

PRESS RELEASE

Insulation: what you need to know

Insulation will help maintain the desired temperature in a building all year round, protecting it against cold in winter and excess heat in summer. We speak to Elouise Steyn, in-house architect for leading supplier to the built environment, and distributor of Knauf mineral wool insulation, Swartland, about the local regulations governing insulation, and what you ought to consider when choosing an insulation material.

24 June 2019, Johannesburg: For many years, energy efficiency in buildings was a matter of personal preference. However, this all changed in 2011 when the SANS 10400-XA: Energy Usage in Buildings, and the SANS 204: Energy Efficiency in buildings were passed. Both these sets of National Building Regulations focus on the energy usage of a building once it has been built – with the hope that it will help lessen the burden on the national electricity grid, as well as providing a greener and more sustainable means of building.

Breaking the regulations down

Says Elouise Steyn, in-house architect for Swartland, leading supplier to the built environment and distributor of Knauf mineral wool insulation: “There are two ways to comply with the building regulations surrounding energy usage in buildings. The most common is to comply with the requirements of the ‘deemed-to-satisfy’ rules documented in SANS 10400: XA and SANS 204, and the other is by way of rational design using Argément-approved software. Characteristic issues affecting energy efficiency in buildings include its orientation, shading, fenestration, and roof/ceiling construction, and the insulation.”

The different climatic zones

In terms of the SANS 10400-XA regulation, South Africa has been divided into six climatic zones, based on their humidity and temperature variations. Elouise notes that this provides the perfect reference when choosing insulation, as it outlines a range of satisfactory insulation thickness for each climatic zone. She adds that it is important to remember that the total R-values are based on the sum of all components of the roofing system, including indoor and outdoor airflows, as well as the building materials used and airspaces. The six different zones are as follows:

- **Zone 1:** Cold interior (Johannesburg, Bloemfontein)
 - **Minimum required total R-value:** 3,7
 - **Dominant direction of heat flow:** Upwards

- **Zone 2:** Temperate interior (Pretoria, Polokwane)
 - **Minimum required total R-value:** 3,2
 - **Dominant direction of heat flow:** Upwards

- **Zone 3:** Hot interior (Louis Trichard, Nelspruit)
 - **Minimum required total R:** 2,7
 - **Dominant direction of heat flow:** Down and upwards
- **Zone 4:** Temperate coastal (Cape Town, Port Elizabeth)
 - **Minimum required total R-value:** 3,7
 - **Dominant direction of heat flow:** Upwards
- **Zone 5:** Sub-tropical coastal (East London, Durban, Richards Bay)
 - **Minimum required total R-value:** 2,7
 - **Dominant direction of heat flow:** Downwards
- **Zone 6:** Arid interior (Upington, Kimberley)
 - **Minimum required total R-value:** 3,5
 - **Dominant direction of heat flow:** Upwards

Working out insulation thickness

Elouise notes that it is relatively simple to work out the thickness of the insulation required, and provides the following example of how to go about it:

EXAMPLE 1 – Zone 1: No reflective foil and metal roof sheeting:

- The total R-Value required in Zone 1 is 3,7
- The average R-Value of a normal roof structure is 0,35 for a metal roof sheeting assembly and 0,40 for a roof tile assembly (NOTE: this figure varies depending on the design)
- Find table 1 showing Knauf Ceiling Roll insulation Values below:

PRODUCT DESCRIPTION	R-value (m ² K/W)
50mm KNAUF Multi-pack (un-cut) ceiling roll	1.05
50mm KNAUF Combi-cut ceiling roll	1.25
100mm KNAUF Multi-pack (un-cut) ceiling roll	2.1
100mm KNAUF Combi-cut ceiling roll	2.25
135mm KNAUF Combi-cut ceiling roll	3.38

- First you need to determine the R-Value of added insulation required:
 - Total R-Value Required for Zone1: 3,7
 - Less R-Value of roof assembly: 0,35
 - Equals total R-Value of added insulation required: 3,35
- Suppliers will give you the R-Value of the different thicknesses available, and you then select a thickness with the R-value of >3,35 – therefore, you would select the 135mm Knauf Combi-Cut Ceiling Roll with an R-Value of 3,38.

