

### Energy Efficiency in Buildings

#### Building Design – Fenestration – Buildings with Natural Environmental Control

Occupancy:

Design Occupancy Time:  Hours per day  
 Days per week

Climatic Zone:

#### Fenestration – Buildings with Natural Environmental Control Constants

Conductance (C<sub>U</sub>) constant:

Solar Heat Gain (C<sub>SHGC</sub>) constant:

#### Max. Conductance / Solar Heat Gain

Ground Storey

|  |                                      |   |  |                                      |             |
|--|--------------------------------------|---|--|--------------------------------------|-------------|
| Net Floor Area of Storey / Room: m <sup>2</sup>    | <input type="text" value="445,000"/> | <b>NOTE !!</b> NO FURTHER CALCULATION REQUIRED. | Max. Conductance (C <sub>U</sub> ) for Storey / Room:        | <input type="text" value="534,000"/> | Permissible |
| Fenestration Area of Storey / Room: m <sup>2</sup> | <input type="text" value="26,138"/>  |   | Max. Solar Heat Gain (C <sub>SHGC</sub> ) for Storey / Room: | <input type="text" value="66,750"/>  | Permissible |
| % Fenestration Area to Nett Floor Area: %          | <input type="text" value="5,874"/>   |   |  |                                      |             |

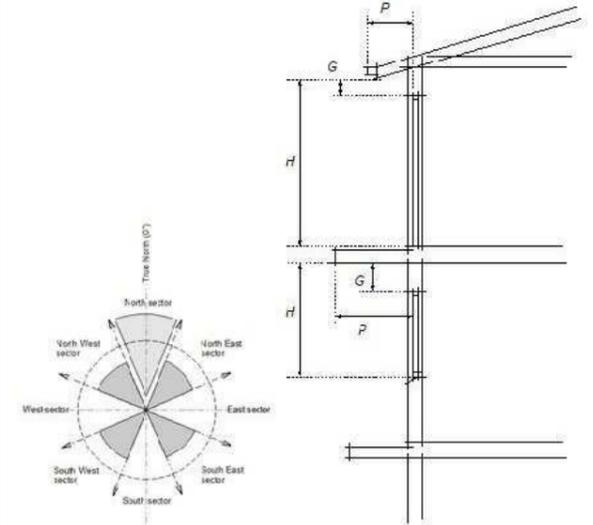
#### Achieved Aggregate Conductance / Solar Heat Gain

Ground Storey

|   |                                     |   |                                     |
|---|-------------------------------------|---|-------------------------------------|
| Conductance (C <sub>U</sub> ) for Storey / Room:        | <input type="text" value="206,49"/> | Conductance (C <sub>U</sub> ) for Storey / Room:        | <input type="text" value="327,51"/> |
| Solar Heat Gain (C <sub>SHGC</sub> ) for Storey / Room: | <input type="text" value="7,06"/>   | Solar Heat Gain (C <sub>SHGC</sub> ) for Storey / Room: | <input type="text" value="59,69"/>  |

