



TRISCO v16 New program performances



www.physibel.be/en/products/trisco

[A New feature: Condensation Module](#)

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- A.2 Initial moisture
- A.3 New calculation parameters

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- B.1 New input parameters

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- C.1 Intersitital condensation to EN ISO 13788

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[E Text output](#)

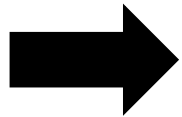
- E.1 Monthly condensation/evaporation rate + moisture accumulation

[F Online Physibel Portal](#)

- F.1 Documentation of the Condensation module

Implementation of vapour transport in **TRISCO**:

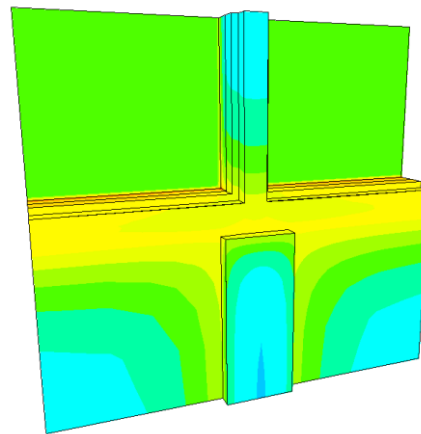
- Assessment of interstitial condensation
- Assessment of drying out (monthly)
- Internal and Surface relative humidity



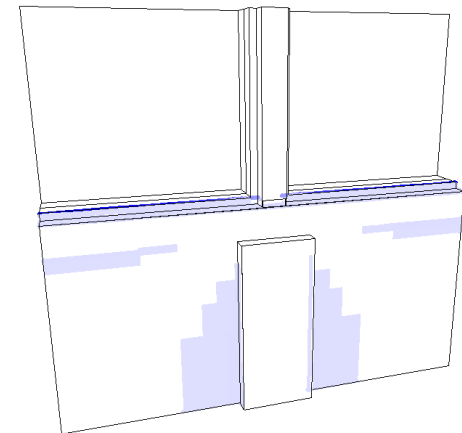
3D implementation of EN ISO 13788 (Glaser)



Façade renovation



Relative humidity



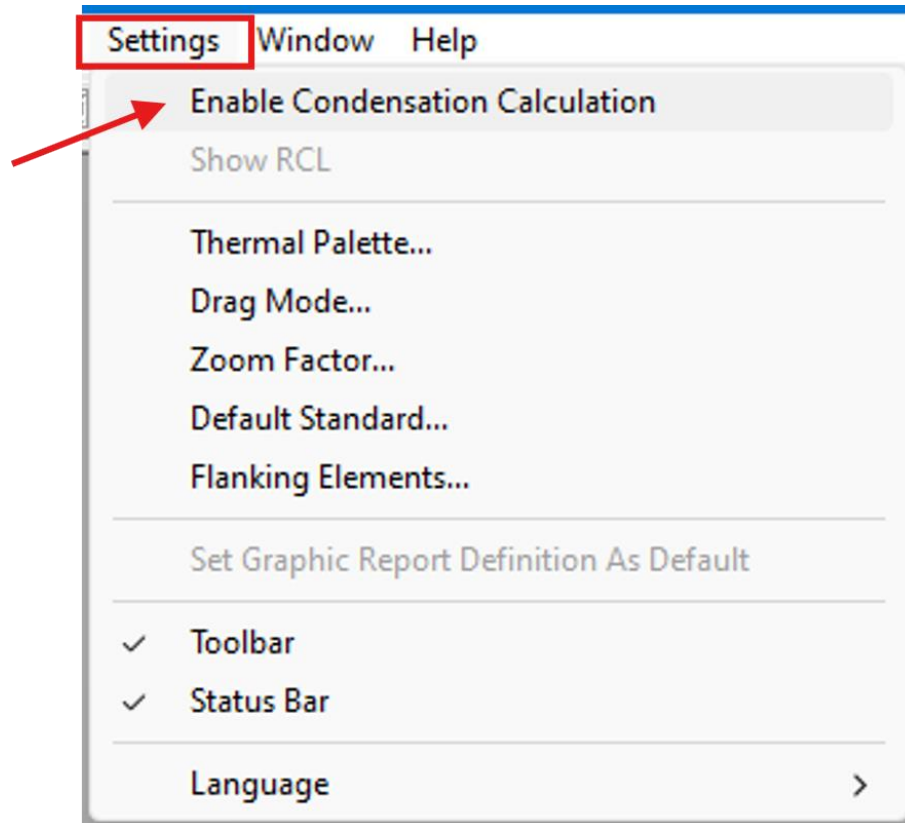
condensation



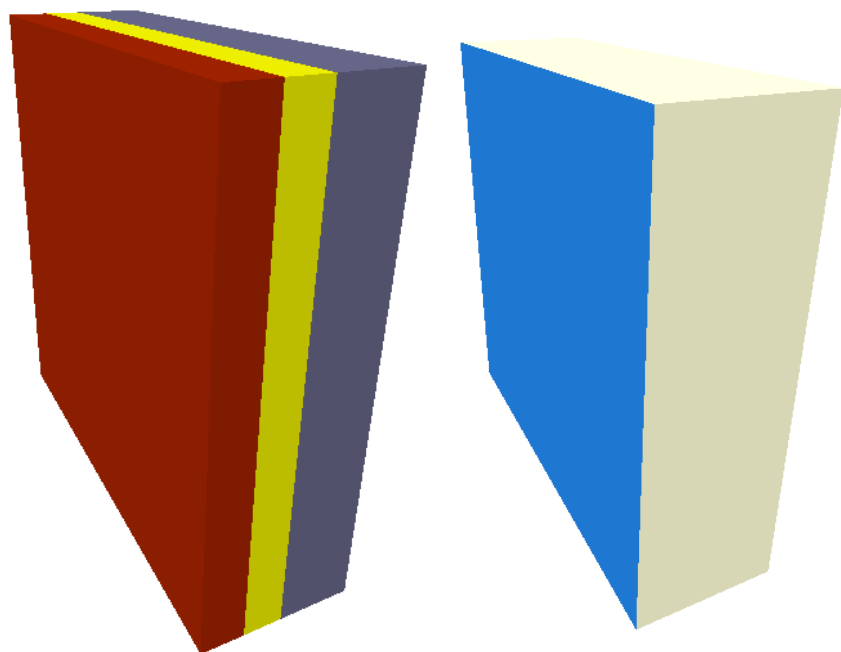
A1. Introduction to Condensation Module

[overview](#)

Enable Condensation module in TRISCO in Settings.



