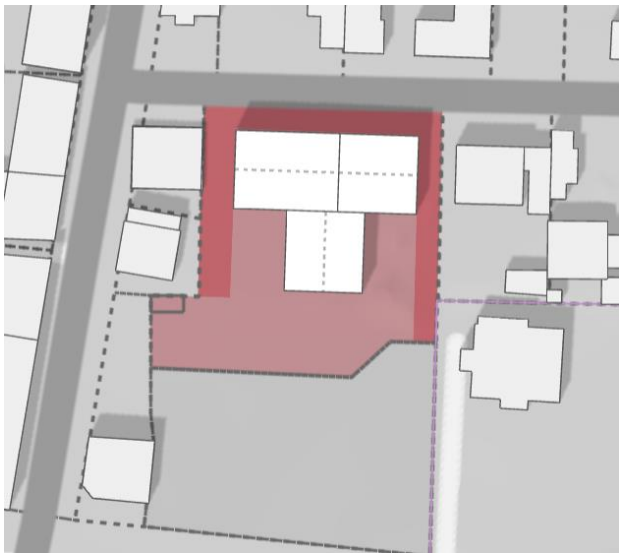
Group 2 / ATCM 4th Sem.
Standpromenaden 13 – 15, 8700 Horsens

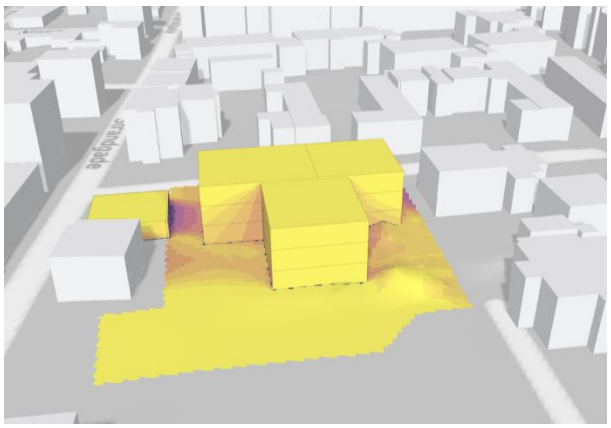
Light analysis

Placement of the building:

