



BISCO v12 New program performances



www.physibel.be/bisco

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- A.2 Visualisation of infra-red radiation
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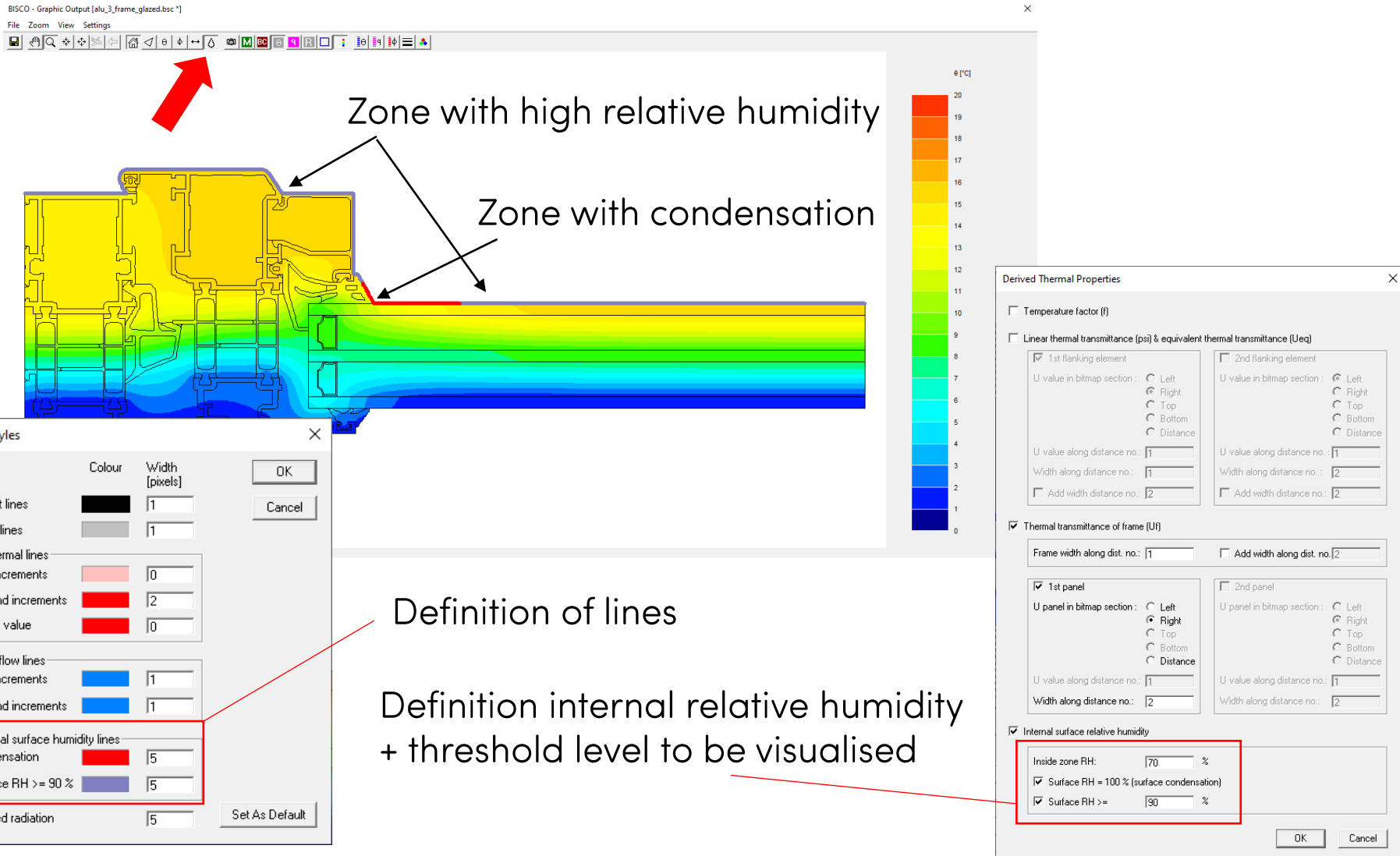
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 - Documentation
 - Tutorials and examples
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- H.2 Subscription licence (software key)

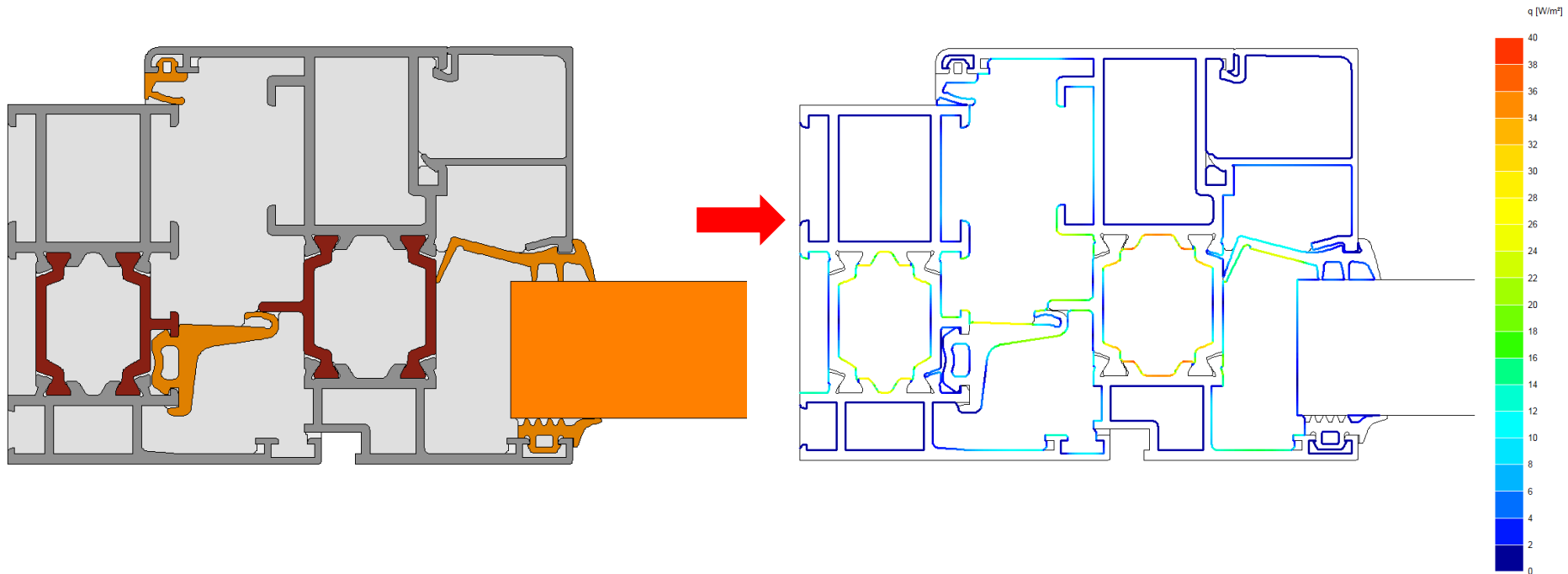
A1. Graphic output – condensation

Visualisation of surface condensation + threshold relative humidity zone



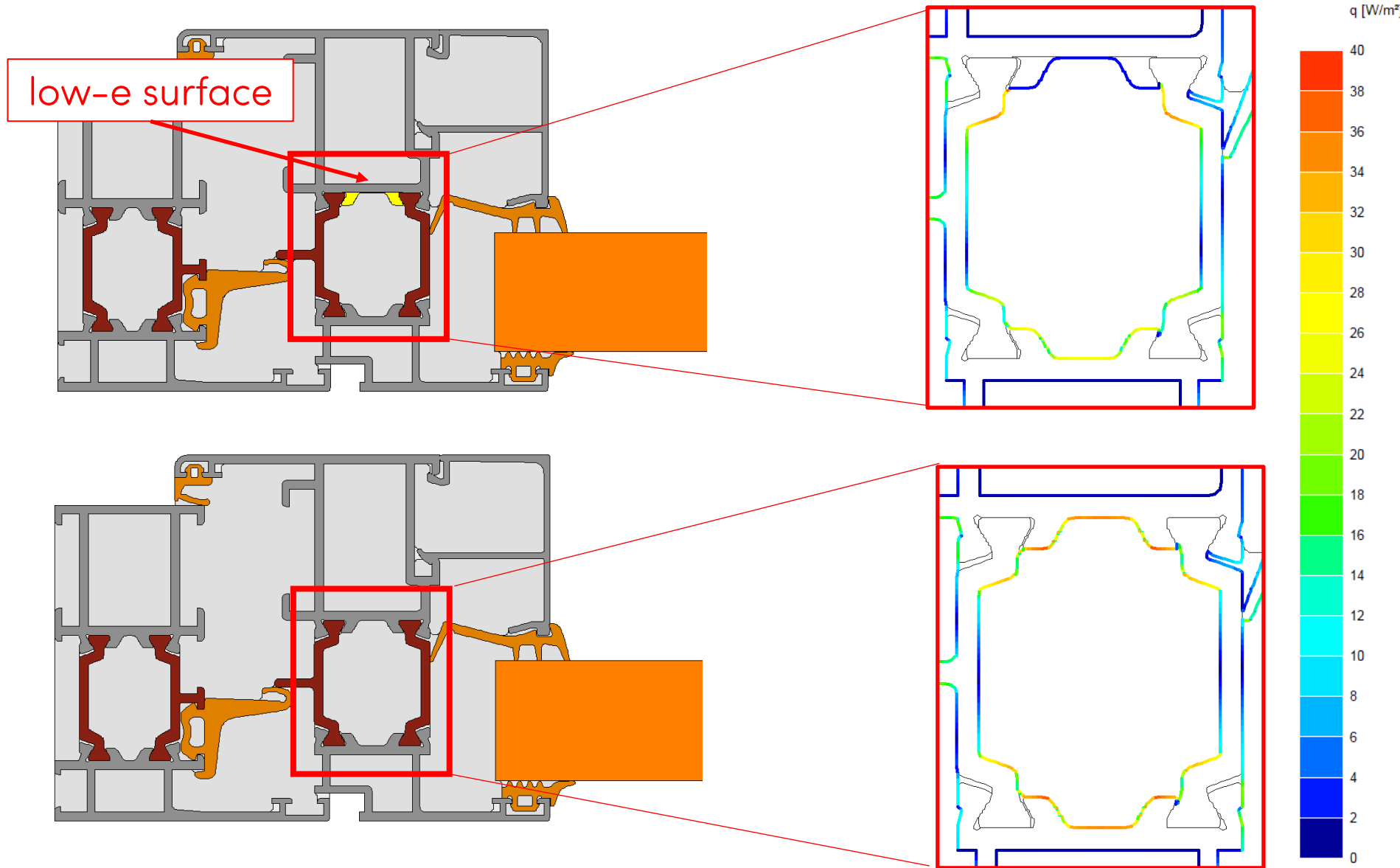
A2. Graphic output – IR radiation

Visualisation of infra-red radiation



(requires RADCON)

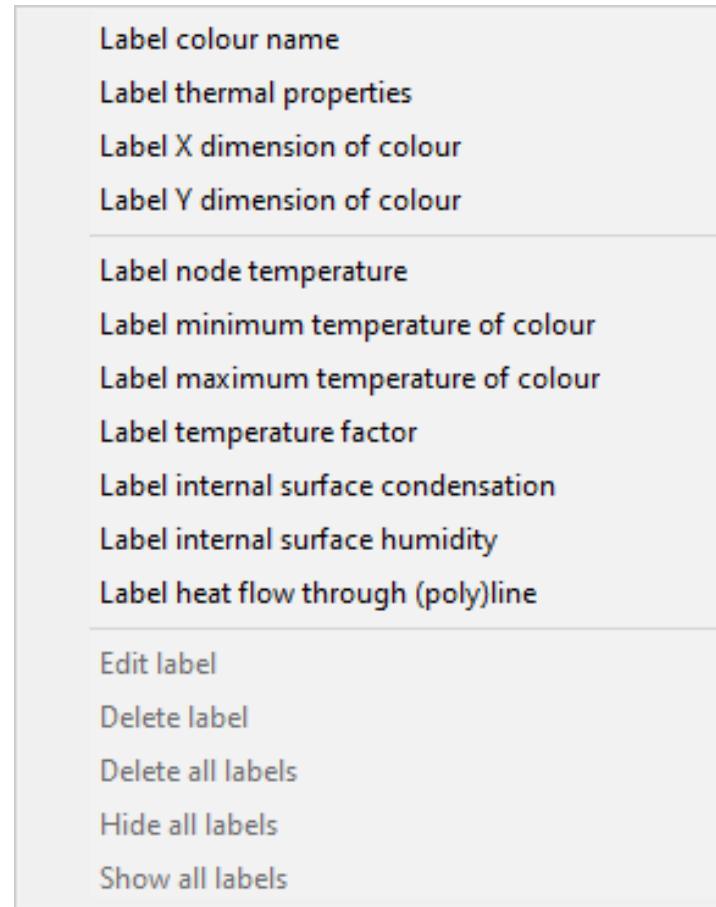
A2. Graphic output – IR radiation

[overview](#)