A1. Introduction to Condensation Module

[overview](#)


No.	X [cm]	Y [cm]	Z [cm]
Sum	52.000	100.000	100.000
0-1	10.000	100.000	100.000
1-2	15.000		
2-3	8.000		
3-4	9.000		
4-5	10.000		

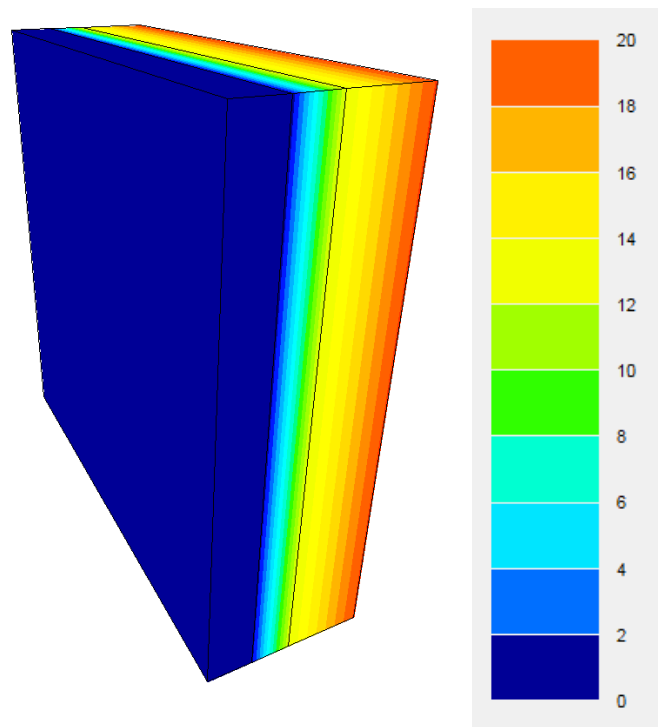
Standard

Relative humidity (%)

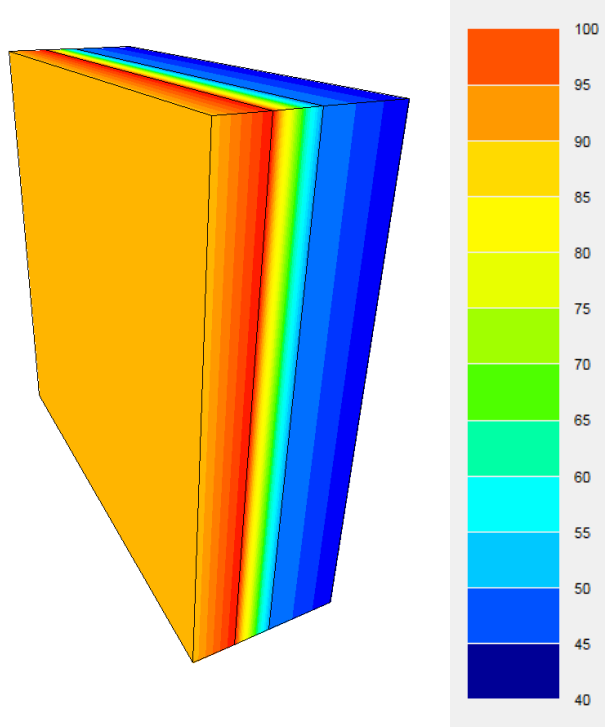
μ vapour diffusion resistance number (-)

Col.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	λ [W/mK]	μ [-]	θ [°C]	RH [%]	h v/m²K]	q [W/m²]	Standard
135	MATERIAL				insulation 0.04 W/mK	0.040	1.20					
136	MATERIAL				aerated concrete	0.120	5.00					
148	MATERIAL				masonry medium density	1.100	7.00					
170	BC_SIMPL	HE			exterior			0.0	90.0	25.00	0	EN13788
174	BC_SIMPL	HI	HOR		interior (normal) horizontal heat flow			20.0	40.0	7.70	0	EN13788

A1. Introduction to Condensation Module

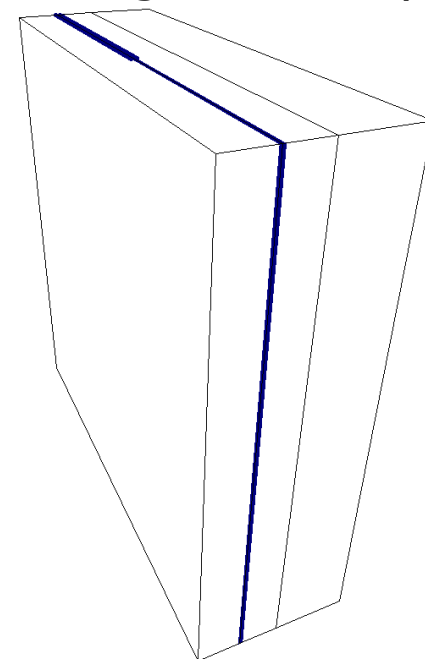
[overview](#)


Temperature (°C)



Relative humidity (%)

103 gram/30days

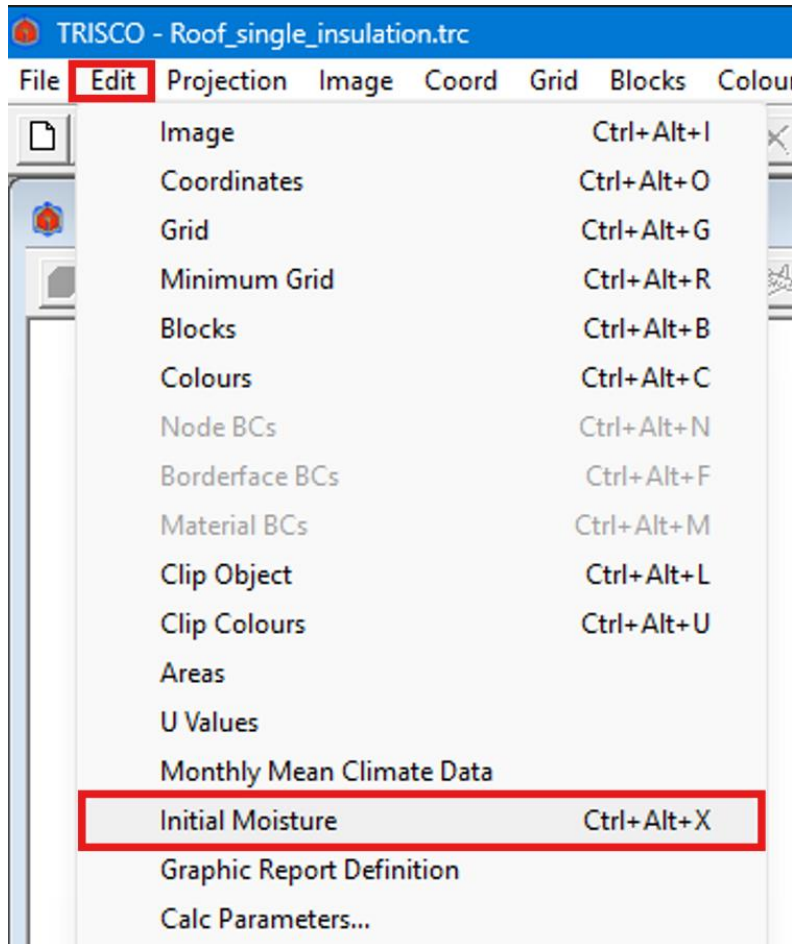


Condensation (%)



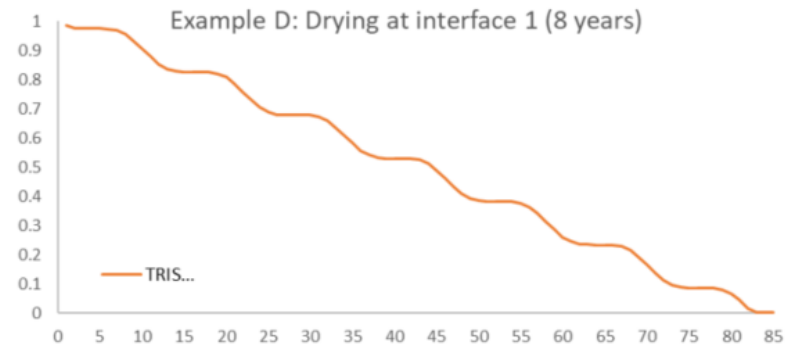
A2. Initial moisture

Specify the location and amount of excess moisture within the layers to calculate the drying rate.



