

**LAB MEASUREMENTS -
DEMONSTRATION**

ENG-445
Building Energetics

**Building
Envelope**

Assist. Professor
Dolaana KHOVALYG

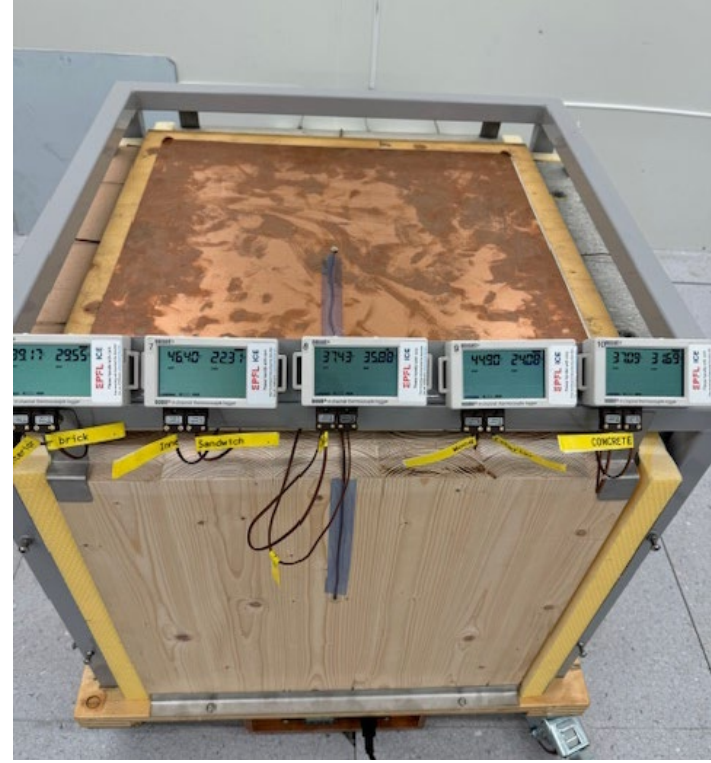
7 November 2024



EPFL Performance of Solid Materials (lab measurements)

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EPFL Performance of Solid Materials (lab measurements)

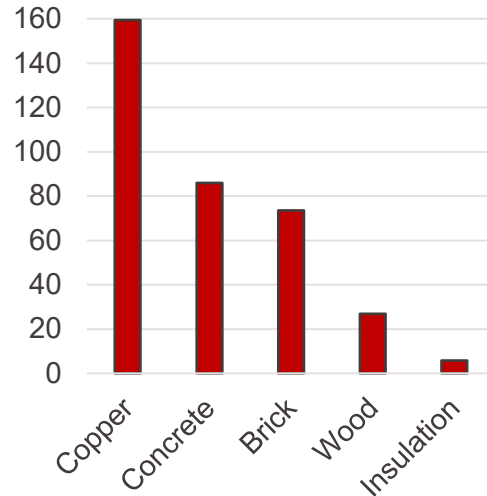
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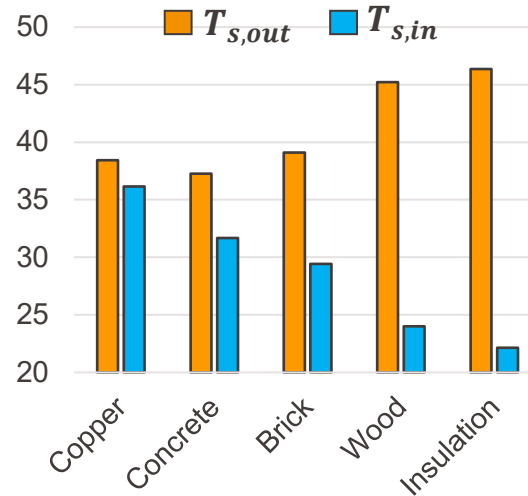
- IN temperature 21 °C, OUT temperature 47°C