A3. Graphic output – Model labelling

Add labels to the figure: a right mouse click within the figure opens a popup menu (cf. below right):

- Colour name
- Thermal properties
- X dimension
- Y dimension
- Node temperature
- Min./max. temperature of colour
- Temperature factor f
- Internal condensation
- Internal surface humidity
- Heat flow through a (poly)line

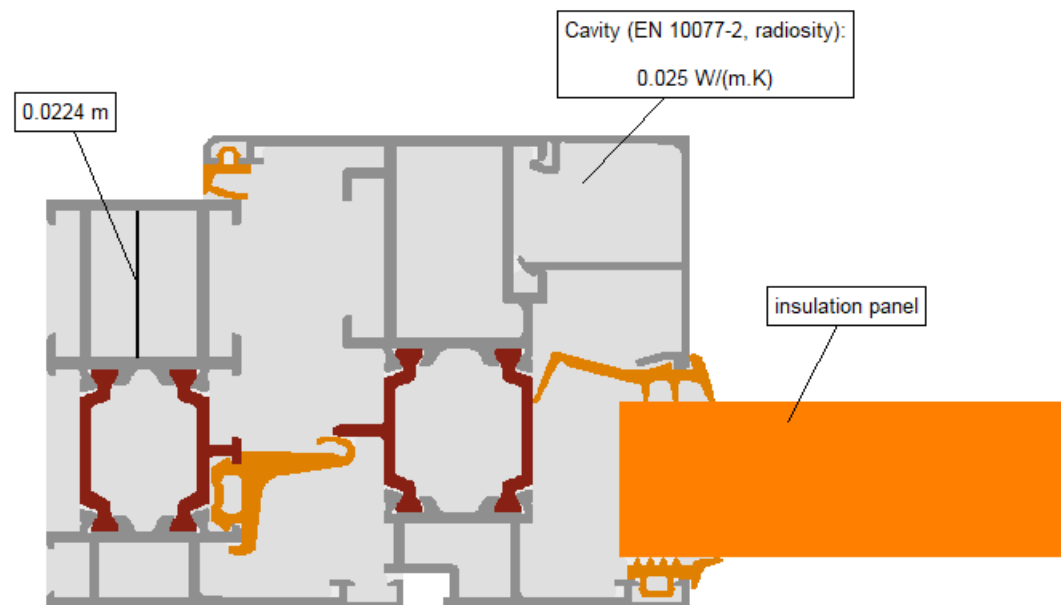


The labels can be replaced on the screen by mouse dragging.

A3. Graphic output – Model labelling

In the Graphic output Window the user can add following labels to the figure:

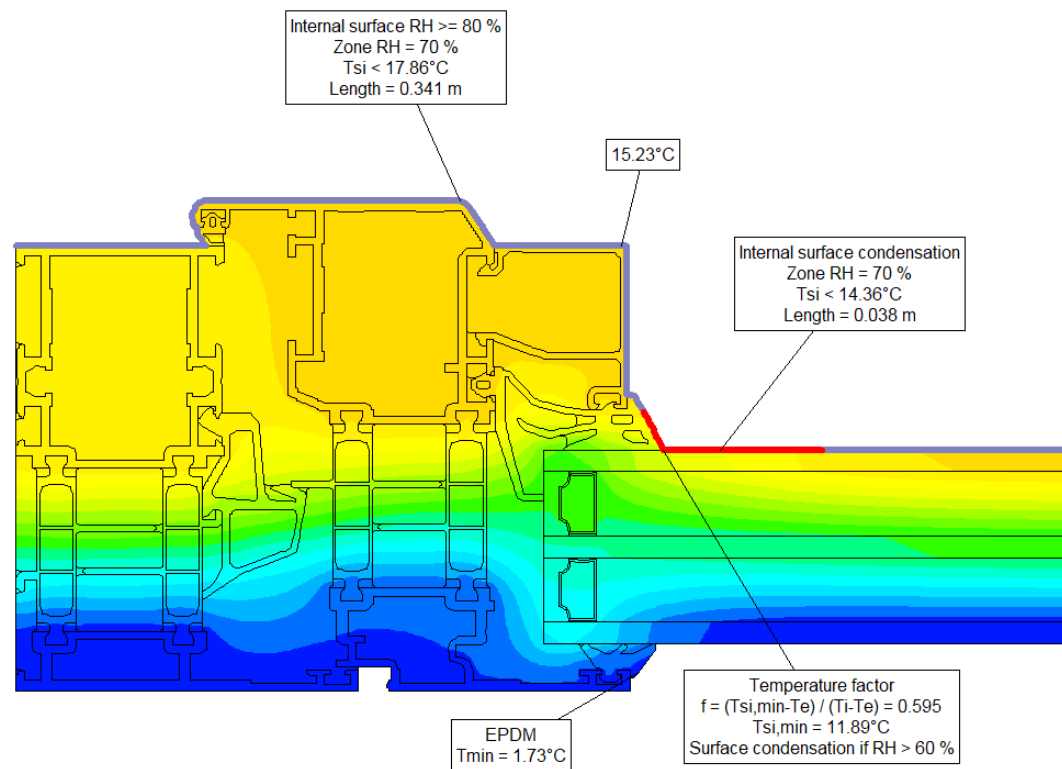
- Colour name
- Thermal properties
- X dimension
- Y dimension
- Node temperature
- Minimum temperature of colour
- Maximum temperature of colour
- Temperature factor f
- Internal condensation
- Internal surface humidity
- Heat flow through a (poly)line



A3. Graphic output – Model labelling

In the Graphic output Window the user can add following labels to the figure:

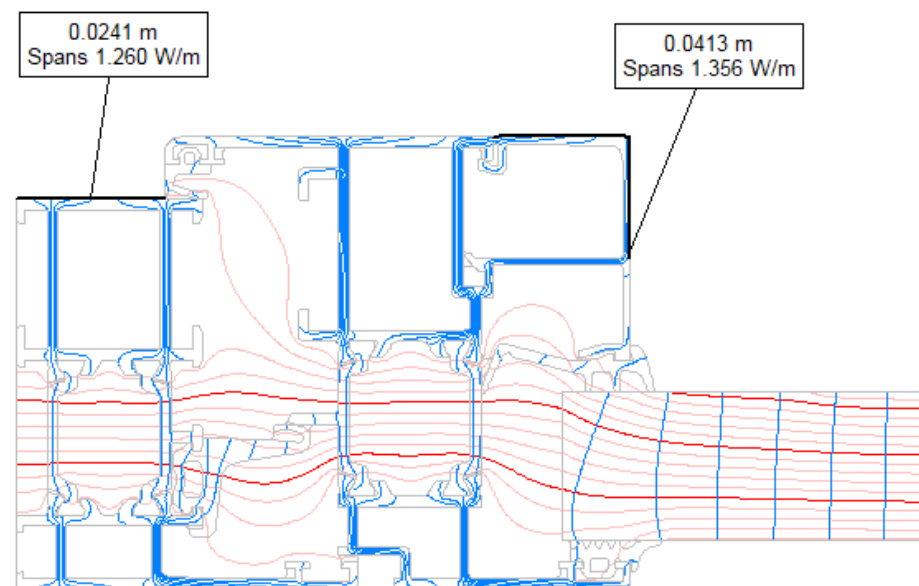
- Colour name
- Thermal properties
- X dimension
- Y dimension
- Node temperature
- Minimum temperature of colour
- Maximum temperature of colour
- Temperature factor f
- Internal condensation
- Internal surface humidity
- Heat flow through a (poly)line



A3. Graphic output – Model labelling

In the Graphic output Window the user can add following labels to the figure:

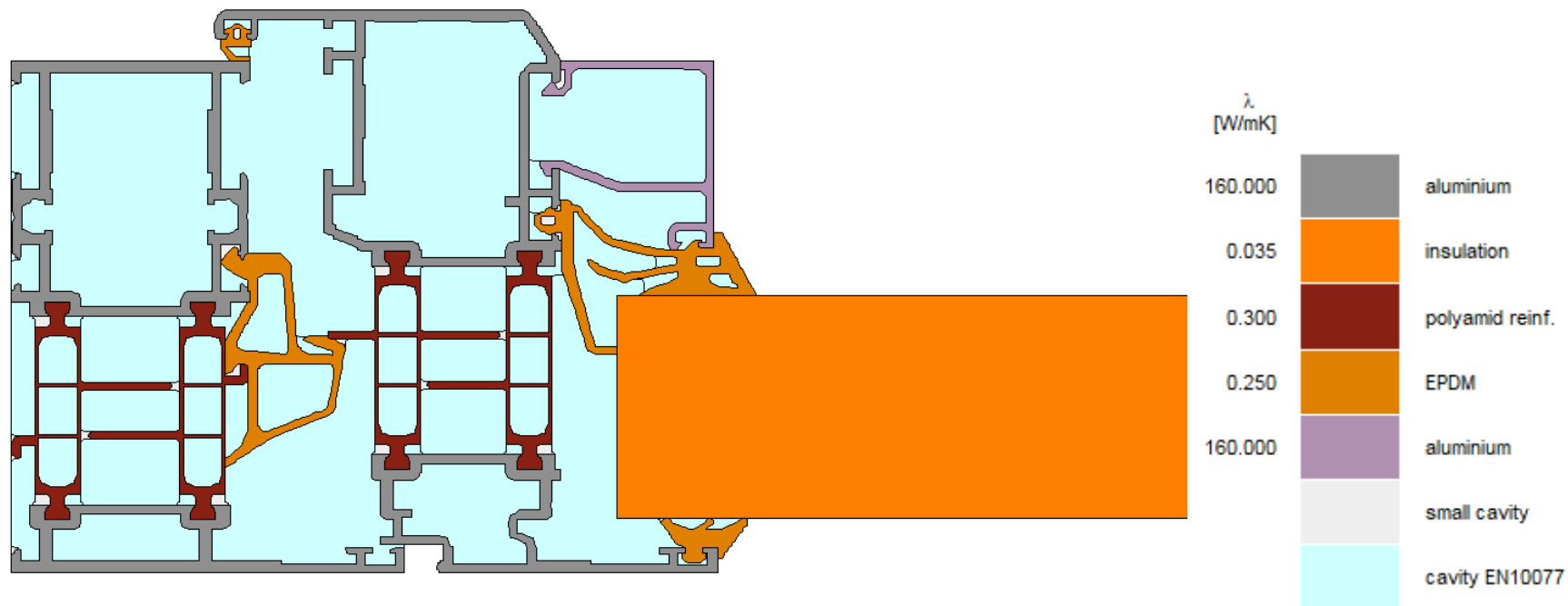
- Colour name
- Thermal properties
- X dimension
- Y dimension
- Node temperature
- Minimum temperature of colour
- Maximum temperature of colour
- Temperature factor f
- Internal condensation
- Internal surface humidity
- Heat flow through a (poly)line



A4. Graphic output – Legend

[overview](#)

Fill materials → revised legend: material name + clustered cavities



A4. Graphic output – Legend

Fill materials → revised legend: material name + clustered cavities

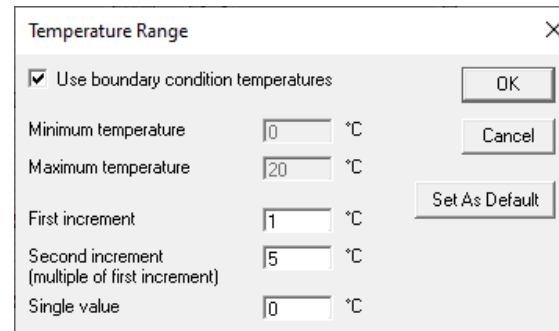
Double click colour field to change colour

Material/Cavity	Color
cavity EN10077	Cyan
ventilated cavity EN10077	Grey
cavity EN6946	Grey
layer EN6946	Grey
equivalent material (radiosity)	Grey
cavity EN10077 (radiosity)	Grey
BC_FREE NIHIL	Grey
BC_FREE CAVITY	Grey
BC_FREE CONVEC	Grey
BC_SKY	Grey
BC_NOSKY	Grey

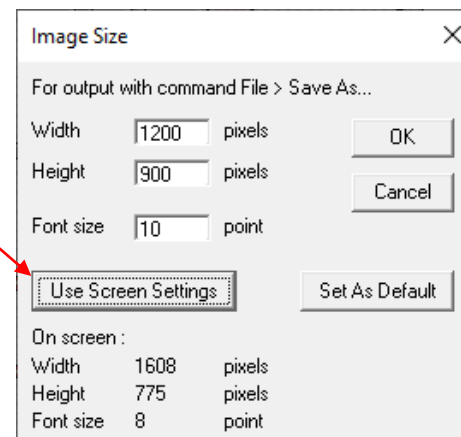
λ [W/mK]

160.000	aluminium
0.035	insulation
0.300	polyamid reinf.
0.250	EPDM
160.000	aluminium
	small cavity
	cavity EN10077

A5. Graphic output – Miscellaneous



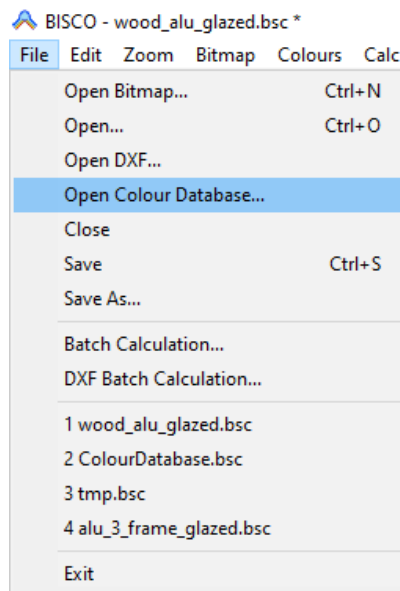
- Automatic selection of temperature range
- Triangulation mesh only visible when image has relevant scale
- Faster image processing algorithm (for complex files)
- Image Size: possible to use Screen Settings for image output



B2. Colour window – Colour Database

Customisable **Colour Database** with predefined colours

File → *Open Colour Database...* allows to quickly adjust frequently used materials and boundary conditions.

