

Customer:

Ashton Industrial Sales Ltd.
South Road, Harlow
Essex CM20 2AR
UNITED KINGDOM

Project/Customer:

Profilex HM spacer

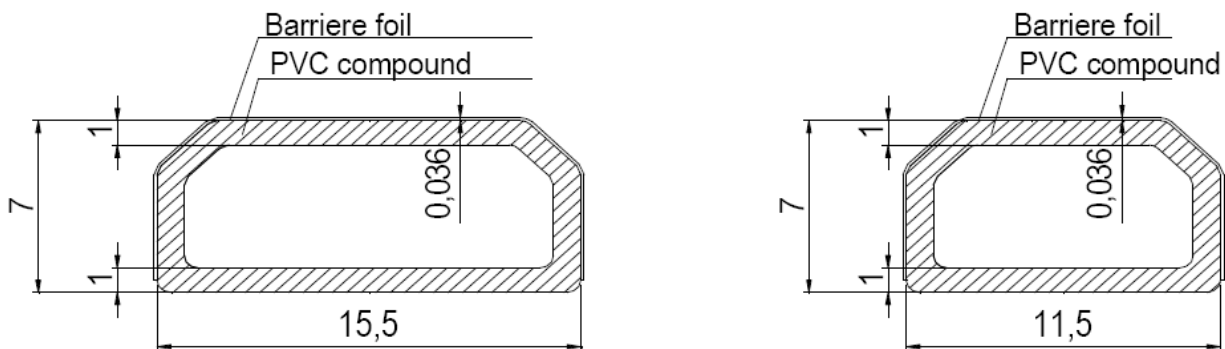
Content:

- U_f simulation of profiles in accordance to EN ISO 10077-2
- U_g calculation of insulating glass in accordance to EN 673
- Ψ_g simulation of IG edge spacer bars in accordance to EN ISO 10077-2

Object:

- Window frame sections in accordance to ift guideline WA-08/1:2008-06
- Insulating glass units in accordance to ift guideline WA-08/1:2008-06
- Profilex HM spacer bar in accordance to customer declarations

Drawing (Source: Customer):



15.5 and 11.5 mm spacer bar cross section

Normative references:

- EN ISO 10077-2:2012-06, Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 2: Numerical method for frames
- EN ISO 10211:2008-04, Thermal bridges in building construction – Heat flows and surface temperatures
- EN 673:2003-06, Glass in building – Determination of thermal transmittance (U value) – Calculation method
- ift guideline WA-08/1:2008-06, Thermally improved spacers, Part 1 – Determination of representative Ψ values for profile sections of windows
- EN ISO 6946:2008-04, Building components and building elements – Thermal resistance and thermal transmittance – Calculation method



Materials:

Boundary conditions	R_s (m ² K/W)	θ (°C)	10077-2 / WA-08/1 conform
external air	0,040	0,0	X
internal air (standard)	0,13	20,0	X
internal air (reduced radiation and convection)	0,200	20,0	X
unventilated cavity	acc. to EN ISO 10077-2		X
unventilated cavity ≤ 2 mm	acc. to EN ISO 10077-2		X
slightly ventilated cavity	acc. to EN ISO 10077-2		X
calibrating panel	0,035		X
adiabat	∞		X
Materials	λ (W/mK)		10077-2 / WA-08/1 conform
soft wood $R_d \leq 500$ kg/m ³	0,13		X
aluminium coated	160,0		X
PVC hard	0,17		X
steel	50		X
EPDM gasket	0,25		X
silicone	0,35		X
insulation foam	0,035		X
polyamide 6.6 25% GF	0,30		X
float glass	1,0		X
gas in IG cavity	acc. to EN ISO 673		X
desiccant in spacer	0,13		X
hot melt butyl (primary sealing)	0,24		X
polysulphide (secondary sealing, 3 mm)	0,40		X
hot melt butyl (secondary sealing, 3 mm)	0,24		X
Profilex spacer PVC compound	**0,17		-
Profilex spacer barrier foil	**0,33		-

For thermal simulations designed values of thermal conductivity must be used. The tabulated values are designed values unless there are marked as different.

Values marked with “ ** “ are designed values taken from customers declaration. Certificates are available from the customer.

Assumptions/Advices:

- Cavities have been treated anisotropic.

