

**Energy Efficiency in Buildings  
SANS 10400-XA & SANS 204**

**SANS Competant Person**

Kobus Burger

**SACAP Reg. No.**

D0215

---

---

**Project Details**

**Type of Project**

**Street Address**

**Erf Description As Per SG  
Diagram/ Title deed**

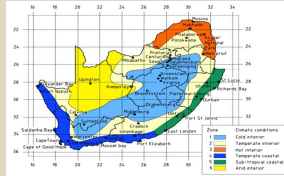
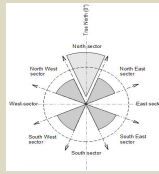
**Client's Initial and Surname**

**Client's Contact number**

**NOTE:** This document should only to be used as a guideline and not as a reference document.  
SANS 10400XA and SANS 204 requirements, always takes preference.

**OCCUPANCY: Zone & Orientation of Building**

Class of Occupancy **H4**  
 Design Occupancy Time **24** Hrs per Day  
   **7** Days per Week  
 Climatic Zone **Pretoria**  
   **2**  
 Building Orientation **North** Windows Orientation  
**Optimized Orientation Achieved**



1	2	3	4
Class of Occupancy of Building	Occupancy	Design Occupancy Times hrs per day / days per week	Design Population
A1	Entertainment and public assembly. Occupancy where persons gather to eat, drink, dance or participate in other recreation.	18 / 7	Number of fixed seats or 1 person per m <sup>2</sup> if there are no fixed seats
A2	Theatrical and indoor sport. Occupancy where persons gather for the viewing of theatrical, operatic, orchestral, choral, cinematographical or sport performances.	18 / 7	Number of fixed seats or 1 person per m <sup>2</sup> if there are no fixed seats
A3	Places of instruction. Occupancy where school children, students or other persons assemble for the purpose of tuition or learning.	12 / 5	1 person per 5m <sup>2</sup>
A4	Worship. Occupancy where persons assemble for the purpose of worshipping.	6 / 4	Number of fixed seats or 1 person per m <sup>2</sup> if there are no fixed seats
A5	Outdoor sport. Occupancy where persons view outdoor sport events.	N/A	Number of fixed seats or 1 person per m <sup>2</sup> if there are no fixed seats
B1	High risk commercial service. Occupancy where a non-industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.	5-Dec	1 person per 15m <sup>2</sup>
B2	Moderate risk commercial service. Occupancy where a non-industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions.	12 / 5	1 person per 15m <sup>2</sup>
B3	Low risk commercial service. Occupancy where a non-industrial process is carried out and where neither the material handled nor the process carried out falls into the high or moderate risk category.	12 / 5	1 person per 15m <sup>2</sup>
C1	Exhibition hall. Occupancy where goods are displayed primarily for viewing by the public.	15 / 7	1 person per 10m <sup>2</sup>
C2	Museum. Occupancy comprising a museum, art gallery or library.	12 / 7	1 person per 20m <sup>2</sup>
D1	High risk industrial. Occupancy where an industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.	12 / 5	1 person per 15m <sup>2</sup>
D2	Moderate risk industrial. Occupancy where an industrial process is carried out and where either the material handled or the process carried out is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions.	12 / 5	1 person per 15m <sup>2</sup>
D3	Low risk industrial. Occupancy comprising usually unattended mechanical or electrical services necessary for the running of a building.	12 / 5	1 person per 15m <sup>2</sup>
D4	Plant room. Occupancy comprising usually unattended mechanical or electrical services necessary for the running of a building.	12 / 5	0
E1	Place of detention. Occupancy where people are detained for punitive or corrective reasons or because of their mental condition.	24 / 7	2 persons per bedroom
E2	Hospital. Occupancy where people are cared for or treated because of physical or mental disabilities and where they are generally bed-ridden.	24 / 7	1 person per 10m <sup>2</sup>
E3	Other institutional (residential). Occupancy where groups of people who either are not fully fit, or who are restricted in their movements or their ability to make decisions, reside and are cared for.	24 / 7	2 persons per bedroom
E4	Health care. Occupancy which is a common place of long term or transient living for a number of unrelated persons consisting of a single unit on its own site who, due to varying degrees of incapacity,	24 / 7	16 persons provided that the total number of persons per room is not more than 4
F1	Large shop. Occupancy where merchandise is displayed and offered for sale to the public and the floor area exceeds 250 m <sup>2</sup> .	12 / 7	1 person per 10m <sup>2</sup> for floor area <= 500m <sup>2</sup> and 20% of 1 person per 10m <sup>2</sup> for floor area > 500m <sup>2</sup>
F2	Small shop. Occupancy where merchandise is displayed and offered for sale to the public and the floor area does not exceed 250 m <sup>2</sup> .	12 / 7	1 person per 10m <sup>2</sup>
F3	Wholesaler's store. Occupancy where goods are displayed and stored and where only a limited selected group of persons is present at any one time.	12 / 7	1 person per 20m <sup>2</sup>
G1	Offices. Occupancy comprising offices, banks, consulting rooms and other similar usage.	12 / 5	1 person per 15m <sup>2</sup>
H1	Hotel. Occupancy where persons rent furnished rooms, not being dwelling units.	24 / 7	2 persons per bedroom
H2	Dormitory. Occupancy where groups of people are accommodated in one room.	12 / 7	1 person per 5m <sup>2</sup>
H3	Domestic residence. Occupancy consisting of two or more dwelling units on a single site.	24 / 7	2 persons per bedroom
H4	Dwelling house. Occupancy consisting of a dwelling unit on its own site, including a garage and other domestic outbuilding, if any.	24 / 7	2 persons per bedroom
H5	Hospitality. Occupancy where unrelated persons rent furnished rooms on a transient basis within a dwelling house or domestic residence with sleeping accommodation for not more than 16 persons within a dwelling unit.	24 / 7	16 persons per dwelling unit provided that the total number of persons per room is not more than 4
J1	High risk storage. Occupancy where material is stored and where the stored material is liable, in the event of fire, to cause combustion with extreme rapidity or give rise to poisonous fumes, or cause explosions.	12 / 5	1 person per 50m <sup>2</sup>
J2	Moderate risk storage. Occupancy where material is stored and where the stored material is liable, in the event of fire, to cause combustion with moderate rapidity but is not likely to give rise to poisonous fumes, or cause explosions.	12 / 5	1 person per 50m <sup>2</sup>
J3	Low risk storage. Occupancy where the material stored does not fall into the high or moderate risk category.	12 / 5	1 person per 50m <sup>2</sup>