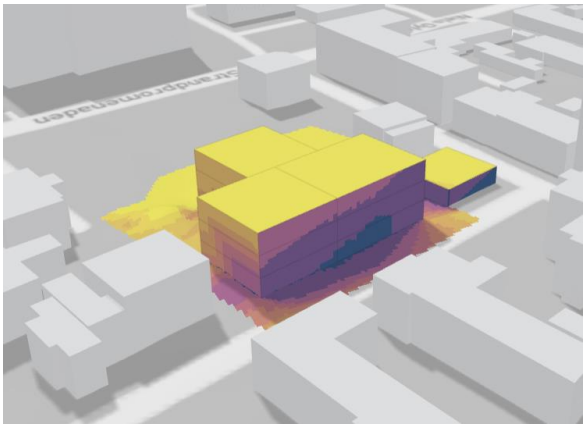


1. Summer

Date & time:
August – 0:00-24:00



South

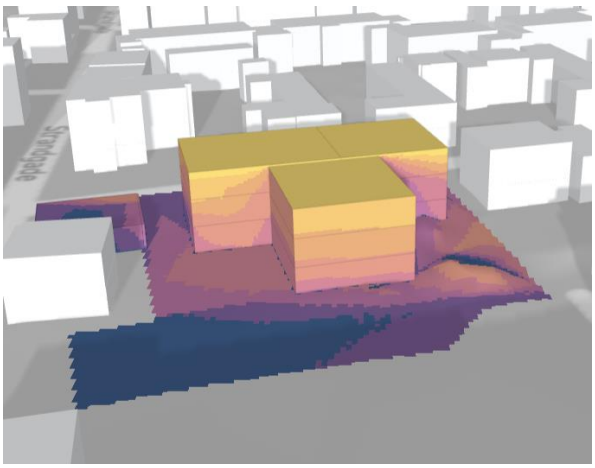


North

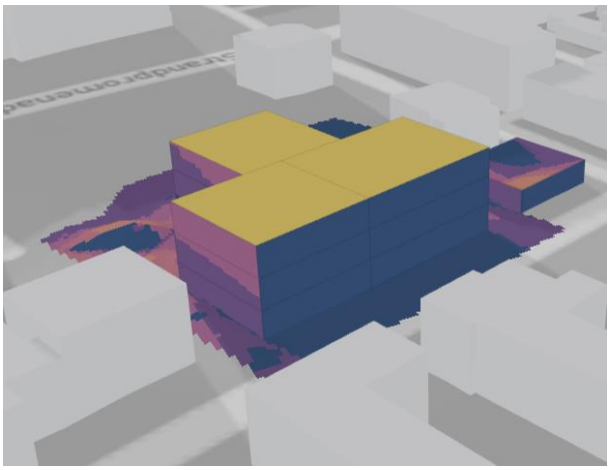
All apartments have view towards south and multiple hours of sunlight throughout the day. The north side does not get that much sunlight and that's why the bedrooms and bathroom in the two big apartments are placed on the north side. The living rooms are carefully placed facing south where the most sunlight comes from.