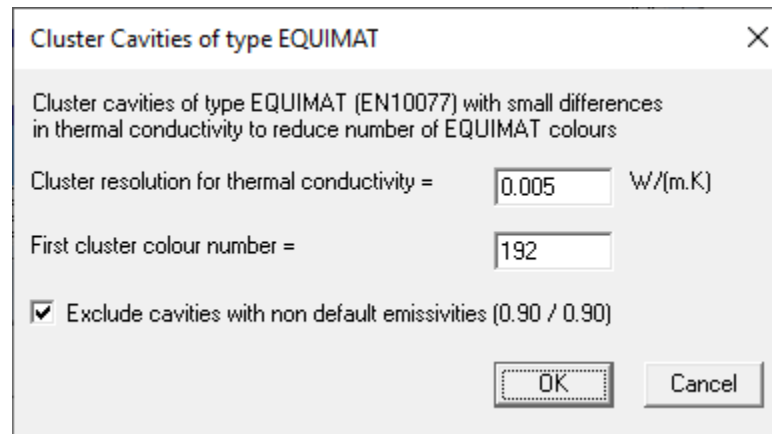


Col	Type	Subtype	Physical flow dir	Geometrical flow dir	Name	c1 / c2 [- / -]	lambda [W/mK]	epsilon [-]	theta [°C]	h [W/m²K]	q [W/m²]	theta_a [°C]	hc [W/m²K]	Pc [W/m]	theta_r [°C]	Standard
0	MATERIAL						1,000	0,90								
1	MATERIAL						1,000	0,90								
2	MATERIAL				aluminium untreated surface		160,000	0,10								
3	MATERIAL				PVC rigid		0,170	0,90								
4	MATERIAL				copper		380,000	0,90								
5	MATERIAL				fibreglass (UP-resin)		0,400	0,90								
6	MATERIAL				aluminium slightly oxidized surface		160,000	0,30								
7	MATERIAL						1,000	0,90								
8	MATERIAL				aluminium		160,000	0,90								
9	MATERIAL				lead		35,000	0,90								
10	MATERIAL				stainless steel (ferritic/martensitic)		30,000	0,30								
11	MATERIAL				stainless steel (austenitic/aust.ferritic)		17,000	0,30								
12	MATERIAL				hardwood		0,180	0,90								
13	MATERIAL				steel		50,000	0,90								
14	MATERIAL				brass		120,000	0,90								
15	MATERIAL				softwood 500 kg/m³		0,130	0,90								
16	MATERIAL				basalt		3,500	0,90								
17	MATERIAL				limestone hard		2,700	0,90								
18	MATERIAL				soda lime		1,000	0,90								
19	MATERIAL						1,000	0,90								
20	MATERIAL						1,000	0,90								
21	MATERIAL				polycarbonate		0,200	0,90								
22	MATERIAL				ABS (acrylonitrile butadiene styrene)		0,200	0,90								
23	MATERIAL				sand and gravel		2,000	0,90								
24	MATERIAL						1,000	0,90								
25	MATERIAL						1,000	0,90								
26	MATERIAL				ceramic/porcelain tiles		1,300	0,90								
27	MATERIAL						1,000	0,90								
28	MATERIAL				insulation panel		0,025	0,90								
29	MATERIAL				PMMA		0,180	0,90								
30	MATERIAL						1,000	0,90								
31	MATERIAL				clay or silt		1,500	0,90								
32	MATERIAL				bitumen sheet		0,230	0,90								
33	MATERIAL						1,000	0,90								

The default Colour Database delivered with the software is updated for EN ISO 10077-2, EN ISO 10456 and EN ISO 6946

B3. Colour window – Cluster EQUIMAT

New function 'Cluster EQUIMAT...' to group EQUIMAT colours with a user defined resolution.



The screenshot shows a dialog box titled "Cluster Cavities of type EQUIMAT" with a close button (X) in the top right corner. The dialog contains the following text and controls:

- Cluster cavities of type EQUIMAT (EN10077) with small differences in thermal conductivity to reduce number of EQUIMAT colours
- Cluster resolution for thermal conductivity = W/(m.K)
- First cluster colour number =
- Exclude cavities with non default emissivities (0.90 / 0.90)
- Buttons: and

B3. Colour window – Cluster EQUIMAT

[overview](#)

Example: window frame

60 different colours for cavities (EQUIMAT)

16 different colours for cavities (EQUIMAT)
(resolution of 0.005 W/mK)

Col.	Width [pix]	Width [m]	Height [pix]	Height [m]	Area [pix]	Zones	Triang. [pix]
All	1450	0.2900	490	0.0950			5,00
8	571	0.1142	455	0.0910	28551	6	5,00
17	911	0.1822	140	0.0280	109320	2	5,00
18	960	0.1920	180	0.0360	57600	3	5,00
44	437	0.0874	217	0.0434	10959	4	5,00
60	433	0.0866	436	0.0872	10851	4	5,00
73	141	0.0282	153	0.0306	3254	1	5,00
86	24	0.0048	140	0.0280	2214	2	5,00
92	25	0.0050	140	0.0280	182	4	5,00
105	30	0.0060	133	0.0266	2840	2	5,00
170	1450	0.2900	63	0.0126	66487	1	5,00
174	1450	0.2900	247	0.0494	224120	1	5,00
182	588	0.1176	230	0.0460	14274	4	5,00
192	22	0.0044	8	0.0016	127	1	5,00

Col.	Type	Subtype	Physical flow dir	Geometrical flow dir	Name	c1 / c2 [- / -]	λ [W/mK]	ϵ [-]	θ [°C]	h [W/m²K]	q [W/m²]	ea [°C]	hc	Pc	er	Standard
182	BC_SIMPL	HL_REDUC			interior (reduced)				20,0	5,00	0					EN10077
192	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.030									NIHIL
193	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.172									NIHIL
194	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.148									NIHIL
195	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.030									NIHIL
196	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.085									NIHIL
197	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.067									NIHIL
198	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.148									NIHIL
199	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.037									NIHIL
200	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.042									NIHIL
201	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.056									NIHIL
202	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.033									NIHIL
203	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.034									NIHIL
204	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.085									NIHIL
205	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90	0.034									NIHIL

BC_SIMPL = simplified boundary condition (combined convection and radiation)



Cluster Cavities of type EQUIMAT

Cluster cavities of type EQUIMAT (EN10077) with small differences in thermal conductivity to reduce number of EQUIMAT colours

Cluster resolution for thermal conductivity = W/(m.K)

First cluster colour number =

Exclude cavities with non default emissivities (0.90 / 0.90)

OK Cancel

Col.	Type	Subtype	Physical flow dir	Geometrical flow dir	Name	c1 / c2 [- / -]	λ [W/mK]	ϵ [-]	θ [°C]	h [W/m²K]	q [W/m²]	ea [°C]	hc	Pc	er	Standard
195							0.172		20,0	5,00						EN10077
196							0.148									NIHIL
197							0.124									NIHIL
198							0.119									NIHIL
199							0.085									NIHIL
200							0.074									NIHIL
201							0.069									NIHIL
202							0.065									NIHIL
203							0.059									NIHIL
204							0.054									NIHIL
205							0.049									NIHIL
206							0.045									NIHIL
207							0.037									NIHIL
208							0.034									NIHIL

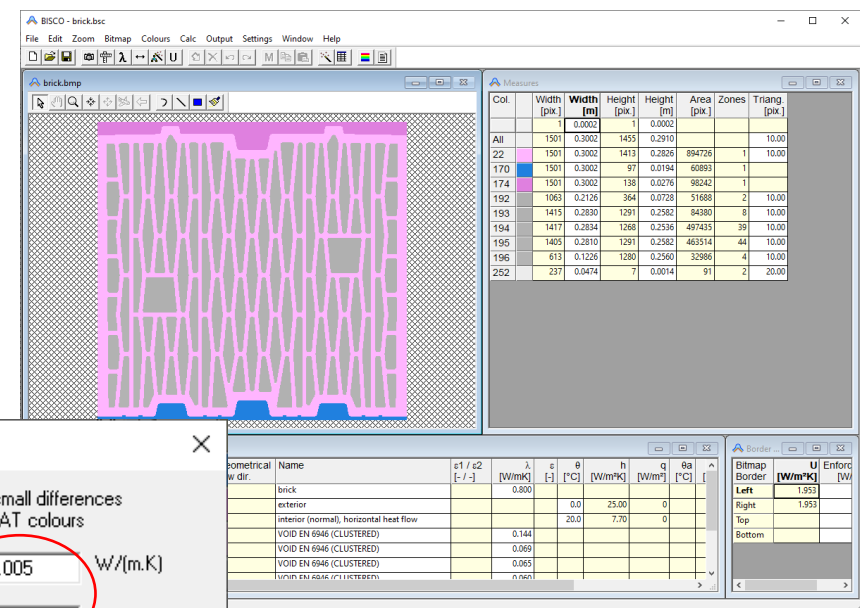
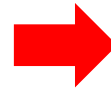
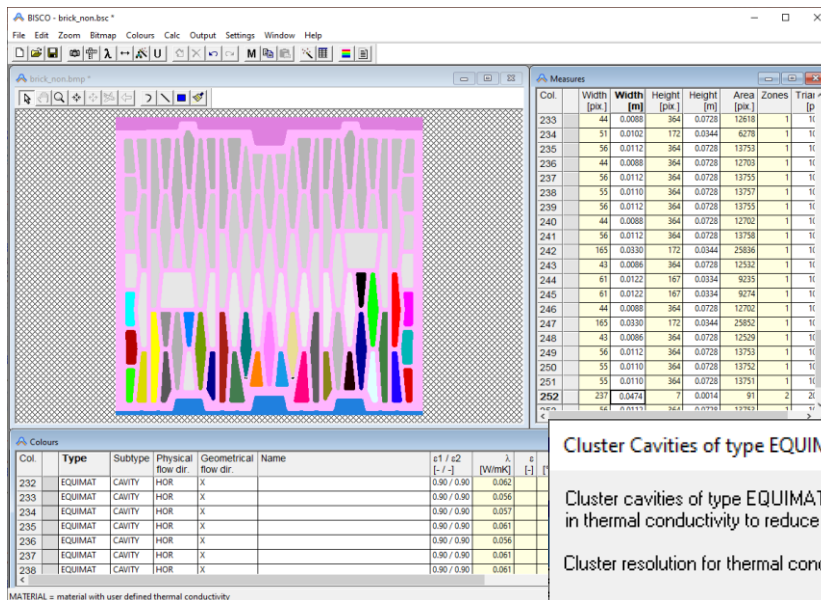
The deviation on the overall heat flow is less than 0.3% for this example

B3. Colour window – Cluster EQUIMAT

Example: masonry

114 different colours for cavities (EQUIMAT)

6 different colours for cavities (EQUIMAT)
(resolution of 0.005 W/mK)

