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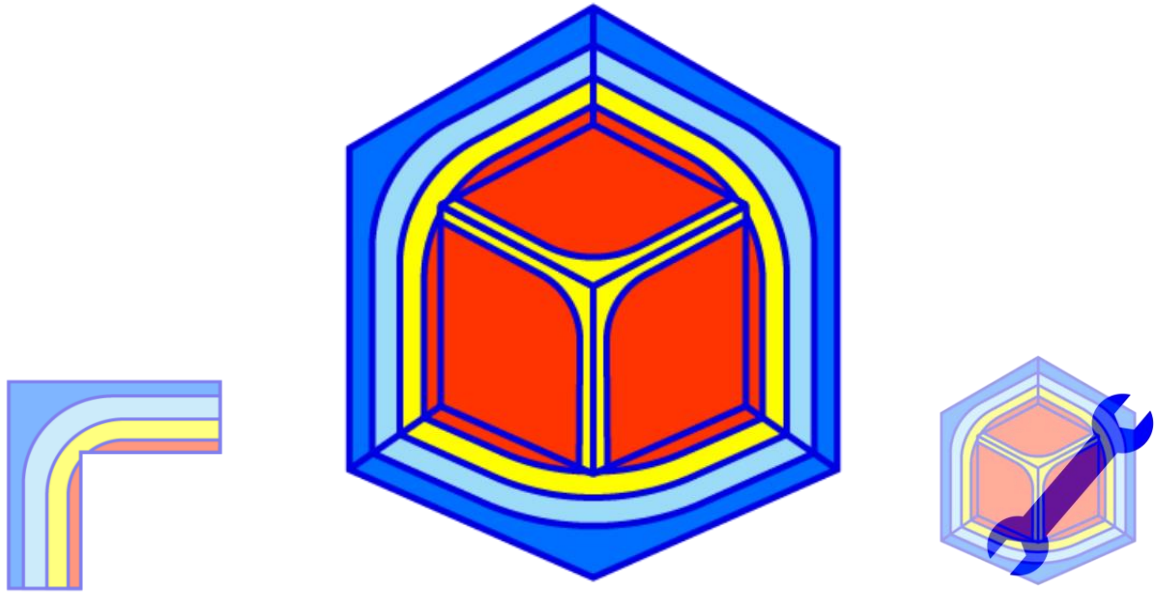
# TRISCO v15 New program performances



www.physibel.be/en/products/trisco

# TRISCO v15 - Overview

overview

A Includes new tool Trisco2D

- A.1 Using a DXF as underlayer
- A.2 Automatic grid recognition
- A.3 Intuitive drawing and material selection functions
- A.4 Fast reporting of ψ-values and $U_{2D}$-values
- A.5 Trisco2D files can be imported in TRISCO

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- G.4 Layer selection when loading DXF

H Online Physibel Portal

- H.1 User management
- H.2 Support
- H.3 Physibel Knowledge Base
  - Documentation
  - Tutorials and examples
  - Videos

I Licencing

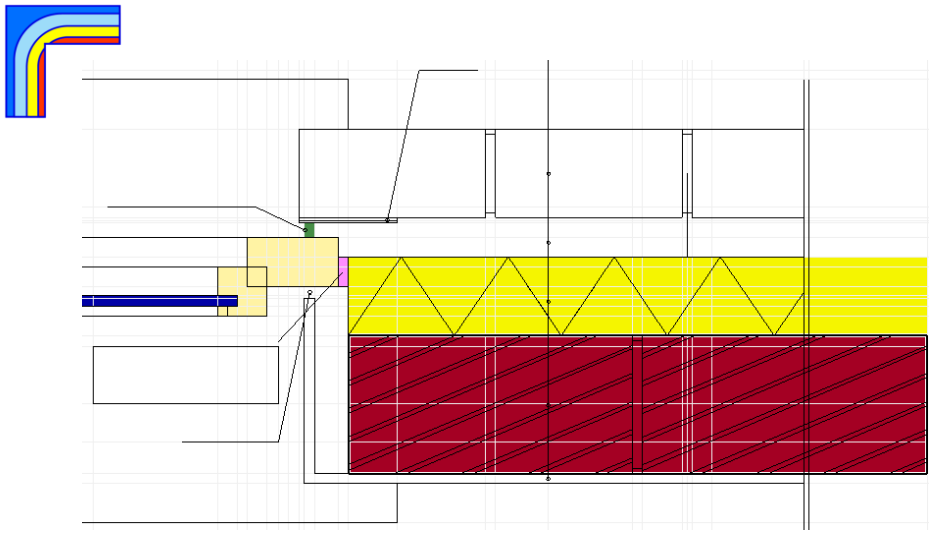
- I.1 Perpetual licence (USB key)
- I.2 Subscription licence (software key)

# A. New tool Trisco2D

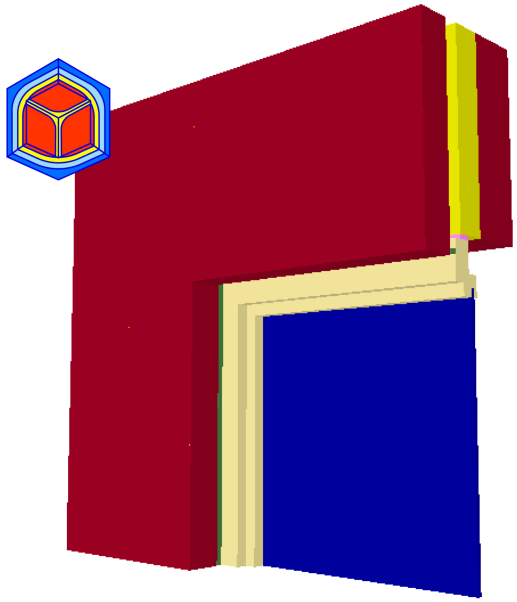
overview

Allows to model fast 2D thermal problems based on rectangular blocks:

- Using DXF-underlayer
- Automatic grid recognition from random DXF files
- Intuitive drawing and material selection functions
- Fast reporting of ψ-values and $U_{2D}$-values
- Trisco2D model can be imported in TRISCO



Preparation of model in Trisco2D

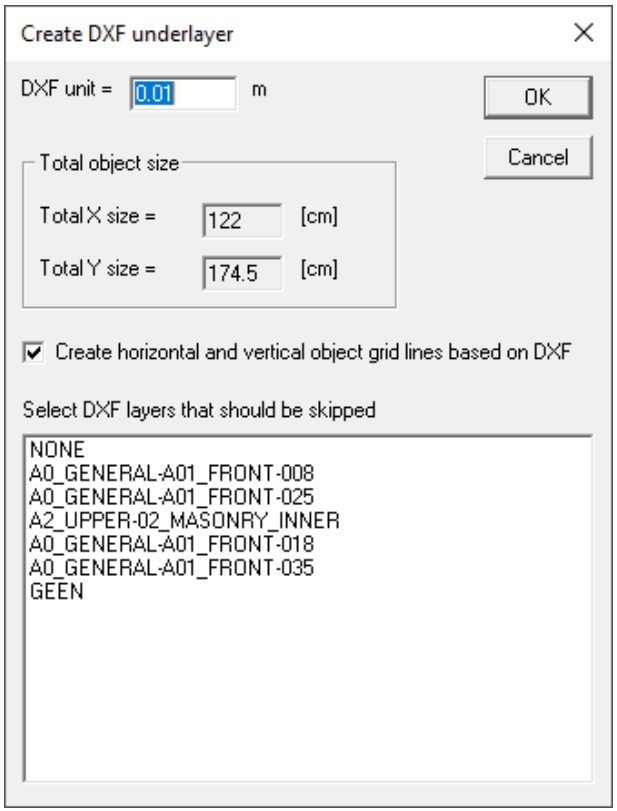


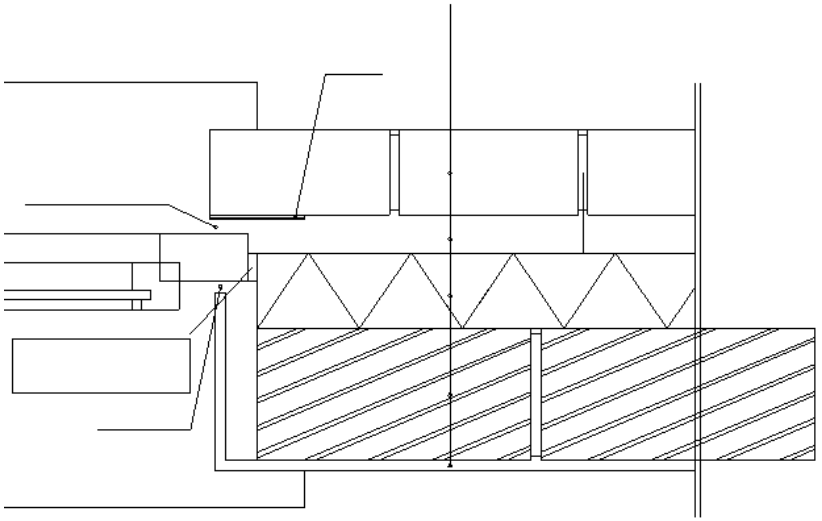
TRISCO

# A.1 Trisco2D – Using a DXF as underlayer

overview

- Import 2D DXF as underlayer in Trisco2D
- DXF file has no format requirements (e.g. can contain open polylines)
- Option to skip unwanted DXF layers

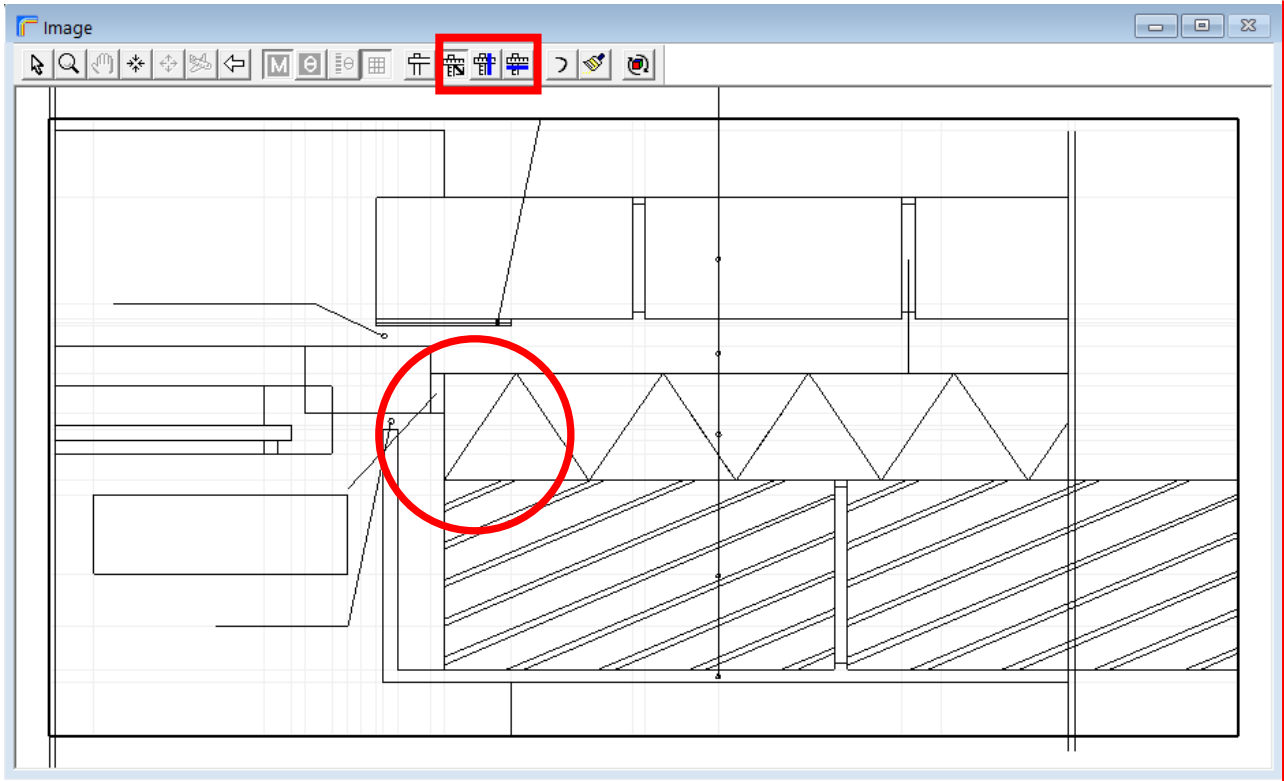


# A.2 Trisco2D – Automatic grid recognition

overview

- Horizontal and vertical object grid lines detected
- Snap functions to add grid lines with mouse cursor
- Drag function to move or delete grid line with mouse cursor