The 'Initial Moisture at Interface' dialog box shows a table with the following data:

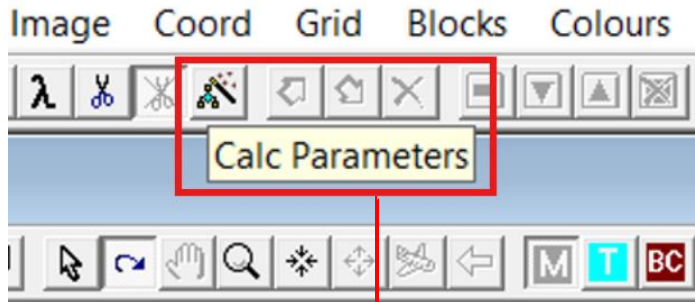
No.		Col.1	Col.2	Moisture [g/m ²]
1		133	161	4800



A3. New calculation parameters

[overview](#)

Optimize results and simulation time using the Condensation Calculation Method.



Calculation Parameters

Thermal | Condensation

Iterations

Maximum number of iteration cycles	1000
Maximum number of iterations within each iteration cycle	10000
Maximum vapour pressure difference within each iteration cycle	0.01 Pa
Maximum vapour pressure difference between iteration cycles	0.1 Pa
Max. vapour flow div. for total object	0.001 %
Max. vapour flow div. for any node	1 %

Condensation Calc Method

☒ Interstitial condensation only at material interfaces

Per cycle keep 10 % of condensation nodes

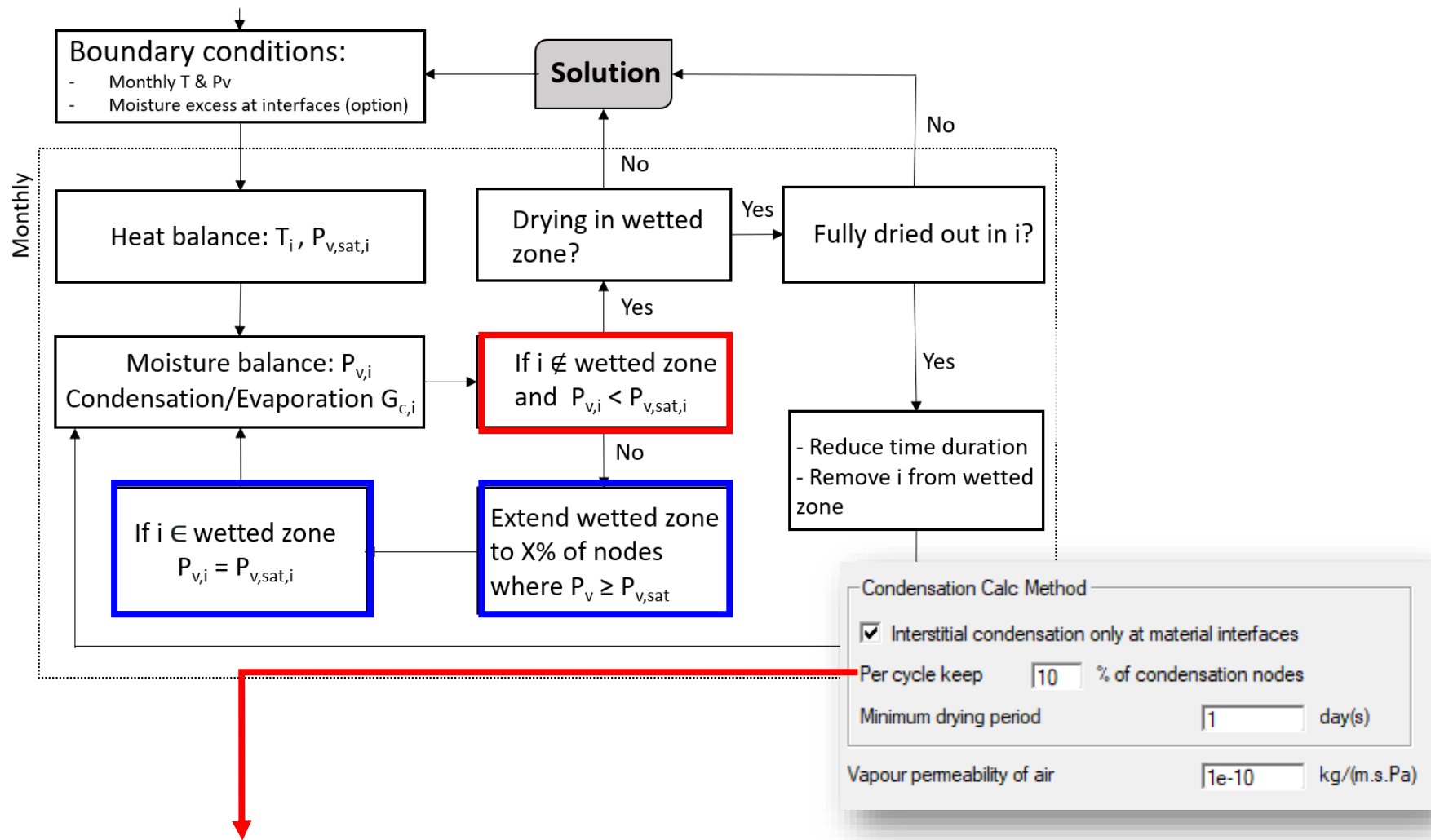
Minimum drying period 1 day(s)

Vapour permeability of air 2e-10 kg/(m.s.Pa)

Set As Default

OK Cancel

A3. New calculation parameters

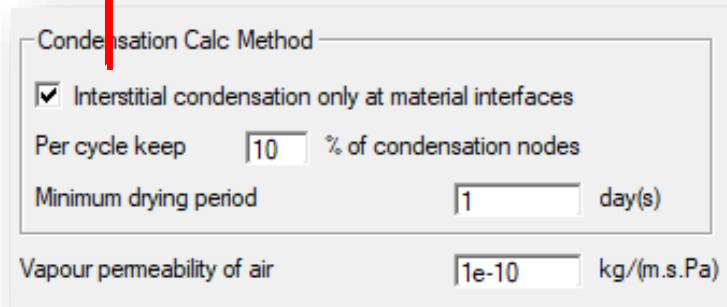


X% of calculation nodes are transferred from
'potential wetted zones' to 'wetted zones'

A3. New calculation parameters

[overview](#)

Interstitial condensation only at material interfaces
(= according to EN ISO 13788).