2. Winter

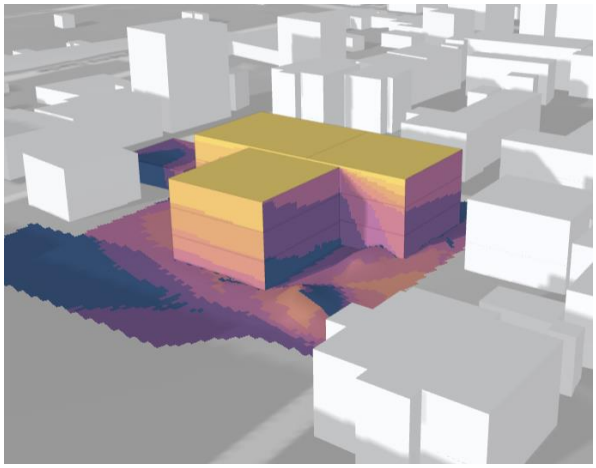
Date & time:
November – 0:00-24:00



South



North



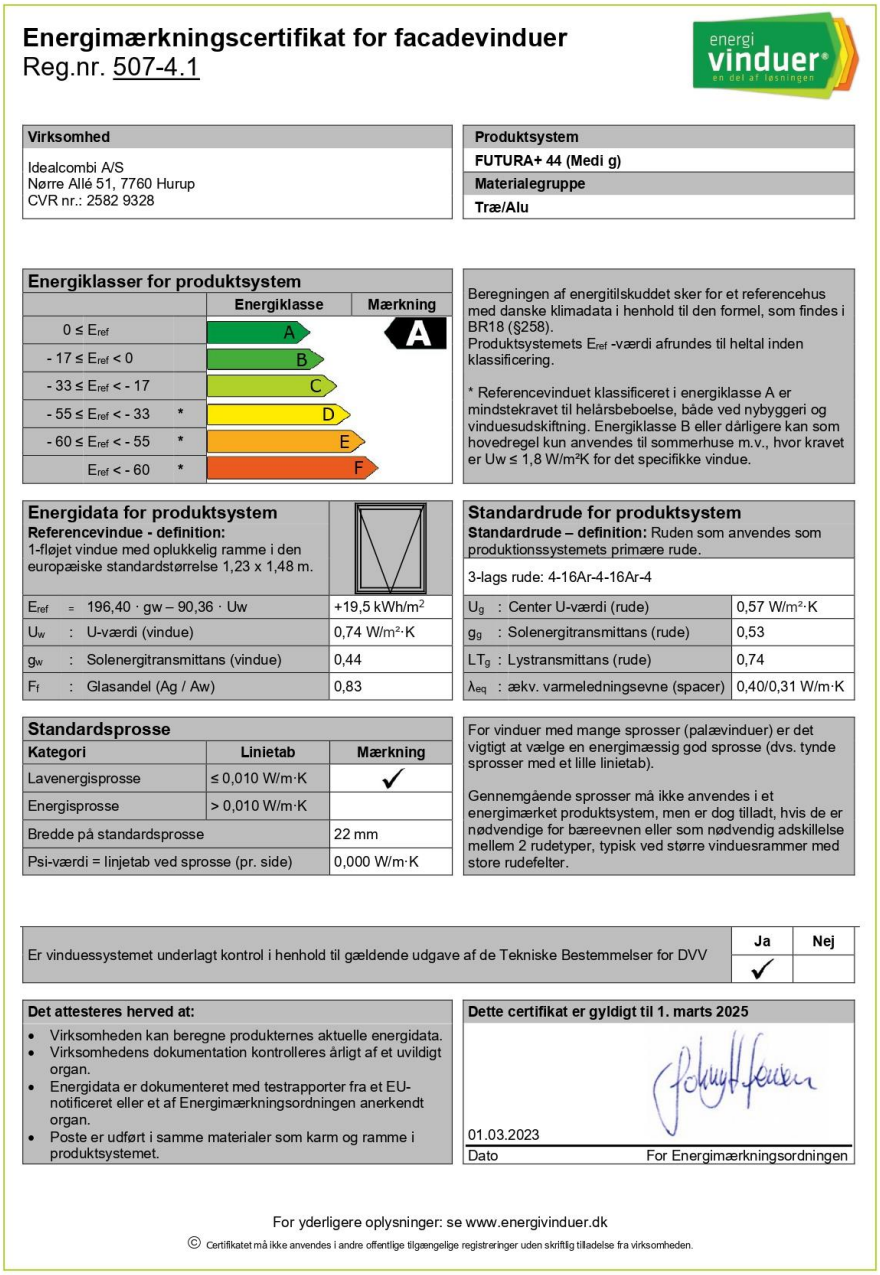
East

In the winter months the building will still get the most sunlight from the south which makes the position of the building on the plot optimal to utilize the most possible sunlight.

Analysis of Daylight in Residential Rooms

(Solar) light transmittance indicates the ratio of the luminous flux on a surface immediately inside and outside the window with an area corresponding to the area of the pane.

The light transmittance of the window is indicated by the or the window manufacturer. The light transmittance is here defined for radiation perpendicular to the pane, and the starting point is a pane with a light transmittance of 0.74.



Energimærkningscertifikat for facadevinduer
Reg.nr. 507-4.1

energi vinduer – en del af løsningen

Virksomhed	Produktsystem
Idealcombi A/S Nørre Allé 51, 7760 Hurup CVR nr.: 2582 9328	**FUTURA+ 44 (Medi g)** **Materialegruppe** **Træ/Alu**

Energiklasser for produktsystem

	Energiklasse	Mærkning
0 ≤ E_{ref}	A	A
- 17 ≤ E_{ref} < 0	B	
- 33 ≤ E_{ref} < - 17	C	
- 55 ≤ E_{ref} < - 33 *	D	
- 60 ≤ E_{ref} < - 55 *	E	
E_{ref} < - 60 *	F	

Beregningen af energitilskuddet sker for et referencehus med danske klimadata i henhold til den formel, som findes i BR18 (§258).
Produktsystemets E_{ref} -værdi afrundes til heltal inden klassificering.

* Referencevinduet klassificeret i energiklasse A er mindstekravet til helårsbeboelse, både ved nybyggeri og vinduesudskiftning. Energiklasse B eller dårligere kan som hovedregel kun anvendes til sommerhuse m.v., hvor kravet er Uw ≤ 1,8 W/m²K for det specifikke vindue.

