

1. Introduction

On a single glazing, condensation occurs more intensively behind a copper coffee pot. This is due to the low emissivity of the coffee-pot.

A simulation using the program TRISCO (with RADCON module) results in a similar isotherm course as the condensation pattern.

2. Case study subject

Figure 1 shows a clear condensation pattern on the internal single glazing surface.



Figure 1. Surface condensation on single glazing.

3. Steady state analysis

TRISCO data [coffee_pot_window.trc](#)

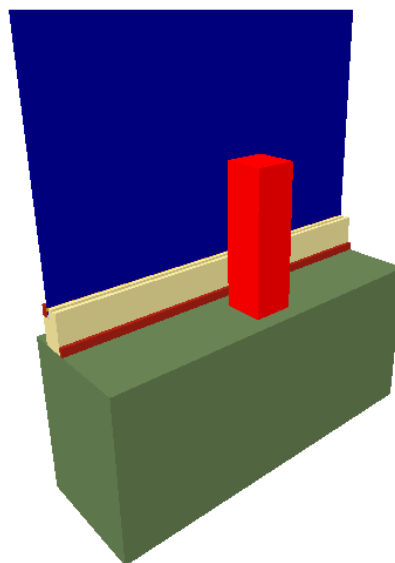


Figure 2. Simulation model.

Col.	Type	Subtype	Physical flow dir.	Geometrical flow dir.	Name	$\varepsilon_1 / \varepsilon_2$ [- / -]	λ [W/mK]	ε [-]	θ [°C]	h [W/m²K]	q [W/m²]	θ_a [°C]	h_c [W/m²K]	P_c [W]	θ_r [°C]	Standard
4	MATERIAL				copper		380.000	0.10								
12	MATERIAL				softwood		0.130	0.90								
15	MATERIAL				softwood		0.130	0.90								
18	MATERIAL				soda lime		1.000	0.90								
59	MATERIAL				masonry		1.000	0.90								
60	MATERIAL				EPDM		0.250	0.90								
170	BC_SIMPL	HE			exterior				0.0	25.00	0					EN6946
174	BC_SKY	NIHIL			interior						0	20.0	3.00		20.0	
215	EQUIMAT	CAVITY	HOR	Xy	cavity (CEN)	0.90 / 0.90	0.059	0.90								EN6946

Figure 3. TRISCO data –colour properties.

Figure 2 shows the simulation model.

Figure 3 shows the TRISCO Colours window in which the properties of materials (thermal conductivity, surface emissivity), cavities (equivalent thermal conductivity) and boundary conditions are defined.

We will discuss here some data highlights only.

- The **indoors** is defined as BC_SKY type. Both the air temperature and the radiation temperature are 20 °C. A convective surface heat transfer coefficient $h_c = 3 \text{ W/m}^2\text{K}$ is assumed.
- The **outdoors** is defined as a BC_SIMPL with temperature 0°C and global surface heat transfer coefficient 25 W/m²K.
- The **long wave emissivity** ε of all material surfaces is 0.9, except for the copper coffee-pot surface for which $\varepsilon = 0.1$ is assumed.
- **Non-linear radiation** is specified in the calculation parameters.

Figure 4 shows the temperatures on the internal surface.

The 5°C isotherm shape corresponds well to the condensation border shape.

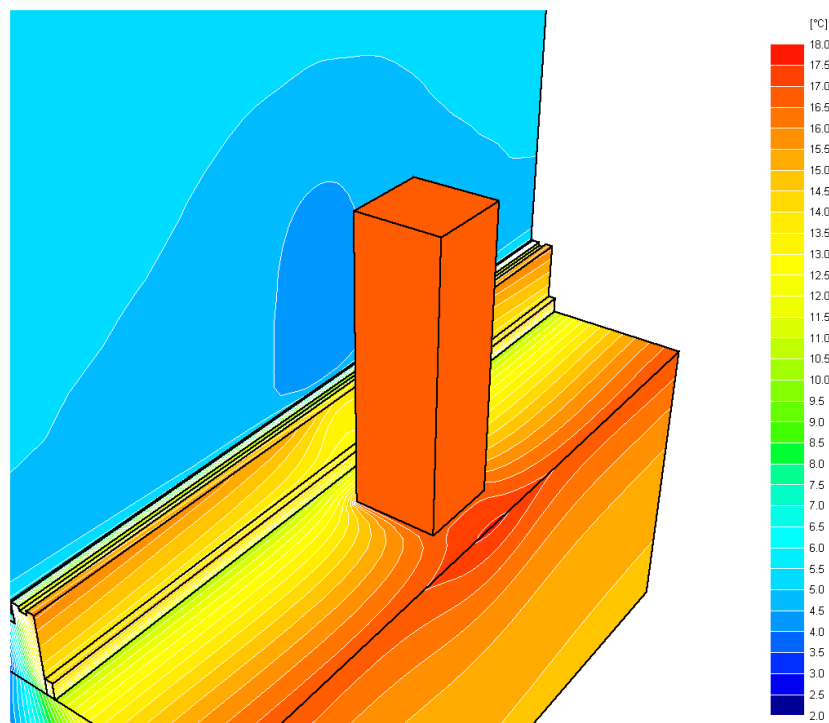


Figure 4. Temperature course on the internal surface.