

# THE NATIONAL BUILDING REGULATIONS PART XA: ENERGY EFFICIENCY.



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**Presentation by Peter Henshall-Howard:**  
**HEAD: BUILDING DEVELOPMENT MANAGEMENT.**

# PART XA: ENERGY EFFICIENCY.



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## A Diagrammatic representation of the relationship between the Act, the Regulations and SANS 10400:

**The National Building Regulations and Building Standards Act, No 103 of 1977:**  
Empowers the Minister to make Regulations which become known as the National Building Regulations.

**The National Building Regulations:**  
Regulations made in terms of the Act

**The Regulations can be complied with**

Either by:

Adhering to the deemed-to-satisfy requirements contained in **SANS 10400: The Application of the National Building Regulations:**

Or by:

Preparing and submitting a Rational Design

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## ENVIRONMENTAL SUSTAINABILITY

## NATIONAL BUILDING REGULATION: XA

### **XA: Energy usage in buildings:**

**XA1:** Buildings shall be designed and constructed so that they are capable of using energy efficiently while fulfilling:

- (a) user needs in relation to vertical transport, if any, thermal comfort, lighting and hot water; or
- (b) have a building envelope and services which facilitate the efficient use of energy appropriate to their function and use, internal environment and geographical location.

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### **XA: Energy usage in buildings (cont)**

**XA2:** Hot water heating requirement: at least 50% of the annual average hot water heating requirement shall be provided by means other than electrical resistance heating including but not limited to solar heating, heat pumps, heat recovery from other systems or processes and renewable combustible fuel.

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### Complying with Regulation XA:

- A competent person must demonstrate that the building has a theoretical annual energy consumption and demand less than or equal to specified values, or
- The orientation of the building is in accordance with SANS 204;
- The fenestration is in accordance with the requirements of Regulation XA or SANS 204;
- The roof assembly is in accordance with Regulation XA or SANS 204

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### Orientation:

According to SANS 204 the building should be compact in Plan with rooms that are used most and the major areas of glazing placed on the northern side of the building to allow solar heat to penetrate the glazing during the winter months. The major axis of the building should run east/west and the roof overhang should provide shading to the windows from the midday summer sun.

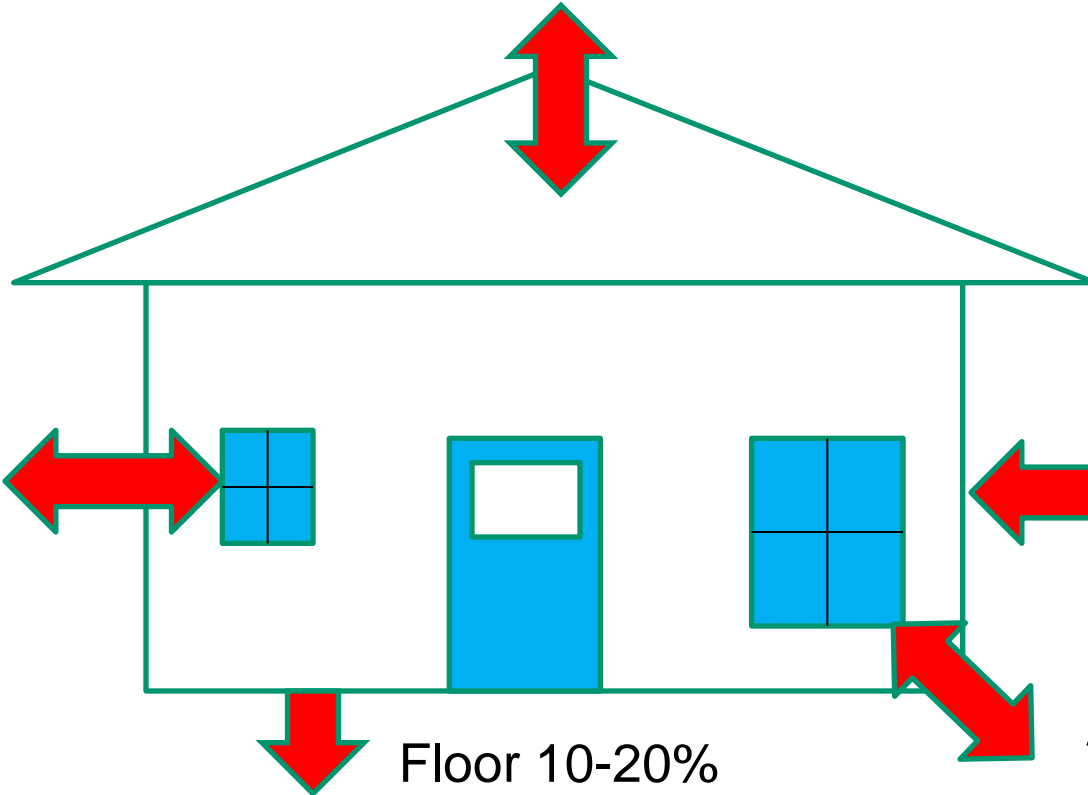
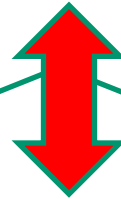
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Ceiling 25-35%