Energidata for produktsystem
Referencevindue - definition:
1-fløjet vindue med oplukkelig ramme i den europæiske standardstørrelse 1,23 x 1,48 m.

E_{ref} = 196,40 · gw – 90,36 · Uw		+19,5 kWh/m²
U_w : U-værdi (vindue)		0,74 W/m²·K
g_w : Solenergitransmittans (vindue)		0,44
F_f : Glasandel (Ag / Aw)		0,83

Standardrude for produktsystem
Standardrude – definition: Ruden som anvendes som produktionssystemets primære rude.

3-lags rude: 4-16Ar-4-16Ar-4

U_g : Center U-værdi (rude)		0,57 W/m²·K
g_g : Solenergitransmittans (rude)		0,53
LT_g : Lystransmittans (rude)		0,74
λ_{eq} : ækv. varmeledningsevne (spacer)		0,40/0,31 W/m·K

Standardsprosse

Kategori	Linietab	Mærkning
Lavenergisprosse	≤ 0,010 W/m·K	✓
Energisprosse	> 0,010 W/m·K	
Bredde på standardsprosse		22 mm
Psi-værdi = linjetab ved sprosse (pr. side)		0,000 W/m·K

For vinduer med mange sprosser (palævinduer) er det vigtigt at vælge en energimæssig god sprosse (dvs. tynde sprosser med et lille linietab).

Gennemgående sprosser må ikke anvendes i et energimærket produktsystem, men er dog tilladt, hvis de er nødvendige for bæreevnen eller som nødvendig adskillelse mellem 2 rudetyper, typisk ved større vinduesrammer med store rudefelter.

Er vinduessystemet underlagt kontrol i henhold til gældende udgave af de Tekniske Bestemmelser for DVV	Ja	Nej
	✓	

Det attesteres herved at:
- Virksomheden kan beregne produkternes aktuelle energidata.
- Virksomhedens dokumentation kontrolleres årligt af et uvildigt organ.
- Energidata er dokumenteret med testrapporter fra et EU-notificeret eller et af Energimærkningsordningen anerkendt organ.
- Poste er udført i samme materialer som karm og ramme i produktsystemet.