Grid

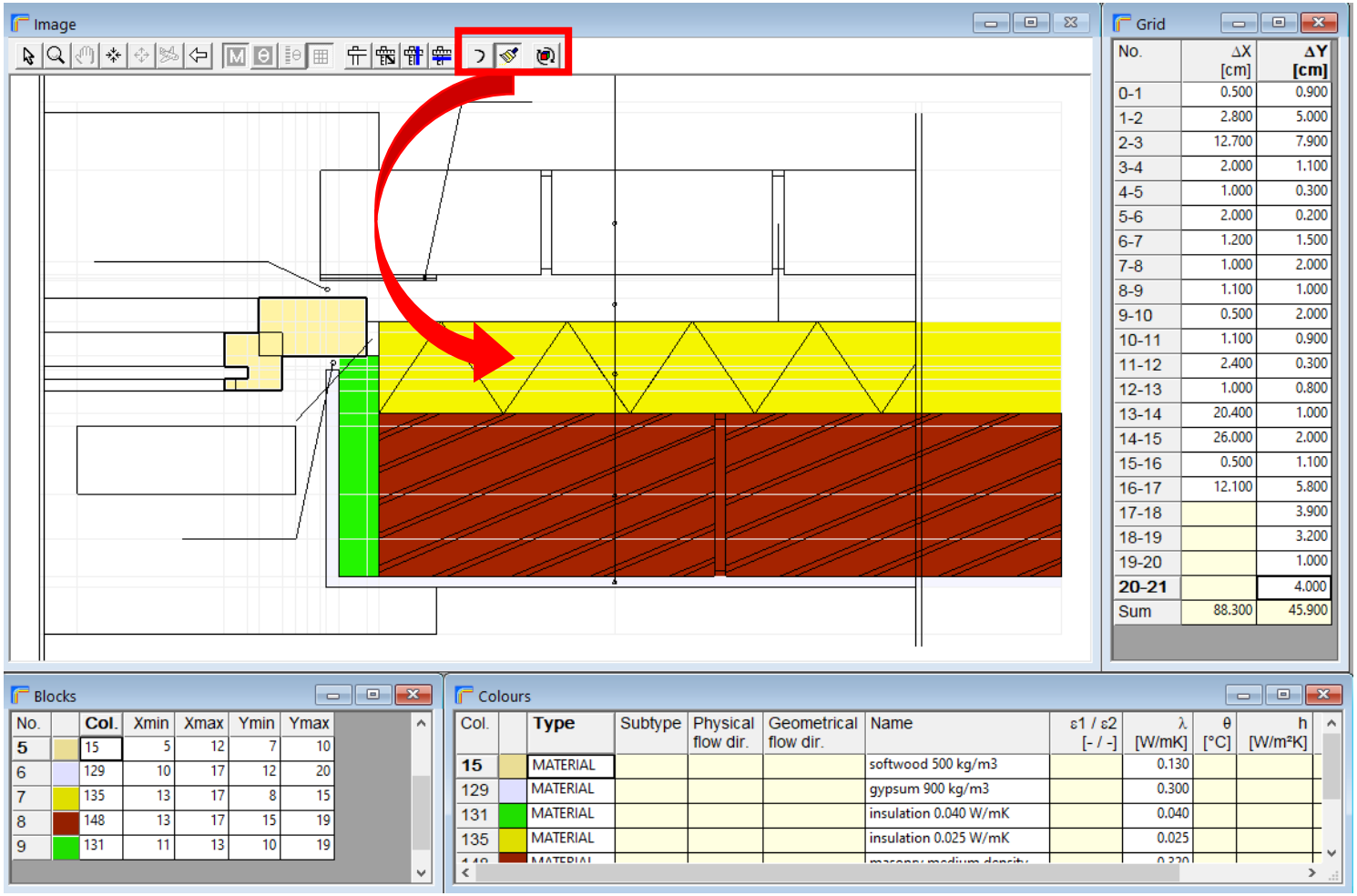
| No. | ΔX [cm] | ΔY [cm] |
|---|---|---|
| 0-1 | 0.500 | 0.900 |
| 1-2 | 2.800 | 5.000 |
| 2-3 | 12.700 | 7.900 |
| 3-4 | 2.000 | 1.100 |
| 4-5 | 1.000 | 0.300 |
| 5-6 | 2.000 | 0.200 |
| 6-7 | 1.200 | 1.500 |
| 7-8 | 1.000 | 2.000 |
| 8-9 | 1.100 | 1.000 |
| 9-10 | 0.500 | 2.000 |
| 10-11 | 1.100 | 0.900 |
| 11-12 | 2.400 | 0.300 |
| 12-13 | 1.000 | 0.800 |
| 13-14 | 5.000 | 1.000 |
| 14-15 | 9.000 | 2.000 |
| 15-16 | 1.000 | 1.100 |
| 16-17 | 5.400 | 5.800 |
| 17-18 | 13.600 | 3.900 |
| 18-19 | 3.000 | 3.200 |
| 19-20 | 9.400 | 1.000 |
| **20-21** | 0.500 | 4.000 |
| 21-22 | 12.100 | |
| Sum | 88.300 | 45.900 |

Automatic grid detection

# A.3 Trisco2D – Intuitive drawing and material selection

overview

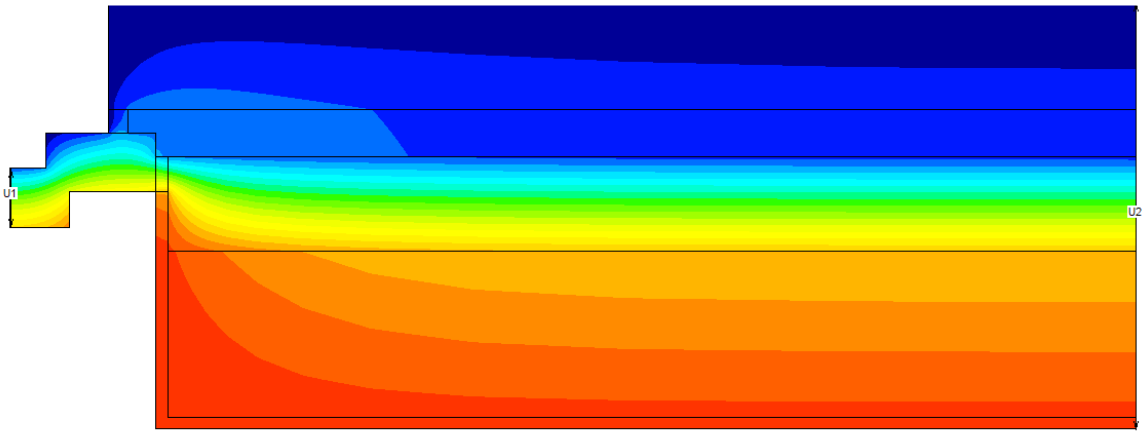
- Draw and fill functions to link colours to grid with mouse cursor
- Fast key to optimize number of blocks



# A.4 Fast reporting of $\psi/U_{2D}$-values and input for TRISCO

overview

- Direct output for 2D thermal problems: $\psi$-values and $U_{2D}$-values in Graphic Output




$\psi = Q/(\theta i-\theta e) - U1*L1 - U2*L2$

$Q = 10.232$ W/m

$\theta i = 20°C$

$\theta e = 0°C$

$U1 = 2.234$ W/(m².K)

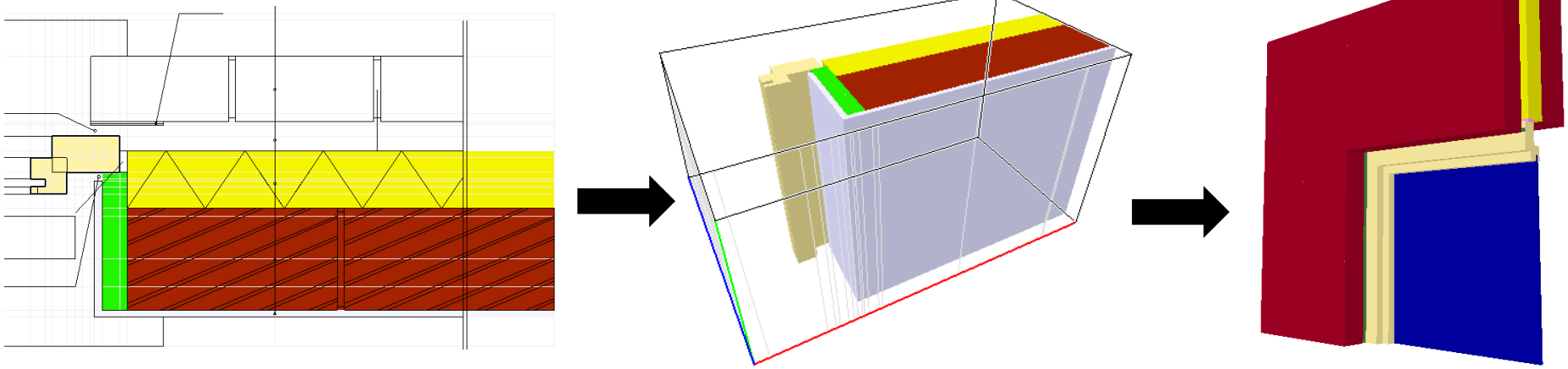
$L1 = 0.083$ m

$U2 = 0.226$ W/(m².K)

$L2 = 0.867$ m

$\psi = 0.130$ W/(m.K)

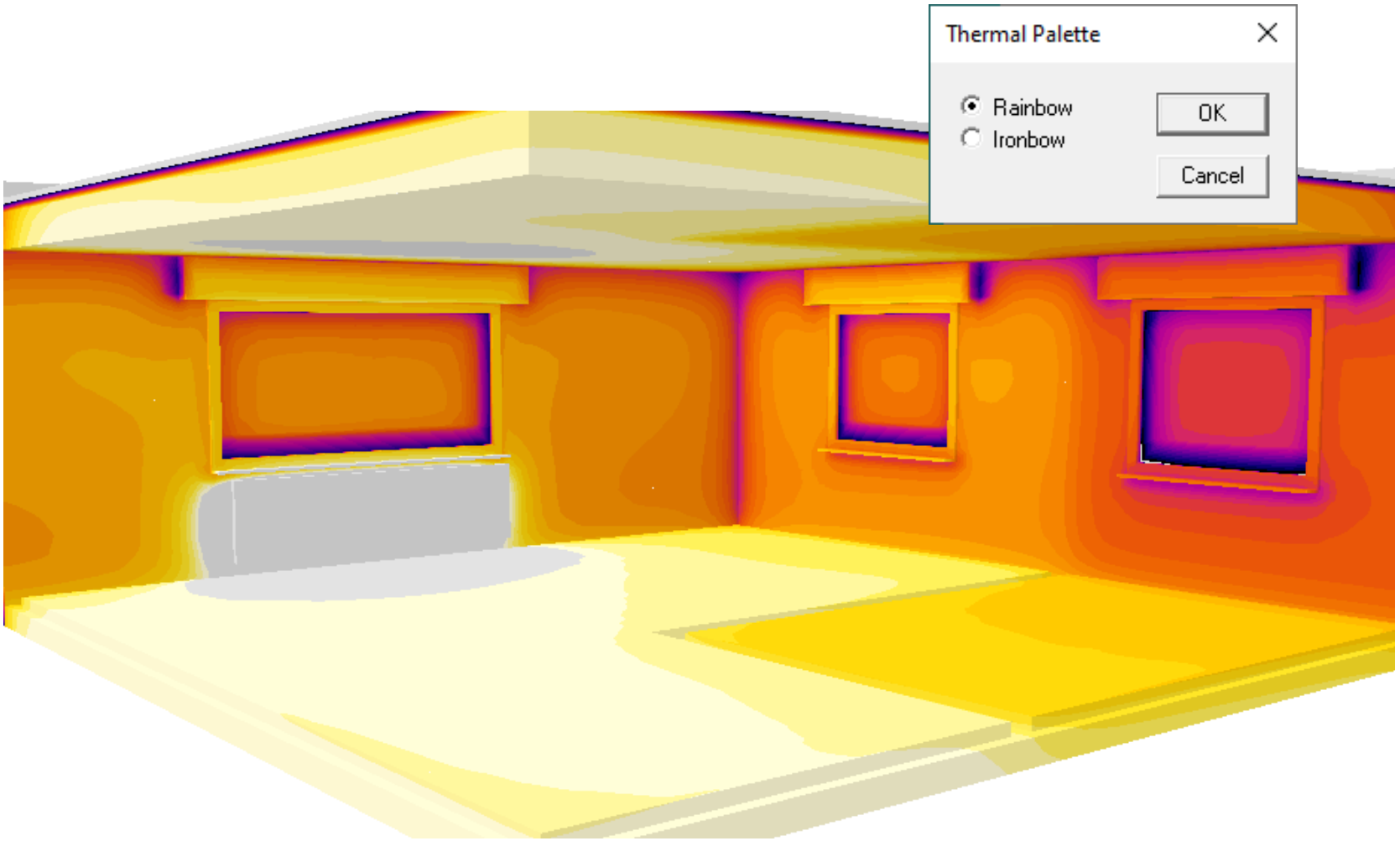
- Trisco2D files can be imported in TRISCO to create 3D geometries