Isothermal lines:

0°C to 20°C in 1°C steps

Red: 13°C isotherm (mould critical temperature at 20°C, 50%)


Blue: 10°C isotherm (condensation critical temperature 20°C, 50%)

Results data sheet in accordance to ift guideline WA-08/1:2008-06
 Detailed simulation models see following pages. Materials and boundary conditions see page 2

Data sheet

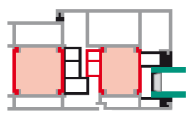
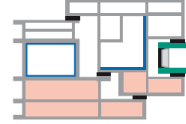


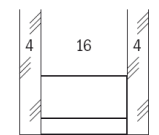
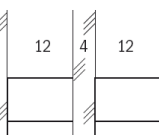
Psi value for windows

in accordance to ift guideline WA-08/1 "Thermally improved spacers – Part 1: Determination of the representative psi values for window frame profiles"



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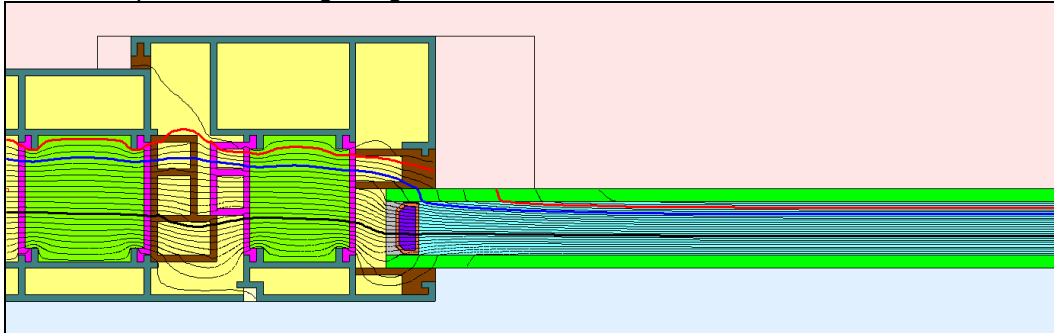
	Product name	Spacer height in mm	Material	Thermal conductivity in W/mK	Thickness d in mm
Cross-section		7.0	PVC compound with barrier foil	PVC 0.17 Foil 0.33	PVC 1.0 Foil 0.036

		Metal with thermal break $U_f \geq 1,3 \text{ W/m}^2\text{K}$	Plastic $U_f \geq 1,0 \text{ W/m}^2\text{K}$	Wood $U_f \geq 1,0 \text{ W/m}^2\text{K}$	Wood / Metal $U_f \geq 1,0 \text{ W/m}^2\text{K}$
Representative frame profil					
Representative psi value double glazing W/mK	 Double Insulating Glass $U_g = 1,1 \text{ W/m}^2\text{K}$	0.033 (0.039)*	0.030 (0.033)*	0.029 (0.033)*	0.031 (0.035)*
Representative psi value triple glazing W/mK	 Triple Insulating Glass $U_g = 0,7 \text{ W/m}^2\text{K}$	0.028 (0.034)*	0.029 (0.032)*	0.027 (0.031)*	0.028 (0.033)*

* values in brackets are valid for secondary sealant of polysulphide 3 mm, values without brackets are valid for secondary sealant of hot melt 3 mm

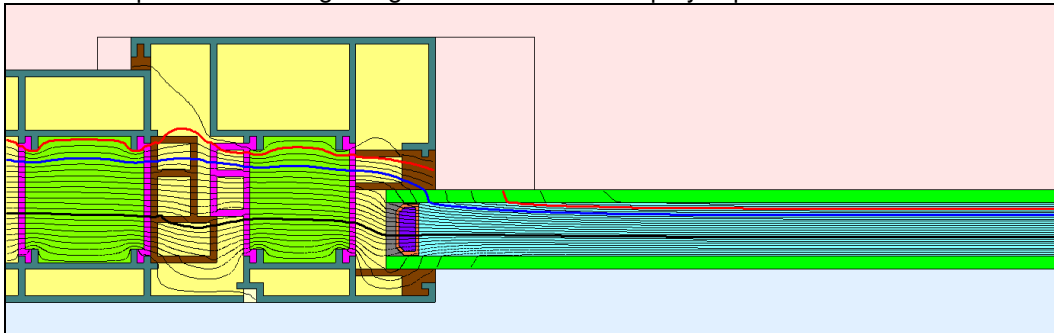
All Ψ_g values are only valid for insulating glass with 4 mm glass panes internal and external and for frame sections with U_f values equal or higher than shown in the table.