Condensation Calc Method

☒ Interstitial condensation only at material interfaces

Per cycle keep % of condensation nodes

Minimum drying period day(s)

Vapour permeability of air kg/(m.s.Pa)

A3. New calculation parameters

[overview](#)

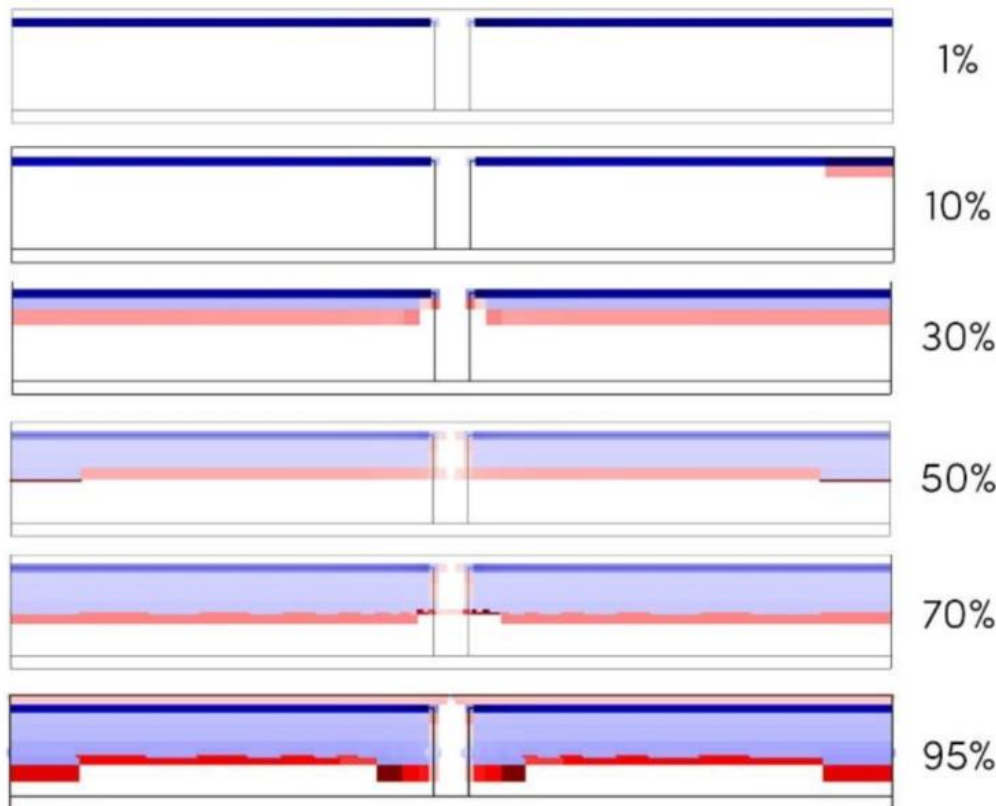
Per cycle keep ... % of condensation nodes

Condensation Calc Method

☐ Interstitial condensation only at material interfaces

Per cycle keep % of condensation nodes

Minimum drying period day(s)



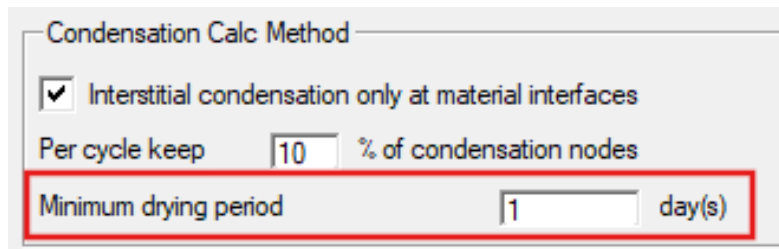
More accurate results.
Longer simulation time

➔ A 10% setting is recommended for simple models, 30% or 50% for complex ones.

A3. New calculation parameters

[overview](#)

Minimum drying period: ... days



Condensation Calc Method

☒ Interstitial condensation only at material interfaces

Per cycle keep % of condensation nodes

Minimum drying period day(s)

During the period drying it is likely that the wetted zone is fully dried out with a calculation step (1 month).

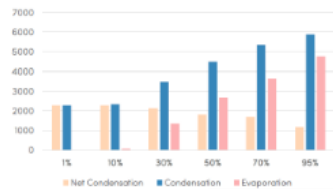
With this parameter the time step can be split to match the release of the wetted nodes within the resolution of 1 hour.

-> To achieve more accurate results, it is recommended to use a **1-day minimum drying period**.

A3. New calculation parameters

[overview](#)

Guidelines and examples of these settings can be found on the Knowledge Base:



Condensation Calc Method

☒ Interstitial condensation only at material interfaces

Per cycle keep % of condensation nodes

Minimum drying period hour(s)

Vapour permeability of air kg/(m.s.Pa)

B20-Condensation module settings in TRISCO

The Condensation module in TRISCO introduces three calculation parameters. Understanding these parameters is essential for achieving accurate results while optimizing computation time.

Based on examples, the aim of the present document is to give the user general guidelines for these settings.

Keywords: Glaser method, interstitial condensation, condensation module

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B1. Colour Window

[overview](#)

Vapour diffusion factor (μ -value) will be available from material database.

Colours									
Col.		Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	$\varepsilon_1 / \varepsilon_2$ [- / -]	λ [W/mK]	μ [-]
15		MATERIAL				softwood 500 kg/m3		0.130	50
133		MATERIAL				insulation 0.030 W/mK		0.030	1.50
161		MATERIAL				gypsum plasterboard		0.250	10

To be defined by user (and/or set in Colour Database)
(Default values in Colour Database: $\mu=1$)

Examples available on Knowledge Base:

Material group or application	Water vapour resistance factor μ [-]	Density
Aggregat	10 000	2 000
Beton	10 000	2 300
Concrete (2)	10 000	2 300
Concrete (3)	10 000	2 300
Concrete (4)	10 000	2 300
Concrete (5)	10 000	2 300
Concrete (6)	10 000	2 300
Concrete (7)	10 000	2 300
Concrete (8)	10 000	2 300
Concrete (9)	10 000	2 300
Concrete (10)	10 000	2 300
Concrete (11)	10 000	2 300
Concrete (12)	10 000	2 300
Concrete (13)	10 000	2 300
Concrete (14)	10 000	2 300
Concrete (15)	10 000	2 300
Concrete (16)	10 000	2 300
Concrete (17)	10 000	2 300
Concrete (18)	10 000	2 300
Concrete (19)	10 000	2 300
Concrete (20)	10 000	2 300
Concrete (21)	10 000	2 300
Concrete (22)	10 000	2 300
Concrete (23)	10 000	2 300
Concrete (24)	10 000	2 300
Concrete (25)	10 000	2 300
Concrete (26)	10 000	2 300
Concrete (27)	10 000	2 300
Concrete (28)	10 000	2 300
Concrete (29)	10 000	2 300
Concrete (30)	10 000	2 300
Concrete (31)	10 000	2 300
Concrete (32)	10 000	2 300
Concrete (33)	10 000	2 300
Concrete (34)	10 000	2 300
Concrete (35)	10 000	2 300
Concrete (36)	10 000	2 300
Concrete (37)	10 000	2 300
Concrete (38)	10 000	2 300
Concrete (39)	10 000	2 300
Concrete (40)	10 000	2 300
Concrete (41)	10 000	2 300
Concrete (42)	10 000	2 300
Concrete (43)	10 000	2 300
Concrete (44)	10 000	2 300
Concrete (45)	10 000	2 300
Concrete (46)	10 000	2 300
Concrete (47)	10 000	2 300
Concrete (48)	10 000	2 300
Concrete (49)	10 000	2 300
Concrete (50)	10 000	2 300
Concrete (51)	10 000	2 300
Concrete (52)	10 000	2 300
Concrete (53)	10 000	2 300
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Concrete (56)	10 000	2 300
Concrete (57)	10 000	2 300
Concrete (58)	10 000	2 300
Concrete (59)	10 000	2 300
Concrete (60)	10 000	2 300
Concrete (61)	10 000	2 300
Concrete (62)	10 000	2 300
Concrete (63)	10 000	2 300
Concrete (64)	10 000	2 300
Concrete (65)	10 000	2 300
Concrete (66)	10 000	2 300
Concrete (67)	10 000	2 300
Concrete (68)	10 000	2 300
Concrete (69)	10 000	2 300
Concrete (70)	10 000	2 300
Concrete (71)	10 000	2 300
Concrete (72)	10 000	2 300
Concrete (73)	10 000	2 300
Concrete (74)	10 000	2 300
Concrete (75)	10 000	2 300
Concrete (76)	10 000	2 300
Concrete (77)	10 000	2 300
Concrete (78)	10 000	2 300
Concrete (79)	10 000	2 300
Concrete (80)	10 000	2 300
Concrete (81)	10 000	2 300
Concrete (82)	10 000	2 300
Concrete (83)	10 000	2 300
Concrete (84)	10 000	2 300
Concrete (85)	10 000	2 300
Concrete (86)	10 000	2 300
Concrete (87)	10 000	2 300
Concrete (88)	10 000	2 300
Concrete (89)	10 000	2 300
Concrete (90)	10 000	2 300
Concrete (91)	10 000	2 300
Concrete (92)	10 000	2 300
Concrete (93)	10 000	2 300
Concrete (94)	10 000	2 300
Concrete (95)	10 000	2 300
Concrete (96)	10 000	2 300
Concrete (97)	10 000	2 300
Concrete (98)	10 000	2 300
Concrete (99)	10 000	2 300
Concrete (100)	10 000	2 300