# B.1 New thermal Palette – comparison with IR-images

overview

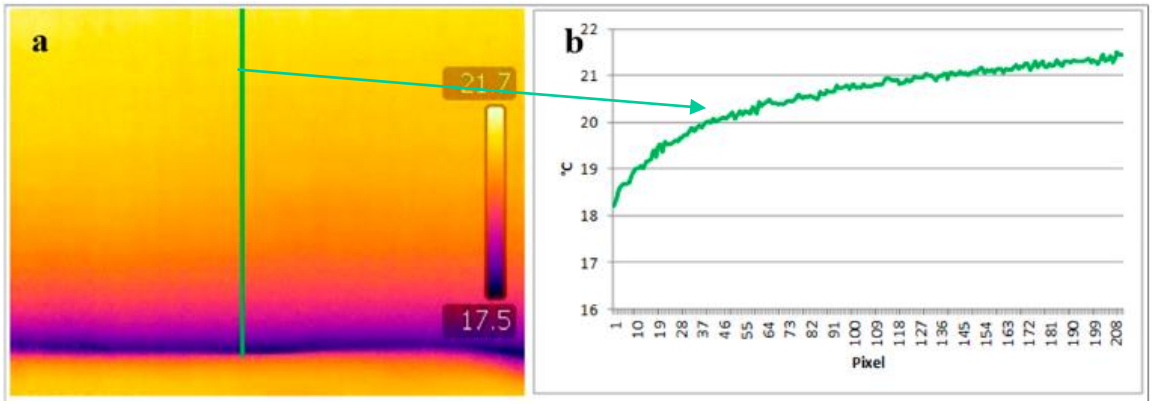
New thermal palette allows to compare simulation with IR-image



# B.1 New thermal Palette – comparison with IR-images

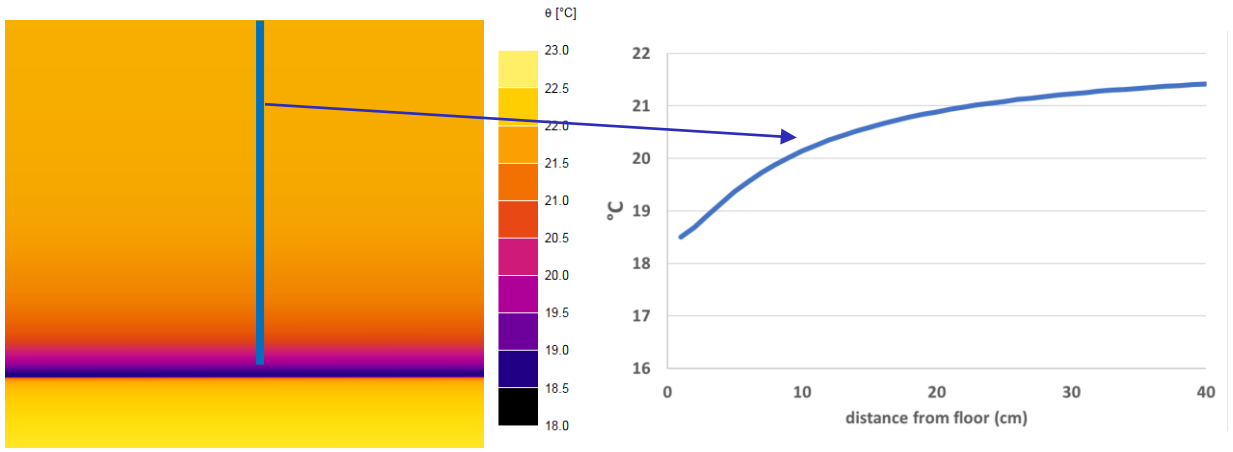
overview

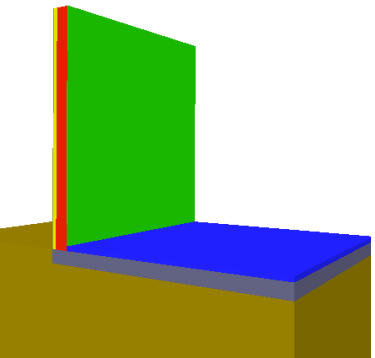
IR-study measurement




SOURCE: *F. Bianchi & A-L. Pisello & G. Baldinelli & F. Asdrubali, 2014. "Infrared Thermography Assessment of Thermal Bridges in Building Envelope: Experimental Validation in a Test Room Setup," Sustainability, MDPI,vol. 6(10)*

TRISCO simulation



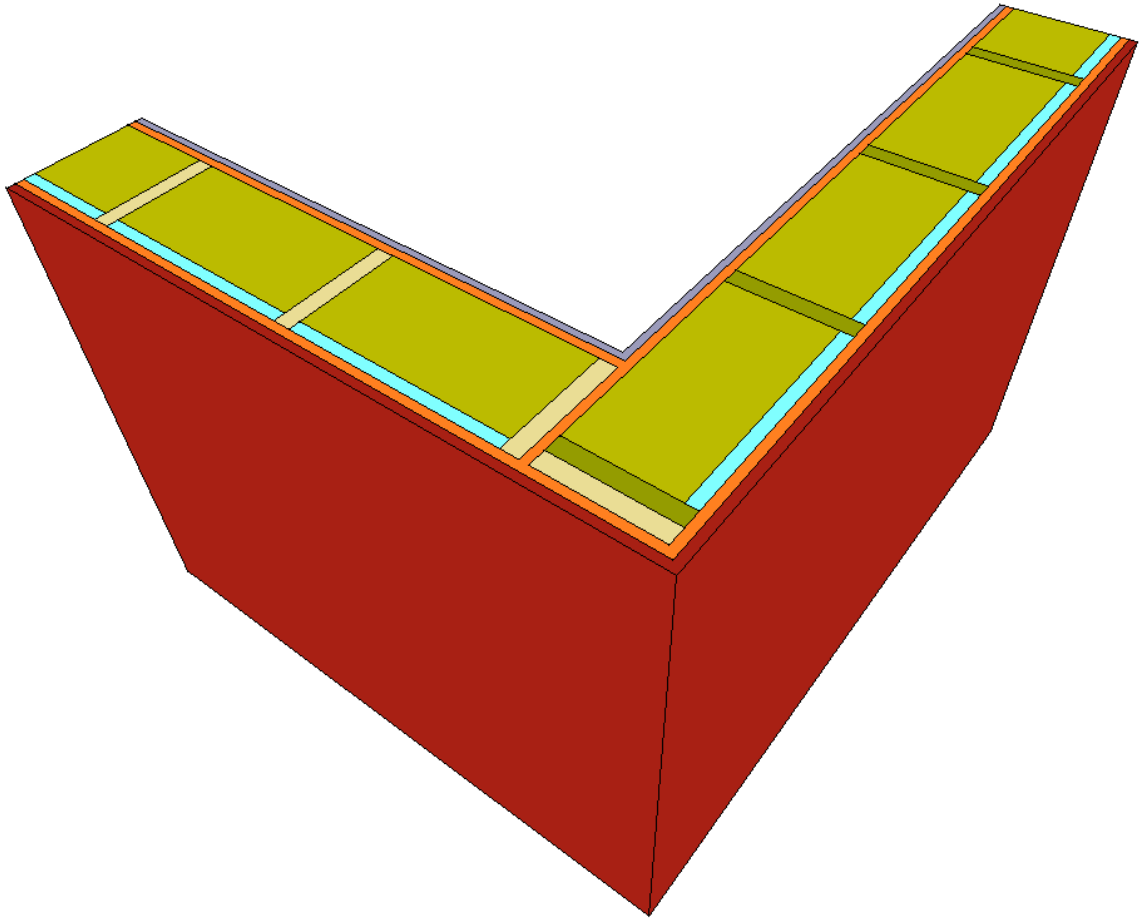
Thermal bridge at floor-to-wall junction

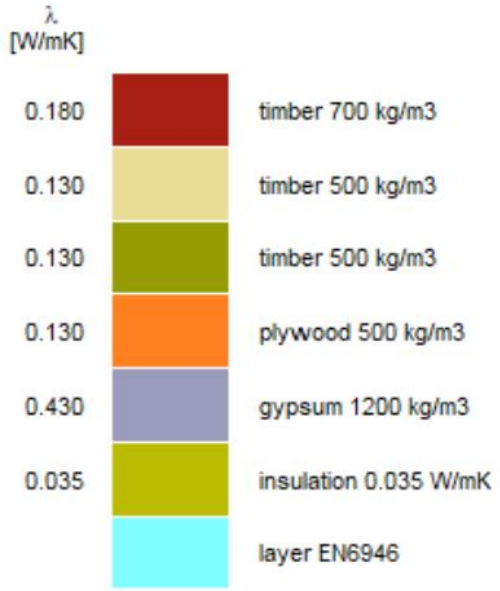
# B.2 Graphic output – Legend

overview

Fill materials

→ revised legend: material name + clustered cavities (with relevant standard)



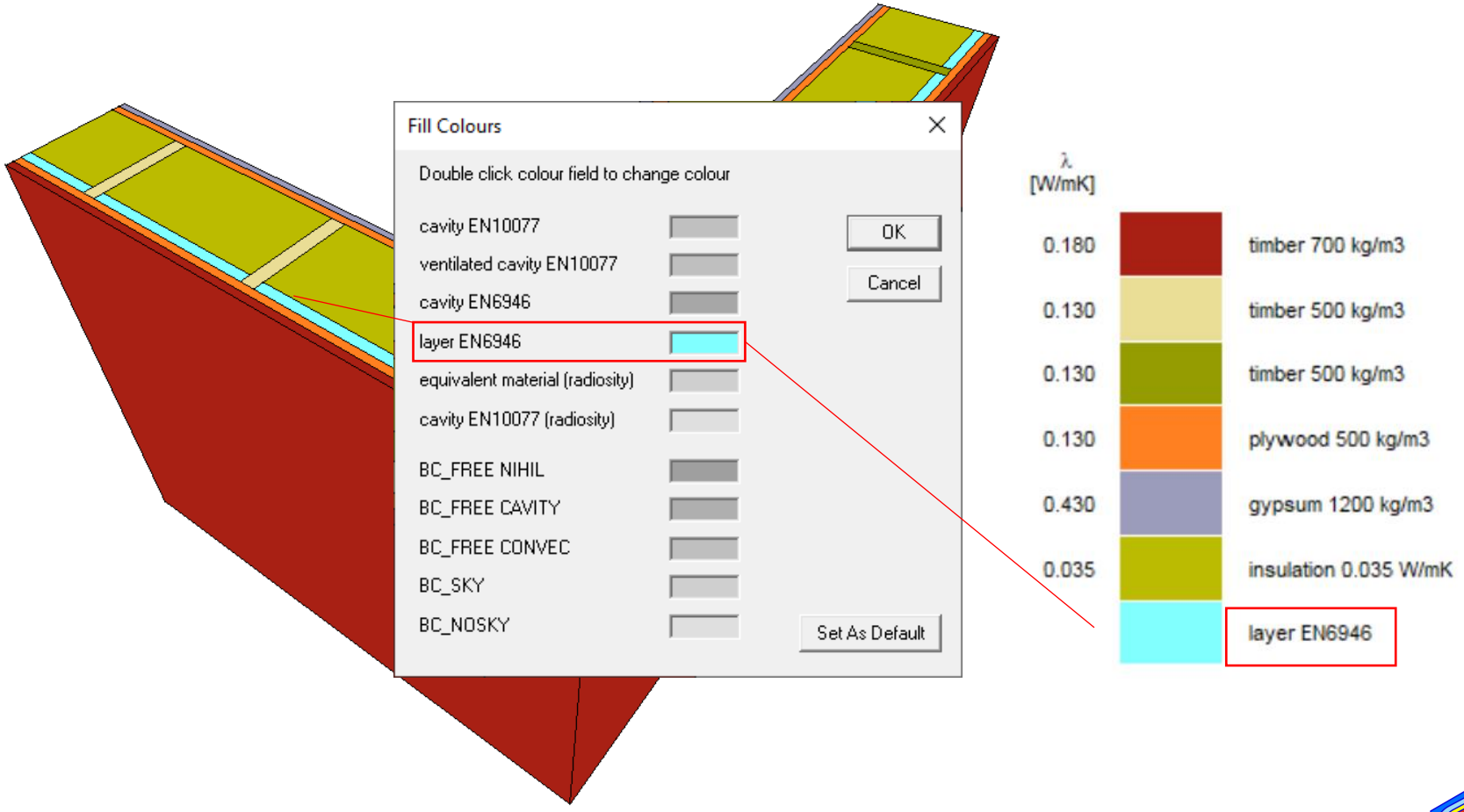


# B.2 Graphic output – Legend

overview

Fill materials

→ revised legend: material name + clustered cavities (with relevant standard)