Windows  
25-35%

Walls  
15-25%

Floor 10-20%

Air Leakage  
5-15%

THIS SKETCH SHOWS TYPICAL  
HEAT GAINS AND HEAT LOSSES

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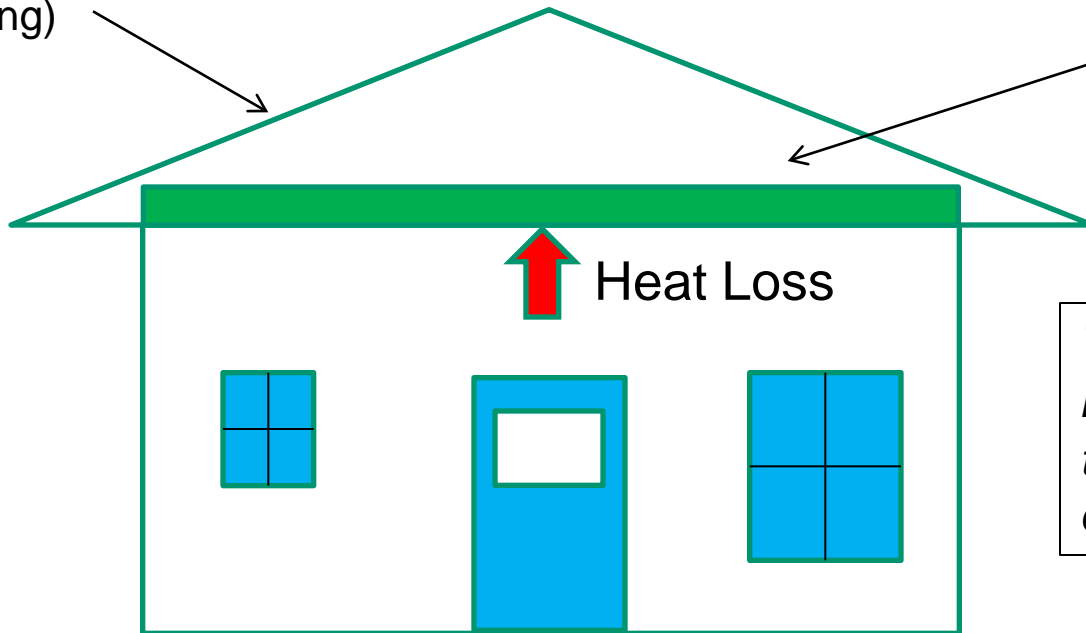


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Required R Value: 3.7

Typical R Value 0.35-0.40  
(Roof and Ceiling)



Insulation with an R Value of at least 3.3 required.