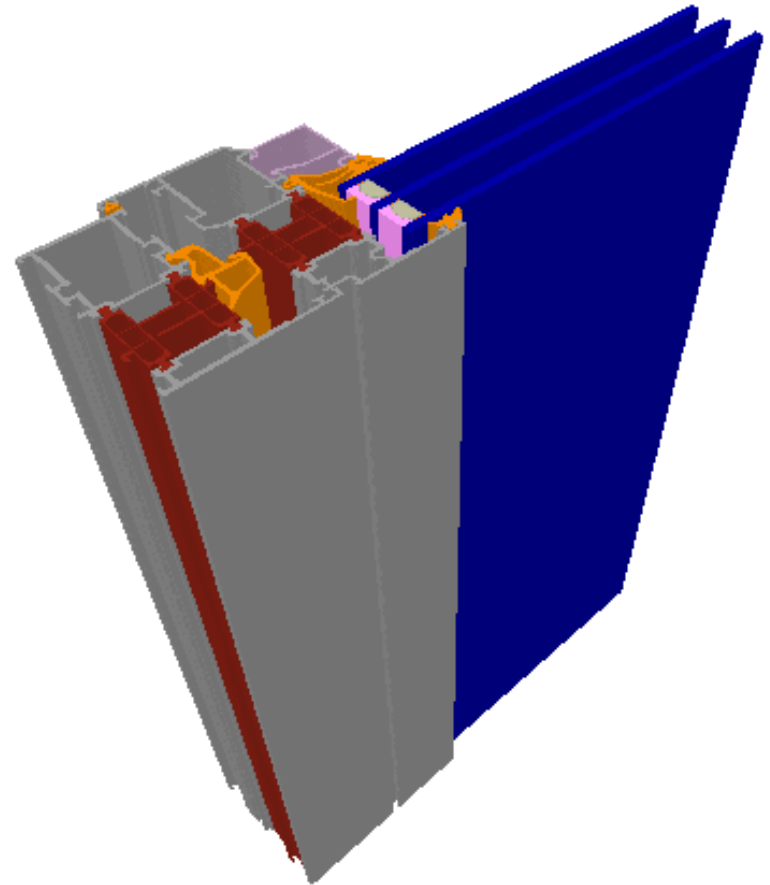
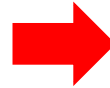
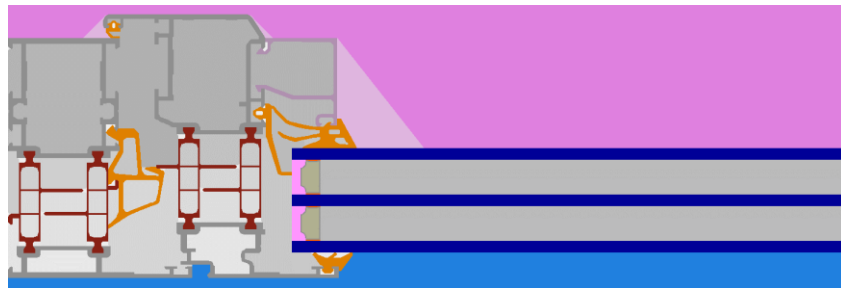


The deviation on the overall heat flow is less than 0.5% for this example

B3. Colour window – Cluster EQUIMAT

Fast 3D extrusion of BISCO files (TRISCO/SOLIDO):

- fixed equivalent thermal conductivities (EN ISO 10077-2)
- number of STL files is reduced (SOLIDO)



C.1 EN ISO 12631 – Screw

Automatic calculation of the “smoothed” thermal conductivity according to method described in EN ISO 12631

Input parameters:

- distance between screws
- thermal conductivity of screws

Screw (EN ISO 12631) Dialog Box:

- Screw diameter: 5.6 mm
- Distance between screws: 250 mm
- Lambda screw: 17 W/(m.K)
- Equivalent lambda: 0.605 W/(m.K)

Measures Table:

Col.	Width [pix.]	Width [m]	Height [pix.]	Height [m]	Area [pix.]	Zones	Triang. [pix.]
	1	0.0001	1	0.0001			
All	3610	0.3610	2200	0.2200			10.00
7	282	0.0282	50	0.0050	14100	1	10.00
8	970	0.0970	1950	0.1950	285800	3	10.00
11	56	0.0056	560	0.0560	31360	1	10.00
28	3610	0.3610	410	0.0410	1287400	2	10.00
57	150	0.0150	360	0.0360	33840	2	10.00
60	970	0.0970	510	0.0510	40000	4	10.00
170	3610	0.3610	250	0.0250	791400	1	
	3610	0.3610	1540	0.1540	3298600	1	
	1570	0.1570	1440	0.1440	864000	2	
	210	0.0210	510	0.0510	86600	1	10.00
	210	0.0210	510	0.0510	86600	1	10.00
	870	0.0870	1290	0.1290	1122300	1	10.00

Colours Table:

Col.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	c1 / c2 [- / -]	λ [W/mK]	c [-]	θ [°C]	h [W/m²K]	q [W/m²]	θ_a [°C]	hc [W/m²K]	Pc [W/m]	θ_r [°C]	Standard
7	MATERIAL				screw head		0.605									
8	MATERIAL				aluminium		160.000									
11	EQUIMAT	SCREW		Y	inox smoothed		0.605									EN12631
28	MATERIAL				insulation		0.035									

Border U Values Table:

Bitmap Border	U [W/m²K]	Enforced U [W/m²K]
Left	0.746	
Right	0.746	
Top		
Bottom		

Annotations:

- Type “EQUIMAT”
- Subtype “SCREW”
- Standard “EN12631”

C.2 EN ISO 6946 – cavities and layers

Example 1: window-wall connection: air layer in wall → EN ISO 6946

BISCO - wall_frame_wood_glazed.bsc *

File Edit Zoom Bitmap Colours Calc Output Settings Window Help

wall_frame_wood_glazed.bmp

Measures

Col.	Width [pix.]	Width [m]	Height [pix.]	Height [m]	Area [pix.]	Zones	Triang. [pix.]
12	360	0.0360	1270	0.1270	457200	1	10.00
15	1140	0.1140	3670	0.3670	589970	2	10.00
18	2010	0.2010	440	0.0440	241200	3	10.00
23	7370	0.7370	220	0.0220	1621400	1	10.00
35	7020	0.7020	1000	0.1000	7020000	1	15.00
55	720	0.0720	2870	0.2870	510490	2	10.00
62	730	0.0730	620	0.0620	900	3	10.00
86	49	0.0049	360	0.0360	11532	2	10.00
92	49	0.0049	360	0.0360	712	4	10.00
105	59	0.0059	346	0.0346	15904	2	10.00
129	7380	0.7380	100	0.0100	738000	1	10.00
156	7380	0.7380	1900	0.1900	14022000	1	15.00
170	10000	1.0000	270	0.0270	1324600	1	
174	10000	1.0000	3160	0.3160	9589095	1	
182	350	0.0350	210	0.0210	20045	2	
224	1912	0.1912	360	0.0360	611840	2	10.00
242	50	0.0050	460	0.0460	23000	1	10.00
243	80	0.0080	10	0.0010	800	1	10.00
244	80	0.0080	10	0.0010	800	1	10.00
245	10	0.0010	190	0.0190	1900	1	10.00
246	7020	0.7020	270	0.0270	1895400	1	10.00

Colours

Col.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	ϵ_1 / ϵ_2 [- / -]	λ [W/mK]	ϵ [-]	θ [°C]	h [W/m²K]	q [W/m²]	θ_a [°C]	h_c [W/m²K]	P_c [W/m]	θ_r [°C]	Standard
182	BC_SIMPL	HI_REDUC	HOR		interior (reduced)				20.0	5.00	0					EN10077
224	EQUIMAT	NIHIL			equivalent U = 0.7 W/m²K		0.026									NIHIL
242	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.127									EN10077
243	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.029									EN10077
244	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.029									EN10077
245	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.066									EN10077
246	EQUIMAT	LAYER	HOR	Y	cavity (CEN)	0.90 / 0.90	0.148									EN6946

C.2 EN ISO 6946 – cavities and layers

Example 2: air cavities in masonry (EN ISO 1745)

The screenshot displays the BISCO software interface for a brick vertical joint. The main window shows a cross-section of a brick wall with a central air cavity. The interface is divided into several panels:

- Measures:** A table listing various components of the masonry and their dimensions.
- Colours:** A table defining the material properties for each component.
- Border U Values:** A table showing the U-values for the different boundaries of the cavity.

Col.	Width [pix.]	Width [m]	Height [pix.]	Height [m]	Area [pix.]	Zones	Triang. [pix.]
	1	0.0010	1	0.0010			
All	286	0.2860	210	0.2100			1.00
-1	38	0.0380	14	0.0140	532	1	1.00
4	145	0.1450	190	0.1900	11752	1	1.00
36	145	0.1450	190	0.1900	11588	1	1.00
170	286	0.2860	10	0.0100	2860	1	
174	286	0.2860	10	0.0100	2860	1	
176	16	0.0160	190	0.1900	1260	1	1.00
192	19	0.0190	14	0.0140	266	1	1.00
193	38	0.0380	14	0.0140	532	1	1.00
194	38	0.0380	14	0.0140	532	1	1.00
195	16	0.0160	14	0.0140	224	1	1.00
196	4	0.0040	14	0.0140	56	1	1.00
197	16	0.0160	14	0.0140	224	1	1.00
198	38	0.0380	14	0.0140	532	1	1.00
199	38	0.0380	14	0.0140	532	1	1.00
200	19	0.0190	14	0.0140	266	1	1.00

Col.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	ϵ_1 / ϵ_2 [- / -]	λ [W/mK]	δ [-]	θ [°C]	h [W/m²K]	q [W/m²]	θ_a [°C]	h_c [W/m²K]	P_c [W/m]	θ_r [°C]	Standard
1	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.076									EN6946
4	MATERIAL				fired clay 1900 kg/m3		0.800									
36	MATERIAL				fired clay 1900 kg/m3		0.800									
170	BC_SIMPL	HE			exterior			0.0	25.00	0						EN6946
174	BC_SIMPL	HI	HOR		interior (normal)			20.0	7.70	0						EN6946
176	MATERIAL				mortar		1.000									
192	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.076									EN6946
193	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.076									EN6946
194	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.076									EN6946
195	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.070									EN6946
196	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.061									EN6946
197	EQUIMAT	CAVITY	HOR	Y	cavity (CEN)	0.90 / 0.90	0.070									EN6946

Bitmap Border	U [W/m²K]	Enforced U [W/m²K]
Left	0.821	
Right	0.821	
Top		
Bottom		

C.3 EN ISO 10077-2 – Conversion method for air cavity

[overview](#)

Air cavities in EN ISO 10077-2 (2017):

- Method 1: 'Single equivalent thermal conductivity' method (EQUIMAT)
- Method 2: 'Radiosity' method (TRANSMAT) (requires feature RADCON)

NBN EN ISO 10077-2:2017

ISO 10077-2:2017(E)

6.4.3 Treatment of cavities using the single equivalent thermal conductivity method

6.4.3.1 General

The heat flow rate in cavities shall be represented by a single equivalent thermal conductivity, λ_{eq} . This equivalent thermal conductivity includes the heat flow by conduction, by convection and by radiation, and depends on the geometry of the cavity and on the adjacent materials.



NBN EN ISO 10077-2:2017

ISO 10077-2:2017(E)

6.4.2 Treatment of cavities using the radiosity method

6.4.2.1 General

The heat transfer through an air cavity occurs simultaneously through convection and through radiation. The two phenomena are happening in parallel so that the calculation of each contribution can be done separately.