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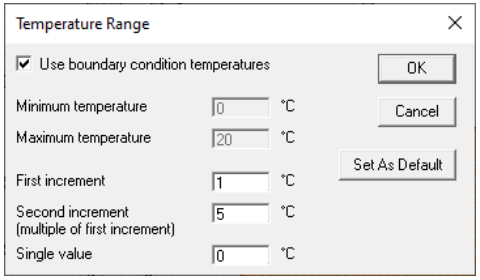
# B.3 Graphic output – Miscellaneous

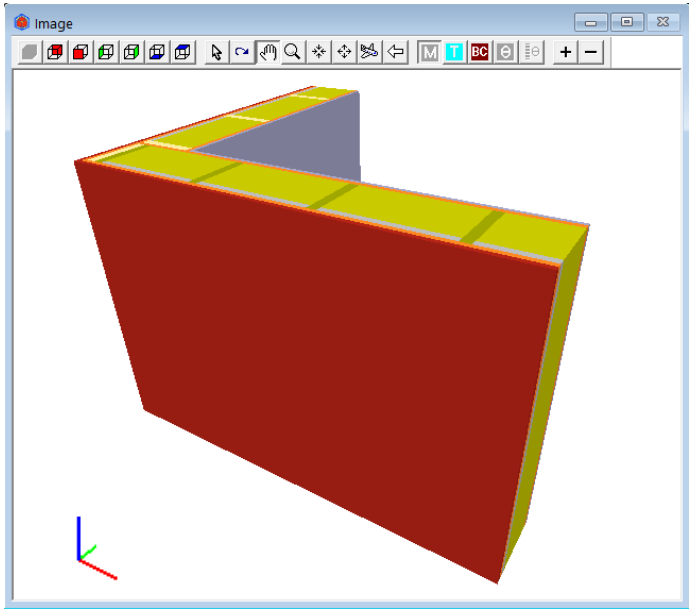
overview

1. Automatic selection of temperature range
2. Coordinate system in left corner of Image window
3. Orthogonal views in Image window
4. Image Size: possible to use Screen Settings for image output

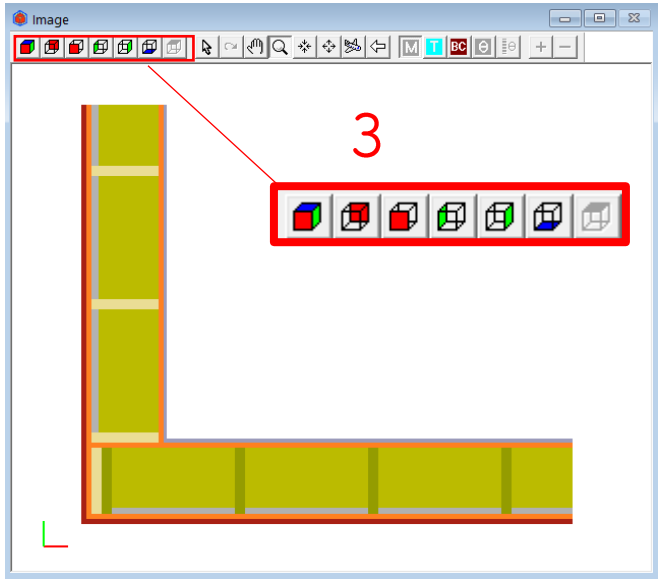
1



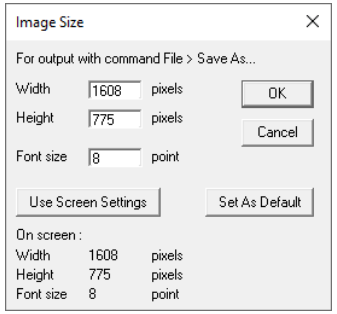

2




3




4

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# C.1 Colour window – revision

overview

The Colour window is revised to allow conformity with different EN standards:

- Rule → Subtype
- Physical flow direction (horizontal, up, down): defined by the user (and standard)
- Geometrical flow direction (X, Y, Z)
- Standard (EN10077, EN6946)
- ε1/ ε2: emissivities linked to a cavity ("single equivalent thermal conductivity method")
- ε emissivity linked to a material ("radiosity method")

Colours

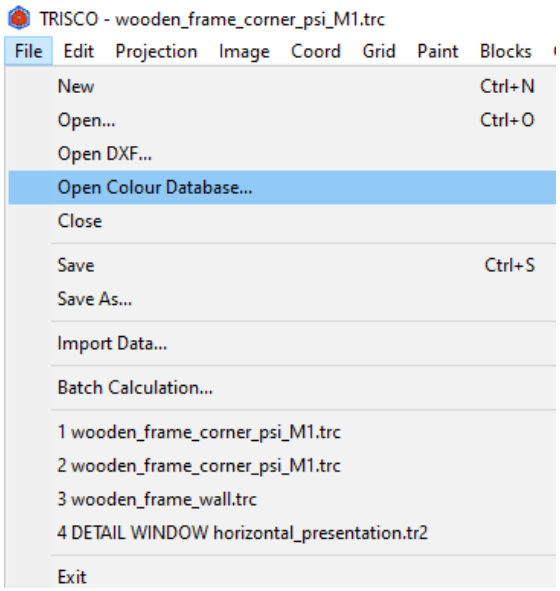
| Col. | Type | Subtype | Physical flow dir. | Geometrical flow dir. | Name | ε1 / ε2 [- / -] | λ [W/mK] | ε [-] | θ [°C] | h [W/m²K] | q [W/m²] | θa [°C] | hc [W/m²K] | Pc [W/m] | θr [°C] | Standard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | MATERIAL | | | | soda lime | | 1.000 | | | | | | | | | |
| 60 | MATERIAL | | | | EPDM | | 0.250 | | | | | | | | | |
| 86 | MATERIAL | | | | polysulfide | | 0.400 | | | | | | | | | |
| 92 | MATERIAL | | | | butyl hot melt | | 0.240 | | | | | | | | | |
| 105 | MATERIAL | | | | molecular sieve | | 0.100 | | | | | | | | | |
| 170 | BC_SIMPL | HE | HOR | | exterior | | | | 0.0 | 25.00 | 0 | | | | | EN10077 |
| 174 | BC_SIMPL | HI_NORML | HOR | | interior (normal) | | | | 20.0 | 7.70 | 0 | | | | | EN10077 |
| 182 | BC_SIMPL | HI_REDUC | HOR | | interior (reduced) | | | | 20.0 | 5.00 | 0 | | | | | EN10077 |
| 192 | EQUIMAT | CAVITY | HOR | Y | cavity (CEN) | 0.90 / 0.90 | 0.079 | | | | | | | | | EN10077 |
| 193 | EQUIMAT | CAVITY | HOR | Y | cavity (CEN) | 0.90 / 0.90 | 0.052 | | | | | | | | | EN10077 |
| 195 | EQUIMAT | CAVITY | HOR | X | cavity (CEN) | 0.90 / 0.90 | 0.037 | | | | | | | | | EN10077 |
| 214 | EQUIMAT | CAVITY | HOR | Y | cavity (CEN) | 0.90 / 0.90 | 0.065 | | | | | | | | | EN10077 |
| 215 | EQUIMAT | CAVITY | HOR | Y | cavity (CEN) | 0.90 / 0.90 | 0.102 | | | | | | | | | EN10077 |

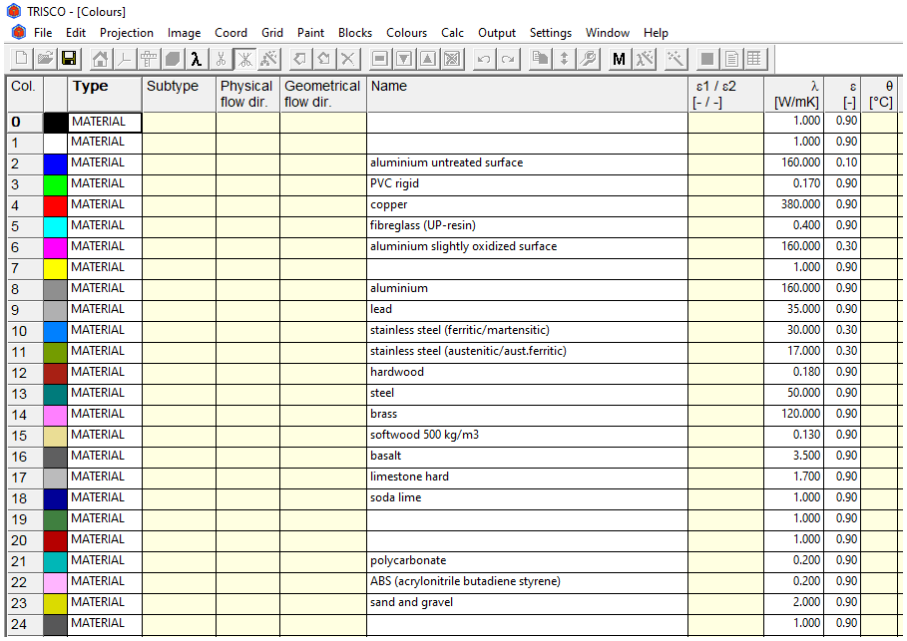
# C.2 Colour window – Colour Database

overview

Customisable Colour Database with predefined colours

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



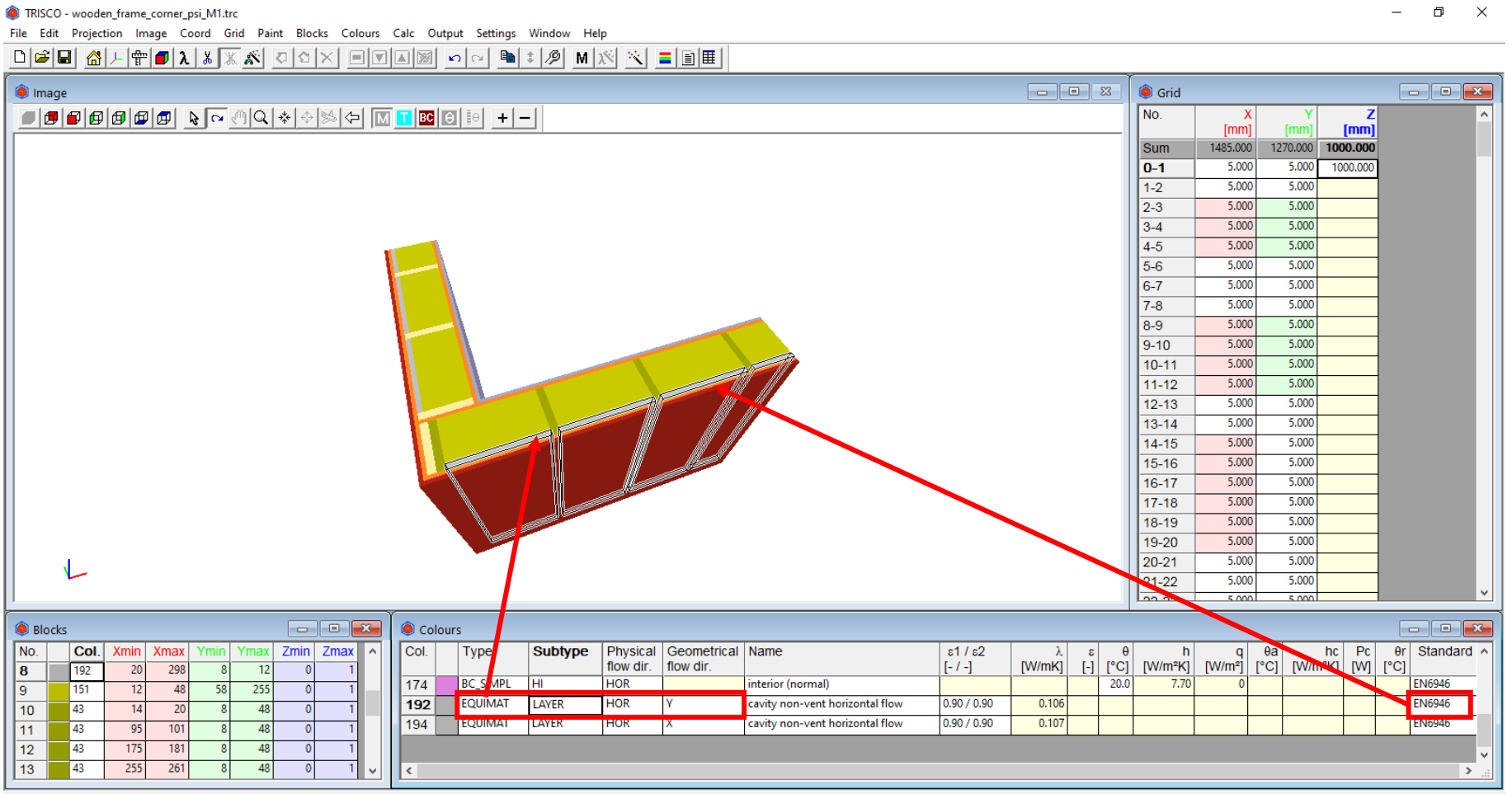

| Col. | | Type | Subtype | Physical flow dir. | Geometrical flow dir. | Name | ε1 / ε2 [- / -] | λ [W/mK] | ε [-] | θ [°C] |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | MATERIAL | | | | | | 1.000 | 0.90 | |
| 1 | | MATERIAL | | | | | | 1.000 | 0.90 | |
| 2 | | MATERIAL | | | | aluminium untreated 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 | | 1.700 | 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 | |

