1.Calculul ariilor elementelor anvelopei incalzite

1.1 Planseu sub terasa necirculabila

$A_{pspn} := 119.07 \quad m^2$

1.2 Planseu peste subsol neincalzit

$A_{ppsn} := 119.07 m^2$

1.3 Pereti exteriori

Aria totala

$A_{petot} := (3 + 5.8 + 1.5 + 2 + 5.3 + 20.175 + 3.6 + 4.9 + 6.1 + 5.475) \cdot (2.72 \cdot 2) = 314.704 \quad m^2$

Aria vitraje

etaj:

$A_{vitrajeetaj} := 1.5 \cdot 1.3 + 1.5 \cdot 1.3 + 1.5 \cdot 1.3 + 3 \cdot 1.3 + 3 \cdot 1.3 + 2 \cdot 1.3 + 1.5 \cdot 1.3 + 0.9 \cdot 1.3 + 1.5 \cdot 1.3 = 21.32$

parter:

$A_1 := 3 \cdot 1.3 + 2 \cdot 1.3 + 2.5 \cdot 0.6 + 2 \cdot 2.13 + 0.9 \cdot 1.3 + 1.6 \cdot 2.13 = 16.838$

$A_2 := 3 \cdot 1.3 + 1.5 \cdot 1.3 + 1.7 \cdot 2.13 + 1.15 \cdot 2.2 + 2.905 \cdot 2.13 = 18.189$

$A_{vitrajeparter} := A_1 + A_2 = 35.027$

$A_{vitraje} := A_{vitrajeetaj} + A_{vitrajeparter} = 56.347 \quad m^2$

Aria pereti exteriori opaca $A_{peopaca} := A_{petot} - A_{vitraje} = 258.357 \quad m^2$

2. Calculul volumului spatiului incalzit

$V_{s.i.} := A_{ppsn} \cdot (2 \cdot 3 + 4 \cdot 0.7) = 1.048 \cdot 10^3$

3. Calculul rezistentelor termice

3.1. Planseu peste subsol neincalzit

Stratificatie:

1. Parchet laminat	$d_1 := 0.02$	m	$\lambda_1 := 0.23$	$\frac{W}{m \cdot K}$
2. Sapa egalizare mortar	$d_2 := 0.04$	m	$\lambda_2 := 0.93$	$\frac{W}{m \cdot K}$
3.Polistiren expandat	$d_3 := 0.13$	m	$\lambda_3 := 0.036$	$\frac{W}{m \cdot K}$
4.Placa b.a.	$d_4 := 0.13$	m	$\lambda_4 := 1.74$	$\frac{W}{m \cdot K}$
5. Tencuiala interioara	$d_5 := 0.02$	m	$\lambda_5 := 0.87$	$\frac{W}{m \cdot K}$

$\alpha_i := 6$ $R_{si} := 0.167$ $\alpha_e := 12$ $R_{se} := 0.084$ $T_i := 20$

$T_e := -20$ $r := 0.75$

$$R'_{m1} := \left(R_{si} + \frac{d_1}{\lambda_1} + \frac{d_2}{\lambda_2} + \frac{d_3}{\lambda_3} + \frac{d_4}{\lambda_4} + \frac{d_5}{\lambda_5} + R_{se} \right) \cdot r = 3.067$$

3.2. Planseu sub terasa necirculabila

Stratificatie:

1. Tencuiala interioara	$d_1 := 0.02$	m	$\lambda_1 := 0.87$	$\frac{W}{m \cdot K}$
2.Placa b.a	$d_2 := 0.13$	m	$\lambda_2 := 1.74$	$\frac{W}{m \cdot K}$
3. Strat difuzie-folie de polietilena	$d_3 := 0.02$	m	$\lambda_3 := 0.02$	$\frac{W}{m \cdot K}$
4.Termoizolatie polistiren expandat	$d_4 := 0.25$	m	$\lambda_4 := 0.044$	$\frac{W}{m \cdot K}$