Easily switch between both methods:

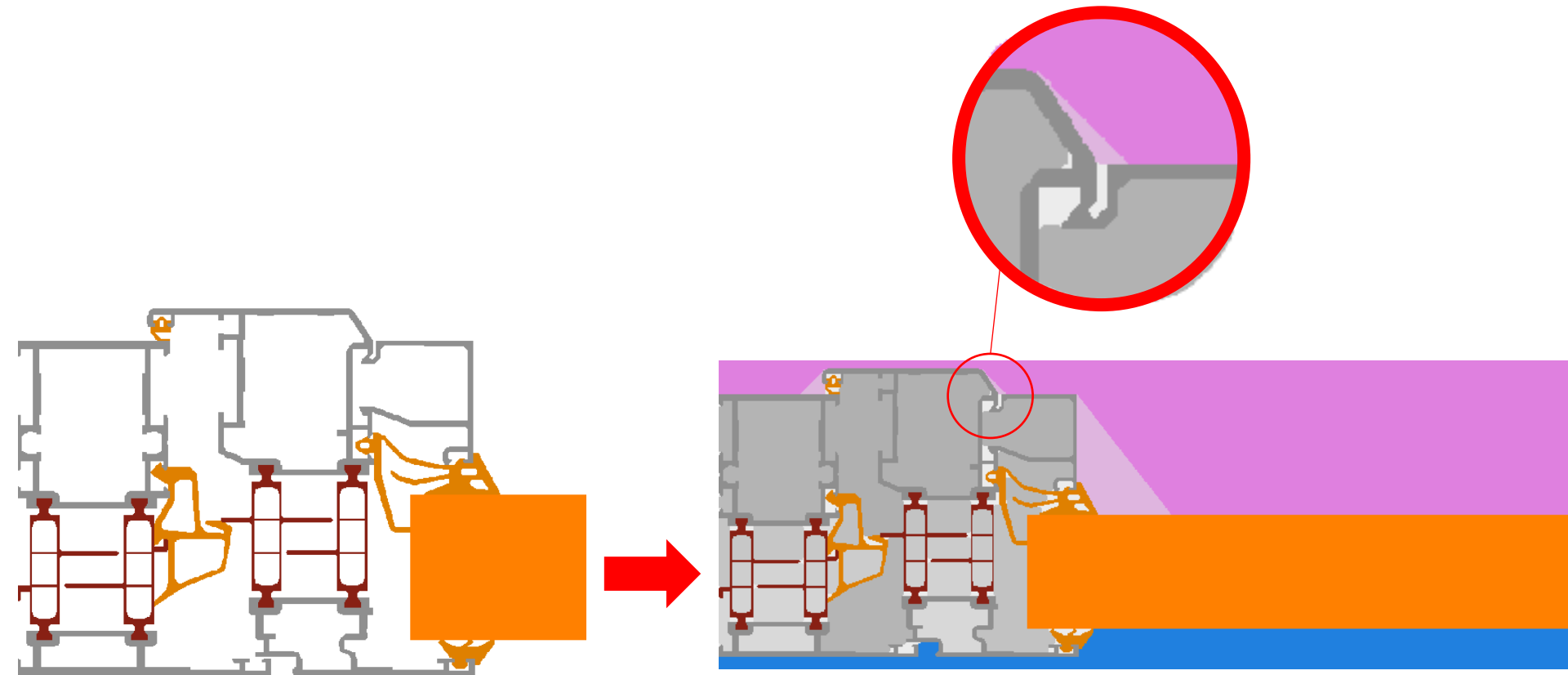
- Colours → Convert to EQUIMAT
- Colours → Convert to TRANSMAT

- List All
- List Defined
- List Present
- Load Material...
- Convert To TRANSMAT
- Convert To EQUIMAT
- Cluster EQUIMAT...
- Copy Row
- Paste Row

+ visualization feature of 'radiosity' method ([Graphic output → A.2](#))

C.3 EN ISO 10077-2 – Surface grooves

Detection of non-ventilated cavities (<2mm) at surfaces



BITMAP → EN 10077 Preparation

C.3 EN ISO 10077-2 – Uf corner profiles

Uf corner profiles: add 2 distances

BISCO - corner_ex.bsc

File Edit Zoom Bitmap Colours Calc Output Settings Window Help

corner_ex.bmp

Col.	Width [pix.]	Width [m]	Height [pix.]	Height [m]	Area [pix.]	Zon
All	303	0.3030	300	0.3000		
15	102	0.1020	99	0.0990	8398	
28	269	0.2690	266	0.2660	9384	
60	83	0.0830	80	0.0800	224	
170	303	0.3030	300	0.3000	15252	
174	245	0.2450	242	0.2420	51022	
182	246	0.2460	243	0.2430	6248	
192	31	0.0310	6	0.0060	186	
193	6	0.0060	31	0.0310	186	

No.	Mode	Dir.	Extent	State	Length [pix.]	Ler
1	LOCKED	Y	MAX	NORMAL	99	0
2	LOCKED	X	MAX	NORMAL	102	0
3	LOCKED	Y	FREE	NORMAL	190	0
4	LOCKED	X	FREE	NORMAL	190	0

Col.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	ϵ_1 / ϵ_2 [- / -]	λ [W/mK]	δ [m]	θ [°C]	h [W/m²K]	q [W/m²]	θ_a [°C]	h_c [W/m²K]	P_c [W/m]	θ_r [°C]	Standard
15	MATERIAL				softwood 500 kg/m³		0.130									
28	MATERIAL				insulation panel		0.035									
60	MATERIAL				EPDM		0.250									
170	BC_SIMPL	HE	HOR		exterior				0.0	25.00	0					EN10077
174	BC_SIMPL	HL_NORML	HOR		interior (normal), horizontal heat flow				20.0	7.70	0					EN10077
182	BC_SIMPL	HL_REDUC	HOR		indoors (reduced)				20.0	5.00	0					EN10077
192	EQUIMAT	CAVITY	HOR	X		0.90 / 0.90		0.116								EN10077
193	EQUIMAT	CAVITY	HOR	Y		0.90 / 0.90		0.116								EN10077

Derived Thermal Properties

Temperature factor (f)

Linear thermal transmittance (psi) & equivalent thermal transmittance (Ueq)

1st flanking element

U value in bitmap section : Left Right Top Bottom Distance

U value along distance no. :

Width along distance no. :

Add width distance no. :

2nd flanking element

U value in bitmap section : Left Right Top Bottom Distance

U value along distance no. :

Width along distance no. :

Add width distance no. :

Thermal transmittance of frame (Uf)

Frame width along dist. no. : Add width along dist. no.

1st panel

U panel in bitmap section : Left Right Top Bottom Distance

U value along distance no. :

Width along distance no. :

2nd panel

U panel in bitmap section : Left Right Top Bottom Distance

U value along distance no. :

Width along distance no. :

Internal surface relative humidity

Inside zone RH: %

Surface RH = 100 % (surface condensation)

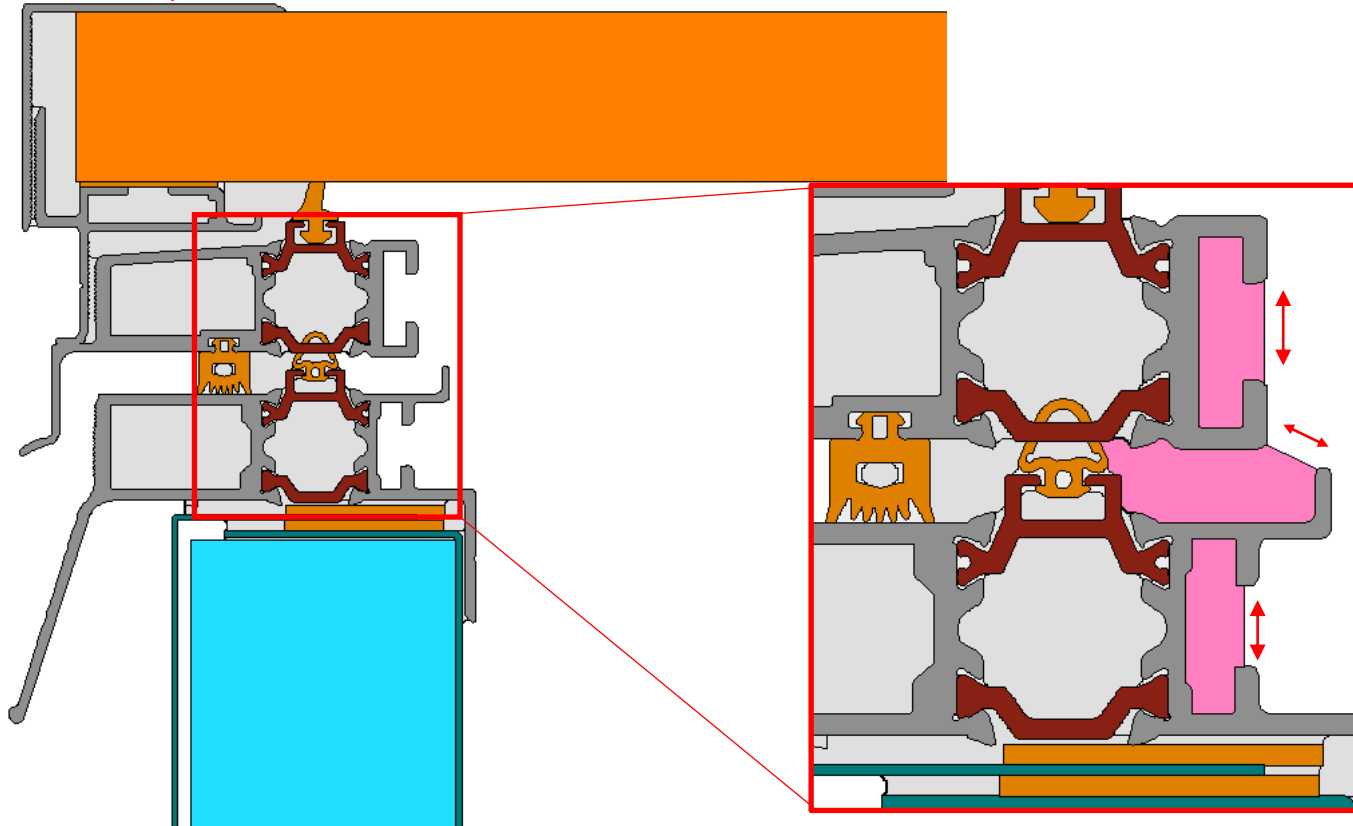
Surface RH >= %

OK Cancel

C.4 EN ISO 13788 – Temperature factor

Slightly ventilated cavities (2-10mm) are considered in the temperature factor

example



D. Text output

D1: feature to save text output in .csv format (e.g. process data in MS Excel)

The screenshot shows a Windows File Explorer window with the address bar set to 'This PC > Desktop > CSV'. The file list includes:

Name	Date modified	Type	Size
alu_1_frame_panel.bmp	19/06/2020 10:49	BMP File	40 KB
alu_1_frame_panel.bsc	19/06/2020 10:49	BSC File	4 KB
alu_1_frame_panel.flw	19/06/2020 10:49	FLW File	2,120 KB
alu_1_frame_panel.flx	19/06/2020 10:49	FLX File	677 KB
alu_1_frame_panel.sol	19/06/2020 10:49	SOL File	919 KB
alu_1_frame_panel.tri	19/06/2020 10:49	TRI File	3,690 KB
alu_1_frame_panel_1.csv	19/06/2020 10:49	Microsoft Excel C...	2 KB
alu_1_frame_panel_2.csv	19/06/2020 10:49	Microsoft Excel C...	3 KB
alu_1_frame_panel_3.csv	19/06/2020 10:49	Microsoft Excel C...	2 KB

The Excel spreadsheet, titled 'alu_1_frame_panel_2.csv', displays a table with columns for material properties and flow characteristics. The visible data includes:

Col.	Type	Subtype	Phys. flow	Geom. flow	Name	lambda (W/mK)	eps [-]	t [°C]	h [W/m²K]	q [W/m²]	Standard
8	MATERIAL				aluminium	160	0.9				
3	MATERIAL				insulation panel	0.035	0.9				
4	MATERIAL				polyamide 6.6	0.3	0.9				
6	MATERIAL				EPDM	0.25	0.9				
170	BC_SIMPL	HE	HOR		exterior			0	25	0	EN10077
174	BC_SIMPL	HI_NORML	HOR		interior (normal) horizontal heat flow			20	7.7	0	EN10077
182	BC_SIMPL	HI_REDUC	HOR		indoors (reduced)			20	5	0	EN10077
152	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
153	TRANSMAT	CAVITY	HOR	DIR		0.057					EN10077
154	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
155	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
156	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
157	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
158	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
159	TRANSMAT	CAVITY	HOR	DIR		0.038					EN10077
200	TRANSMAT	CAVITY	HOR	DIR		0.047					EN10077
201	TRANSMAT	CAVITY	HOR	DIR		0.037					EN10077
202	TRANSMAT	CAVITY	HOR	DIR		0.035					EN10077
203	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
204	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
205	TRANSMAT	CAVITY	HOR	DIR		0.027					EN10077
206	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077
207	TRANSMAT	CAVITY	HOR	DIR		0.025					EN10077

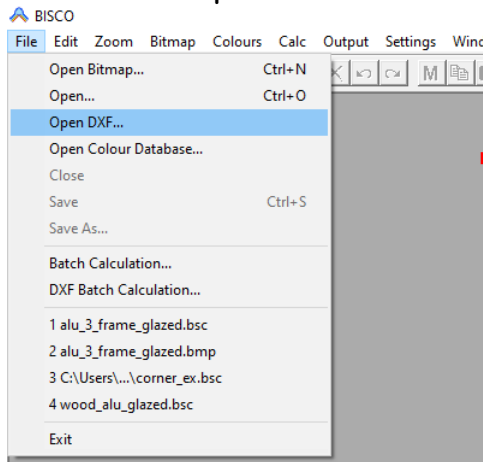
D2: Automated 'Make report' function:

This function now **copies and opens the report template** in current folder

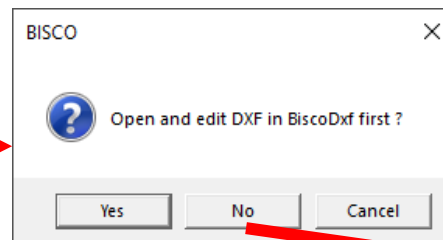
E.1 BiscoDxf – accesible from BISCO

BiscoDxf is accessible from BISCO

File → Open DXF...



