



With the constant development of Neopor and Basotect, two renowned materials, BASF has been making strong advances in the building and construction industry. **APN** takes a look

## Home improvement

**B**ASF's innovative insulation solution Neopor, an expandable polystyrene (EPS) containing infrared absorbers, can dramatically reduce energy use for cooling houses in hot and humid climates, according to a new simulation study. The study, carried out by the Passive House Institute, Darmstadt, Germany, found that the energy consumption for cooling buildings can be reduced by up to 40% in Singapore and by up to 48% in Mumbai, India, depending on the thickness of the insulation panels used.

"Insulation is effective for energy-efficient construction. This is significant in cities like Singapore and Mumbai that experience a hot and humid climate practically throughout the year. Aside from the environmental benefits, energy-efficient construction also directly translates to real cost savings for consumers," said Jessica Grove-Smith, Passive House Institute, Darmstadt, Germany.

According to BASF's study, Neopor is a type of thermal insulation that substantially reduces energy required for cooling to keep room temperatures within a comfortable range. Through the inclusion of infrared absorbers, Neopor provides up to 20 percent better insulation performance compared to standard EPS. This allows panels made of Neopor to be lighter, thinner, and achieve the same insulation performance. "Insulation materials made of Neopor are highly eco-friendly contributing to a reduction in cooling cost and an increase in the value of buildings due to their improved environmental compatibility," said Dr. Giorgio Greening, head of Global Business Unit Foams, BASF.

"There is a prevailing misconception that insulation materials are only able to reduce energy consumption for heating in cold climates. The objective of the simulation study was specifically to determine the benefit of insulation in different hot climates. The results clearly demonstrate that insulation can indeed be just as effective in reducing energy consumption for cooling and also to a smaller extent for dehumidification in hot and humid climates," Grove-Smith continued.

The study was conducted based on the dynamic hygro-thermal building simulation program DYNBIL, which assesses the heating, cooling and dehumidification energy requirement of a double-story corner terrace house with a basement and living area of approximately 120m<sup>2</sup>. The study, carried out in Singapore, Mumbai, Dubai, Los Angeles and Buenos Aires, was based on the premise that Neopor is installed for the insulation of walls and roofs.

"This is an important result for locations like Singapore and India, where governments have introduced energy-efficient construction guidelines. In tandem with the growing concerns over the effects of global warming and accordingly, a trend toward increased energy efficiency, greater attention will be placed on the conservation of cooling energy and lowering of CO<sub>2</sub> emissions through effective thermal insulation of both old and new buildings. Already a number of countries in Asia are promoting sustainability in the building and construction industry by introducing rating systems or insulation regulations that will provide, among other benefits, energy savings. We will work with them towards more

energy-efficient construction using BASF's insulation solutions such as Neopor, Peripor and Styropor which all contribute to energy savings for heating or cooling houses," said Chay KinWah, head of Business Management, Foams Asia Pacific, BASF.

Throughout Asia, energy efficiency guidelines have become a feature of building design. Singapore introduced its BCA Green Mark Scheme in 2005, while Mumbai introduced its Energy Conservation Building Code in 2007. More recently, Malaysia introduced its Green Building Index in early 2009. Other countries in moderate climate zones such as China, Korea and Japan are also focusing on insulation in energy-efficient construction guidelines.

### From external to internal insulation

On the same topic of BASF materials, Basotect was recently chosen as the acoustic and thermal insulation in the basement of the Hefei Grand Theater, Anhui Province, China, where the air conditioning is channeled through ducts from under theater seats. The lightweight BASF specialty foam lines the top of the basement structure that holds up the rows of theater seats.

Known for its good acoustic absorption in the medium and high frequency ranges in particular, Basotect reduces echo caused by multiple reflection of sound on reverberant surfaces. It also provides excellent thermal insulation, which ensures that air conditioning remains cool as it passes through the ducts under the theater seats.

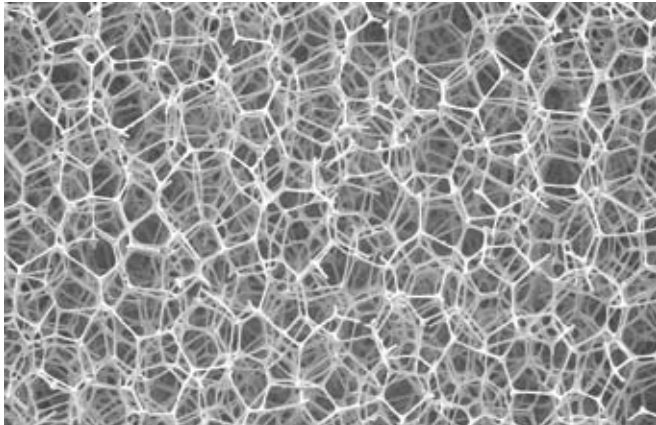
"With its low thermal conductivity, Basotect contributes to meeting the standards of ener-

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gy-efficient construction,” said Dr. Christof Moeck, Head of Global Business Management Basotect, BASF.

“Thanks to its favorable combination of properties, Basotect is particularly suited for thermal insulation and acoustic management in this project. As an eco-friendly material, Basotect meets stringent emission requirements due to its flame-retardancy and fiber-free properties. Additionally, Basotect’s natural resistance to fungi and bacteria growth makes it an ideal solution for this application,” said Yan Xiang, director of the acoustic lab at the, School of Architecture, Tsinghua University, Beijing, and acoustic consultant for the Hefei Grand Theater.

Basotect is also air flow resistant. As such, it is able to withstand the long-term stress of the air conditioning pumped into the theater, without getting damaged or breaking apart.



## Ecological energy saving design of Hefei Grand Theater

The Hefei Grand Theater covers an area of 57 thousand square meters and is known for the ecological energy saving technologies applied in its construction. As opposed to the conventional method of introducing air conditioning from the ceiling, air conditioning pumped in from the base of the theater is a more energy efficient coding technique. However, the ecological energy saving design presented other challenges. This included managing the noise generated by the air conditioners, which was amplified in the tightly enclosed space beneath the theater seats.

## Wide applications of Basotect

Basotect has been used as acoustic and thermal insulation in the building and construction, transportation and automotive industries. In the building and construction industry, the tried-and-true variant weighing nine grams per liter has been used so far primarily to provide thermal insulation and acoustic and noise management in buildings such as sound-recording studios, movie theaters and VIP lounges.

Microscopic view of Basotect