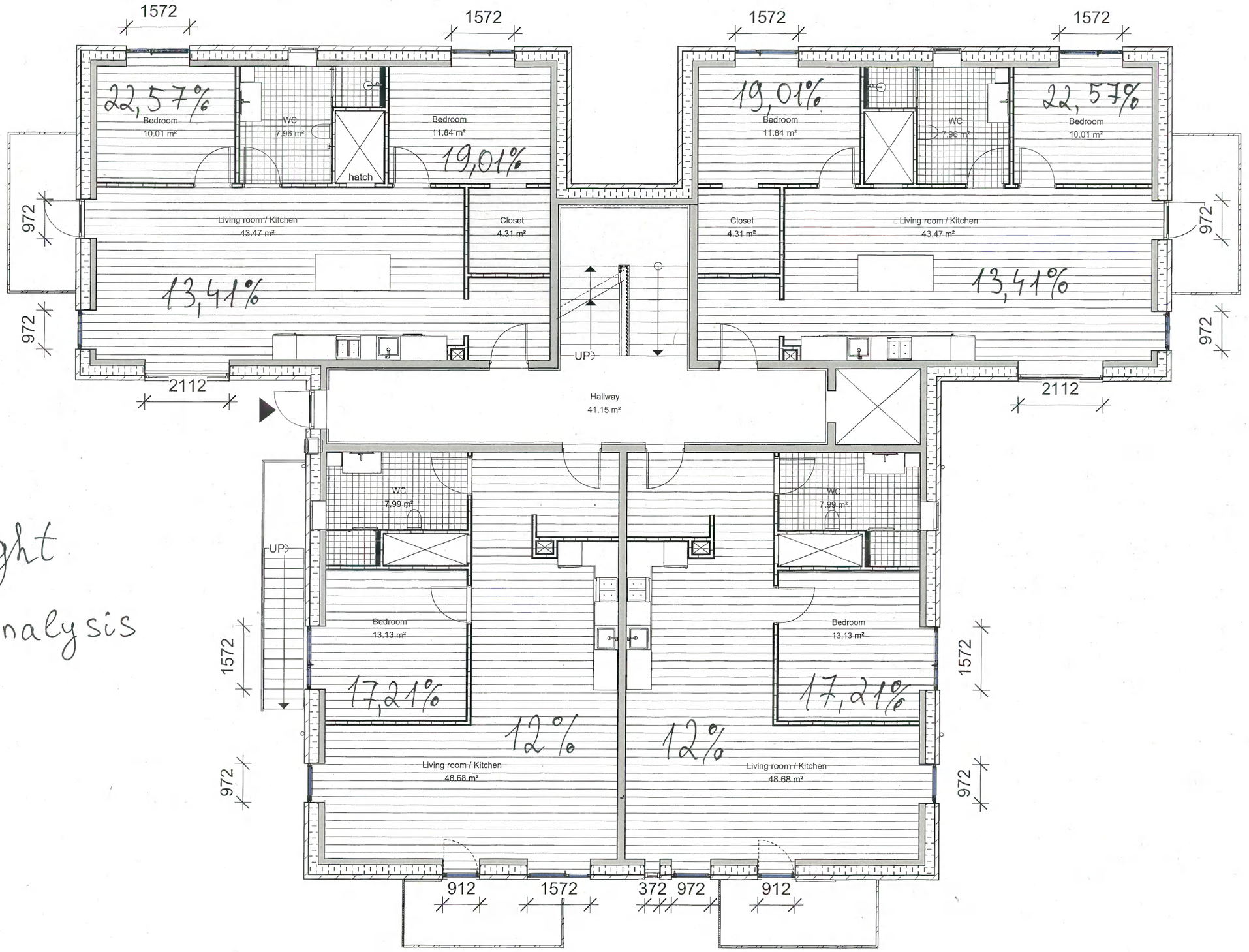
Dette certifikat er gyldigt til 1. marts 2025

01.03.2023
Dato — For Energimærkningsordningen

For yderligere oplysninger: se www.energivinduer.dk

Documentation of daylight conditions in our housing:

Light Analysis



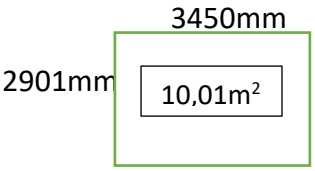
Solar Light Transmittance (LT)

LT of the window is indicated by the Manufacturer.

LT_{ref} – Light Transmittance of the reference Plane.

<u>For our windows:</u> $LT_{ref} = 0,75$; $LT_{act} = 0,74$;

1. First Room



$Room_{area} = 10,01m^2$

Window = 1572x2100mm

Area of glass area = $A_{GA} = 1,572*2,1*0,7=2,31m^2$

$FLT = LT_{act} / LT_{ref}$

FLT = 0,74 / 0,75 = 0,98

$I = FLT * A_{GA} = 0,98 * 2,31m^2 = 2,26m^2$

Glass area must be at least 10% of floor area:

Minimum glass area $AG_{min} = 0,1 * 10,01m^2 = 1,001\ m^2$

To check how many % of floor area is the window:

$I*100/Room_{area} = 2,26 *100/10,01m^2 = 22,57\%$

2. $Room_{area} = 11,84m^2$
Window = 1572x2100mm

Area of glass area = $A_{GA} = 1,572*2,1*0,7=2,31m^2$

$LT_{ref} = 0,75$; $LT_{act} = 0,74$; $FLT = LT_{act} / LT_{ref}$

FLT = 0,74 / 0,75 = 0,98

$I = FLT * A_{GA} = 0,98 * 2,31m^2 = 2,26m^2$

Glass area must be at least 10% of floor area:

Minimum glass area $AG_{min} = 0,1 * 11,84m^2 = 1,184\ m^2$

To check how many % of floor area is the window:

$I*100/Room_{area} = 2,26 *100/11,84m^2 = 19,01\%$

3. $Room_{area} = 43{,}47m^2$

$LT_{ref} = 0{,}75$; $LT_{act} = 0{,}74$; $FLT = LT_{act} / LT_{ref}$

$FLT = 0{,}74 / 0{,}75 = 0{,}98$

a. Door: 972x2145mm

$A_{GA} = 0{,}972*2{,}145*0{,}7=1{,}46m^2$

$I = FLT * A_{GA} = 0{,}98 * 1{,}46m^2 = 1{,}43m^2$

b. Window = 972x2100mm

$A_{GA} = 0{,}972*2{,}100 *0{,}7=1{,}43m^2$

$I = FLT * A_{GA} = 0{,}98 * 1{,}43m^2 = 1{,}40m^2$

c. Window = 2112x2100mm

$A_{GA} = 2{,}112*2{,}100 *0{,}7=3{,}10m^2$

$I = FLT * A_{GA} = 0{,}98 * 3{,}10m^2 = 3{,}0m^2$

$I_{total} = I_1 + I_2 + I_3 = 1{,}43 +1{,}4 + 3{,}0 = 5{,}83m^2$

Glass area must be at least 10% of floor area:

Minimum glass area $AG_{min} = 0{,}1 * 43{,}47m^2 = 4{,}347m^2$

To check how many % of floor area is the window:

$I*100/Room_{area} = 5{,}83 *100/43{,}47m^2 = 13{,}41\%$

4. $Room_{area} = 13{,}13m^2$
Window = 1572x2100mm

Area of glass area = $A_{GA} = 1{,}572*2{,}1*0{,}7=2{,}31m^2$

$LT_{ref} = 0{,}75$; $LT_{act} = 0{,}74$; $FLT = LT_{act} / LT_{ref}$

$FLT = 0{,}74 / 0{,}75 = 0{,}98$

$I = FLT * A_{GA} = 0{,}98 * 2{,}31m^2 = 2{,}26m^2$

Glass area must be at least 10% of floor area:

Minimum glass area $AG_{min} = 0{,}1 * 13{,}13m^2 = 1{,}313\ m^2$

To check how many % of floor area is the window:

$I*100/Room_{area} = 2,26 *100/13,13m^2 = 17,21\%$

5. $Room_{area} = 48,68m^2$

$LT_{ref} = 0,75$; $LT_{act} = 0,74$; $FLT = LT_{act} / LT_{ref}$

$FLT = 0,74 / 0,75 = 0,98$

d. Door: 912x2145mm

$A_{GA} = 0,912*2,145*0,7=1,45m^2$

$I = FLT * A_{GA} = 0,98 * 1,45m^2 = 1,42m^2$

e. Window = 972x2100mm

$A_{GA} = 0,972*2,100 *0,7=1,43m^2$

$I = FLT * A_{GA} = 0,98 * 1,43m^2 = 1,40m^2$

f. Window = 2112x2100mm

$A_{GA} = 2,112*2,100 *0,7=3,10m^2$

$I = FLT * A_{GA} = 0,98 * 3,10m^2 = 3,0m^2$

$I_{total} = I_1 + I_2 + I_3 = 1,42 +1,4 + 3,0 = 5,82m^2$

Glass area must be at least 10% of floor area:

Minimum glass area $AG_{min} = 0,1 * 48,68m^2 = 4,868m^2$

To check how many % of floor area is the window:

$I*100/Room_{area} = 5,82*100/48,68m^2 = 12\%$