Selection of DXF file

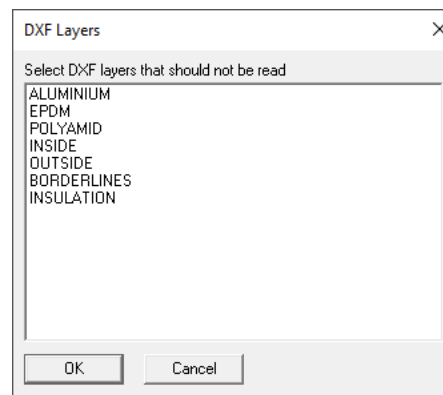


Automatic conversion of DXF to BMP in BISCO



opens generated BMP in BISCO

Delete unwanted layers



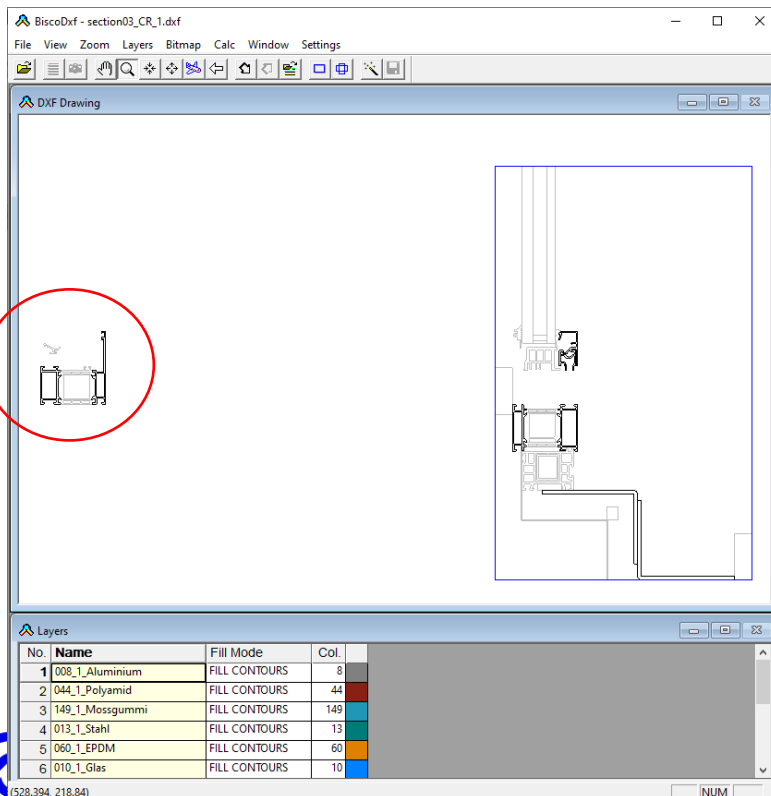
BiscoDxf opens for editing

E.2 BiscoDxf – Improved algorithm

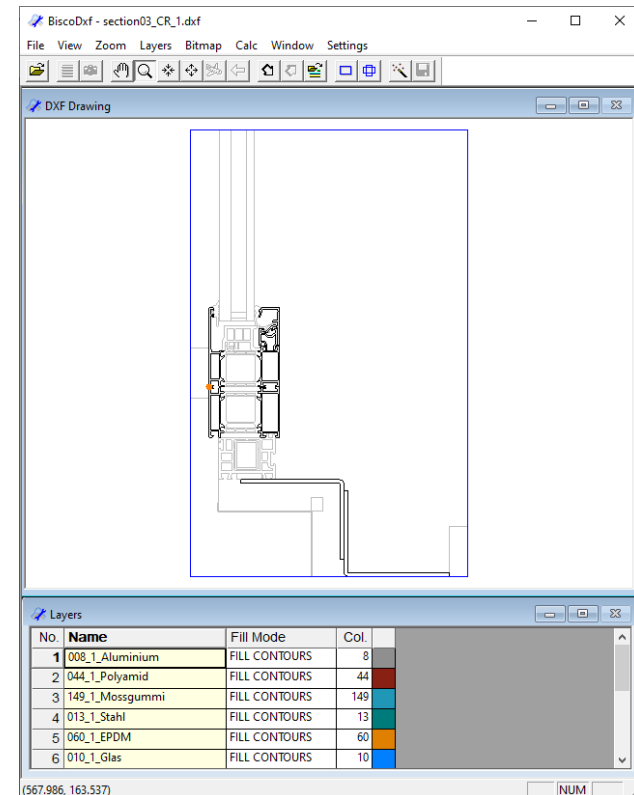
In BISCO v11 problems may occur when the 2D DXF files are extracted from 3D DXF files because of differences in extrusion direction

→ BiscoDxf in BISCO v12 anticipates for mirrored extrusion directions

BISCO v11

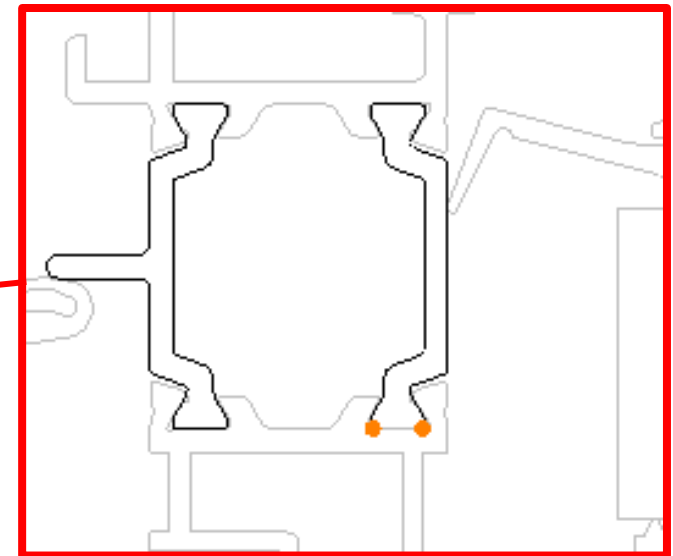
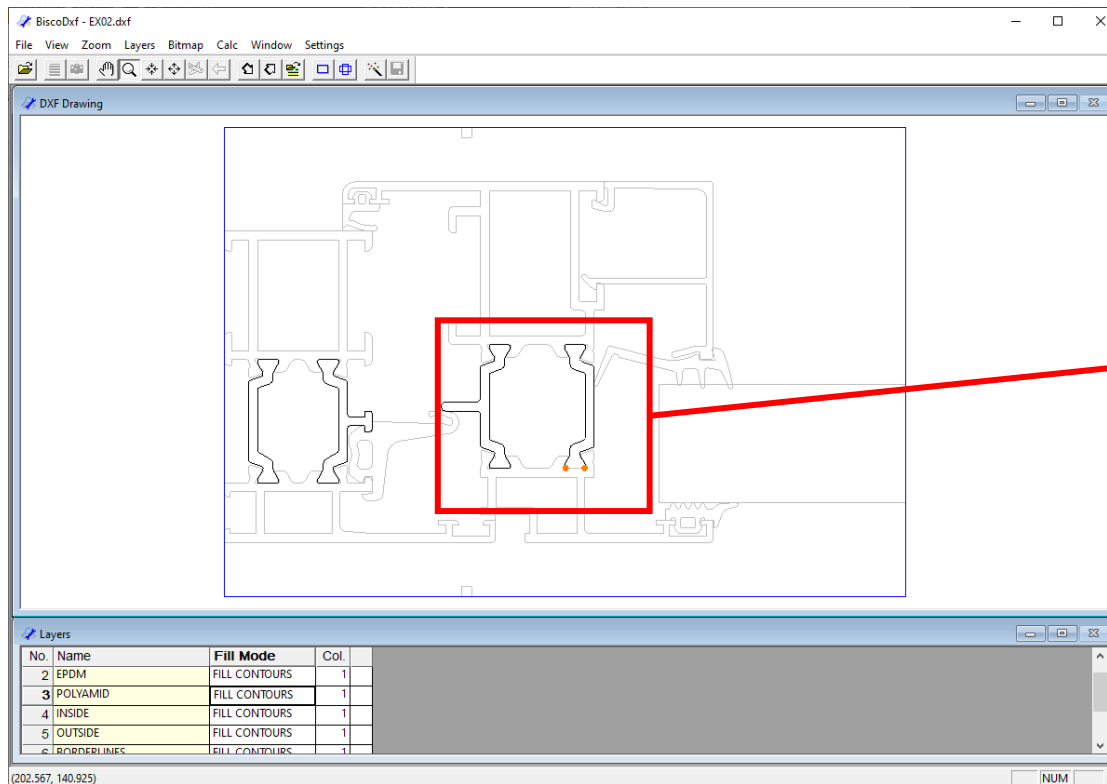


BISCO v12



E.3 BiscoDxf – Warnings

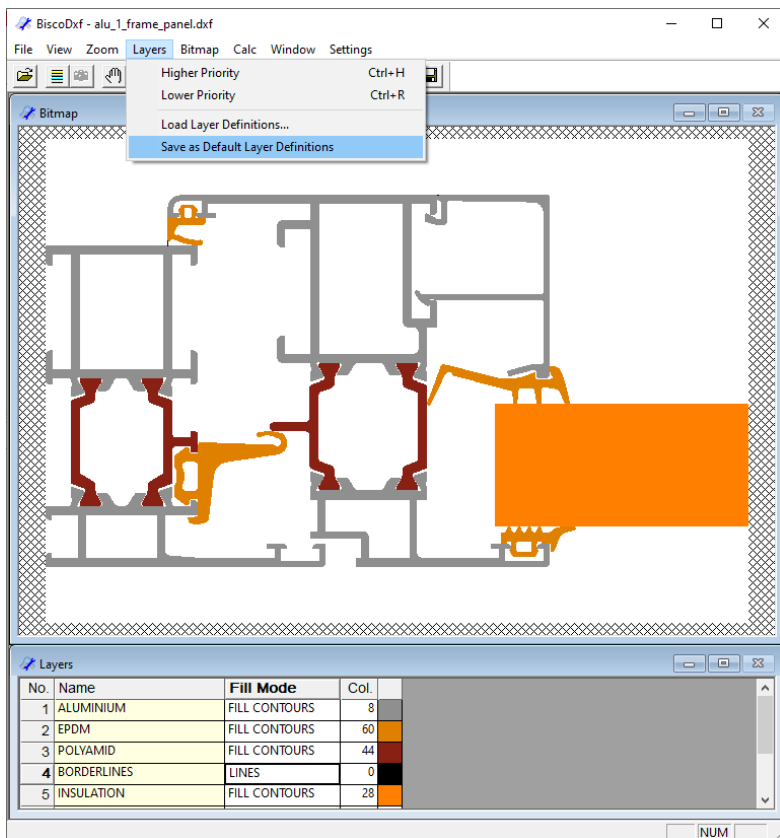
Warning (orange dots) when a polyline is not closed or contains duplicates



E.4 BiscoDxf – layer info

New feature to store layer information as default

Layers → Save as Default Layer Definitions



C:\Users\...\AppData\Roaming\Physibel\Bisco\

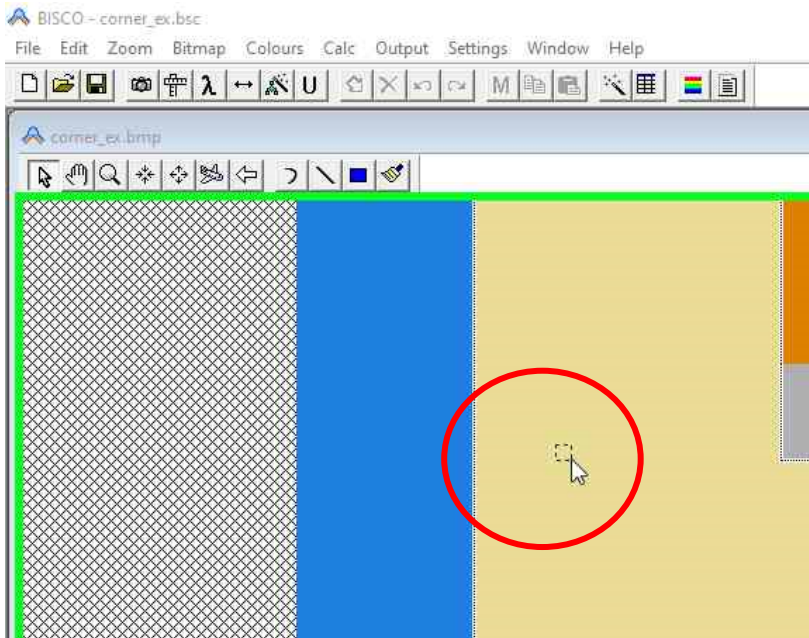
```

BiscoDxf.lay - Notepad
File Edit Format View Help
name=ALUMINIUM
disp=1
colr=8
name=EPDM
disp=1
colr=60
name=POLYAMID
disp=1
colr=44
name=BORDERLINES
disp=0
colr=0
name=INSULATION
disp=1
colr=28
name=OUTSIDE
disp=1
colr=1
name=INSIDE
disp=1
colr=1
  
