

Energy Efficiency in Buildings

Building Design – Fenestration – Buildings with Natural Environmental Control

Occupancy:

E3

Design Occupancy Time:

24

Hours per day

7

Days per week

Climatic Zone:

1

Fenestration – Buildings with Natural Environmental Control

Constants

Conductance (C_U) constant:

1.20

Solar Heat Gain (C_{SHGC}) constant:

0.15

Max. Conductance / Solar Heat Gain

Ground Storey

Net Floor Area of Storey / Room: m²

298,000

NOTE !! NO FURTHER CALCULATION REQUIRED.

Fenestration Area of Storey / Room: m²

24,413

Max. Conductance (C_U) for Storey / Room:

357,600

Permissible

% Fenestration Area to Nett Floor Area: %

8,192

Max. Solar Heat Gain (C_{SHGC}) for Storey / Room:

44,700

Permissible

Achieved Aggregate Conductance / Solar Heat Gain

Ground Storey

Conductance (C_U) for Storey / Room:

192,86

Solar Heat Gain (C_{SHGC}) for Storey / Room:

6,56

Conductance / Solar Heat Gain Available

Conductance (C_U) for Storey / Room:

164,74

Solar Heat Gain (C_{SHGC}) for Storey / Room:

38,14

| Glazing Elements | | | | | Glazing Element | | Sector | Shading | | | | Solar Exposure | Energy Constants | | | Multipliers | |
|------------------|----------------|--------------|-------------|-----------|-----------------|------|-------------|----------------|------------|------------|-------|----------------|------------------|----------------|----------------|------------------------|------------------------|
| Storey Level | Identifier No: | No. of Units | Size w x h | Area (m²) | U-value | SHGC | Orientation | Projection (P) | Height (H) | Height (G) | P/H | Factor (E) | C _A | C _B | C _C | Heating S _H | Cooling S _C |
| Ground Storey | w06 | 15 | 0.9 x 0.875 | 11.81 | 7.90 | 0.81 | North | 0.900 | 1.385 | 0.510 | 0.325 | 0.440 | | | | 0.995 | 0.940 |
| Ground Storey | w06 | 16 | 0.9 x 0.875 | 12.60 | 7.90 | 0.81 | South | 3.090 | 1.385 | 0.510 | 1.116 | 0.230 | | | | 0.860 | 0.790 |

ALL XA CALCULATIONS ARE COMPLIANT AND IN ACCORDANCE TO SANS 1400 PART XA

Refer to Electrical engineers and Mechanical engineers drawings for lighting layouts and calculations

ROOF INSULATION AS PER BUILDING SECTIONS ALL TO MECHANICAL ENGINEERS APPROVAL

110MM BRICK, 10MM VOID, 110MM WALL WITH FLUSH JOINT

CONCRETE SCREED WITH FLOOR FINISH

85MM SURFACE BED

30MM THICK ISOBOARD INSULATION

85MM SURFACE BED, ON 30MM THICK UNDERFLOOR ISOBOARD INSULATION, ON 250 MICRON DPM ON WELL COMPACTED FILL. SURFACE BED TO ENGINEERS DETAIL

FOUNDATION WALL TO ENGINEERS DETAILS

REINFORCED CONCRETE FOUNDATION TO ENGINEERS SPECIFICATION

UNDER FLOOR INSULATION

1 : 20

Worst-case whole glazing element performance figures.

| Glass Description | Performance Values | | | |
|------------------------|---------------------------|------|------------------------------------|------|
| | Aluminium / Steel Framing | | Timber / uPVC / *Aluminium Framing | |
| | Total U-value | SHGC | Total U-value | SHGC |
| Single – clear | 7.9 | 0.31 | 5.6 | 0.77 |
| Single – tinted | 7.9 | 0.39 | 5.6 | 0.65 |
| Single Low E | 5.73 | 0.36 | 4.06 | 0.63 |
| Clear Double (3/6/3) | 4.23 | 0.72 | 3 | 0.68 |
| Tinted Double | 4.23 | 0.39 | 3 | 0.56 |
| Clear Double Low E | 3.4 | 0.36 | 2.41 | 0.62 |
| Tinted Double Low E | 3.4 | 0.34 | 2.41 | 0.51 |

(* Thermal Break Framing)

| No. | Description | Date |
|-----|------------------------|----------------|
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Project Title:

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