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

# D.1 EN ISO 6946 – cavities and layers

overview

Implementation of air layers according to EN ISO 6946
Example: wall junction with non-ventilated air layers in wall

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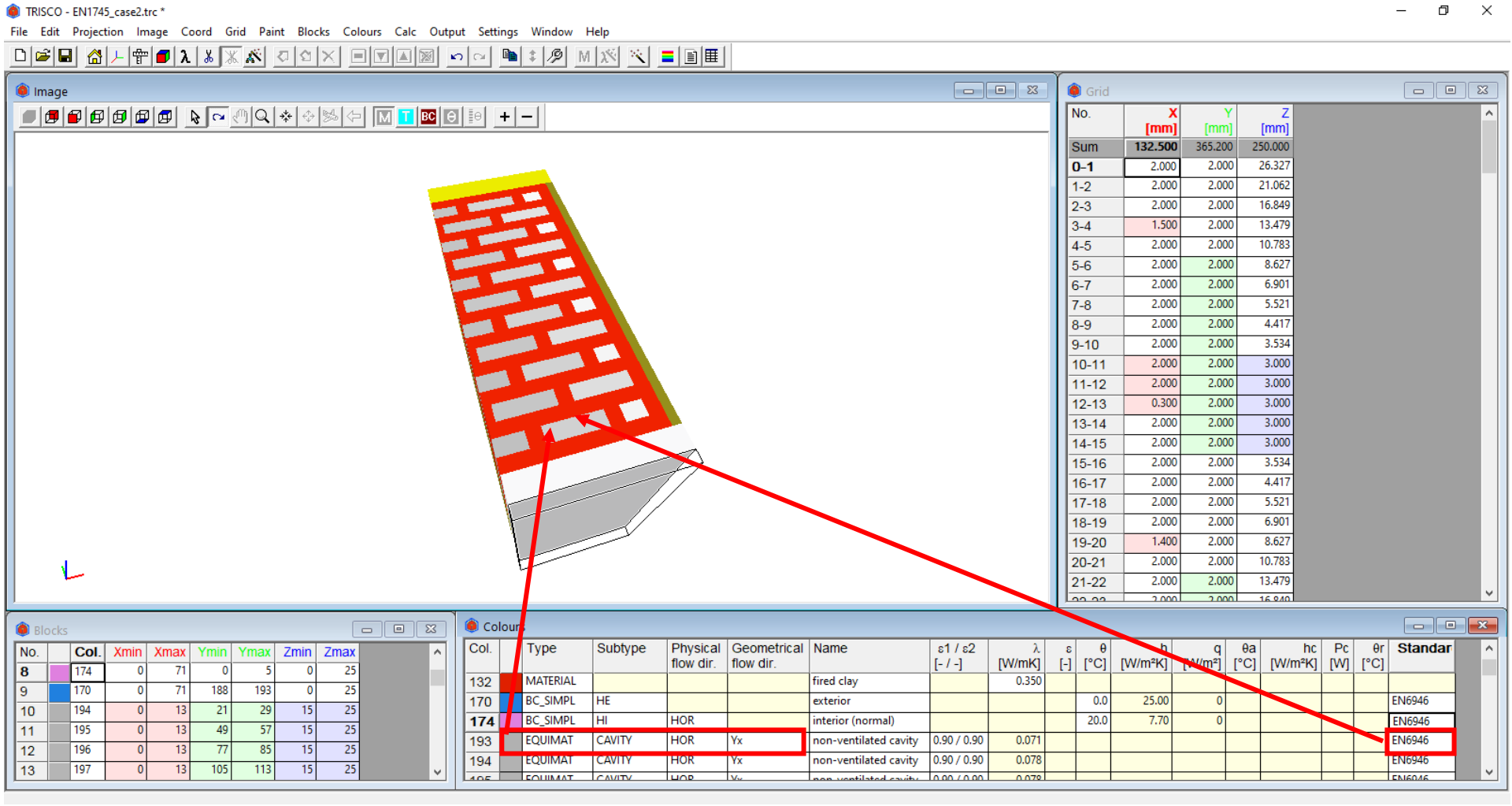
# D.1 EN ISO 6946 – cavities and layers

overview

Implementation of cavities according to EN ISO 6946
Example: air cavities in masonry (EN ISO 1745)




| No. | X [mm] | Y [mm] | Z [mm] |
|---|---|---|---|
| Sum | 132.500 | 365.200 | 250.000 |
| 0-1 | 2.000 | 2.000 | 26.327 |
| 1-2 | 2.000 | 2.000 | 21.062 |
| 2-3 | 2.000 | 2.000 | 16.849 |
| 3-4 | 1.500 | 2.000 | 13.479 |
| 4-5 | 2.000 | 2.000 | 10.783 |
| 5-6 | 2.000 | 2.000 | 8.627 |
| 6-7 | 2.000 | 2.000 | 6.901 |
| 7-8 | 2.000 | 2.000 | 5.521 |
| 8-9 | 2.000 | 2.000 | 4.417 |
| 9-10 | 2.000 | 2.000 | 3.534 |
| 10-11 | 2.000 | 2.000 | 3.000 |
| 11-12 | 2.000 | 2.000 | 3.000 |
| 12-13 | 0.300 | 2.000 | 3.000 |
| 13-14 | 2.000 | 2.000 | 3.000 |
| 14-15 | 2.000 | 2.000 | 3.000 |
| 15-16 | 2.000 | 2.000 | 3.534 |
| 16-17 | 2.000 | 2.000 | 4.417 |
| 17-18 | 2.000 | 2.000 | 5.521 |
| 18-19 | 2.000 | 2.000 | 6.901 |
| 19-20 | 1.400 | 2.000 | 8.627 |
| 20-21 | 2.000 | 2.000 | 10.783 |
| 21-22 | 2.000 | 2.000 | 13.479 |

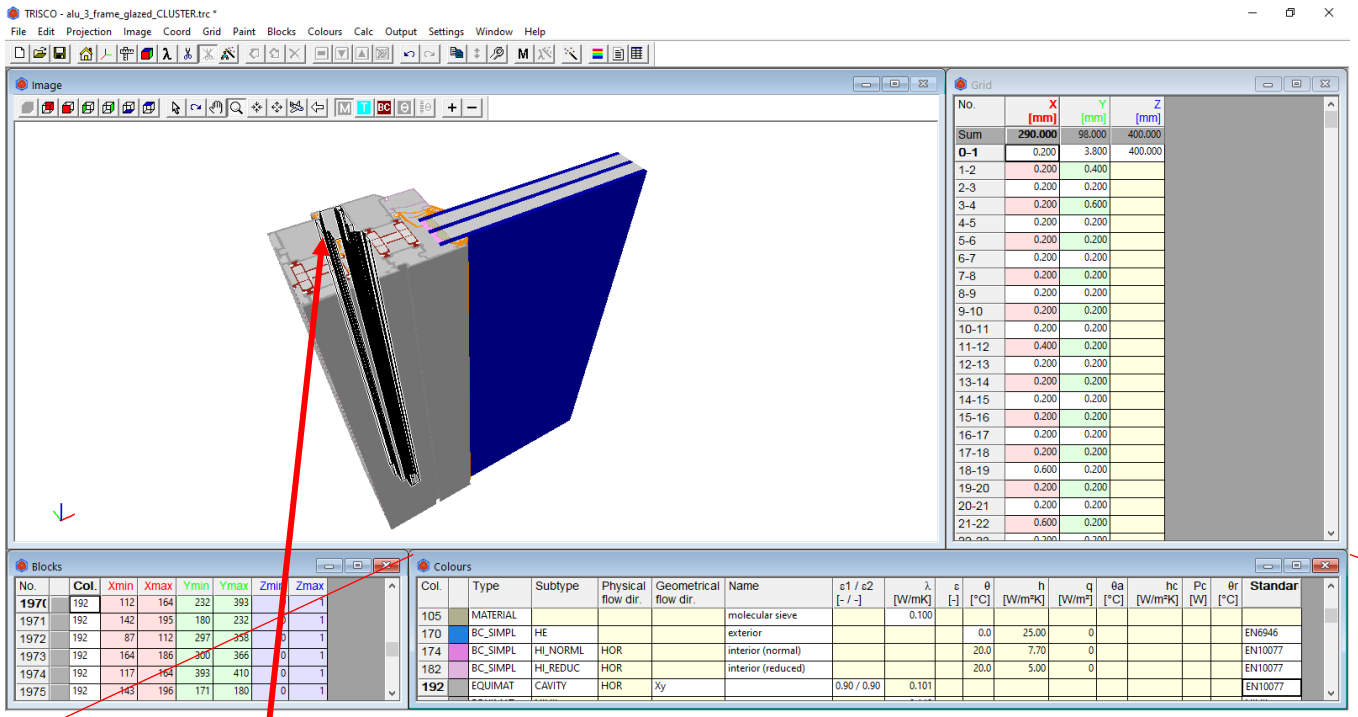
| No. | Col. | Xmin | Xmax | Ymin | Ymax | Zmin | Zmax |
|---|---|---|---|---|---|---|---|
| 8 | 174 | 0 | 71 | 0 | 5 | 0 | 25 |
| 9 | 170 | 0 | 71 | 188 | 193 | 0 | 25 |
| 10 | 194 | 0 | 13 | 21 | 29 | 15 | 25 |
| 11 | 195 | 0 | 13 | 49 | 57 | 15 | 25 |
| 12 | 196 | 0 | 13 | 77 | 85 | 15 | 25 |
| 13 | 197 | 0 | 13 | 105 | 113 | 15 | 25 |

| Col. | Type | Subtype | Physical flow dir. | Geometrical flow dir. | Name | ε1 / ε2 [- / -] | λ [W/mK] | ε [-] | θ [°C] | h [W/m²K] | q [W/m²] | θa [°C] | hc [W/m²K] | Pc [W] | θr [°C] | Standar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 132 | MATERIAL | | | | fired clay | | 0.350 | | | | | | | | | |
| 170 | BC_SIMPL | HE | | | exterior | | | | 0.0 | 25.00 | 0 | | | | | EN6946 |
| 174 | BC_SIMPL | HI | HOR | | interior (normal) | | | | 20.0 | 7.70 | 0 | | | | | EN6946 |
| 193 | EQUIMAT | CAVITY | HOR | Yx | non-ventilated cavity | 0.90 / 0.90 | 0.071 | | | | | | | | | EN6946 |
| 194 | EQUIMAT | CAVITY | HOR | Yx | non-ventilated cavity | 0.90 / 0.90 | 0.078 | | | | | | | | | EN6946 |

# D.2 Cavities according to EN ISO 10077-2

overview

Implementation of cavities according to EN ISO 10077-2
Example: window frame in 3D




Colours

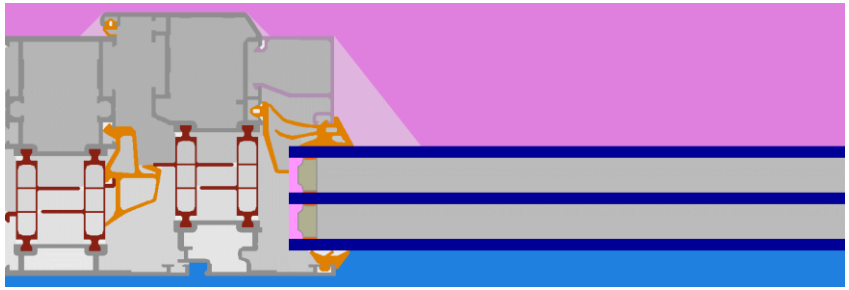
| Col. | | Type | Subtype | Physical flow dir. | Geometrical flow dir. | Name | ε1 / ε2 [- / -] | λ [W/mK] | ε [-] | θ [°C] | h [W/m²K] | q [W/m²] | θa [°C] | hc [W/m²K] | Pc [W] | θr [°C] | Standar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105 | | MATERIAL | | | | molecular sieve | | 0.100 | | | | | | | | | |
| 170 | | BC_SIMPL | HE | | | exterior | | | | 0.0 | 25.00 | 0 | | | | | EN6946 |
| 174 | | BC_SIMPL | HI_NORML | HOR | | interior (normal) | | | | 20.0 | 7.70 | 0 | | | | | EN10077 |
| 182 | | BC_SIMPL | HI_REDUC | HOR | | interior (reduced) | | | | 20.0 | 5.00 | 0 | | | | | EN10077 |
| **192** | | EQUIMAT | CAVITY | HOR | Xy | | 0.90 / 0.90 | 0.101 | | | | | | | | | EN10077 |