```

Next project file: stored layer names get the correct 'fill mode', 'colour' and sequence

F.1 Bitmap editing – snap to pixel

Pixel is highlighted when in 'selection' mode or in 'drawing' mode



Snap to pixel simplifies:

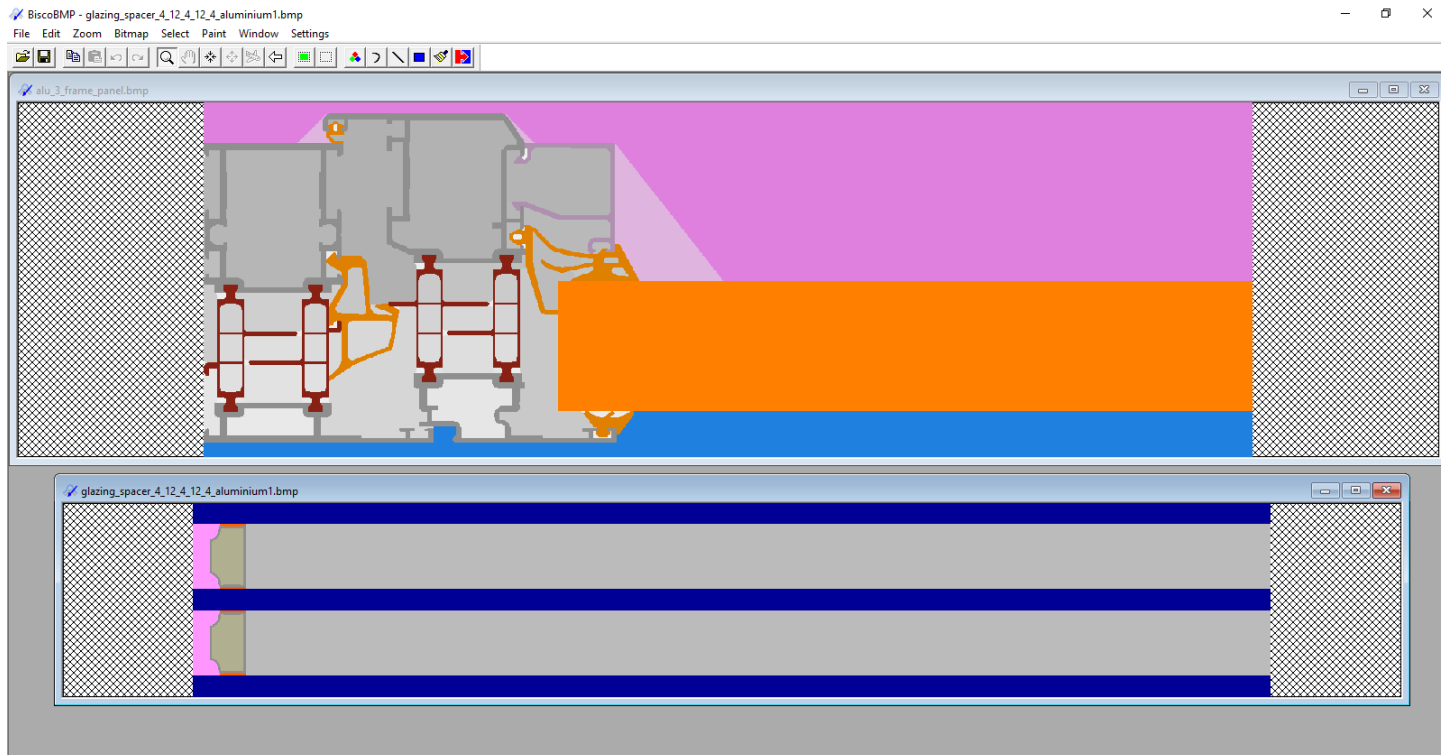
- drawing
- importing bitmaps (e.g. glazing)
- defining distances

F.2 Bitmap editing – Drawing tool BiscoBmp

BiscoBmp accessible from BISCO



Bitmap → Edit using BiscoBmp



BiscoBmp functionalities:

- Open multiple bitmaps
- Modify the size of the bitmap
- Verify dimension of a zone
- Crop the bitmap borders
- Modify the bitmap resolution
- Rotate the bitmap over 90°
- Flip and mirror the bitmap
- Add bitmap borders
- Several select options: all / none / window / colour / add to and subtract from selection.
- Several select operations: copy & paste / move / crop to selection.
- Draw pixels, lines, rectangles and fixed angle lines (increment 45°)
- Fill zones
- Replace colours



When closing BiscoBmp the adjustments are automatically loaded into current BISCO file

F.3 Bitmap editing – Rectangles & lines

Drawing functions: rectangles & lines

BISCO - wooden_frame_corner_bsc.bsc

File Edit Zoom Bitmap Colours Calc Output Settings Window Help

wooden_frame_corner_bsc.bmp

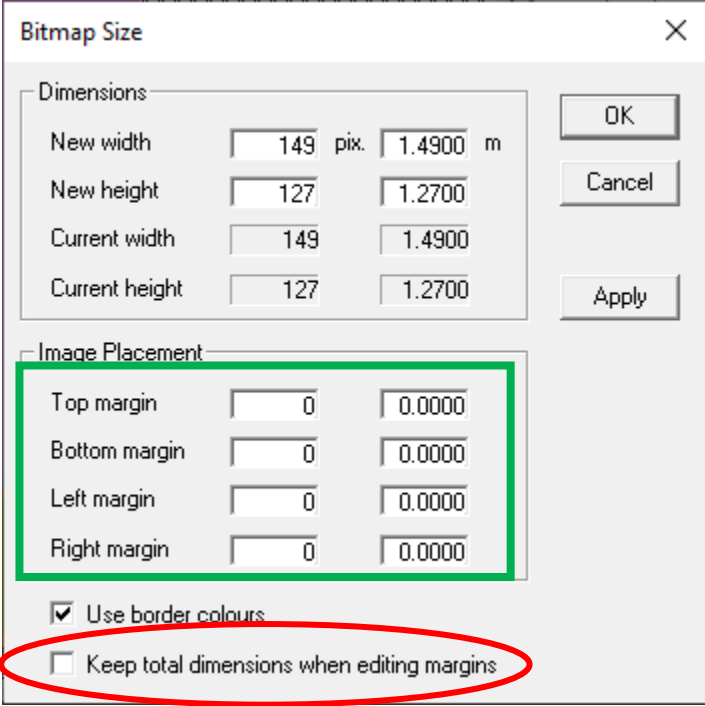
Colours

Col.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	ϵ_1 / ϵ_2 [- / -]	λ [W/mK]	c [-]	θ [°C]	h [W/m²K]	q [W/m²]
12	MATERIAL				hardwood		0.180				
15	MATERIAL				softwood		0.130				
43	MATERIAL				softwood		0.130				
124	MATERIAL				plywood 500 kg/m3		0.130				

F.4 Bitmap editing – Miscellaneous

Bitmap size: option to keep dimension when editing margins

Allows to easily extend the
bitmap borders with
desired extension length



Bitmap Size

Dimensions

New width	<input type="text" value="149"/> pix.	<input type="text" value="1.4900"/> m
New height	<input type="text" value="127"/>	<input type="text" value="1.2700"/>
Current width	<input type="text" value="149"/>	<input type="text" value="1.4900"/>
Current height	<input type="text" value="127"/>	<input type="text" value="1.2700"/>

Image Placement

Top margin	<input type="text" value="0"/>	<input type="text" value="0.0000"/>
Bottom margin	<input type="text" value="0"/>	<input type="text" value="0.0000"/>
Left margin	<input type="text" value="0"/>	<input type="text" value="0.0000"/>
Right margin	<input type="text" value="0"/>	<input type="text" value="0.0000"/>

Use border colours

Keep total dimensions when editing margins

OK
Cancel
Apply

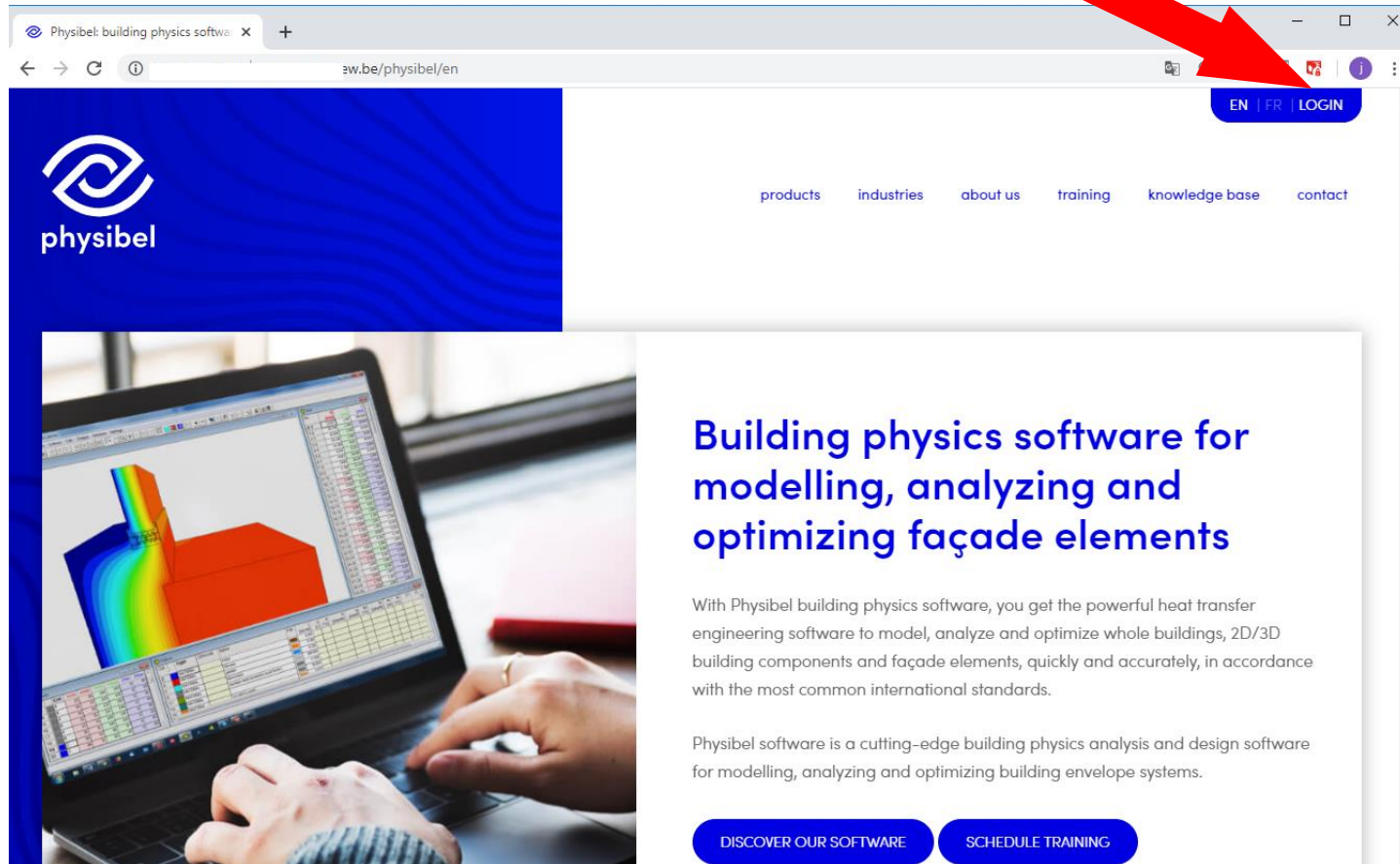
F.5 Bitmap editing – Miscellaneous

- Cursor colour adjusted for background colour
- Zoom and draw function buttons moved to Bitmap window
- Pan: drag mode changed to 'drag object'
- Function 'Clean Colour...' to delete pixel noise

G.1 Online Physibel Portal

[overview](#)

log in to portal via www.physibel.be



The screenshot shows a web browser window displaying the Physibel website. The address bar shows the URL www.physibel.be. The website features a blue header with the Physibel logo on the left and a navigation menu on the right. The navigation menu includes links for [products](#), [industries](#), [about us](#), [training](#), [knowledge base](#), and [contact](#). A prominent blue button labeled **EN | FR | LOGIN** is located in the top right corner, with a large red arrow pointing to it from the text above. Below the header, there is a large image of a laptop displaying a 3D building model with a color-coded heat transfer analysis. To the right of the image, the main content area contains the following text:

Building physics software for modelling, analyzing and optimizing façade elements

With Physibel building physics software, you get the powerful heat transfer engineering software to model, analyze and optimize whole buildings, 2D/3D building components and façade elements, quickly and accurately, in accordance with the most common international standards.