Aluminium profile / double glazing / Profiflex with 3 mm hot melt sealant:



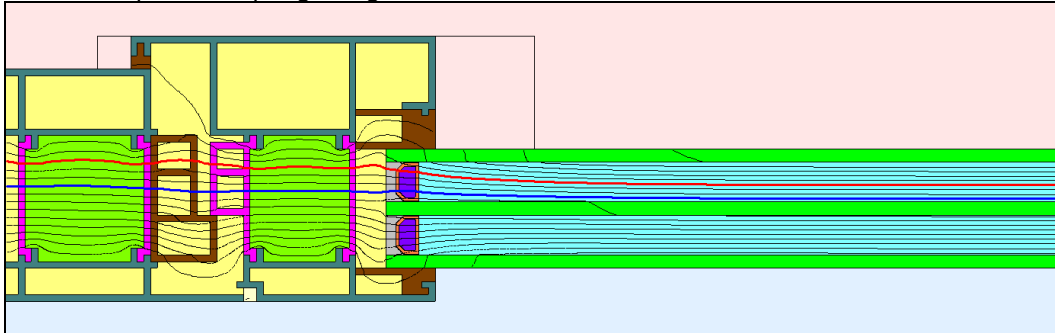
U_f	=	1,6	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,033	W/mK

Aluminium profile / double glazing / Profiflex with 3 mm polysulphide sealant:



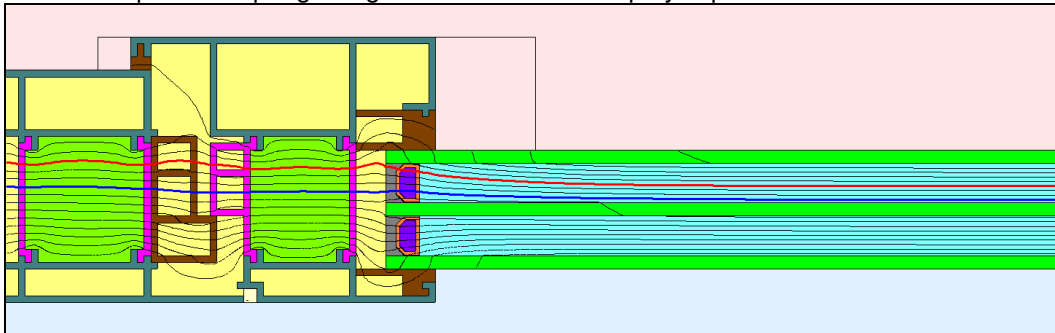
U_f	=	1,6	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,039	W/mK

Aluminium profile / triple glazing / Profilex with 3 mm hot melt sealant:



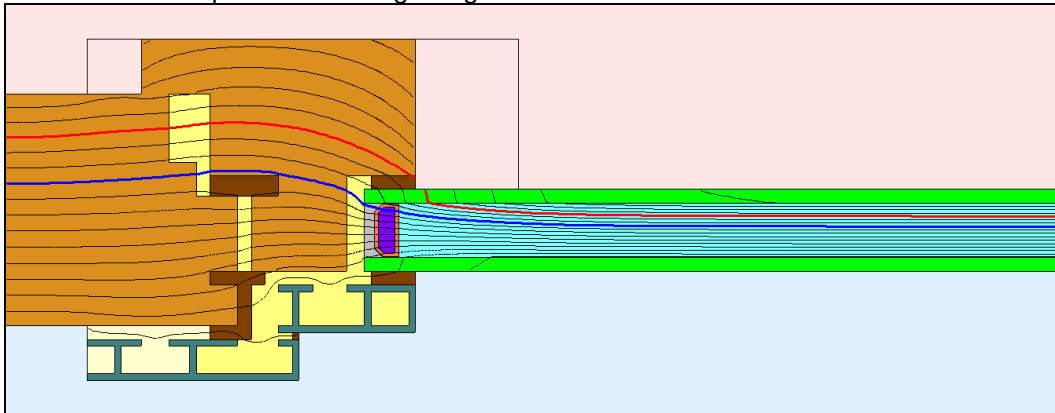
U_f	=	1,6	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,028	W/mK

Aluminium profile / triple glazing / Profilex with 3 mm polysulphide sealant:



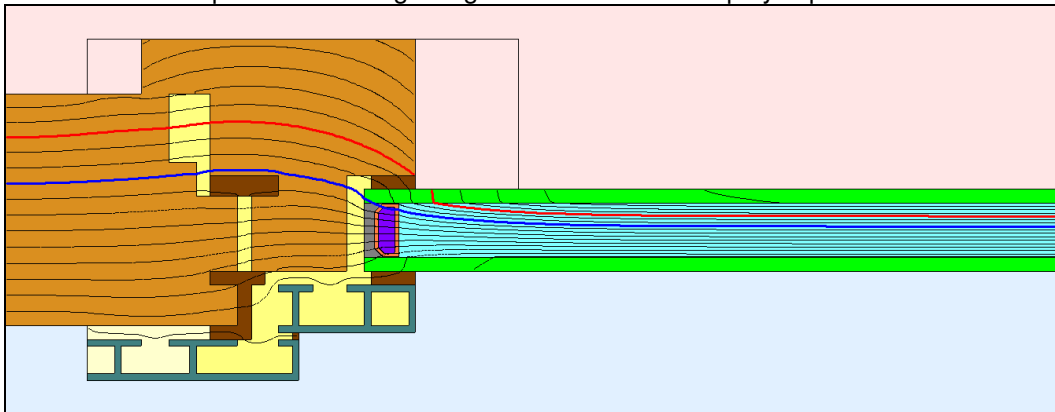
U_f	=	1,6	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,034	W/mK

Wood-aluminium profile / double glazing / Proflex with 3 mm hot melt sealant:



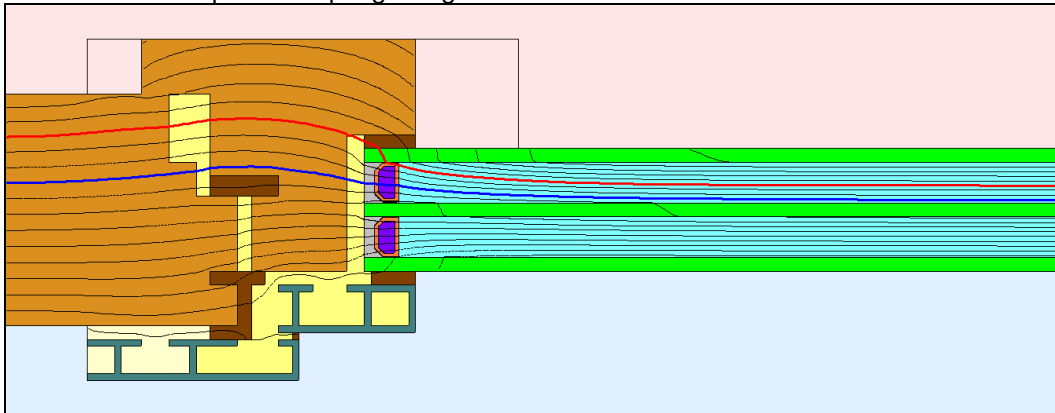
U_f	=	1,4	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,031	W/mK

Wood-aluminium profile / double glazing / Proflex with 3 mm polysulphide sealant:



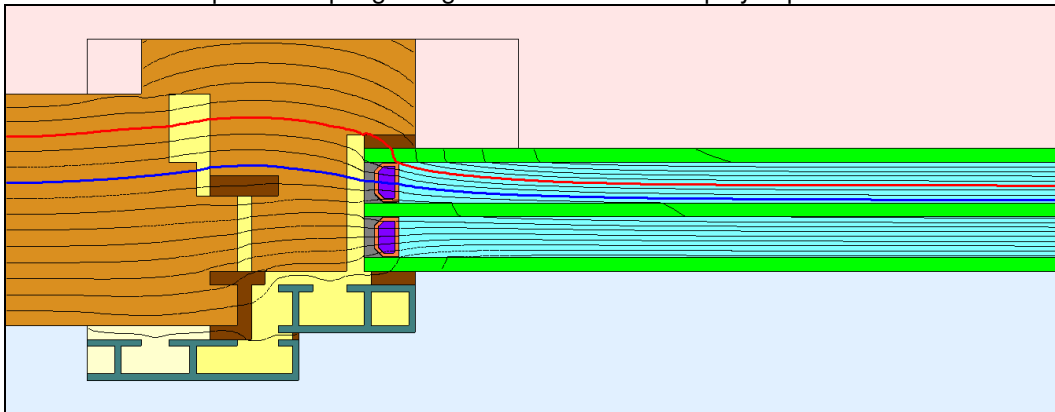
U_f	=	1,4	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,035	W/mK