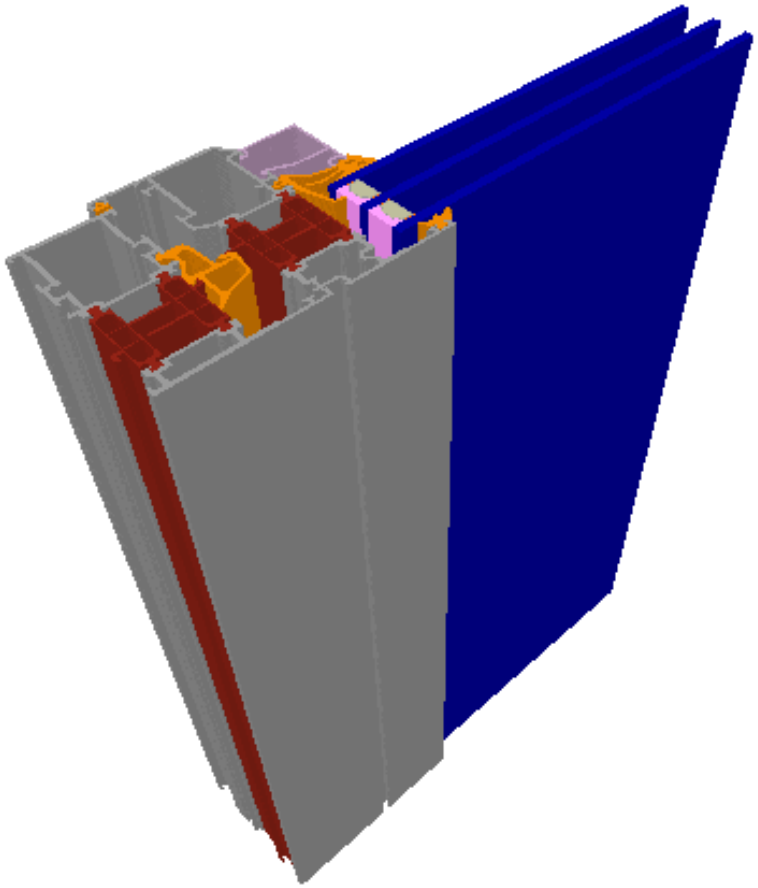
# D.3 Interaction between BISCO and TRISCO

overview

Fast 3D extrusion of BISCO files in TRISCO:

- Implementation of air cavities according to EN ISO 10077-2 in TRISCO
- fixed equivalent thermal conductivities (clustered cavities)





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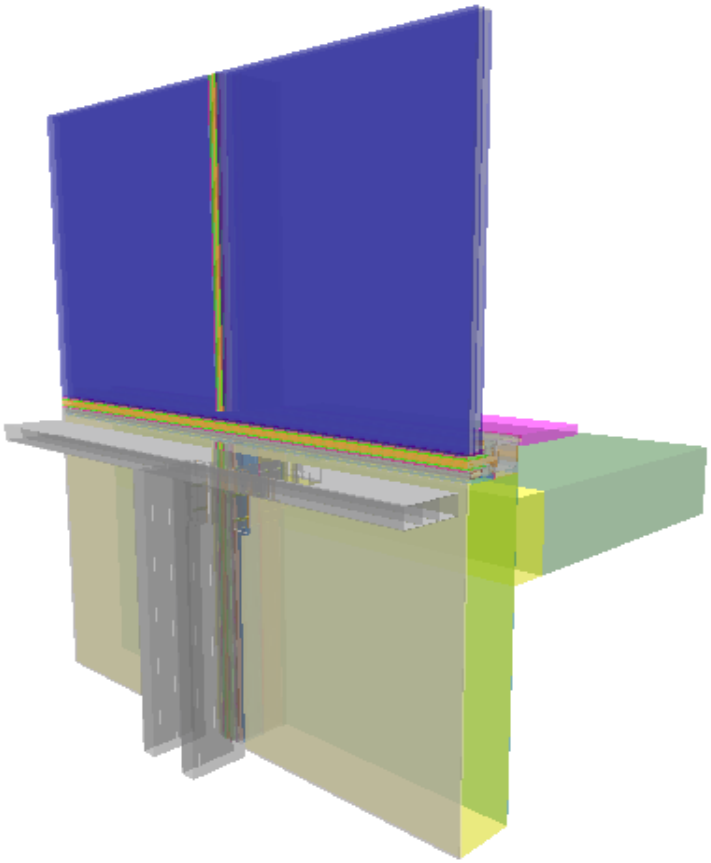
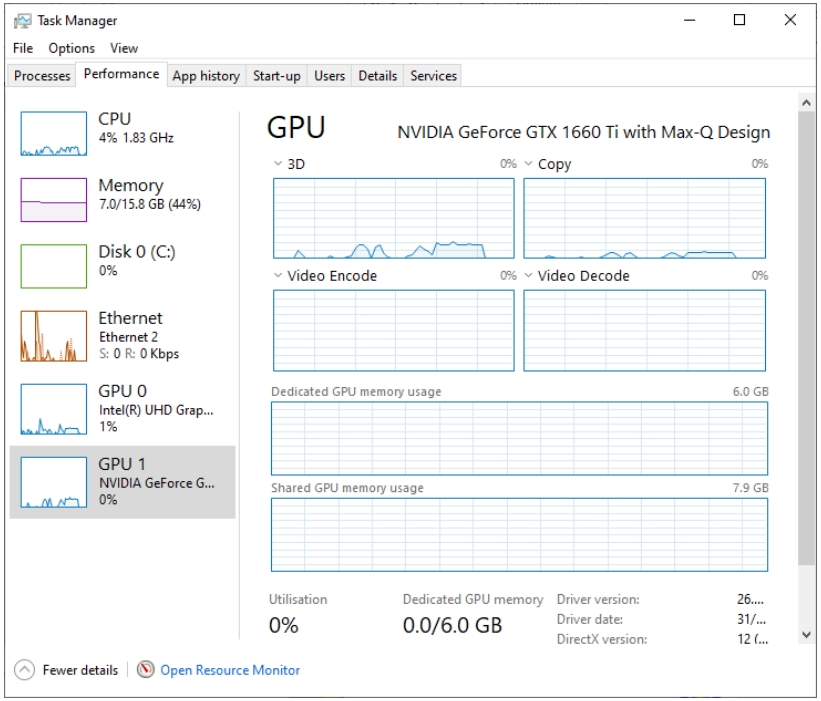
# E. Graphic visualisation performance

overview

- Adjusted algorithm improves 3D visualization, avoiding sporadic crashes when relying on an integrated graphic processor (INTEL)
- Automatic selection of high-performance dedicated GPU (AMD or Nvidia) if present to ensure high quality 3D visualization of complex models



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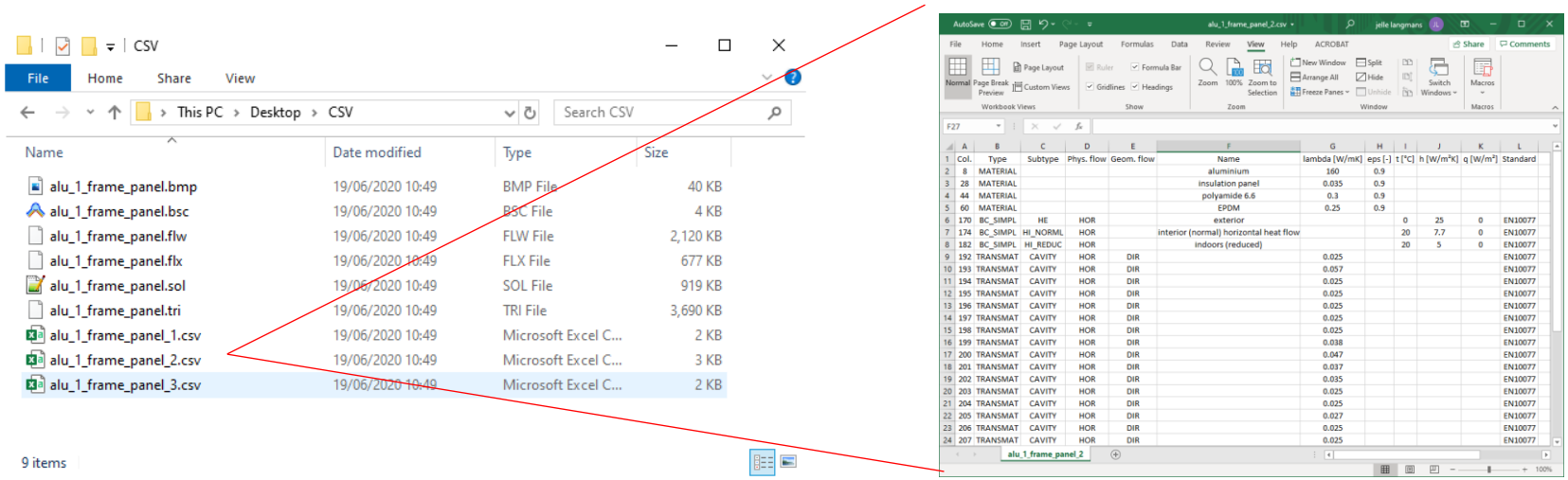
TRISCO v15

# F. Text output

overview

F1: feature to save text output in .csv format (e.g. process data in MS Excel)




F2: Automated ‘Make report’ function:

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

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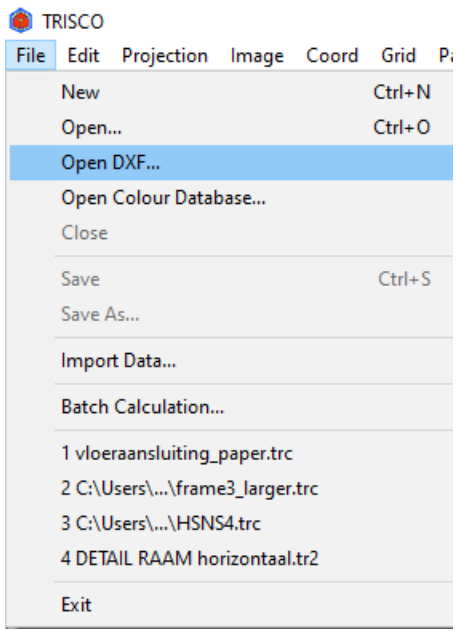
TRISCO v15

# G.1 TriscoDxf – accessible from TRISCO

overview

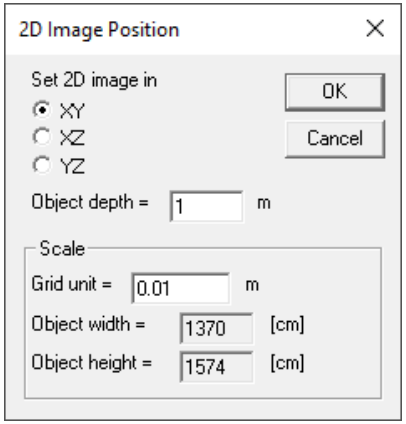
File → Open DXF...




Delete unwanted layers


TriscoDxf opens for editing

define scale + extrusion depth




opens generated BMP in TRISCO

Optimized to import efficiently 'prepared DXF-files':

