



June 2009

Knauf Insulation with **ECOSE® Technology**

The new generation of mineral wool



Introducing the new generation of mineral wool



Knauf Insulation mineral wool with ECOSE® Technology offers superior handling...

Our mineral wool with ECOSE Technology doesn't look or feel like any insulation you have ever experienced.

- Softer feel
- Less dusty
- Odourless
- Easy to cut

Knauf Insulation mineral wool with ECOSE Technology is naturally brown: there are no artificial colours or dyes added.



...superior level of sustainability...

The natural brown colour represents a level of sustainability never achieved before:

- Manufactured from naturally occurring and/or recycled raw materials, and bonded using a bio-based technology free from formaldehyde, phenols, acrylics and with no artificial colours, bleach or dyes added
- Contributes to improved indoor air quality compared to conventional mineral wool
- Reduces impact on environment through lower embodied energy
- Reduces pollutant manufacturing emissions and workplace exposures
- Improves the overall sustainability of buildings in which they are incorporated
- Cost competitive with our traditional mineral wool

...and delivers all the benefits you are used to from our traditional mineral wool!

Thermal insulation properties, fire resistance, fire classification, acoustical insulation, sound absorption and mechanical properties as well as the high levels of recycled content are maintained, with improved product durability.



warmth



quietness



fire protection



energy saving



sustainability



with **ECOSE**[®]
TECHNOLOGY



ECOSE Technology is a revolutionary, new, formaldehyde-free binder technology, based on rapidly renewable materials instead of petro-based chemicals. It reduces embodied energy and delivers superior environmental sustainability.

ECOSE Technology was developed for glass and rock mineral wool insulation, but offers the same potential benefits to other products where resin-substitution would be an advantage, such as in wood based panels, abrasives and friction materials.

www.ecose-technology.com

Superior handling



A new generation of mineral wool that feels good... naturally

Knauf Insulation conducted installer trials throughout Europe featuring over 500 individual installers.

These were organised using both internal and external coordinators, including Gruppe Nymphenburg Consult AG and were conducted during the first half 2009.

Softer feel

More than 90% of professional installers stated that glass mineral wool with ECOSE Technology has a softer feel and is less itchy compared to conventional mineral wool.

“This is great stuff! It doesn't make my skin itch; I can't believe that this is glass mineral wool.”

Less dusty

Mineral wool with ECOSE Technology shows significantly less dust formation in use than traditional mineral wool.

“One of the advantages of working with this new mineral wool is that it generated significantly less dust.”



Odourless

ECOSE Technology has made the new generation of mineral wool odourless. More than 80 % of installers state that they prefer the neutral smell of mineral wool with ECOSE Technology over the smell of traditional glass wool.

“ You really cannot smell it. It’s definitely an improvement over the smell of traditional glass wool and makes the product more pleasant to work with. ”

Easy to cut

A majority of installers also indicate an ease in cutting mineral wool with ECOSE Technology.

“ I prefer this product because, quite simply, it’s easy to work with. ”



Superior level of sustainability

A more sustainable solution, Mother Nature approved

Mineral wool with ECOSE Technology delivers superior environmental sustainability using patented ECOSE Technology. Mineral wool insulation is already considered the best performing insulation in terms of its environmental impact; the development of mineral wool made with ECOSE Technology extends the leading position of mineral wool as the most important insulation product of the future.

Mineral wool with ECOSE Technology delivers a superior level of sustainability...



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.

Improves indoor air quality compared to traditional mineral wool

Glass mineral wool with ECOSE Technology products meet the industry's most stringent standards and guidelines related to Indoor Air Quality (M1/RTS, Finland, GREENGUARD for Children and School™/USA, AFSSET/France).



Improves sustainability of buildings

Sustainable building has become a growing part of today's construction industry. The superior environmental characteristics of mineral wool with ECOSE Technology contribute to improving the overall sustainability of buildings in which they are incorporated.



Reduces workplace exposures and pollutant manufacturing emissions

By eliminating phenol and formaldehyde from our manufacturing process, the resulting workplace exposure and pollutant manufacturing emissions are removed.

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) by approximately 4% and embodied energy of the glass mineral wool.

Cost competitive

Knauf Insulation with ECOSE Technology is cost competitive with our traditional mineral wool to facilitate the market transformation to more sustainable construction.

...in addition to the environmental benefits of conventional mineral wool.

All Knauf Insulation products are inherently sustainable because of high recycled and renewable content. They save hundreds of times more energy in use than required to manufacture them.

Renewable and abundant resources

Sand and rock are natural and one of the world's most abundant and renewable resources.

High level of recycled content

Glass mineral wool from Knauf Insulation is made using up to 60% recycled content glass and is 100% recyclable.

Optimized packaging

Glass mineral wool products are compressed in package up to a ratio of 9 to 1. This optimized packaging allows for reduction of packaging material usage, space saving in storage, reduced energy consumption in transport thus providing a significant overall cost saving and environmental benefit.



Delivers all the benefits you are used to

Proven product performance combined with improved durability



Mineral wool with ECOSE Technology maintains the already very high performance of mineral wool and meets all performance criteria of our conventional products.