Wood-aluminium profile / triple glazing / Proflex with 3 mm hot melt sealant:



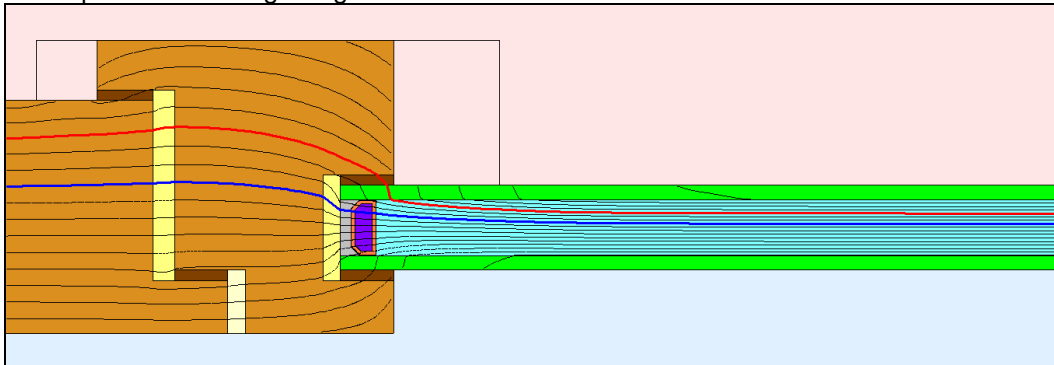
U_f	=	1,4	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,028	W/mK

Wood-aluminium profile / triple glazing / Proflex with 3 mm polysulphide sealant:



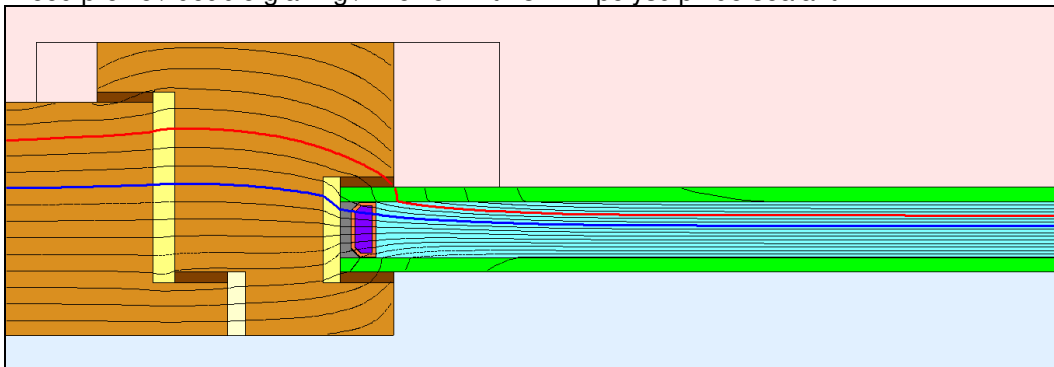
U_f	=	1,4	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,033	W/mK

Wood profile / double glazing / Profilex with 3 mm hot melt sealant:



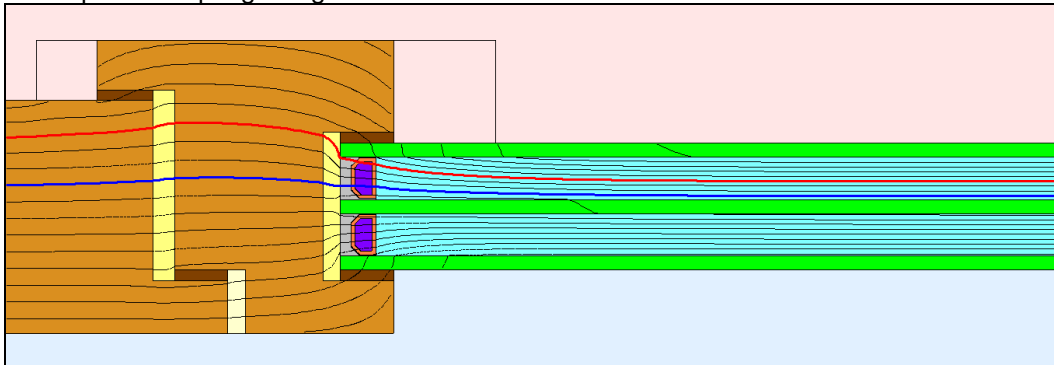
U_f	=	1,4	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,029	W/mK

