INTRODUCTION TO THE GLASER METHOD

Introduction

The Glaser method is explained using a basic case of a brick wall with interior insulation.

More detailed information can be found in:
- EN ISO 13788 (Hygrothermal performance of building components and building elements - Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods).
- The Physibel program GLASTA manual.

The GLASTA data files for the basic case discussed should be in the same folder as this document.
In order to use the files in GLASTA these files should be copied:
- copy files *.wal to the folder C:\Users\...\Documents\Physibel\GLASTA5Walls
- copy files *.boc to the folder C:\Users\...\Documents\Physibel\GLASTA5\Climates
- copy files *.glp to the folder C:\Users\...\Documents\Physibel\GLASTA5\Reports

Basic case data – interior wall insulation

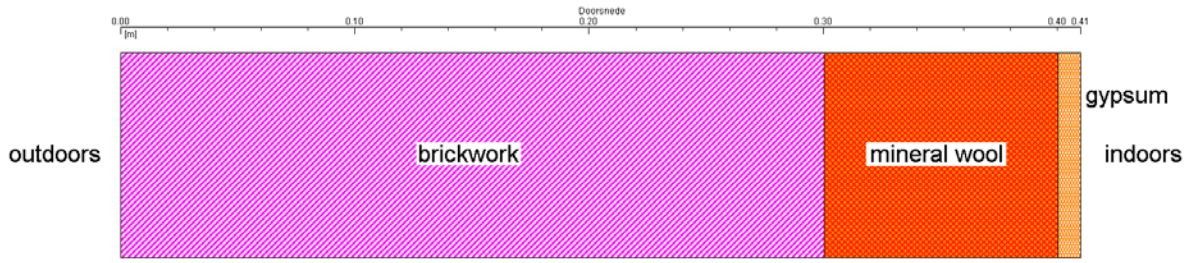

Figure 1. Wall section

Assume a brick wall with interior insulation (Figure 1) with an outdoors environment with temperature 0°C and relative humidity 90 % and an indoors environment with temperature 20°C and relative humidity 60 %.

The spreadsheet Glaser_method_example.xlsx (Figure 2) allows to calculate both the temperature course and the vapour pressure course through the wall.
At first sight the result should be the one represented left in Figure 3. However, this result doesn't takes into account the existence of vapour saturation. Right in Figure 3 the corrected courses are given. At the interface where the vapour pressure equals the saturation vapour pressure interstitial condensation occurs.

More detailed calculation results can be obtained using the program GLASTA: PPB_Wall1.glp

		outdoors		brickwork		mineral wool		gypsum		indoors			
d [m]				0,30		0,10		0,01					
λ [W/mK]				1,000		0,033		0,500					
h [W/m²K]		25,0								7,7			
R [m²K/W]		0,040		0,300		3,030		0,020		0,130		R_t [m²K/W]	3,520
												U_w [W/m2K]	0,284
θ [°C]	0,0		0,2		1,9		19,1		19,3		20,0		
μ [-]				20		1		10					
μd [m]		0,0014		6,0000		0,1000		0,1000		0,0084		R_d [m]	6,210
Nμd [m/s]		7,56E+06		3,24E+10		5,40E+08		5,40E+08		4,54E+07		R_d [m/s]	3,35E+10
												1/R_d [s/m]	2,98E-11
ϕ [%]	90,0										60,0		
p [Pa]	550		550		1373		1387		1400		1402		
p_s [Pa]	611		620		701		2209		2237		2336		
p < p_s ?			OK		CONFLICT		OK		OK				
p [Pa]	550		550		701		1038		1374		1402	corrected values !	

Figure 2. Spreadsheet [Glaser_method_example.xlsx]

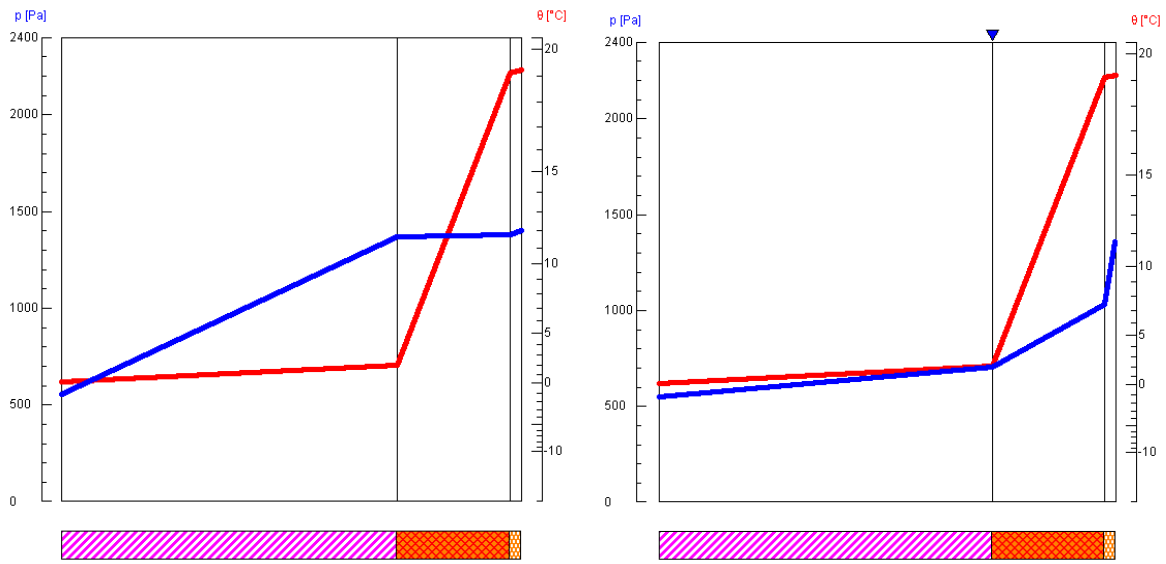

Figure 3.
Left: temperature course and vapour pressure course without considering the existence of saturation.
Right: temperature course and vapour pressure course taking into account the saturation.