ECOSE Technology was developed during five years of research and development. Extensive testing in internal and external labs on product performance and quality control has been carried out.

Product performance of mineral wool with ECOSE Technology	In accordance with EN 13162:2008 and
For all applications	
Thermal resistance and thermal conductivity	EN 12667, EN 12939
Length and width	EN 822
Thickness	EN 823
Squareness	EN 824
Flatness	EN 825
Dimensional stability	EN 1604
Tensile strength parallel to faces	EN 1608
Reaction to fire	EN 13501-1
Durability characteristics	
For specific applications	
Dimensional stability under specified conditions	EN 1604
Compressive stress or compressive strength	EN 826
Tensile strength perpendicular to faces	EN 1607
Point load	EN 12430
Compressive creep	EN 1606
Water absorption	EN 1609, EN 12087
Water vapour transmission	EN 12086
Dynamic stiffness	EN 29052-1
Compressibility	EN 12431, EN 1606
Sound absorption	EN ISO 354, EN ISO 11654
Air flow resistivity	EN 29053

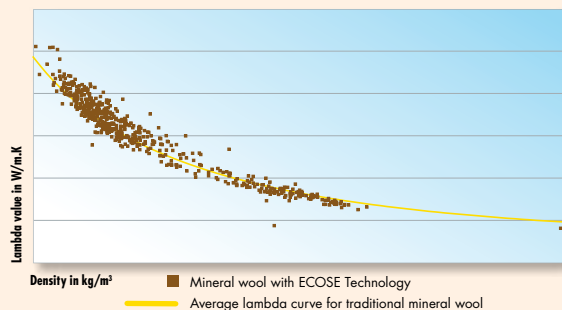
Classification varies according to product characteristics. Detailed information for each single product can be found on product labels, product datasheets, product literature and on the local Knauf Insulation websites.

Additional testing has been carried out, such as:

- Fitness for use properties, such as friction fit (rigidity). Tested according to local standards and/or Knauf Insulation quality control standards.
- Product performance over time, such as mechanical properties and dimensional stability, are also tested according to internal Knauf Insulation quality control standards.
- Insects, vermin & fungal testing: Extensive testing shows mineral wool with ECOSE Technology does not provide a medium for the growth of micro organisms; it does not rot, decay or sustain mould.

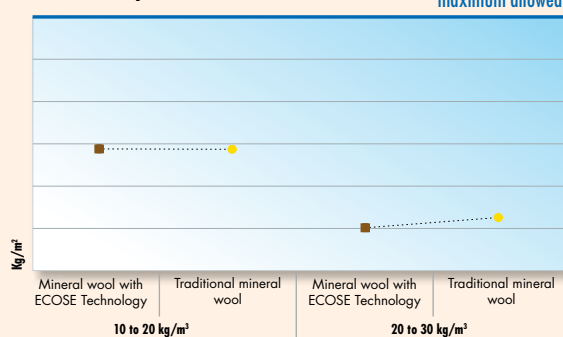
Proven performance

Thermal conductivity (EN 12667, EN 12939)



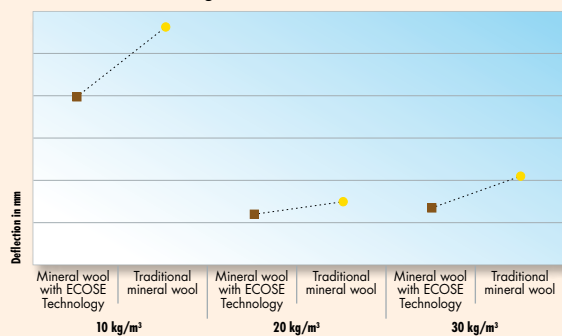
Thermal conductivity properties of mineral wool with ECOSE Technology are equivalent to traditional mineral wool.

Water absorption (EN 1609)



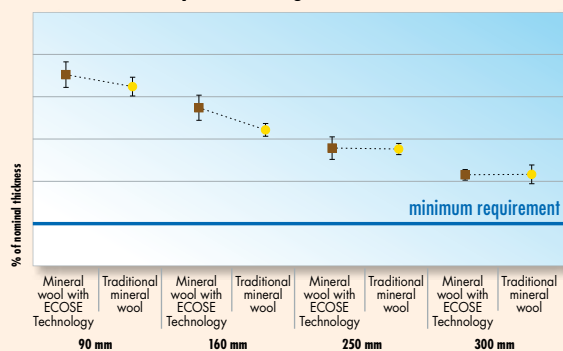
Mineral wool with ECOSE Technology performs equally or better than traditional mineral wool for applications where water repellency is required.

Stiffness after storage (ACERMI method)



The product stiffness of mineral wool slabs with ECOSE Technology is equal or better compared to traditional mineral wool slabs.