- Closed polylines
- Every material in different layer

For 'non-prepared DXF-files' → DXF as underlayer in Trisco2D

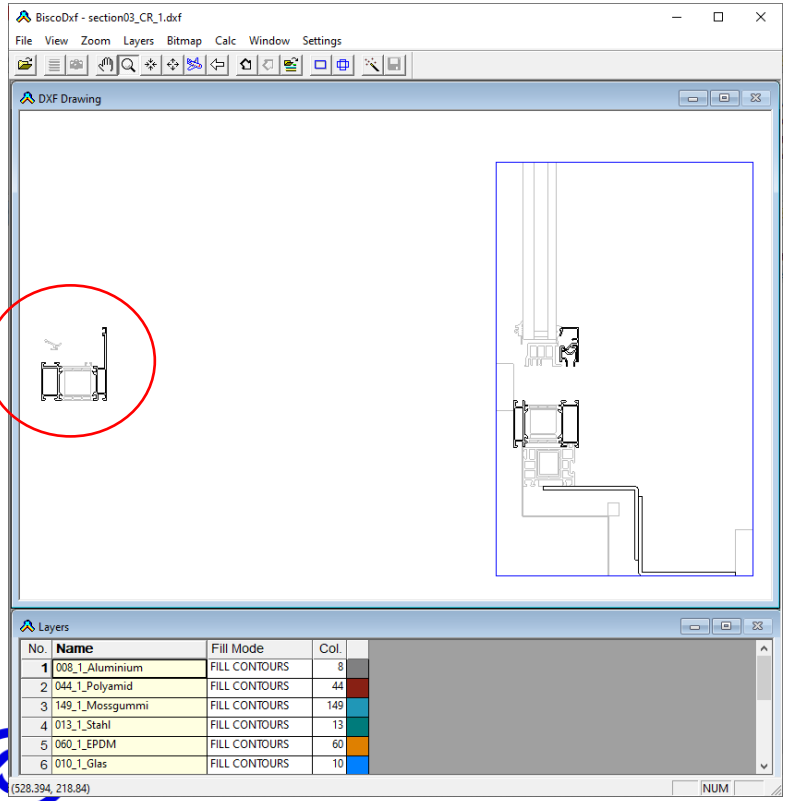
# G.2 TriscoDxf – Improved algorithm

overview

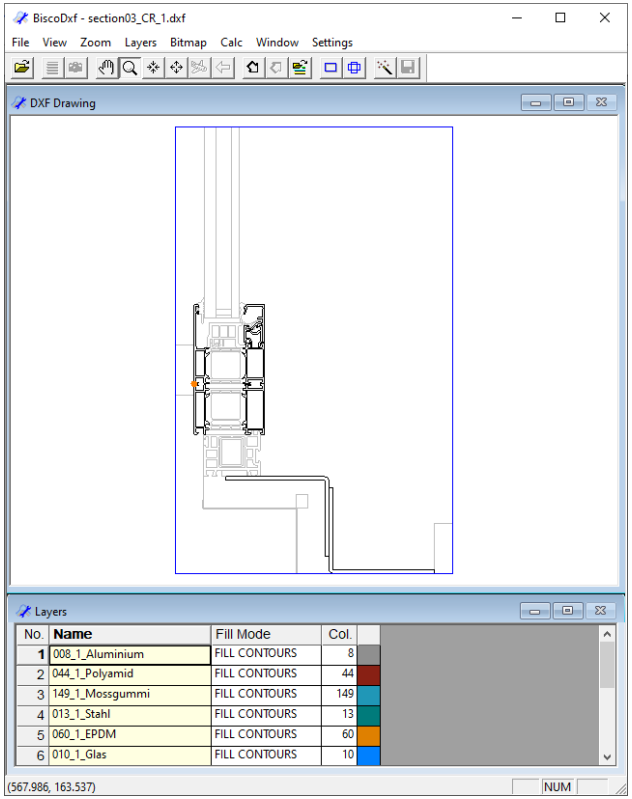
In TRISCO v14 problems may occur when the 2D DXF files are extracted from 3D DXF files because of differences in extrusion direction

→ TriscoDxf in TRISCO v15 anticipates for mirrored extrusion directions

## TRISCO v14



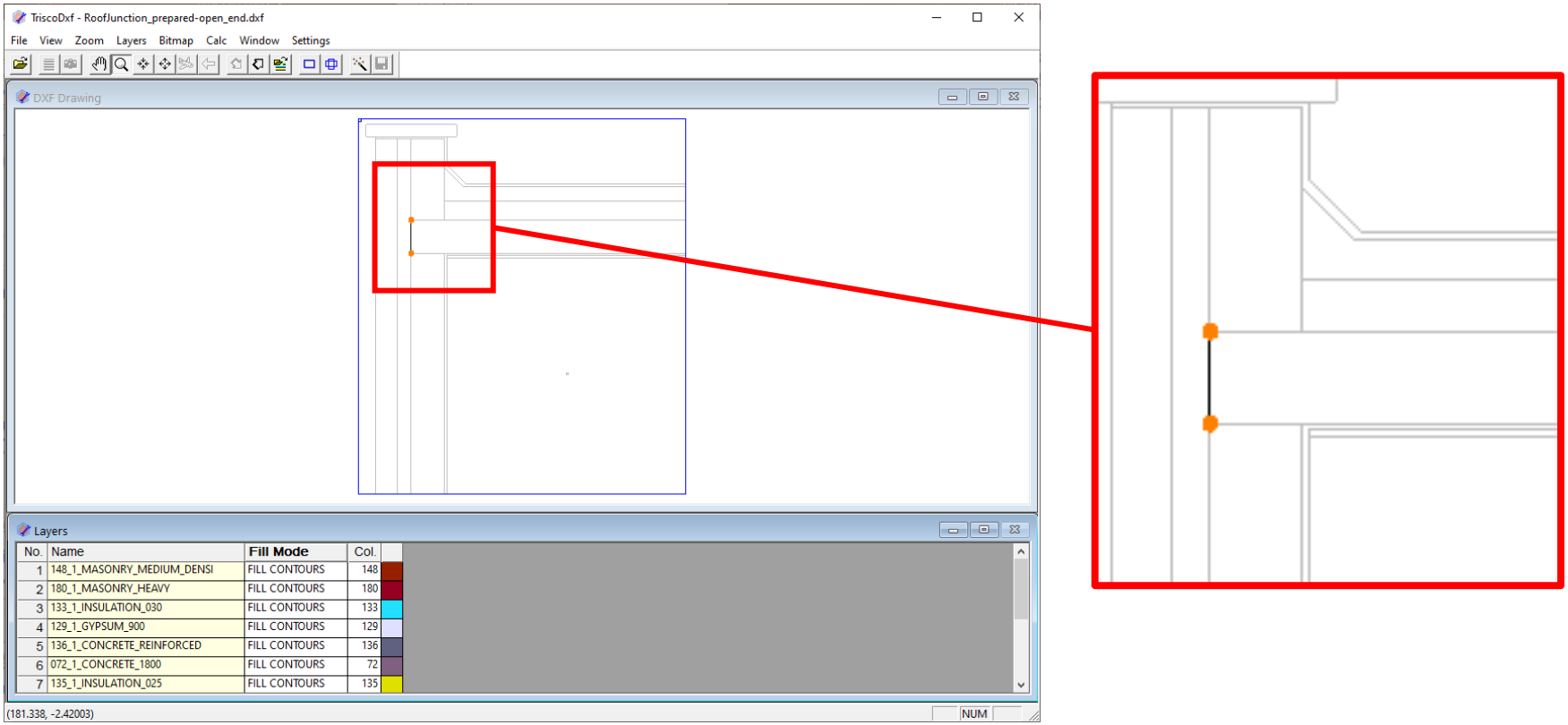

## TRISCO v15



# G.3 TriscoDxf – Warnings

overview

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

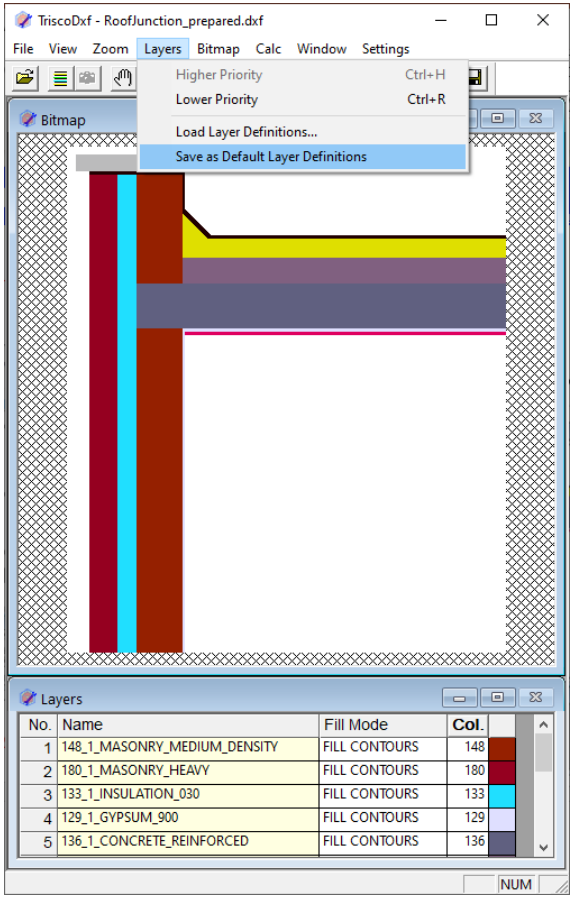


# G.4 TriscoDxf – layer info

overview

New feature to store layer information as default

Layers → Save as Default Layer Definitions




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

TriscoDxf.lay - Notepad

File Edit Format View Help

```
name=148_1_MASONRY_MEDIUM_DENSITY
disp=1
colr=148
name=180_1_MASONRY_HEAVY
disp=1
colr=180
name=133_1_INSULATION_030
disp=1
colr=133
name=129_1_GYPSUM_900
disp=1
colr=129
name=136_1_CONCRETE_REINFORCED
disp=1
colr=136
name=072_1_CONCRETE_1800
disp=1
colr=72
name=135_1_INSULATION_025
disp=1
colr=135
name=032_1_BITUMEN
```