A13 - Material properties: standardised values for water vapour resistance factor

This documents lists standardised water vapour transport properties from EN 12524:

- Table 1: General building materials
- Table 2: Thermal insulation materials and masonry materials
- Table 3: Foils

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Boundary condition input for monthly calculation according to EN ISO 13788

Colours																			
Col.		Type	Subtype	Physical flow dir.	Geo flow	Name	$\varepsilon_1 / \varepsilon_2$ [- / -]	λ [W/mK]	ε [-]	μ [-]	θ [°C]	RH [%]	h [W/m²K]	q [W/m²]	θ_a [°C]	h_c [W/m²K]	P_c [W]	θ_r [°C]	Standard
161		MATERIAL				gypsum plasterboard		0.250		10									
170		BC_SIMPL	HE			exterior					-5.0	70.0	25.00	0					EN13788
190		BC_SIMPL	HI	UP		indoors; upwards heat flow					20.0	80.0	10.00	0					EN13788

B1. Colour Window

[overview](#)

Input monthly climate data to assess interstitial condensation accumulation over months or years.

170	BC_SIMPL	CLIM_E			exterior					CLIM	CLIM
190	BC_SIMPL	CLIM_I	UP		indoors; upwards heat flow					CLIM	CLIM

Monthly Mean Climate Data

Month	θ_e [°C]	RHe[%]	θ_i [°C]	RHi[%]
January	0.0	70.0	20.0	60.0
February	3.0	70.0	20.0	60.0
March	5.0	70.0	20.0	60.0
April	10.0	70.0	20.0	60.0
May	12.0	70.0	20.0	60.0
June	15.0	70.0	20.0	60.0
July	18.0	70.0	20.0	60.0
August	20.0	70.0	20.0	60.0
September	15.0	70.0	20.0	60.0
October	12.0	70.0	20.0	60.0
November	8.0	70.0	20.0	60.0
December	5.0	70.0	20.0	60.0

Calculate Interstitial Condensation

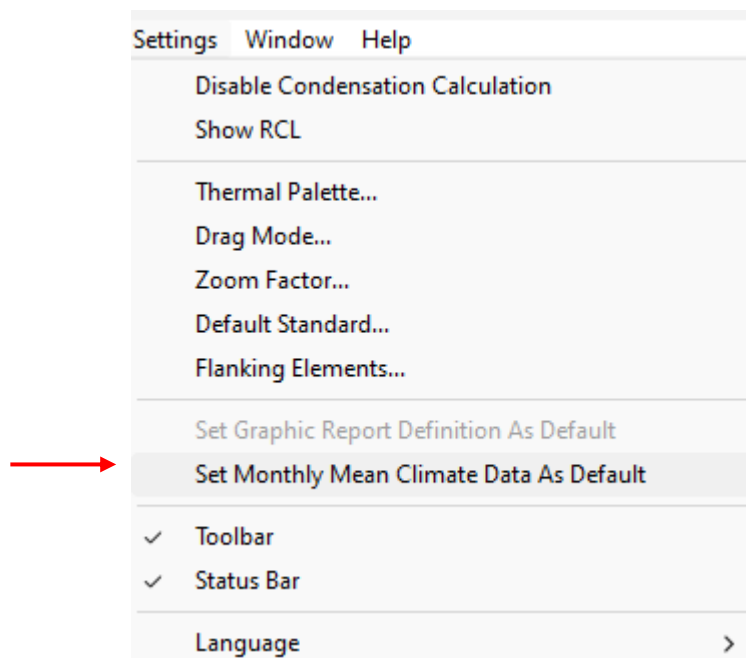
Start

☐ January
☐ February
☐ March
☐ April
☐ May
☐ June
☐ July
☐ August
☐ September
☒ October
☐ November
☐ December

Number of months

OK Cancel

Option to save generated Climatic data as default



The screenshot shows a window titled 'Monthly Mean Climate Data' containing a table with the following data:

Month	θ_e [°C]	RHe[%]	θ_i [°C]	RHi[%]
January	0.0	70.0	20.0	60.0
February	3.0	70.0	20.0	60.0
March	5.0	70.0	20.0	60.0
April	10.0	70.0	20.0	60.0
May	12.0	70.0	20.0	60.0
June	15.0	70.0	20.0	60.0
July	18.0	70.0	20.0	60.0
August	20.0	70.0	20.0	60.0
September	15.0	70.0	20.0	60.0
October	12.0	70.0	20.0	60.0
November	8.0	70.0	20.0	60.0
December	5.0	70.0	20.0	60.0