Materials	Thickness (mm)	Weight (kg)	ρ (kg/m^3)	q (W/m^2)	$T_{s,out}$ (°C)	$T_{s,in}$ (°C)	ΔT (K)
Copper	0.6	1.27	8470	159.4	38.4	36.2	2.3
Concrete	75	46.68	2490	86.0	37.3	31.7	5.6
Brick	75	36.36	1940	73.5	39.1	29.4	9.7
Wood	75	9.57	510	26.9	45.2	24.0	21.2
Insulation	75	3.01	160	5.8	46.4	22.1	24.2

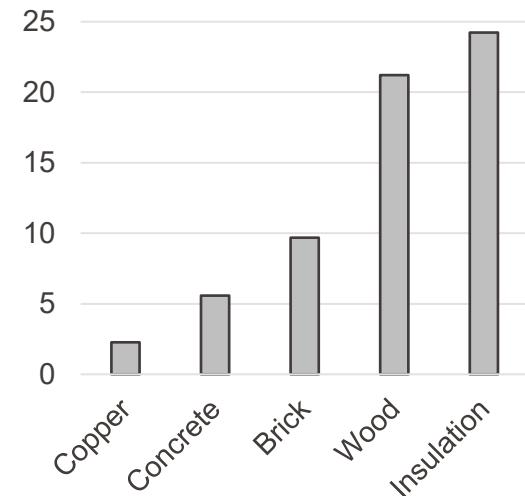
Heat Flow



Surface Temperatures



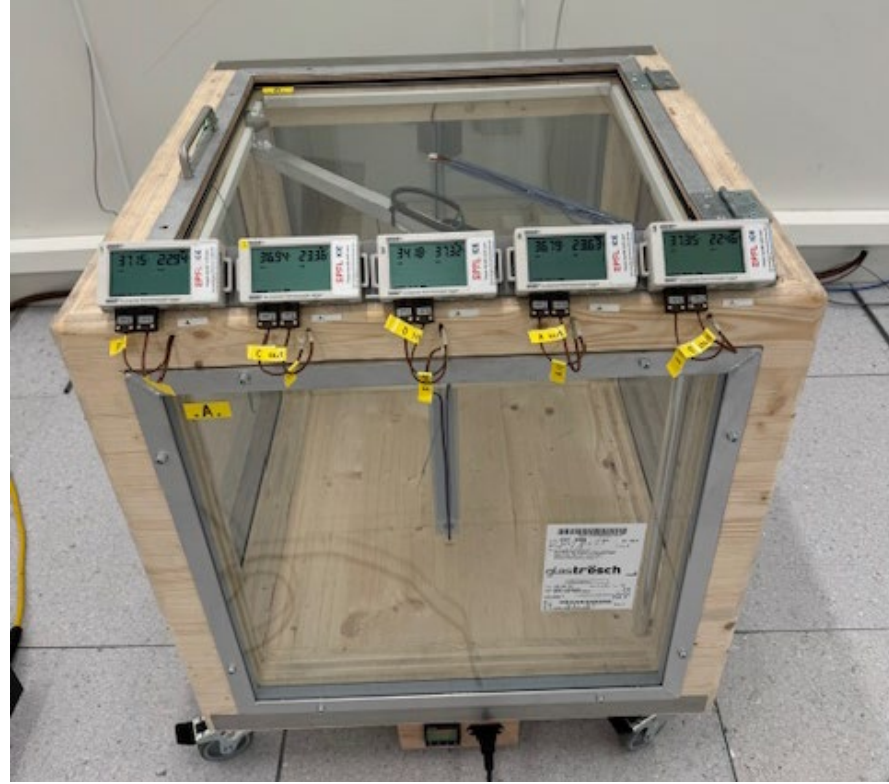
Temperature Difference



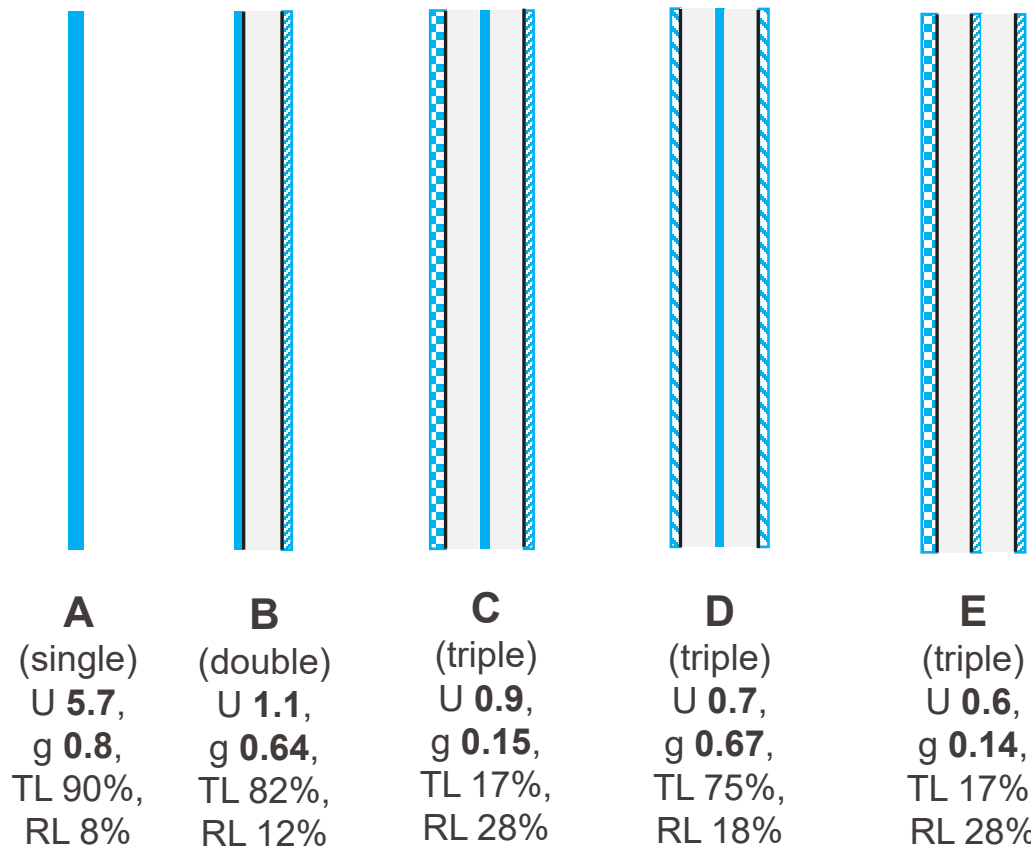
EPFL Performance of Glasses (lab measurements)