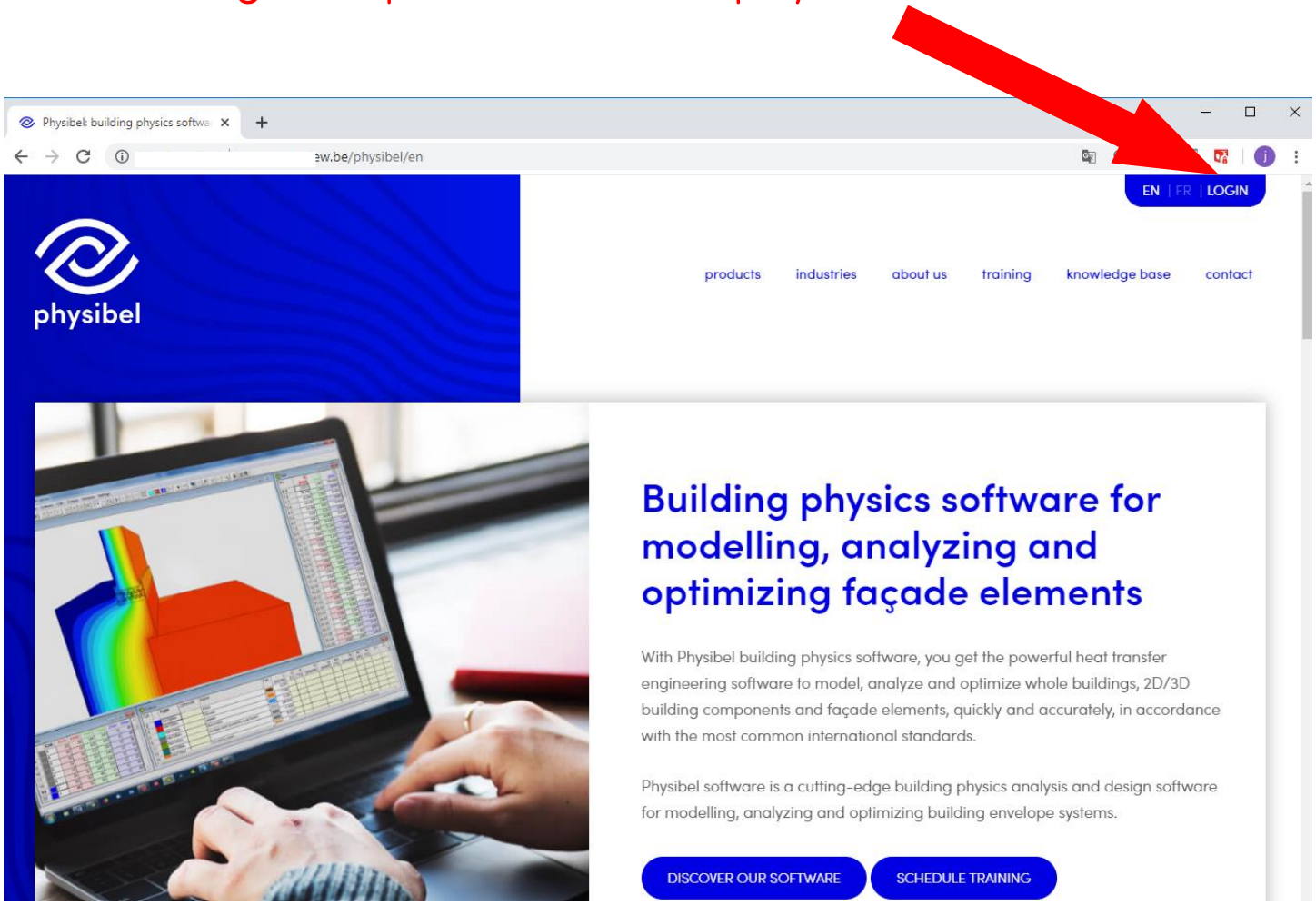
Ln 1, Col 1 100% Windows (CRLF) UTF-8

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

# H.1 Online Physibel Portal

overview

log in to portal via www.physibel.be



# H.1 Online Physibel Portal

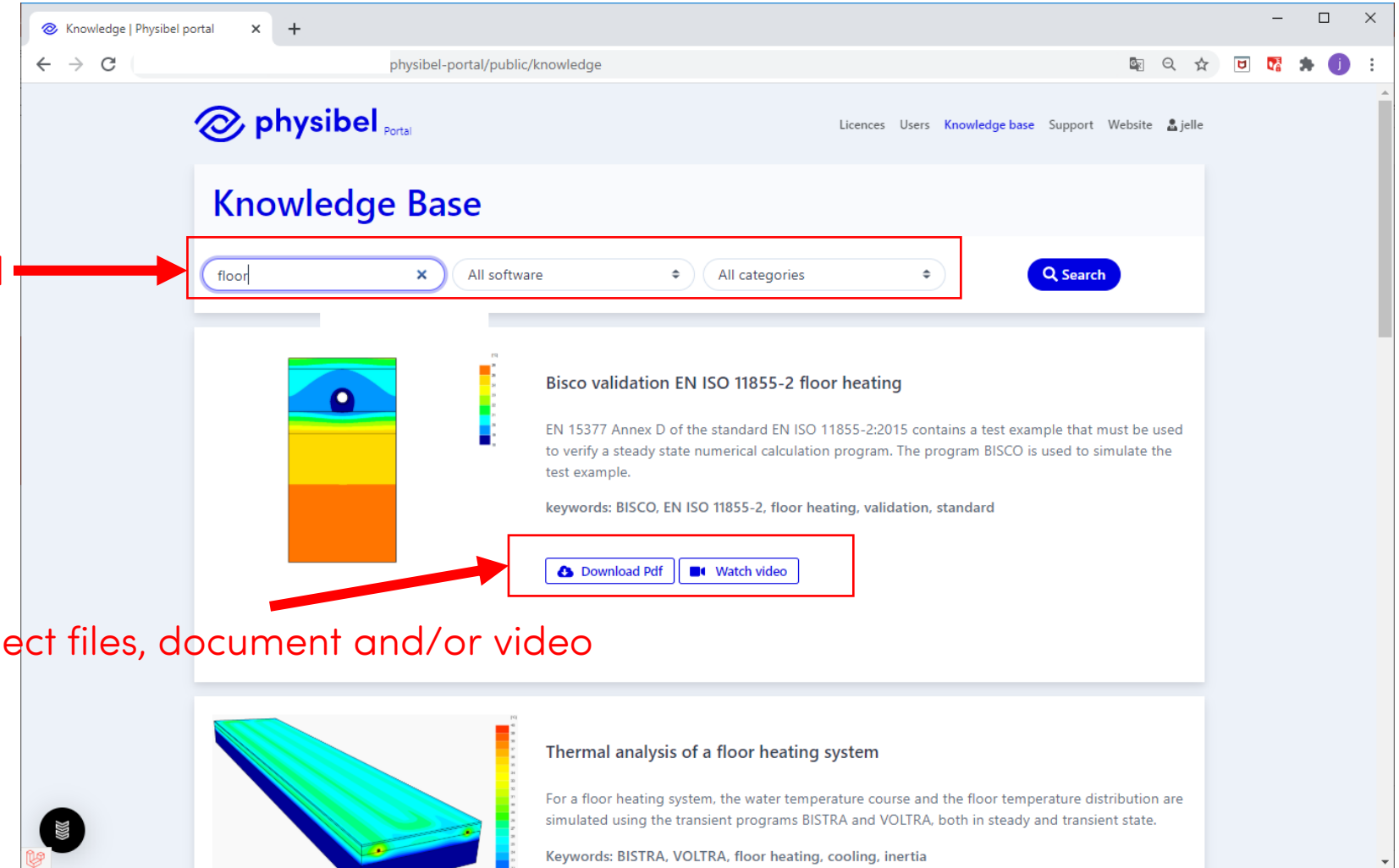
overview

## Access to

- Knowledge Base with example projects, tutorials and videos

Search tool

Access project files, document and/or video

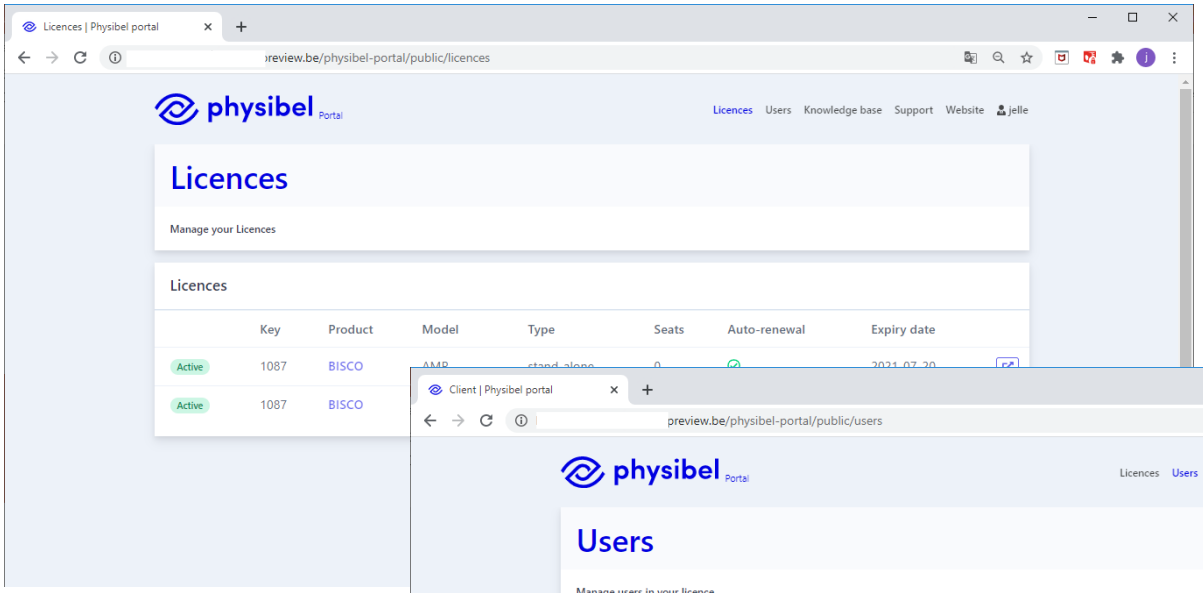


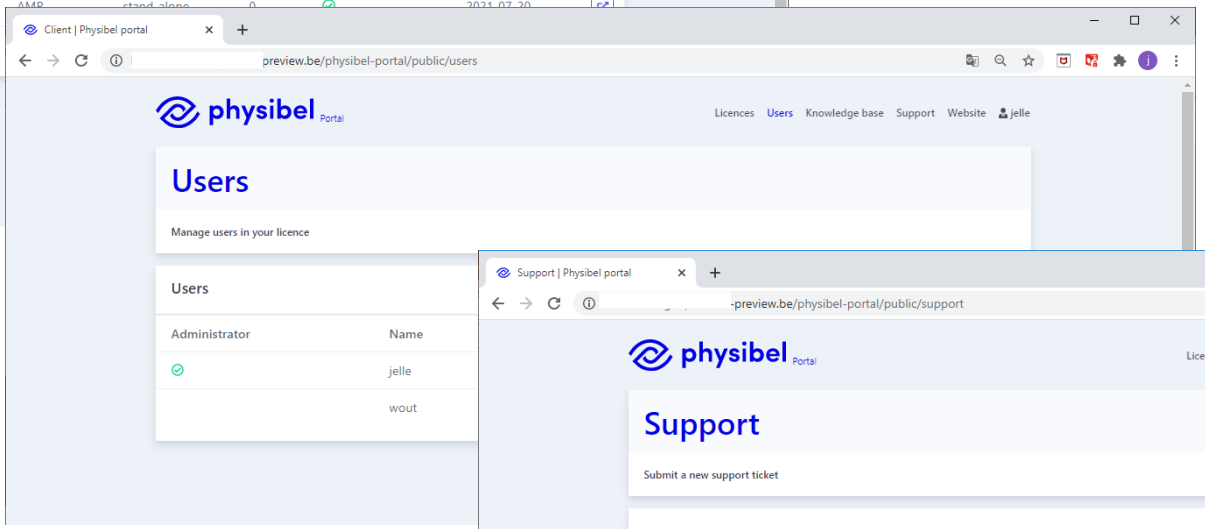
# H.1 Online Physibel Portal

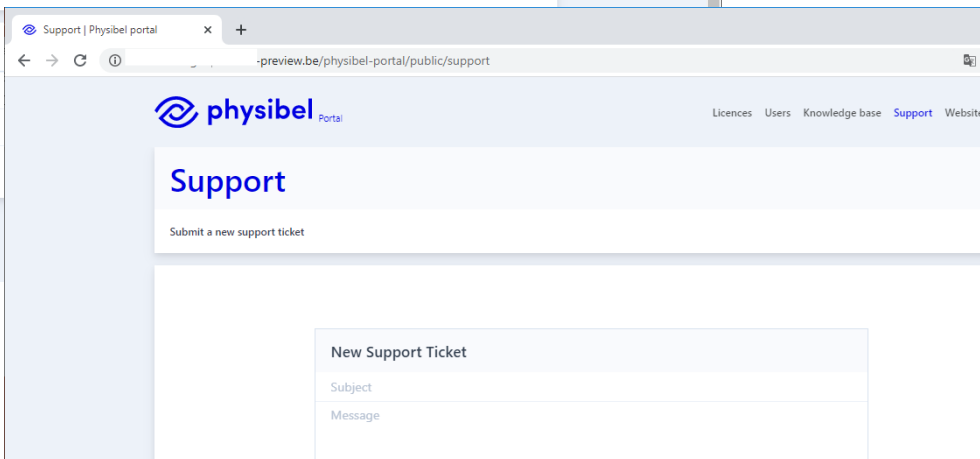
overview

## Access to

- Licence and user management
- Support



# H Licencing options

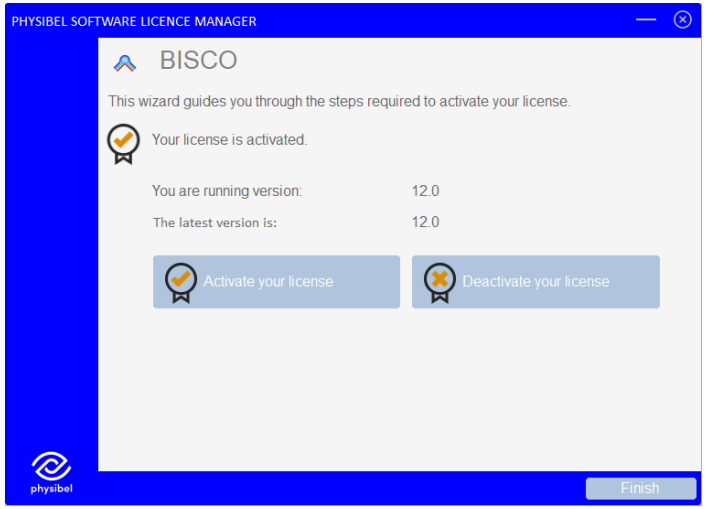
overview

## 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



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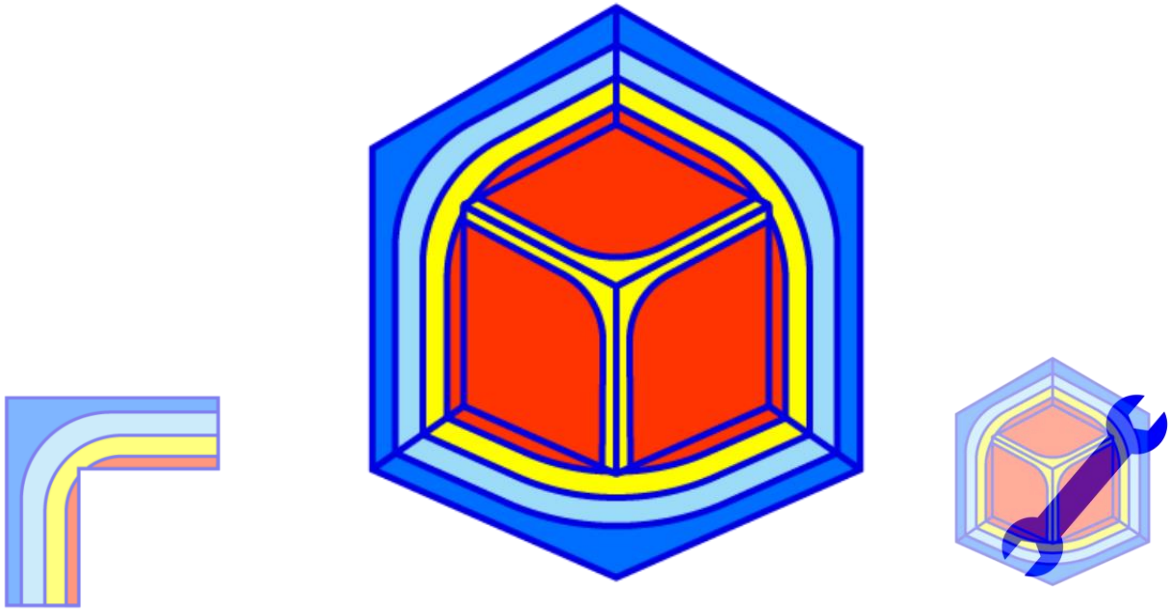
# TRISCO v15  New program performances



www.physibel.be/en/products/trisco

downloadable program demo version