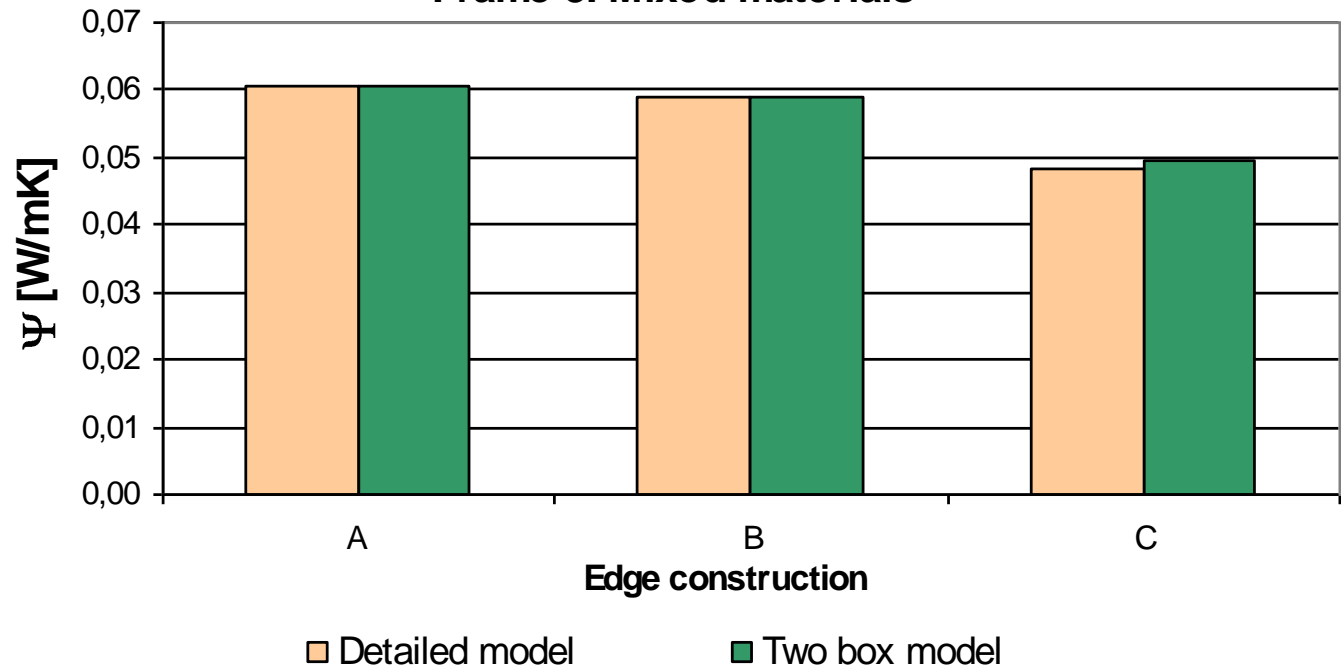
Wood

Aluminium

Plastic



Linear thermal transmittance  
Frame 3. Mixed materials

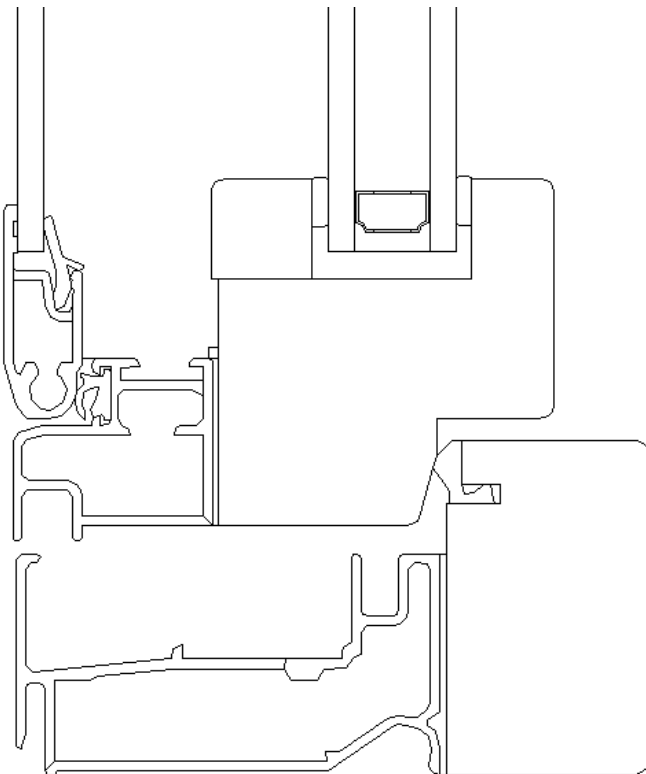


# Test with "1 + 2" glazing

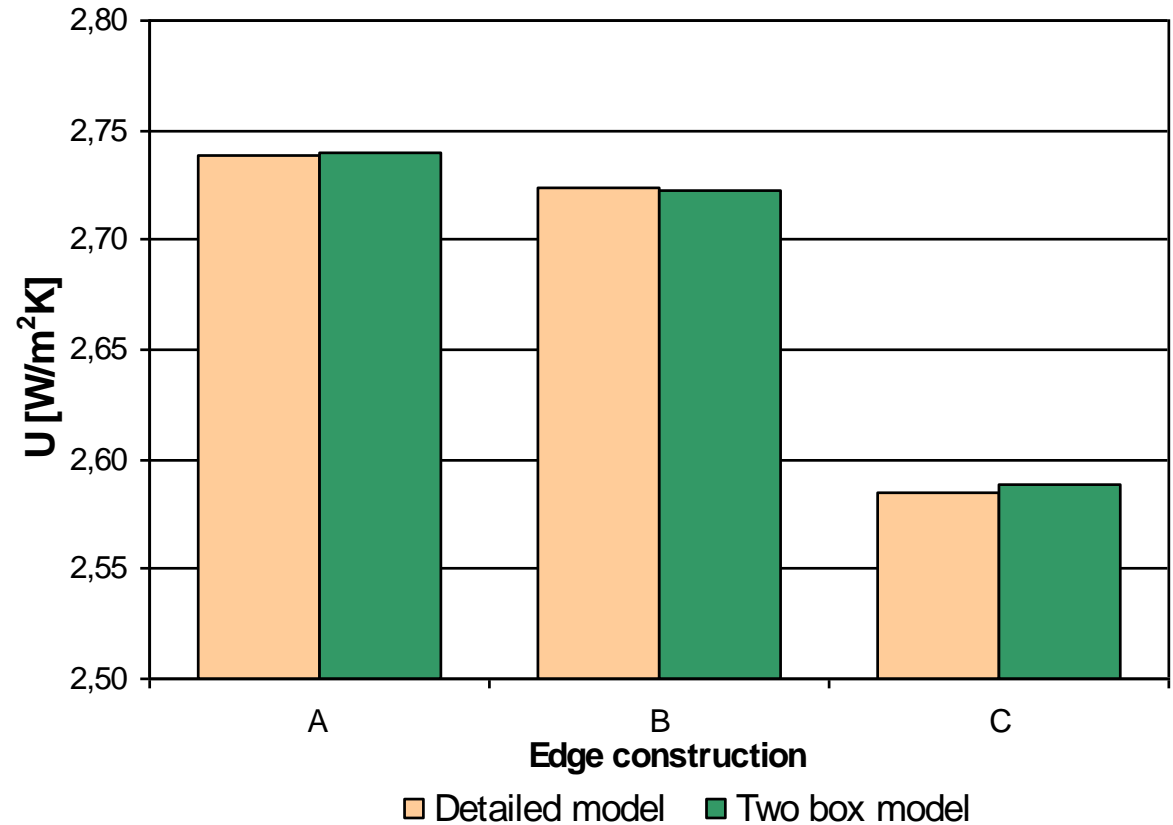
## Frame:

Wood

Aluminium



Thermal transmittance, U



No  $\Psi$ -value

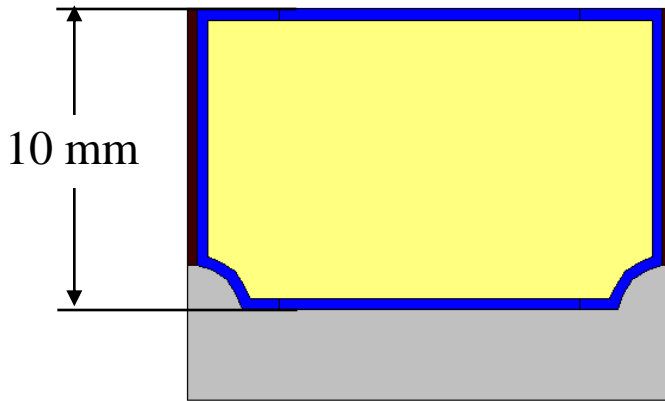


# Height of spacer box

By Jacob B Laustsen, DTU

Calculations with 6 mm and 10 mm spacer box

Detailed spacer:



6 mm spacer box can not be used for the aluminium spacer

10 mm spacer box is better for high spacer profiles

Detailed spacer 10 mm		spacer box 6 mm			spacer box 10 mm		
Material	$\Psi$	$\lambda_{eq}$	L	$\Psi$	$\lambda_{eq}$	L	$\Psi$
Aluminium	0.0698	$\rightarrow \infty$	$\rightarrow \infty$		4.069	2.60	0.0707
Stainless steel	0.0674	13.628	8.54	0.0625	2.367	1.54	0.0678
Plastic with alu. foil	0.0505	0.845	0.60	0.0510	0.425	0.34	0.0535

# Height of Spacer box

Proposal: Two standard heights of the spacer box

6 mm: Typical spacers

10 mm: Thick spacers