Wood profile / double glazing / Profilex with 3 mm polysulphide sealant:



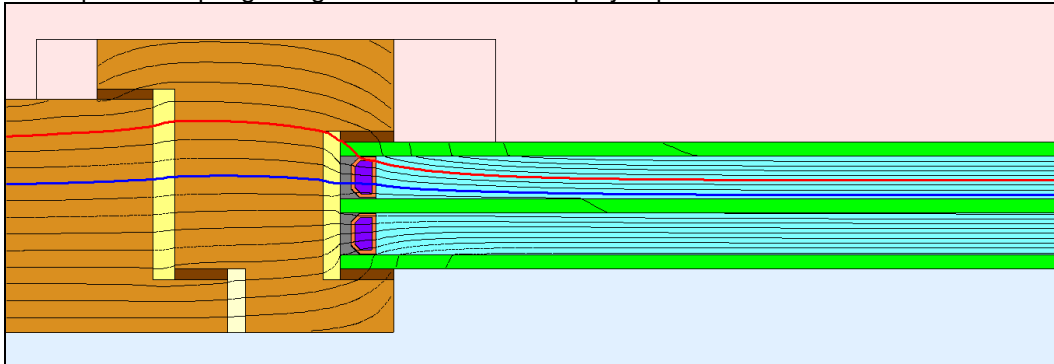
U_f	=	1,4	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,033	W/mK

Wood profile / triple glazing / Proflex with 3 mm hot melt sealant:



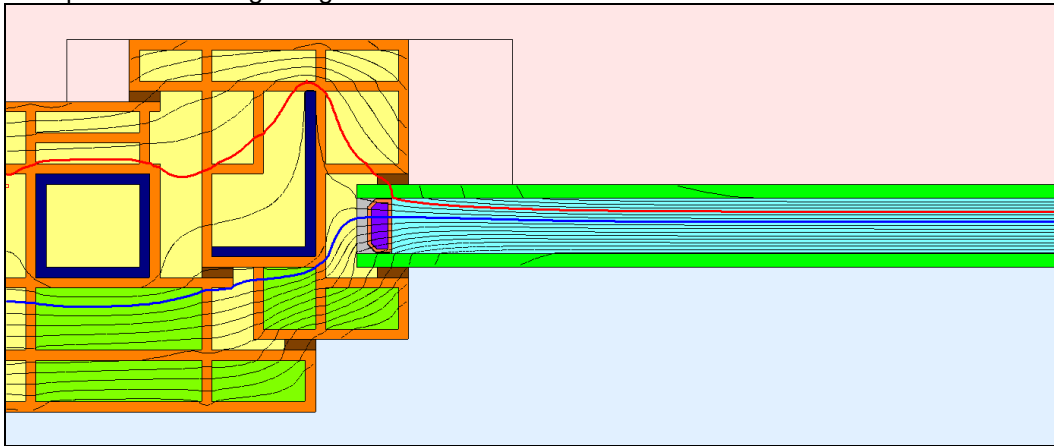
U_f	=	1,3	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,027	W/mK

Wood profile / triple glazing / Proflex with 3 mm polysulphide sealant:



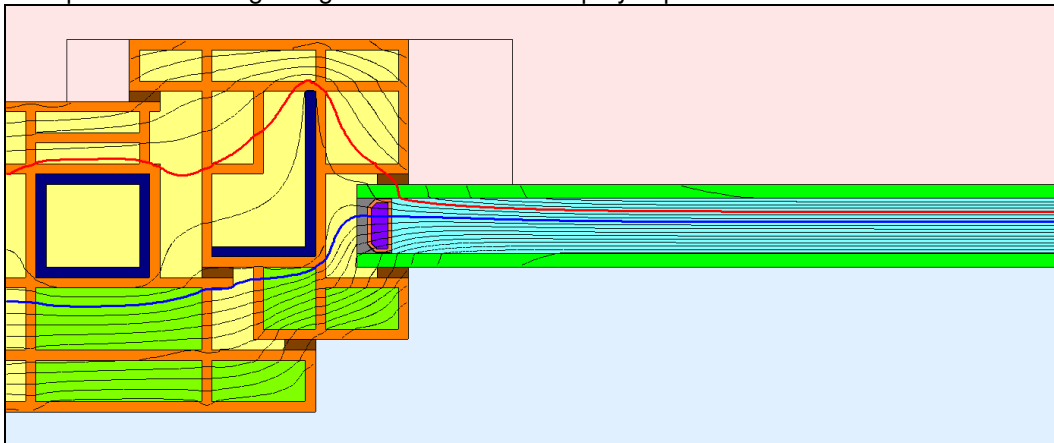
U_f	=	1,3	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,031	W/mK