EXAMPLE 2 – Zone 5: With reflective foil and clay tile roof sheeting:

- The total R-Value required in Zone 5 is 2,7
- If the roof has reflective foil, the average R-Value of normal reflective foil for **downwards** dominant direction of heat flow is 1,3(NOTE: this varies depending on type of foil and dominant direction of heat flow)
- You need to determine the R-Value of added insulation required:
 - Total R-Value Required for Zone1: 2,7
 - Less R-Value of roof assembly: 0,4
 - Less R-Value of reflective foil: 1,3
 - Equals total R-Value of added insulation required: 1,0
- Choose a thickness with the R-value of >1,0 – therefore the 3850mm KNAUF Multi-pack (uncut) ceiling roll, with an R-Value of 1,05, will be sufficient.

Elouise notes that it is very important to understand that when you specify insulation, you always need to specify the R-value required, and not just the thickness of the insulation, as different products do not all have the same R-values for the same thicknesses.

When compared to other competitors on the market, Elouise explains that Knauf insulation offers best-in-market R-values and fire ratings: “Knauf insulation is top in its class when it comes to R-values, and it has a Euro Class A1 fire rating, as well as SANS10177 Part 5 fire-rated certification – making it a really high-end quality product. It is classified and non-combustible with no flame-spread.”

Other features to look out for when selecting insulation

Not all insulation is created equal – some brands offer a multitude of eco-friendly and convenient features over and above their insulative qualities. Elouise says that Knauf mineral wool insulation for example delivers a superior level of sustainability and practical benefits, including:

Bonded using a bio-based technology: ECOSE Technology is a revolutionary, new, formaldehyde-free binder technology, based on rapidly renewable materials instead of petro-based chemicals. It is free from formaldehyde, phenols, acrylics, and no artificial colours, bleach or dyes are added. No formaldehyde means no itch and no smell, making it more pleasant to handle for the installer.

Ease of installation: Factory applied perforation cuts make it easy and quick to create two precise and equally sized 600mm wide rolls or 800mm + 400mm wide rolls, depending on the spacing of your rafters. This means no measuring and cutting of insulation rolls in the roof space is required and saves a great amount of time.

Improves indoor air quality compared to our traditional mineral wool: Glass mineral wool with ECOSE Technology products meet the Europe and

America's most stringent standards and guidelines related to Indoor Air Quality (EUROFINS Indoor Air Comfort GOLD - Der Blaue Engel, Germany – M1/RTS, Finland, Greenguard for Children and School™ / USA).

More square meters per roll: Knauf Insulation rolls are compressed and therefore, depending on thickness of material, rolls have 2-3 times more m² per roll. This means stockist can keep 2-3 times less rolls in stock and have better space utilisation of warehouses. This also means 2-3 times less on transport, less fuel and less time.

Reduces impact on environment through lower embodied energy: Binder embodied energy is reduced by up to 70% compared to traditional binder, which contributes to further lower the expected GWP (Global Warming Potential).

Cost competitive: Knauf Insulation with ECOSE Technology is cost competitive with other insulation brands on the market to facilitate the market transformation to more sustainable construction.

Elouise concludes: "One of the best ways to reduce carbon dioxide emissions is to use the energy we currently have more efficiently. And one of the most cost-effective ways to do that is through better insulating our homes and buildings. Knauf mineral wool insulation sees the importance of making a more sustainable, climate-friendly product. I look forward to seeing what impact Knauf Insulation mineral wool and ECOSE Technology will have on reducing our climate change impact."

ENDS

Released on behalf of Swartland (www.swartland.co.za) by The Line (www.theline.co.za).