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Performance of Glasses (lab measurements)



Types of glasses:

-  Float (4 mm, only for A - 6 mm)
-  SILVERSTAR EN2plus (4 mm)
-  SILVERSTAR TRIII E (4 mm)
-  Sunstop T argent 20 (6 mm)

 Low-e coating

 Argon-filled gap (14 mm)

EPFL Performance of Glasses (lab measurements)

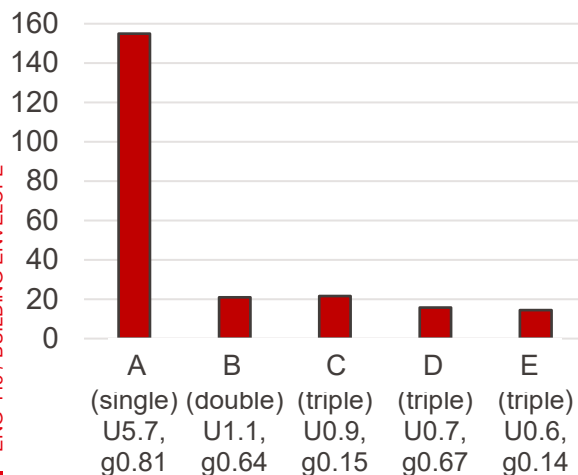
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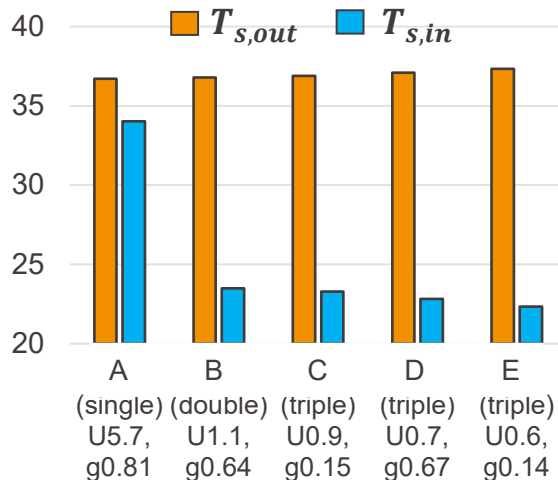
- IN temperature 21 °C, OUT temperature 46°C