PVC profile / double glazing / Profilex with 3 mm hot melt sealant:



U_f	=	1,2	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,030	W/mK

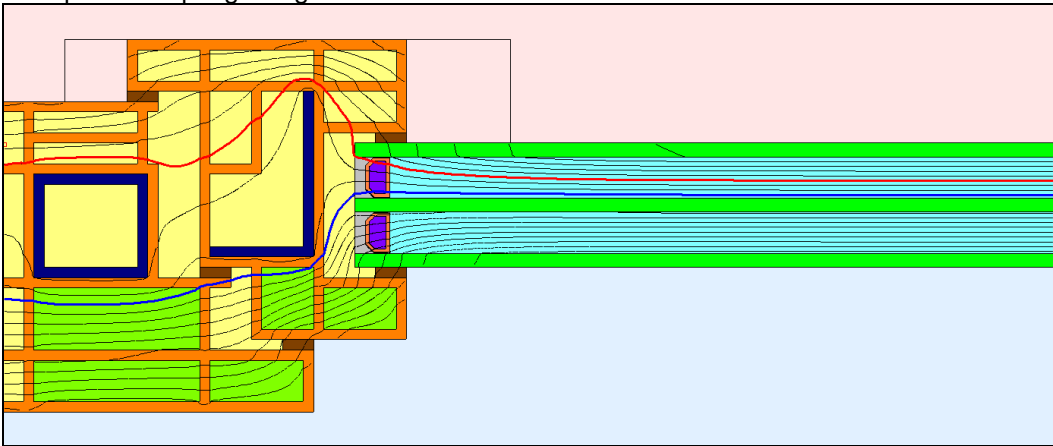
PVC profile / double glazing / Profilex with 3 mm polysulphide sealant:



U_f	=	1,2	W/m ² K
U_g	=	1,1	W/m ² K
Ψ_g	=	0,033	W/mK

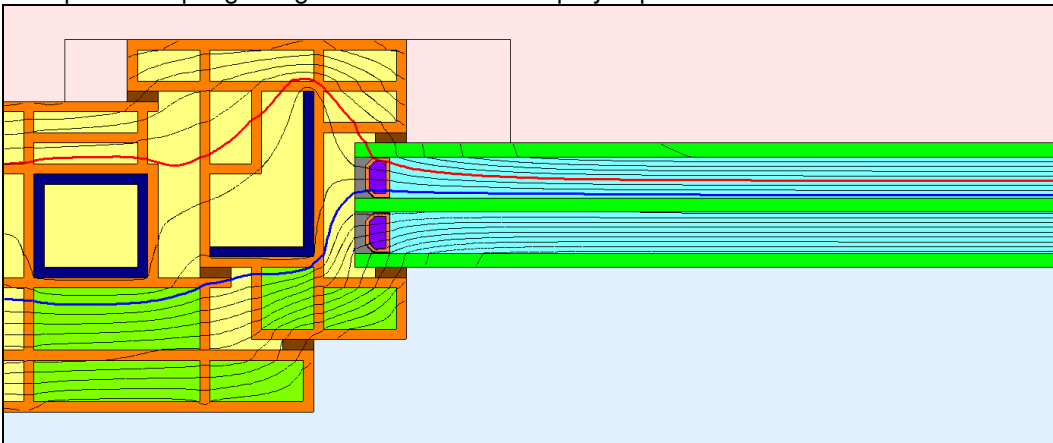


PVC profile / triple glazing / Proflex with 3 mm hot melt sealant:



U_f	=	1,2	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,029	W/mK

PVC profile / triple glazing / Proflex with 3 mm polysulphide sealant:



U_f	=	1,2	W/m ² K
U_g	=	0,7	W/m ² K
Ψ_g	=	0,032	W/mK

BAUWERK – Building physics consultancy
 Rosenheim, 22 May 2012

Dipl.-Ing. (FH) Roland Steinert