#### GLAZING ELEMENTS : FACTOR & CO-EFFICIENT SUMMARY

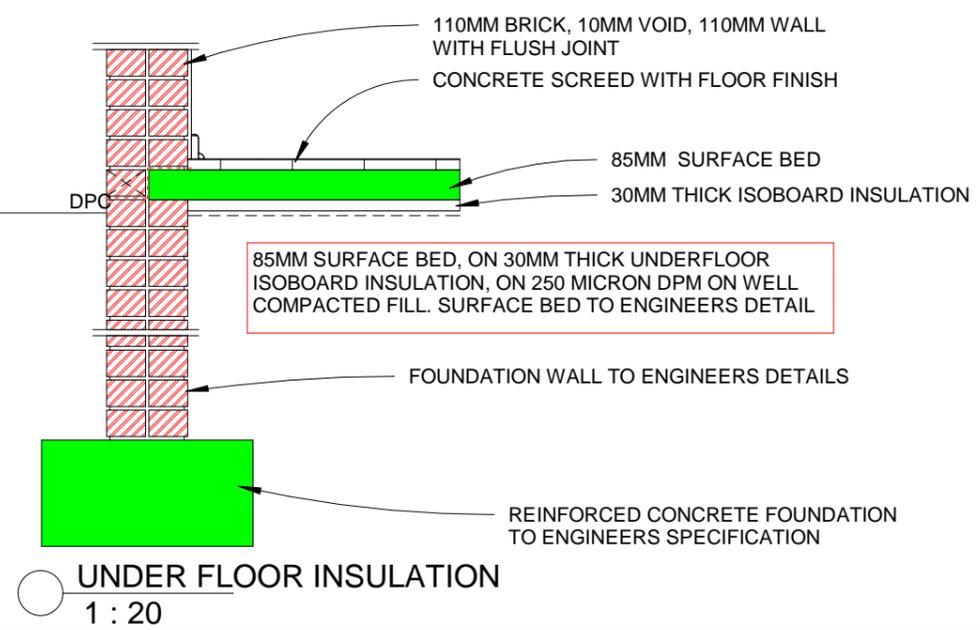
| Glazing Elements |                |              |               | Glazing Element        |         | Sector | Shading     |                |            |            | Solar Exposure | Energy Constants |                |                | Multipliers    |                        |                        |
|------------------|----------------|--------------|---------------|------------------------|---------|--------|-------------|----------------|------------|------------|----------------|------------------|----------------|----------------|----------------|------------------------|------------------------|
| Storey Level     | Identifier No: | No. of Units | Size w x h    | Area (m <sup>2</sup> ) | U-value | SHGC   | Orientation | Projection (P) | Height (H) | Height (G) | P/H            | Factor (E)       | C <sub>A</sub> | C <sub>B</sub> | C <sub>C</sub> | Heating S <sub>H</sub> | Cooling S <sub>C</sub> |
| 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    | w07            | 6            | 0,889 x 0,457 | 2,44                   | 7,90    | 0,81   | North       | 0,900          | 0,967      | 0,510      | 0,465          | 0,360            |                |                |                | 0,990                  | 0,910                  |
| Ground Storey    | w06            | 12           | 0.9 x 0.875   | 9,45                   | 7,90    | 0,81   | South       | 3,090          | 1,385      | 0,510      | 1,116          | 0,230            |                |                |                | 0,860                  | 0,790                  |
| Ground Storey    | w07            | 6            | 0,889 x 0,457 | 2,44                   | 7,90    | 0,81   | South       | 3,090          | 0,967      | 0,510      | 1,598          | 0,190            |                |                |                | 0,815                  | 0,730                  |



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



#### 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                       | 0,59 | 5,6                                | 0,65 |
| Single Low E         | 5,73                      | 0,66 | 4,06                               | 0,63 |
| Clear Double (3/6/3) | 4,23                      | 0,72 | 3                                  | 0,68 |
| Tinted Double        | 4,23                      | 0,59 | 3                                  | 0,56 |
| Clear Double Low E   | 3,4                       | 0,66 | 2,41                               | 0,62 |
| Tinted Double Low E  | 3,4                       | 0,54 | 2,41                               | 0,51 |

(\* Thermal Break Framing)

| No. | Description            | Date           |
|-----|------------------------|----------------|
| 01  | ISSUED FOR INFORMATION | 26 / 10 / 2021 |

Owner/Client: \_\_\_\_\_

Owner/Client Signature: \_\_\_\_\_

Eng. Signature: \_\_\_\_\_

Arch. Signature: \_\_\_\_\_

Arch. Council no.: 7812



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Project Title:  
**Trompsburg Special Needs School Establishment of New Special Needs School in Trompsburg, Free State**

|                            |                |
|----------------------------|----------------|
| date : 26/10/2021 15:31:14 | scale : 1 : 20 |
| drawn : Author             |                |

Drawing Description:  
**BEAUTY NAILS FOOD PRODUCTION XA**  
 Sheet size: A3

ISSUED FOR INFORMATION:  ISSUED FOR CONSTRUCTION:  DATE ISSUE: Issue Date

|                 |                             |            |
|-----------------|-----------------------------|------------|
| Job No.<br>2020 | Drawing No.<br>TSNS_BNFP_XA | Rev.<br>01 |
|-----------------|-----------------------------|------------|