*The R value is a measure of the thermal resistance of a material*

Roof Insulation Requirements



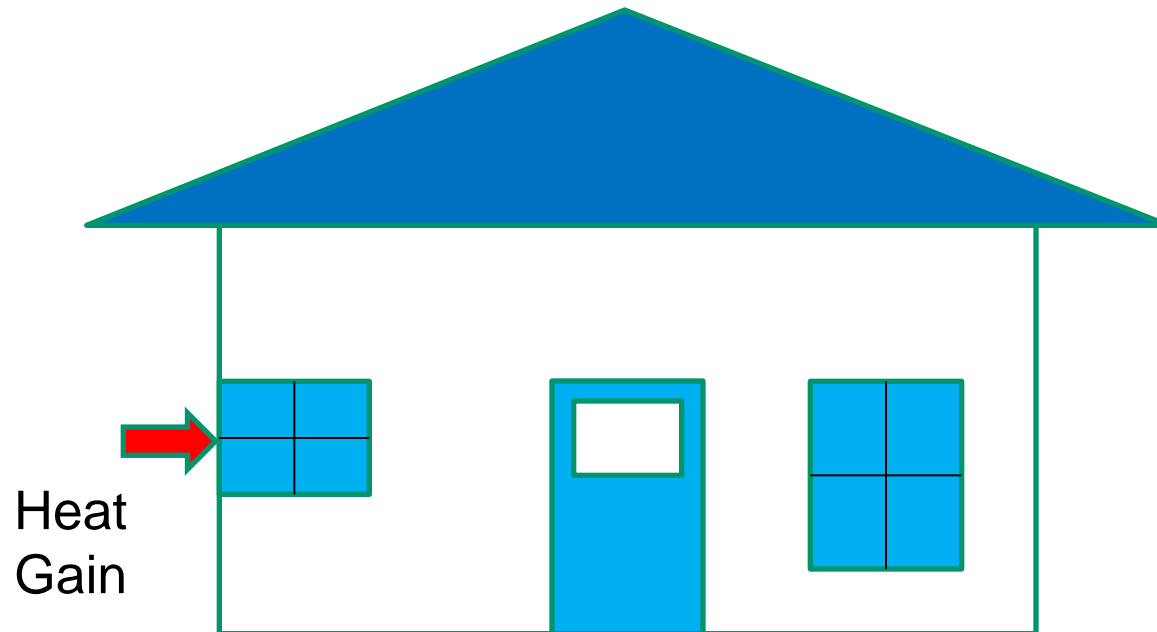
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## FENESTRATION



Fenestration:

If glazing area is  $< 15\%$  net floor area: OK  
(Deemed-to-satisfy) (Note 10% minimum for light)  
If not: check Conductance and Solar Heat Gain

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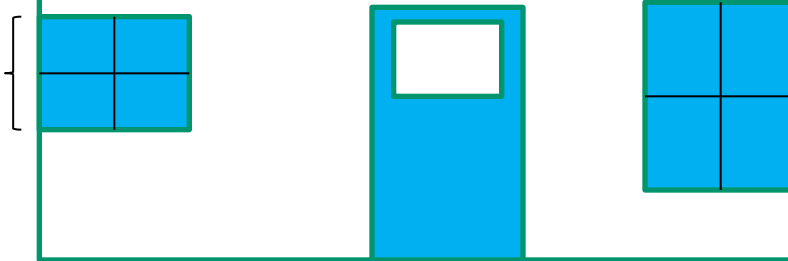
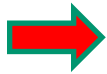


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## FENESTRATION: CONDUCTANCE

Conductance  
through glazing  
and frame



*Conductance* is a measure of the heat that can pass through a material within a given time. *Conductance* must not exceed the net floor area multiplied by a *conductance constant* and = glazing area x *U* value of the window.

*U-value* is a measure of the heat transmission through a material.

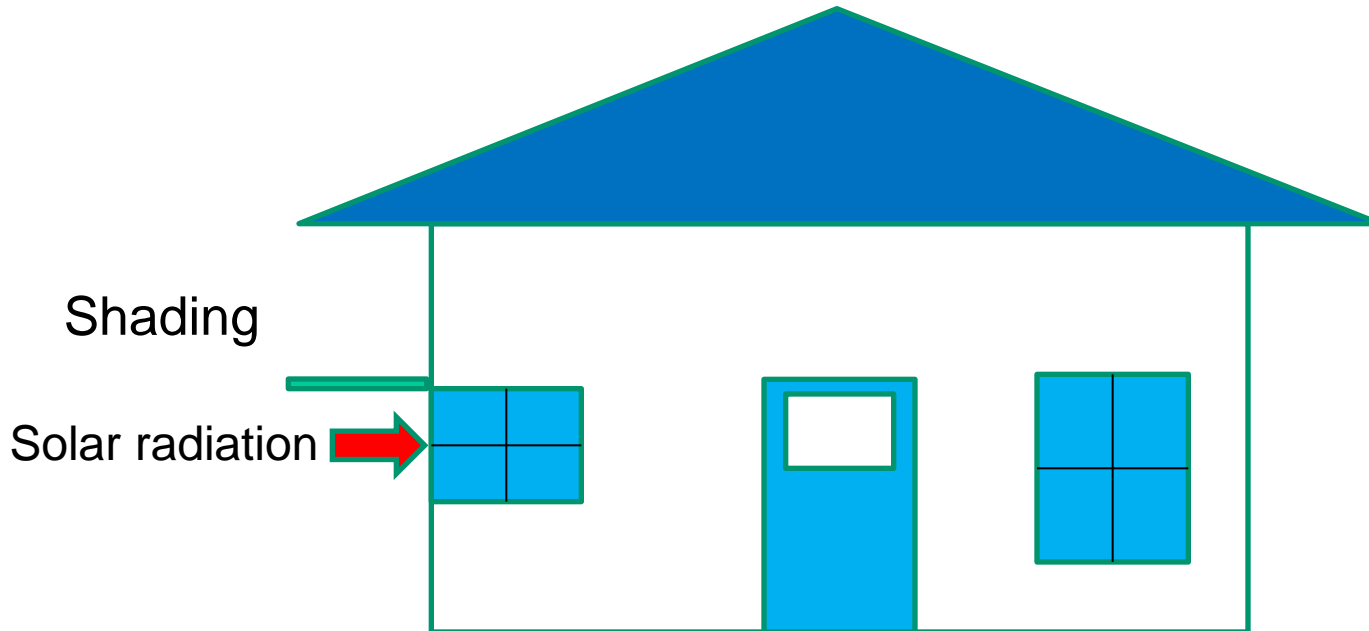
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## FENESTRATION: SOLAR HEAT GAIN