Condensation module is a 3D implementation of EN ISO 13788 in TRISCO

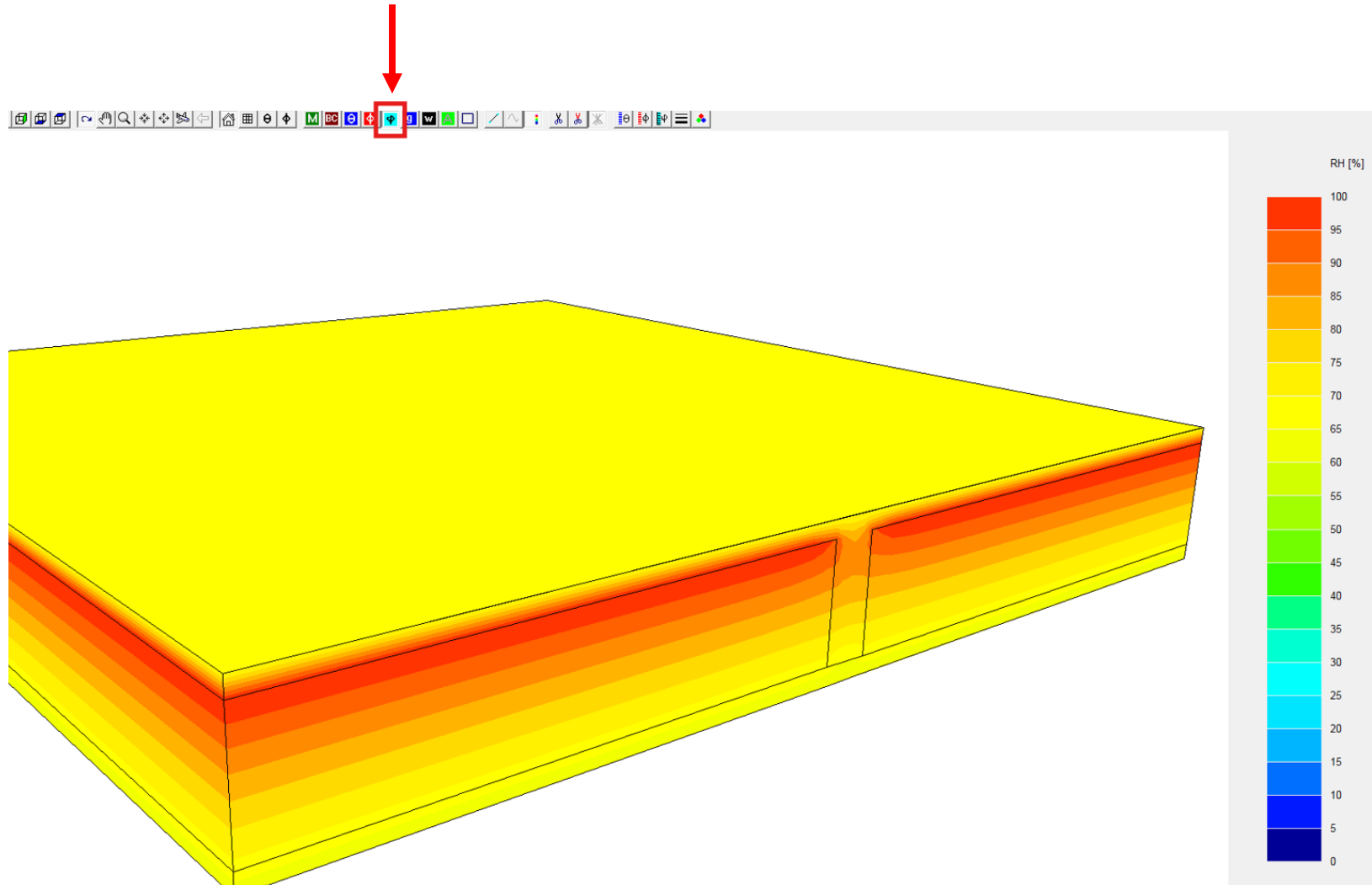
Colours																			
Col.		Type	Subtype	Physical flow dir.	Geo flow	Name	$\varepsilon_1 / \varepsilon_2$ [- / -]	λ [W/mK]	ε [-]	μ [-]	θ [°C]	RH [%]	h [W/m²K]	q [W/m²]	θ_a [°C]	h_c [W/m²K]	P_c [W]	θ_r [°C]	Standard
161		MATERIAL				gypsum plasterboard		0.250		10									
170		BC_SIMPL	HE			exterior					-5.0	70.0	25.00	0					EN13788
190		BC_SIMPL	HI	UP		indoors; upwards heat flow					20.0	80.0	10.00	0					EN13788

- Used as an assessment tool
- No capillary/hygroscopic materials
- When a monthly approach is justified
- No air transport involved

D.1 Graphic output

[overview](#)

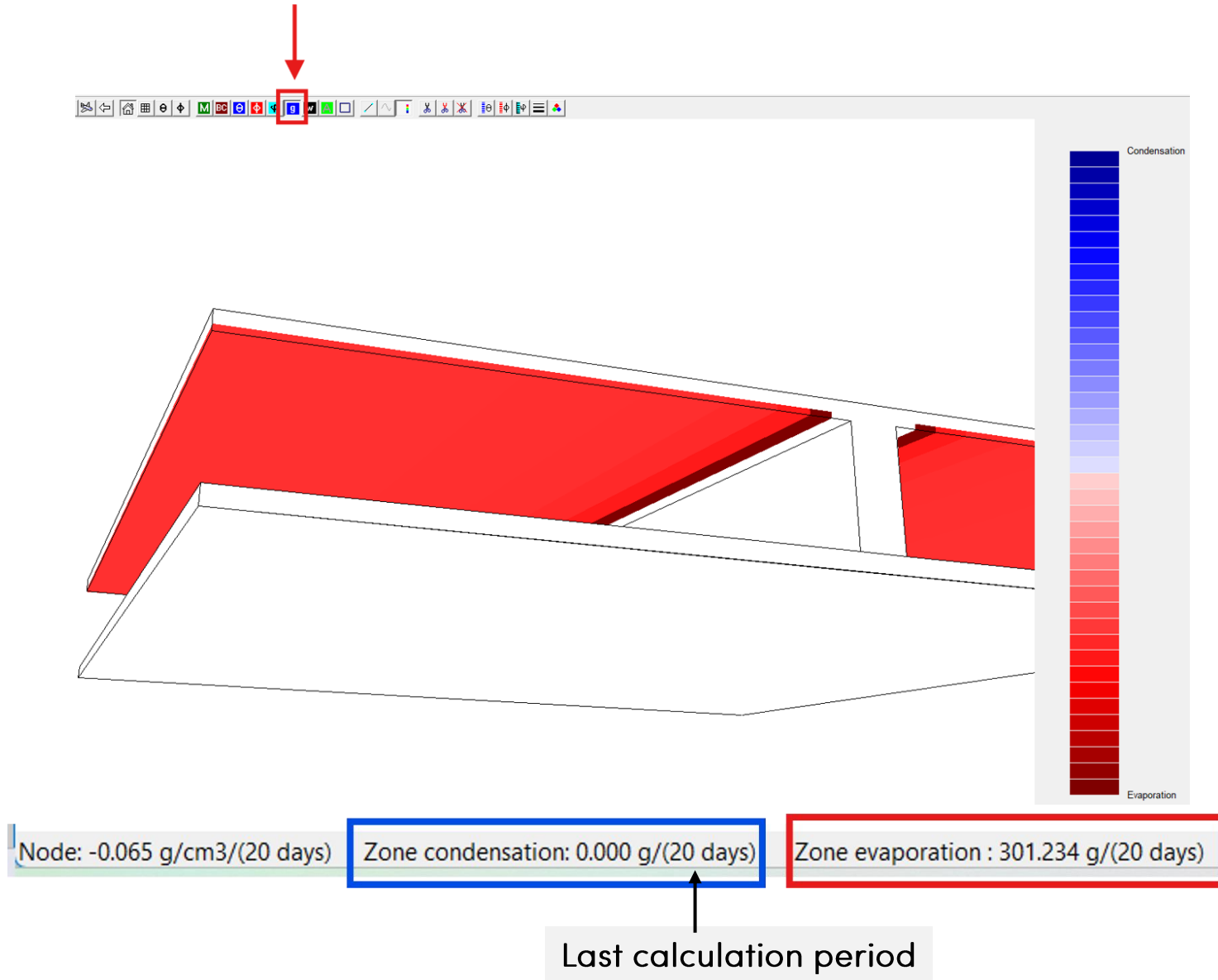
Graphic Output -> Fill Relative Humidity