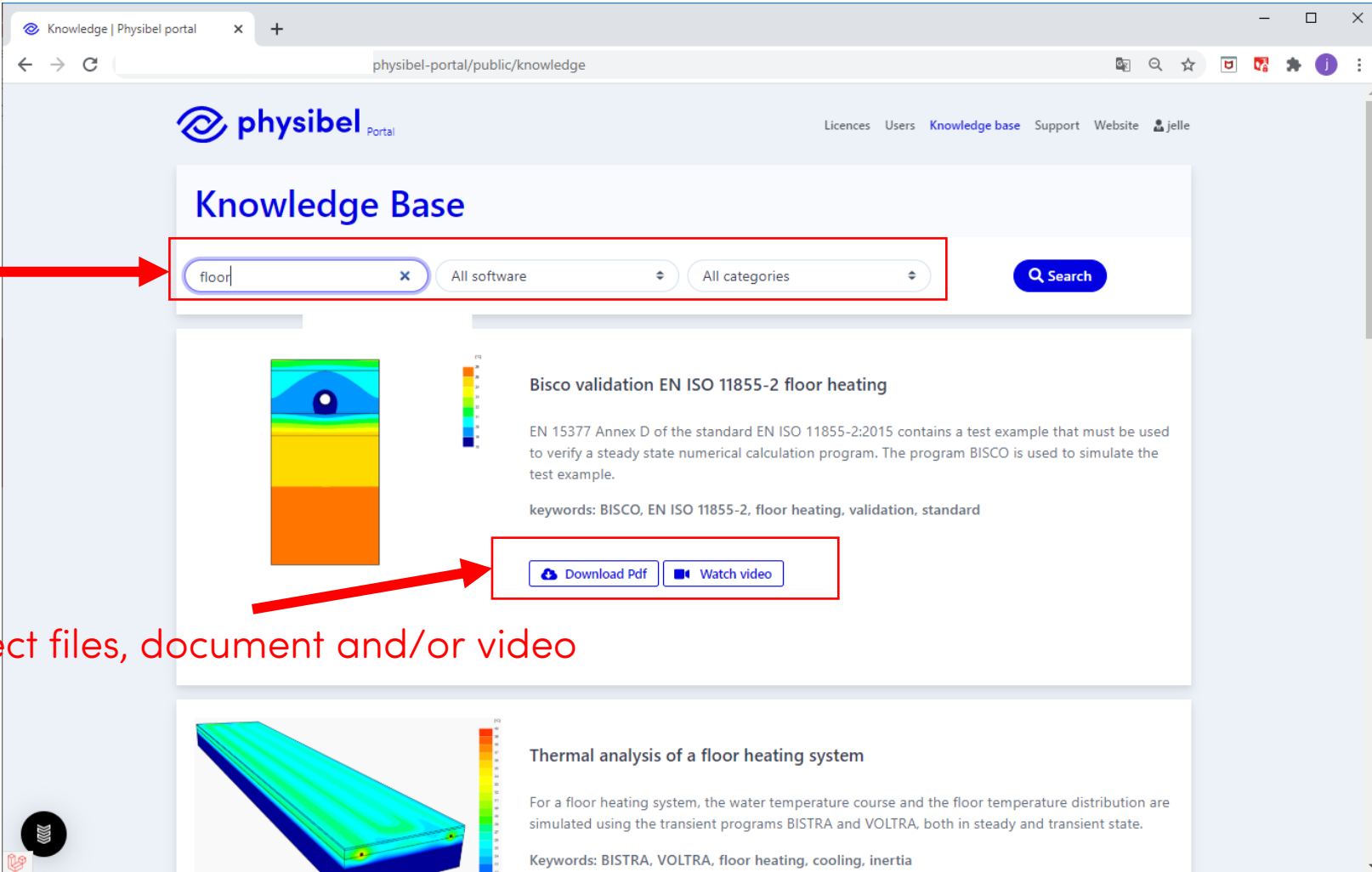
Physibel software is a cutting-edge building physics analysis and design software for modelling, analyzing and optimizing building envelope systems.

At the bottom of the main content area, there are two blue buttons: **DISCOVER OUR SOFTWARE** and **SCHEDULE TRAINING**.

G.1 Online Physibel Portal

Access to

- Knowledge Base with example projects, tutorials and videos



The screenshot shows the Physibel Knowledge Base portal. The search bar contains the text "floor" and is highlighted with a red box and a red arrow pointing to it from the text "Search tool". Below the search bar, the results for "Bisco validation EN ISO 11855-2 floor heating" are displayed. This result includes a 2D cross-section image of a floor heating system with a color scale on the right. Below the image, there are two buttons: "Download Pdf" and "Watch video", which are also highlighted with a red box and a red arrow pointing to them from the text "Access project files, document and/or video".

Knowledge | Physibel portal

physibel-portal/public/knowledge

physibel Portal

Licences Users Knowledge base Support Website Jelle

Knowledge Base

Search tool → floor × All software All categories Search

Bisco validation EN ISO 11855-2 floor heating

EN 15377 Annex D of the standard EN ISO 11855-2:2015 contains a test example that must be used to verify a steady state numerical calculation program. The program BISCO is used to simulate the test example.

keywords: BISCO, EN ISO 11855-2, floor heating, validation, standard

→ Download Pdf Watch video

Thermal analysis of a floor heating system

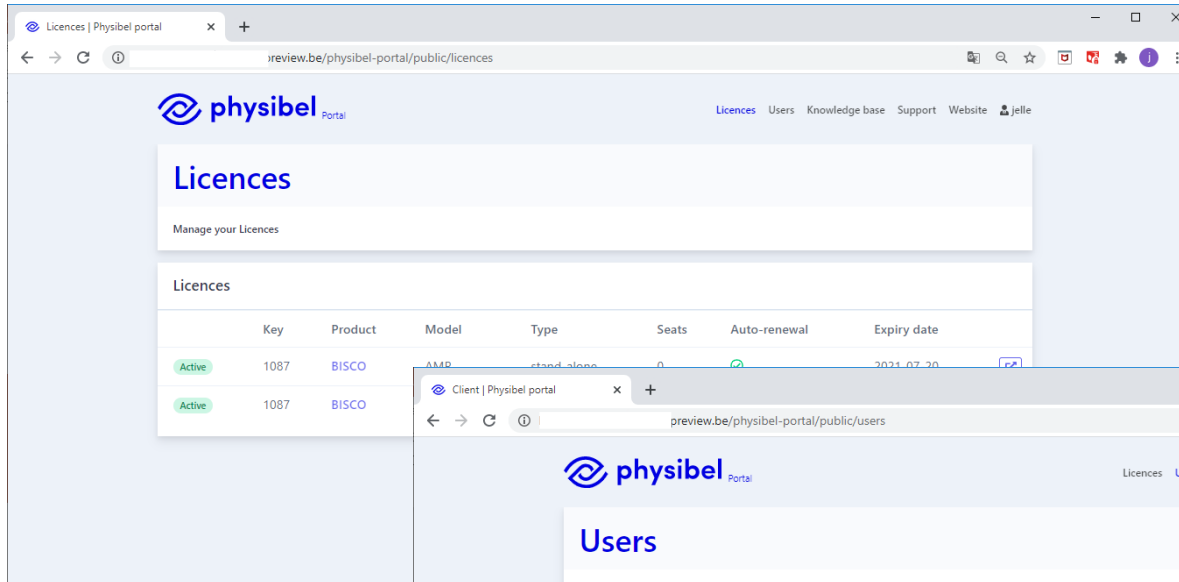
For a floor heating system, the water temperature course and the floor temperature distribution are simulated using the transient programs BISTRA and VOLTRA, both in steady and transient state.

Keywords: BISTRA, VOLTRA, floor heating, cooling, inertia

G.1 Online Physibel Portal

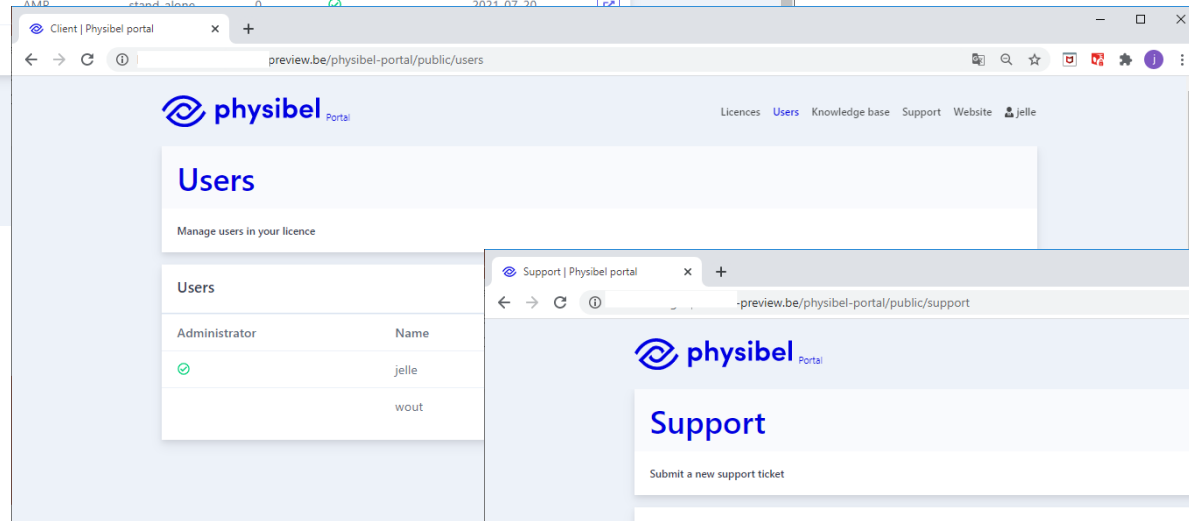
Access to

- Licence and user management
- Support



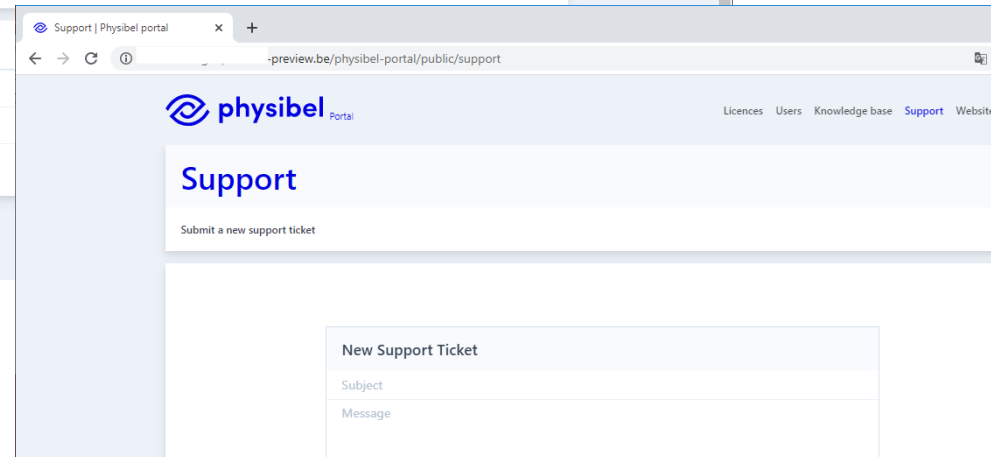
Screenshot of the Physibel Portal Licences page. The page title is "Licences" and the subtitle is "Manage your Licences". The page displays a table of licences with the following columns: Key, Product, Model, Type, Seats, Auto-renewal, and Expiry date. Two licences are listed, both with a status of "Active".

	Key	Product	Model	Type	Seats	Auto-renewal	Expiry date
Active	1087	BISCO	AMP	stand-alone	0		2021-07-20
Active	1087	BISCO					



Screenshot of the Physibel Portal Users page. The page title is "Users" and the subtitle is "Manage users in your licence". The page displays a table of users with the following columns: Administrator and Name. Two users are listed: jelle and wout.

Administrator	Name
✓	jelle
	wout



Screenshot of the Physibel Portal Support page. The page title is "Support" and the subtitle is "Submit a new support ticket". The page displays a form for submitting a new support ticket with the following fields: Subject and Message.

New Support Ticket

Subject

Message

H Licencing options

[overview](#)

Option 1: hardware key

- Stand-alone
- Model: perpetual
- Updates and support via Annual Maintenance Plan (AMP)



Option 2: Software licence

- Stand-alone / network floating / cloud-based floating
- Model: subscription (1 or 3-yearly)
- Updates and support included in subscription





BISCO v12 New program performances



www.physibel.be/bisco

downloadable program demo version