## FLOOR: Design

### Floor Construction

#### Floor Slab on the ground

Is the Concrete slab on the ground	Yes
Is a In-slab heating to be proposed	No

#### Suspended floor Slab

Is Suspended floor a building envelope	No
Is a In-slab heating to be proposed	No

### Floor Insulation Requirements

#### Floor Slab on the ground

Perimeter insulation required	Yes
-------------------------------	-----

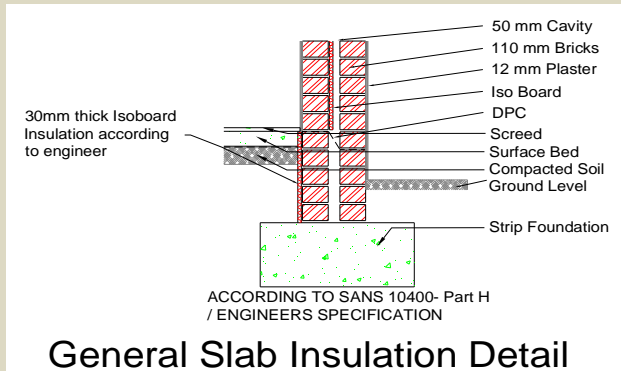
**Min. Insulation required of R-value:1.0 & refer SANS 10400-XA (4.4.2) / SANS 204 (4.3.2)**

Under-floor insulation required	No
---------------------------------	----

#### Suspended floor Slab

Insulation of partial or unenclosed exterior perimeter required	No
---	----

Perimeter & under-floor insulation required	No
---	----



## WALL: Design

### Wall Construction: External

#### SANS 10400-XA Required R-value

Wall Type

Masonry

Minimum R-value required:

0.35

Refer SANS 10400-XA (4.4.3) & SANS 204.

#### **Compliant masonry walling**

Double-skin masonry wall, no cavity, plastered internally or rendered externally.

#### SANS 10400-XA Obtained R-value

Wall Assembly Material	Conductivity	Thickness	Resistivity
Moving Air			
External Plasterwork	0.6000	0.015	0.025
Brickwork	0.7000	0.23	0.329
Internal Plaster work	0.6000	0.015	0.025
-----	N/A	N/A	0.000
-----	N/A	N/A	0.000
Unventilated Air			
<b>Total R-value Achieved</b>			<b>0.379</b>

**Min R-Value Achieved**

#### SANS 204 Required CR-value

Minimum CR-value required  Hours

Advisory Note - *Applicable to masonry walls only in terms of SANS 204*

Double brick wall type

No cavity

CR-value

40

CR-value of wall insufficient.

## ROOF: Design

### Roofs Assembly

<u>SANS 10400-XA</u>		<u>Min. Required R-value</u>	
Minimum Total R-value required:	<b>3.20</b>		m <sup>2</sup> .K/W
Direction of heat flow:	<b>Up</b>		

<u>SANS 10400-XA</u>		<u>Obtained R-value</u>	
Roof Covering Material	Clay tile type		
Roof covering material R-value	0.35		m <sup>2</sup> .K/W
Ceiling R-value	0.05		m <sup>2</sup> .K/W
<b>Total obtained R-value</b>	<b>0.40</b>		m <sup>2</sup> .K/W

**Min R-Value NOT Achieved, Refer to SANS**

### SANS 204

<u>Obtained R-value</u>	
<b>Construction Type R-value</b>	
Is Roof vented	Unventilated
Type roof construction	Metal cladding @ 22-45° pitch w/ cathedral/open beam ceiling

<u>R-value for Roof</u>		
Heat flow Direction	<b>UP</b>	
Moving Air (7m/s)	0.03	
Metal cladding	0.00	
Roof air space(30 mm to 100 mm, non-reflective)	0.16	
Plasterboard, gypsum	0.06	
Unventilating Air	0.11	
<b>Total Obtained R-value</b>	<b>0.36</b>	m <sup>2</sup> .K/W

**Min R-Value NOT Achieved: Thermal Insulation Require**

### Thermal Insulation

<u>SANS 204</u>		
Insulation product to be installed	Cellulose fibre loose-fill	See SANS 204 (4.3.6.2)
Density of insulation to be installed	27.50	kg/m <sup>3</sup>
Min. Thickness of insulation to be installed	115	mm
Insulation required with minimum R-Value:	2.84	m <sup>2</sup> .K/W

### RECOMMODATION

It is recommended that a Cellulose fibre loose-fill with a thickness of 115 mm needs to be installed in order to achieve the min. additional R-value of 2.84 m2K/W

