Fact Sheet
Eco-efficiency of Neopor® in an ETICS

BASF has conducted a comprehensive comparison of the three most widely-used ETICS insulating materials to help architects, builders and other interested parties select insulating materials for external thermal insulation composite systems (ETICS). During this scientific comparison, an eco-efficiency analysis was used to examine the impact a Neopor ETICS (Figure 1), a Styropor ETICS and a stone wool ETICS have on the environment and on costs.

The basis of the study conducted in 2012 / 2013 is the manufacture of the ETICS components, installation at the building site and disposal after a service life of 50 years in a 1600 m^2 facade.

The study looked at the best possible insulation combination for external walls where a U-value of 0,15 $W/m^2 \cdot K$ is required. Under the EU Buildings Directive, from the beginning of 2021 all new builds must comply with the standard on low-energy buildings.

An apartment building built in the 50s in the Brunck district of Ludwigshafen in Germany was analyzed as an example (Figure 2). The wall construction of the old building is the same for any potential type of insulation, which meant that only the superstructures and components relating to insulation had to be included in the analysis.

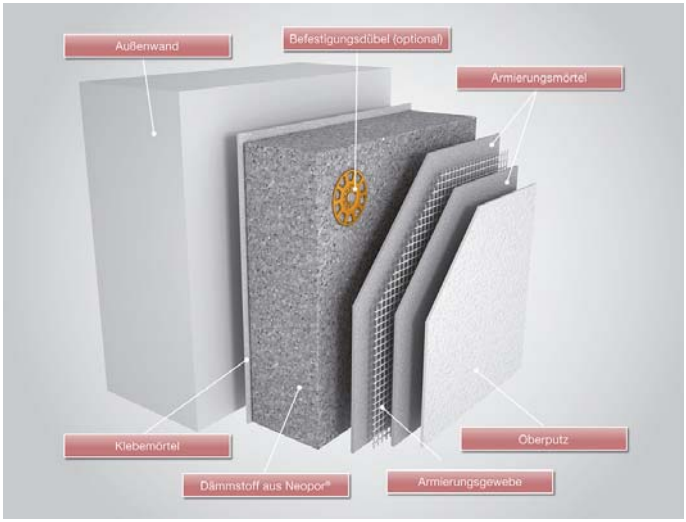

Figure 1: Neopor ETICS give architects considerable freedom in design and help builders save money.

Figure 2: Neopor thermal insulation provided the largest contribution in heating energy savings during modernization of the Brunck district.

U-Value: 0,15 W/m²·K	Neopor 032	Neopor 035	Styropor 035	Stone wool 035	Stone wool 040
Thermal conductivity, λ_D [W/m·K]	~ 0,031	~ 0,033	~ 0,034	~ 0,035	~ 0,040
Thermal conductivity, rated value* [W/m·K]	0,032	0,035	0,035	0,035	0,040
Insulation thickness [mm]	180	200	200	200	230
Density [kg/m³]	15	15	20	110	95
Flame-retardant	Polymeric flame-retardant			None	

* According to German national technical approval

Environmental impact

The eco-efficiency analysis compared the environmental impact of the insulation materials in six ecological impact categories. Figure 3 shows the overall result for the environmental footprint.

- The two Neopor alternatives show a clear advantage over the stone wool alternatives in all six environmental categories. The difference is particularly strong in the categories land use, risk potential, toxicity potential and emissions.
- The environmental differences are largely attributable to the different densities and thickness of the insulation materials used. In particular, the higher density of stone wool requires more material input per square meter than EPS foam.

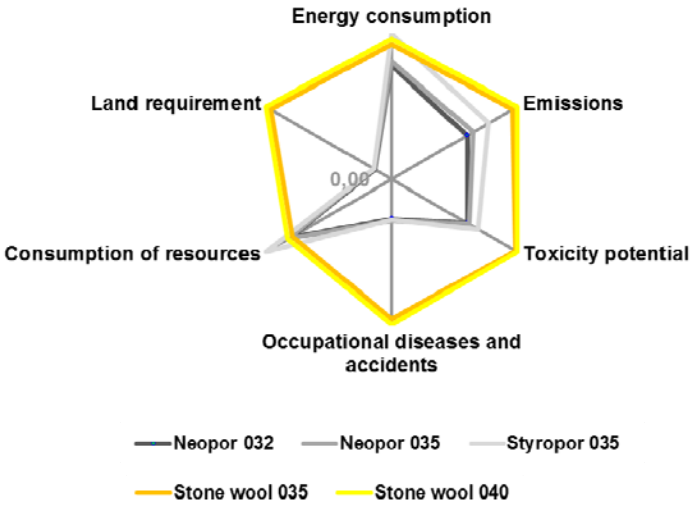

Figure 3: Environmental fingerprint of the individual ETICS (1.0 = worst alternative; the lower the score, the lower the environmental impact)

Note:
Each building project is unique in terms of planning and situation. Planners referring to this study should consider the impact of mutually dependent variables.