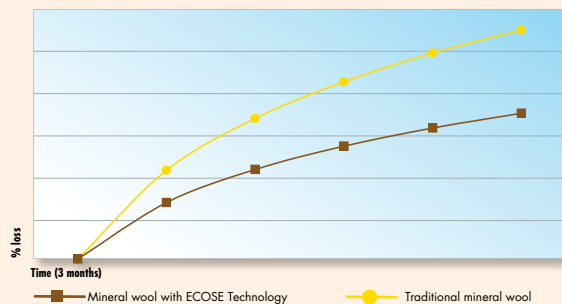
Thickness recovery after storage (EN 823)



The product recovery of glass mineral wool with ECOSE Technology is equal or better compared to traditional glass mineral wool.

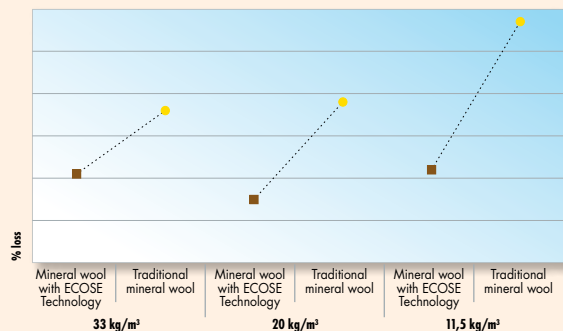
Improved durability

Loss of recovered thickness over time in store



The decay of thickness recovery is slower with mineral wool with ECOSE Technology compared to traditional mineral wool enhancing product storage durability.

Loss of tensile strength after accelerated ageing (Florida test*) (EN 1608)



The loss of tensile strength for glass mineral wool with ECOSE Technology over time is significantly less compared to traditional mineral wool especially for the lighter density products.

* Florida test: 21 cycles of 8 hours duration with relative humidity between 18% and 98% and temperatures of 25°C to 55°C.

Compliance with European and National Norms and Standards

By converting our products to ECOSE Technology, we are introducing a new generation of mineral wool. Our products have superior characteristics compared to traditional mineral wool and at the same time comply with all the required European and National Norms and Standards for mineral wool insulation.

European Norms and Standards

CE marking



Knauf Insulation mineral wool with ECOSE Technology is tested in accordance with all applicable European Norms. All our products comply with the main norm for mineral wool insulation: EN 13162: 2008 "Thermal insulation products for buildings – Factory made mineral wool (MW) products - Specification".

Health and Safety



Knauf Insulation mineral wool with ECOSE Technology also complies with the voluntary EUCB certification and Nota Q of Directive 67/548/EEC as amended 97/69/EC and is therefore free from suspicion of carcinogen effects and any associated hazard classification. Our glass and stone fibres are pre-registered under the REACH regulations (EC 1907:2006). REACH deals with the Registration, Evaluation, Authorisation and Restriction of Chemical substances.

National Norms and Standards

In addition to testing to European Norms and Standards, our products are also tested to comply with the required national certification schemes, as indicated on the product labels, including:



EU



France



Germany



Germany



United Kingdom



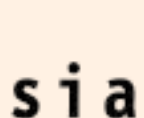
Belgium



Spain



The Netherlands



Switzerland

All our mineral wool manufacturing facilities are producing in accordance to the strict requirements of ISO 9001:2000. Furthermore, most of our plants are certified in accordance to ISO 14001: 2004 and OHSAS 18001:2007 reflecting our strong ambition for continuous improvement with respect to the growing environmental, health and safety aspects.



Material Safety Data Sheets as well as Product Data Sheets are available in local languages via your local Knauf Insulation contact person and on the local Knauf Insulation websites.



“ In my research, I analyze the connections between fossil fuel use and climate change. Emission of carbon dioxide, the most important greenhouse gas, is of particular importance. 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 insulating our homes and buildings properly. ”

“ Knauf 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 have on reducing our climate change impact. ”

Kevin Gurney, Associate Professor,
Purdue University College of Science, USA
IPCC Member Co-recipient of 2007 Nobel Peace Prize



What would you choose?

If you have the choice between conventional mineral wool and our new mineral wool with ECOSE Technology, which delivers the same exceptional quality and guarantees superior handling and durability with an even higher level of sustainability and all this at the same price...

Mineral wool with ECOSE Technology

	Installers and contractors	Architects and consultants	Merchants and distributors	Home owners and building users	Local community
Improved indoor air quality		✓		✓	
Superior handling	✓	✓	✓		
Superior sustainability	✓	✓	✓	✓	✓
Superior durability	✓	✓	✓	✓	
Proven product performance and quality	✓	✓	✓	✓	
Same price	✓	✓	✓	✓	



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About Knauf Insulation

Knauf Insulation is one of the leading and fastest growing manufacturers of insulation materials; our mission is to become the world leader in energy efficient systems for buildings. Our values, Customer Focused, Entrepreneurial, Open and Committed, drive the way we do business.

Building on over 30 years of expertise in energy efficiency, we are focused on providing a comprehensive range of solutions for residential and non-residential buildings and industrial customers. We are committed to providing building materials to improve sustainable construction; with the introduction of our new mineral wool insulation using ECOSE® Technology we are delivering on this commitment.

Knauf Insulation is active in more than 50 countries with 30 manufacturing plants and nearly 5,000 employees across the globe.

The company, which is part of the German family-owned Knauf Group, continues its strong and steady operational and financial growth, having achieved a turnover in excess of € 1 billion in 2008.