*Solar heat gain* is a measure of the solar radiation passing through the window resulting in an increase in the temperature of the room.  
*Solar Heat gain* must not exceed the net floor area multiplied by a *Solar Heat Gain Coefficient* and = glazing area x solar heat coefficients and solar exposure factors

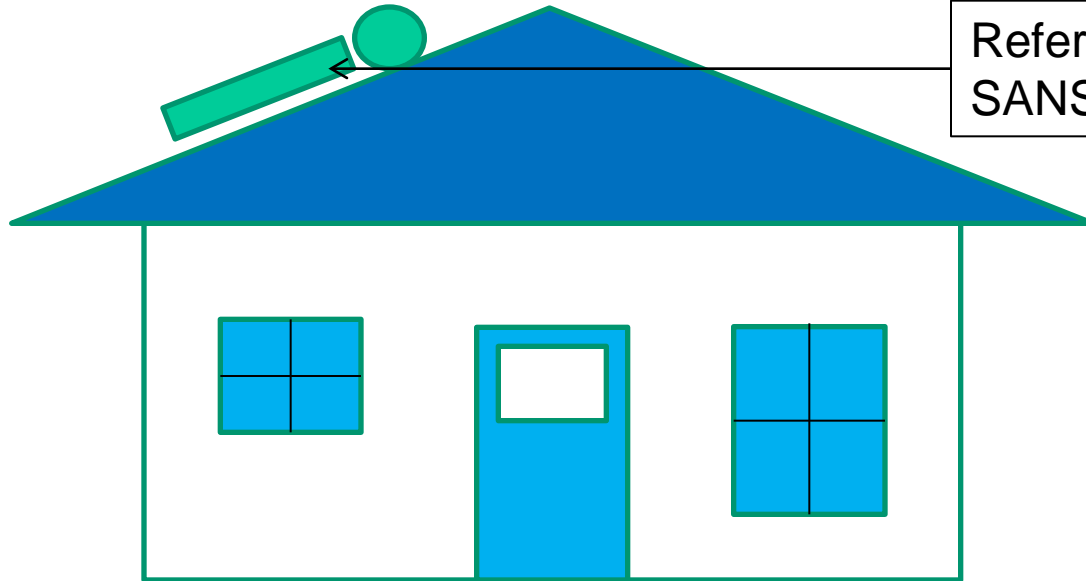
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## HOT WATER REQUIREMENTS.



Reference document:  
SANS 1307

Hot Water: 50% of the hot water requirements must be heated by means other than electrical resistance, Typical alternate means are solar water heaters and heat pumps amongst others.

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## NATIONAL BUILDING REGULATIONS: PART XA

### **XA: Energy usage in buildings:**

#### **Summary:**

- The regulations apply to all buildings except industrial buildings, storage facilities and parking garages;
- The orientation of the building is in accordance with SANS 204
- All roofs will require insulation of some form or another;
- The conductance and solar heat gain of each storey in a building must be checked;
- 50% the annual hot water requirement must be heated by means other than electrical resistance.



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Thank you.