Results of the eco-efficiency analysis

Eco-efficiency portfolio

The eco-efficiency portfolio (Figure 4) shows that Neopor is the most eco-efficient alternative in this comparison; the rigid foam in this application is less expensive and the environmental impact significantly lower. This links in with the reduced insulation thickness and density of the material with nearly identical insulation value. The end result for the customer is a low-cost external wall with optimum insulation and minimum environmental impact. This makes a Neopor ETICS by far the most eco-efficient option.

Conclusions

Since the impact of selecting a construction material on cost and the environment are playing an increasingly important role, this eco-efficiency analysis underpins the planning of building projects in terms of their sustainability. Systems with a high eco-efficiency benefit both builders and the environment. In the Neopor ETICS, life cycle costs and impact on the environment are proving lower than with Styropor insulating materials or mineral wool.

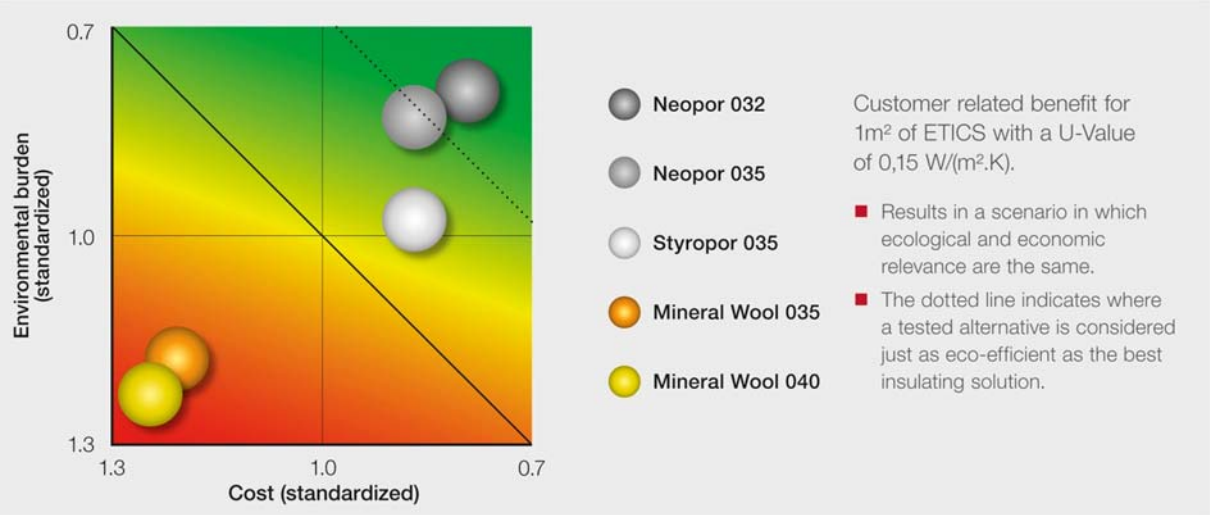

Figure 4: Eco-efficiency portfolio (BASF 2013 – confirmed by TÜV Rheinland)

Neopor®

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What is an eco-efficiency analysis?

An eco-efficiency analysis compares product and process solutions which provide the same customer benefits over their entire life cycle from the ecological and economic points of view.

BASF's eco-efficiency analysis is based on ISO 14040 and 14044 for ecological assessment; the entire life cycle of the products "from cradle to grave" is examined from an ecological point of view. The environmental impact of processes in manufacturing, converting, maintaining and disposing of products is described using six categories: energy consumption, emissions, toxicity potential, occupational diseases / occupational accidents, consumption of resources and land requirement.

The environmental impact of these six categories is standardized and weighted and then combined to produce the overall environmental burden of a product. An analysis of the life cycle costs is conducted parallel to the ecological assessment. Labor and material costs for producing the product are combined with the processing costs and costs for final disposal or recycling. Economic and ecological data are then transferred to a biaxial graph showing on the horizontal axis the costs and on the vertical axis the environmental burden. This enables the results to be shown clearly and in a way that is easy to compare in what is referred to as the eco-efficiency portfolio. The end result is a balanced assessment of the environmental impact and life cycle costs.

The BASF eco-efficiency method has been validated by the TÜV (Germany) and NSF (USA).

Validated eco-efficiency analysis:

"The method used is scientifically based and reflects the state of the art. Results and data are consistent. The data used are appropriate for the goal and scope of the study. Necessary recommendations for the report were discussed during the review. The presentation of results is transparent and consistent."

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You can find more information on the BASF eco-efficiency method at:
www.basf.com/group/corporate/de/sustainability/eco-efficiency-analysis

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For further information please visit www.neopor.de