D.1 Graphic output

[overview](#)

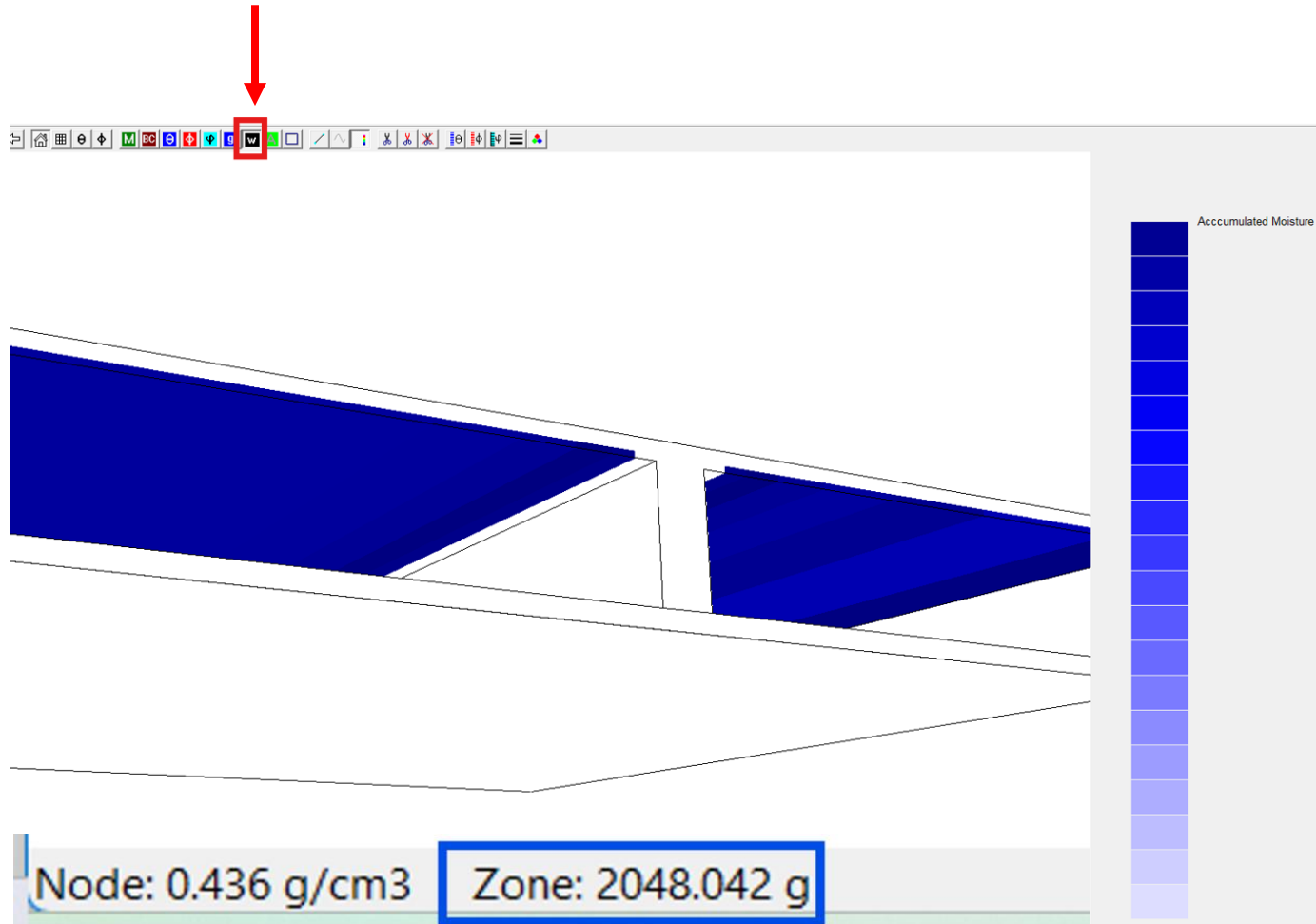
Graphic Output -> Fill Interstitial Condensation Rate



D.1 Graphic output

[overview](#)

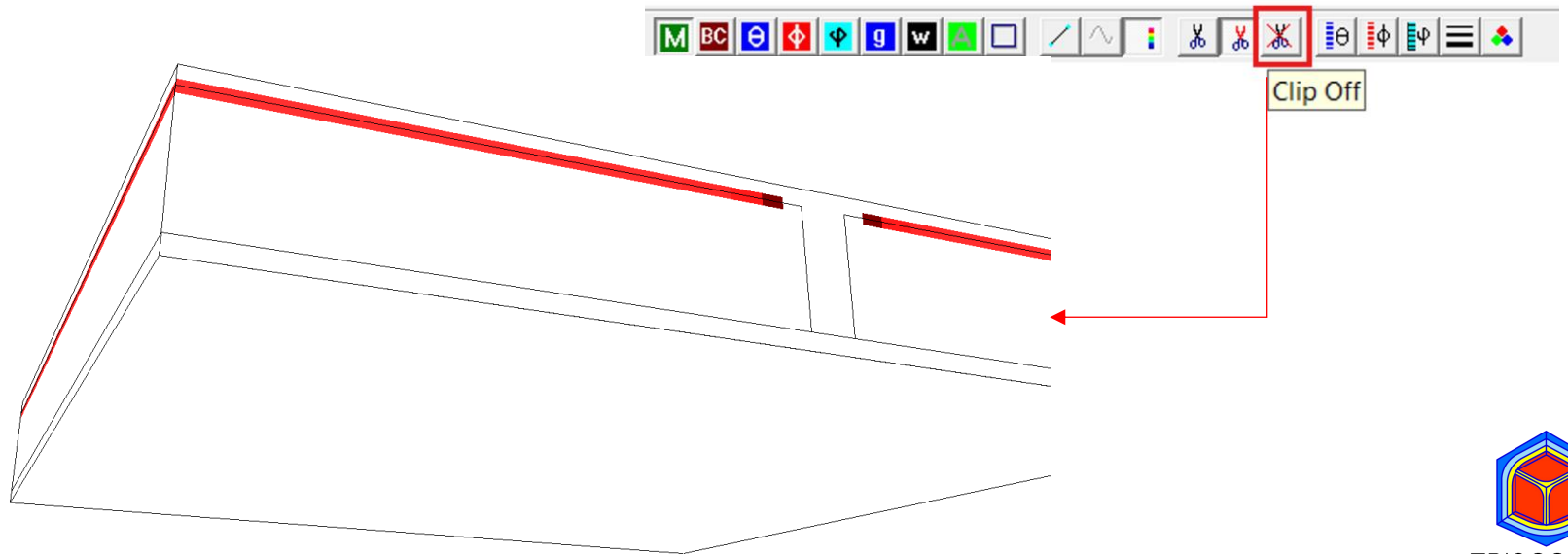
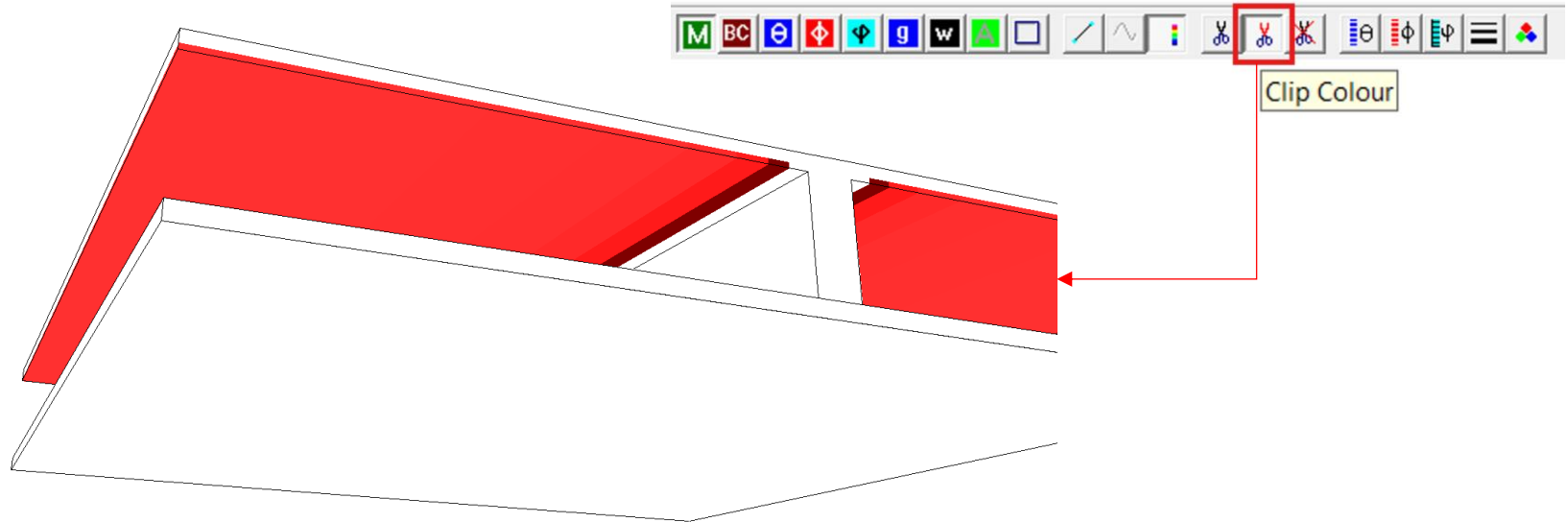
Graphic Output -> Fill Accumulated Interstitial Moisture