Label	Panes	Name (manuf. GlasTrösch)	Thickness (mm)	TL (%)	RL (%)	U_g (W/m^2K)	g (—)	q (W/m^2)	$T_{s,out}$ (°C)	$T_{s,in}$ (°C)	ΔT (K)
A	single	Float	6	90	8	5.7	0.81	154.9	36.7	34.0	2.7
B	double	SILVERSTAR EN2plus	24	82	12	1.1	0.64	21.0	36.8	23.5	13.3
C	triple	SILVERSTAR TRIII E	42	17	28	0.9	0.15	21.5	36.9	23.3	13.6
D	triple	SILVERSTAR EN2plus Sunstop	40	75	18	0.7	0.67	15.7	37.1	22.8	14.3
E	triple	SILVERSTAR EN2plus Sunstop	42	17	28	0.6	0.14	14.5	37.3	22.3	15.0

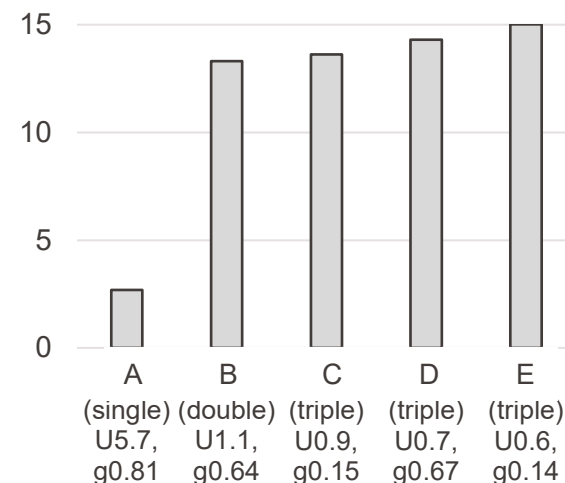
Heat Flow

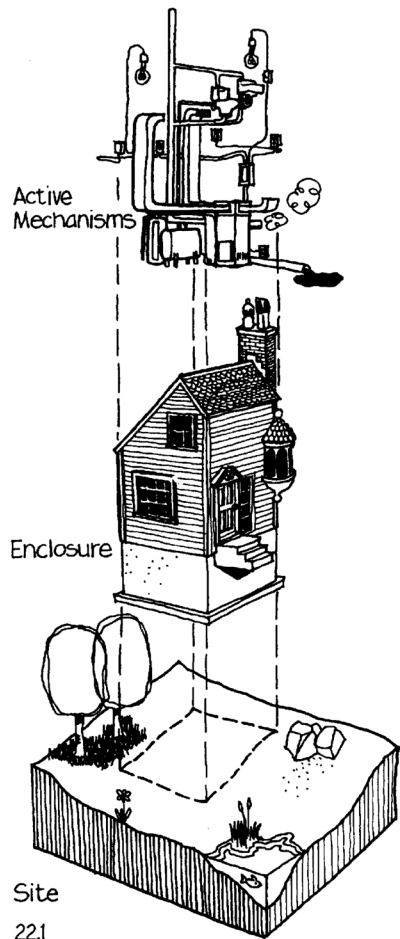


Surface Temperatures



Temperature Difference





Source: Edward Allen «How Buildings Work» (2005)

Thank you for your attention!

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<https://www.epfl.ch/labs/ice/>