5. Beton de panta $d_5 := 0.04$ m $\lambda_5 := 1.64$ $\frac{W}{m \cdot K}$

6. Sapa egalizare din mortar $d_6 := 0.04$ m $\lambda_6 := 0.93$ $\frac{W}{m \cdot K}$

7. Hidroizolatie-folie PVC $d_7 := 0.02$ m $\lambda_7 := 0.40$ $\frac{W}{m \cdot K}$

8.Protectie hidroizolatie-nisip $d_8 := 0.01$ m $\lambda_8 := 0.58$ $\frac{W}{m \cdot K}$

$\alpha_i := 8$ $R_{si} := 0.125$ $\alpha_e := 12$ $R_{se} := 0.084$ $T_i := 20$

$T_e := -20$ $r := 0.85$

$$R'_{m2} := \left(R_{si} + \frac{d_1}{\lambda_1} + \frac{d_2}{\lambda_2} + \frac{d_3}{\lambda_3} + \frac{d_4}{\lambda_4} + \frac{d_5}{\lambda_5} + \frac{d_6}{\lambda_6} + \frac{d_7}{\lambda_7} + \frac{d_8}{\lambda_8} + R_{se}\right) \cdot r = 6.055$$

3.3. Perete exterior

Stratificatie:

1. Tencuiala interioara $d_1 := 0.02$ m $\lambda_1 := 0.87$ $\frac{W}{m \cdot K}$

2. Perete caramida $d_2 := 0.30$ m $\lambda_2 := 0.207$ $\frac{W}{m \cdot K}$

3.Polistiren expandat $d_3 := 0.10$ m $\lambda_3 := 0.036$ $\frac{W}{m \cdot K}$

4. Tencuiala exterioara $d_4 := 0.02$ m $\lambda_4 := 0.87$ $\frac{W}{m \cdot K}$

$\alpha_i := 8$ $R_{si} := 0.125$ $\alpha_e := 24$ $R_{se} := 0.042$ $T_i := 20$

$T_e := -20$ $r := 0.80$

$$R'_{m3} := \left(R_{si} + \frac{d_1}{\lambda_1} + \frac{d_2}{\lambda_2} + \frac{d_3}{\lambda_3} + \frac{d_4}{\lambda_4} + R_{se} \right) \cdot r = 3.552$$

4. Verificare R'm $R'_m > R'_{min}$ -C107/1-Anexa 3 Part 1

4.1 Planseu peste subsol neincalzit

$R'_{min1} := 2.90$ $R'_{m1} := 3.067$

$2.90 < 3.067$

4.2 Planseu sub terasa necirculabila

$R'_{min2} := 5.00$ $R'_{m2} := 6.055$

$5.00 < 6.055$

4.3 Pereti exteriori

$R'_{min3} := 1.80$ $R'_{m3} := 3.552$

$1.80 < 3.552$

4.4 vitraje

$R'_{min4} := 0.77$ $R'_{m4} := 0.77$

5. Extragem τ

5.1 Planseu peste subsol neincalzit

$\tau_1 := 0.5$

5.2 Planseu sub terasa necirculabila

$\tau_2 := 0.9$

5.3 Pereti exteriori

$\tau_3 := 1$

5.4 Pereti vitraje

$\tau_4 := 1$

6. $n := 0.6$

Element	Arie m^2	R'm $\frac{m^2 \cdot K}{W}$	L=A/R'm	τ	Lxτ
Planseu peste subsol neincalzit	119.07	3.067	38.82229	0.5	19.41114
Planseu sub terasa necirculabila	119.07	6.055	19.66473	0.9	17.69825
Pereti exteriori opaca	258.357	3.552	72.73564	1	72.73564
Vitraje	56.347	0.77	73.17792	1	73.17792

$\Sigma L\tau := 19.41114 + 17.69825 + 72.73564 + 73.17792 = 183.023$

$V := 119.07 \cdot (3 + 3 + 0.13) = 729.899$ m^3 -volumul spatiului incalzit

$G := \frac{\Sigma L\tau}{V} + n \cdot 0.34 = 0.455$

$A_{tot} := 119.07 + 119.07 + 258.357 + 56.347 = 552.844$

$\frac{A_{tot}}{V} = 0.757$ => $0.794 > 0.75$ => GN=0.54

$G := 0.455$

=> $G < GN$