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Technical Bulletin 4
Durability

Durability of ROCKWOOL Stone Wool Insulation

Insulation plays a major role in improving the energy efficiency of buildings and, where non-renewable energy is used, reducing carbon emissions. By lowering active heating and cooling requirements for indoor environments, effective thermal insulation helps lower energy usage and enable building owners to keep costs down.

The longer that insulation products maintain their performance over the course of a building's lifespan, the better. These products represent a long-lasting investment that can deliver energy efficiency benefits for years to come. This bulletin will consider the assessment methods and criteria that determine durability for stone wool insulation, and demonstrate the specific durability of ROCKWOOL stone wool insulation through testing and real-world performance.

Defining durability

In the context of buildings and construction, the durability of insulation products relates to the length of time for which they maintain their as-built performance across key criteria* including:

- Thickness
- Thermal conductivity
- Tensile strength
- Compressive strength
- Point load behaviour
- Reaction-to-fire classification
- Fire resistance
- Acoustic properties
- Water absorption
- Moisture content

*The relevance of each criterion is dependent upon the specific product and its intended application.

Insulation products that maintain their performance across these criteria may be considered as durable and long lasting. In the case of thermal conductivity, this longevity carries energy efficiency benefits decades into a building's lifespan.

Assessing durability

A Life Cycle Assessment (LCA) provides a systematic analysis of the potential environmental impacts of products or services during their life cycle, which is an important factor during design. Increasingly, stakeholders can turn to field research and independent testing to provide similar insights into the performance of products in the long term. These provide routes to verifying longevity, and importantly, access to reliable performance data.

With regards to insulation, long-lasting thermal performance is an important marker of durability. The thermal performance of an insulation product is best assessed by measuring the thermal resistance (R-value) of real-life samples – therefore, samples can be tested before installation and after long periods of service. Should the product continue to show the same performance as before installation, its thermal performance should be deemed as durable. It is important to ensure, however, that these tests are provided by reputable bodies as the quality of data and its reliability can vary.

Eurima Durability Report

For stone wool insulation, independent testing was undertaken by Eurima – the European Mineral Wool Manufacturers' Association. To demonstrate the durability of mineral wool insulation, Eurima initiated a project with FIW, a third-party laboratory, which followed a strict sampling procedure and testing method.

Focusing on insulation installed in walls and roofs, which included ROCKWOOL stone wool materials, the Eurima research[1] examined:

- Existing buildings, unaffected by structural damage, aged 20 to 55 years
- Insulation materials extracted from buildings by an independent third-party laboratory
- Usability of the aged materials, and consequently their durability.

Results were compared with the original aged product specification sheets, valid at the time they were produced, and the report concluded:

"The insulations in the building constructions examined after a useful life of 20 to 55 years are in every case fully functional and showed excellent thermal properties."

Durability evidence for ROCKWOOL stone wool insulation

In 2023, the Danish Technological Institute (DTI)[2] tested ROCKWOOL stone wool insulation materials recovered from a hangar building at Copenhagen Airport (CPH) originally constructed in 1958. 15 full insulation slabs were taken from the façade of the building, five of which were used for testing by the DTI.

The slabs were tested for:

- Thermal conductivity (EN 12667:2001 and EN 13162:2012 + A1:2015)
- Moisture content (carefully wrapped on the building site)
- Length, width, and thickness (dimensions): (EN 822 and EN 823)
- Density
- Compressive strength (EN 826:2013)

Across these tests, ROCKWOOL stone wool insulation has proven to retain its insulating properties for more than 65 years without a drop in performance. The durability of its thermal conductivity, and therefore its ability to provide effective thermal insulation for more than six decades, will be of particular note to designers, specifiers and wider stakeholders seeking long-term energy efficiency.

1. *EURIMA, 2016: Durability Project – Mineral Wool.*
2. *Testing conducted at the Danish Technological Institute, 2023.*

Combining laboratory research with real world design

The long-lasting performance of ROCKWOOL stone wool insulation is well evidenced by the Eurima and DTI studies. It is equally important to consider how this translates into modern building design, and how this performance aligns with current standards. Three significant points of reference that designers may wish to consider include:

Declarations of Performance – Durability Characteristics

The Declaration of Performance is a key part of the Construction Products Regulation. It provides information on the performance of a product. Each construction product covered by a European harmonised standard (hEN) or for which a European Technical Assessment has been issued needs this Declaration and has to be CE marked.

Durability Characteristics as covered by section 4.2.7 of the relevant harmonised product standards (BS EN 13162:2012+A1:2015) state that the thermal resistance, thermal conductivity and reaction to fire performance of products 'do not change with time'.

Whilst there is no requirement to make a declaration of aged performance for these parameters, the Eurima report – and in the case of ROCKWOOL stone wool insulation, the DTI research – provide evidence of specific aged thermal performance.

Service life

For over 80 years, ROCKWOOL has been producing stone wool insulation for the construction industry. The suggested service life of insulation, as detailed in Annex D of BS 7543, is 60 years. However, the Eurima and DTI reports now provide valuable real-world data which suggests that stone wool insulation maintains performance with no degradation, even up to 65 years[3].

Fitness of materials

Section 1: Materials, of Regulation 7, references several ways to establish the fitness of materials, including CE Marking, the Construction Products Regulations, independent certifications, schemes, tests, calculations and past experience. Carried out by an independent EU notified body, the Eurima research provides verified evidence that stone wool insulation performs in the long term – and recently, the DTI report is a valuable addition to this evidence base.

3. Testing conducted at the Danish Technological Institute in 2023 refers to ROCKWOOL insulations slabs taken from an external wall system.

Conclusion

There is now a suitable range of field research and independent test evidence to suggest that, when correctly installed, ROCKWOOL stone wool insulation can retain its insulation properties for more than 65 years in external wall systems. In the case of thermal conductivity and thermal insulation, ROCKWOOL stone wool insulation can contribute to energy efficiency measures for many decades of a building's lifespan.

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