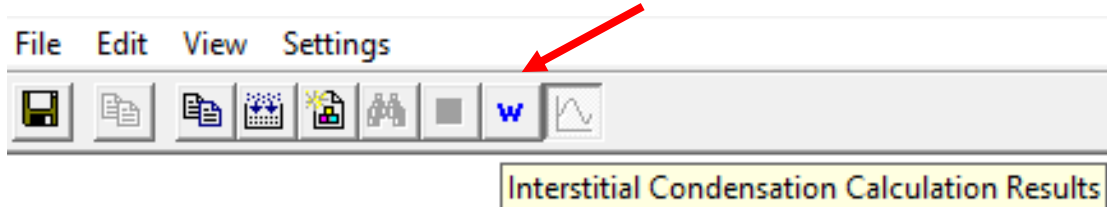
D.1 Graphic output

[overview](#)

Graphic Output -> Clip Colour/Clip Off



E.1 Text Output

[overview](#)

TRISCO - Interstitial Condensation Calculation Results

TRISCO data file: C5_HUMID.trc

Number of nodes = 32

Vapour flow divergence for total object = 3.61568×10^{-10} %

Vapour flow divergence for worst node = 1.4008×10^{-9} %

Net interstitial condensation rate in entire object (last calculation period)
Condensation - evaporation = -107.966 g / (30 days)

E.1 Text Output

[overview](#)

Text Output



	Month	#Days	#Calculation periods	Condensation [g]	Accumulated [g]
1	October	31	1	0.021	0.021
2	November	30	10	672.091	672.112
3	December	31	1	631.274	1303.386
4	January	31	1	1139.345	2442.732
5	February	28	1	770.075	3212.807
6	March	31	1	631.275	3844.083
7	April	30	1	-45.059	3799.024
8	May	31	2	-375.187	3423.837
9	June	30	4	-904.288	2519.550
10	July	31	4	-1589.154	930.396
11	August	31	12	-930.385	0.011
12	September	30	9	0.005	0.016

The number of cycles in monthly simulation, depends on **Minimum Drying Period** setting

Monthly condensation or evaporation amount (g).

Accumulated moisture amount (g) over time.

F.1 Documentation of the Condensation module

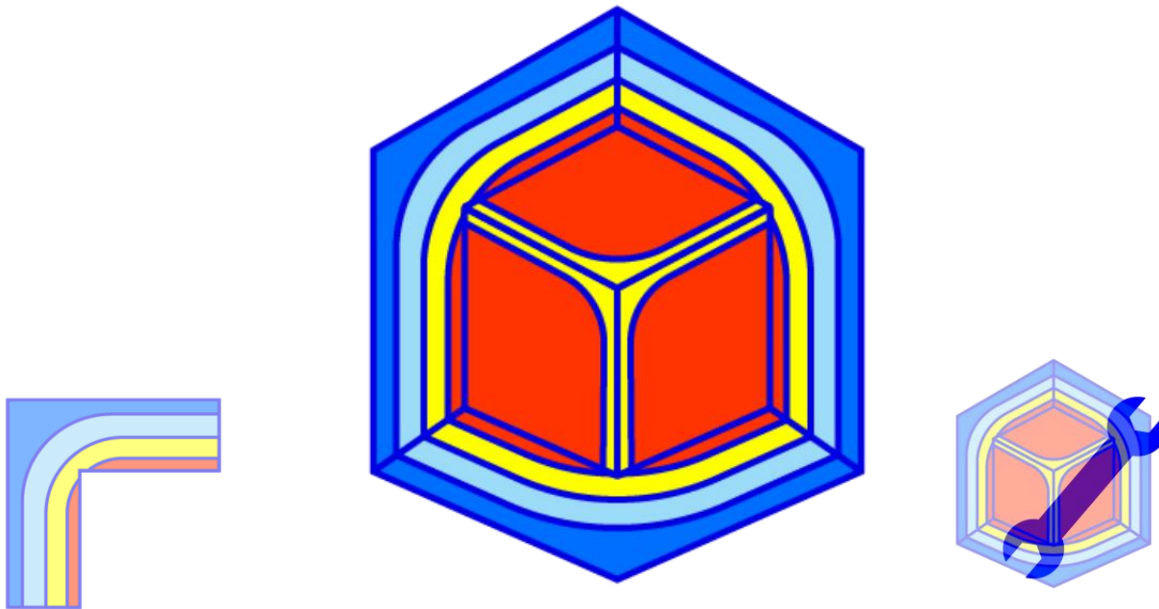
[overview](#)

- S3 - Condensation module in TRISCO (seminar/article)
- B20 - Condensation module settings in TRISCO
- A13 - Material properties: standardised values for water vapour resistance factor
- A11-Validation of the condensation module (TRISCO) according to EN ISO 13788
- A15 - Validation of the condensation feature (TRISCO) according to ASHRAE handbook of fundamentals.
- F2- Preparing indoor and outdoor climate data for use in the Physibel program GLASTA according to EN ISO 13788
- T-TRCd - TRISCO short tutorial series: Youtube tutorial video





TRISCO v16 New program performances



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downloadable program demo version