Fast & Easy Construction with Insulating Concrete Forms (ICF)

Neopor®
Innovation in Insulation

BASF
The Chemical Company

Quality Products from BASF—The Benchmark in Polystyrene For Over 50 years

Styropor®—Behind this name lies a success story that is everyone´s goal. BASF discovered a classic over 50 years ago in expandable polystyrene (EPS). Under the tradename Styropor, EPS is now the solution for efficient insulation and safe packaging worldwide.

With Neopor®, BASF has taken the classic Styropor a step further. This new material for modern insulating materials is foamed just like Styropor and processed to boards and molded parts.

The vital difference can be seen with the naked eye in the silver-gray color. In Neopor, graphite is added to the material, absorbing and reflecting heat radiation and improving the insulating performance of EPS by up to 20 percent.

Products made from BASF´s Neopor are an economic investment in the future and add to the value of a property.

1930

Patent for the polymerization of monostyrene

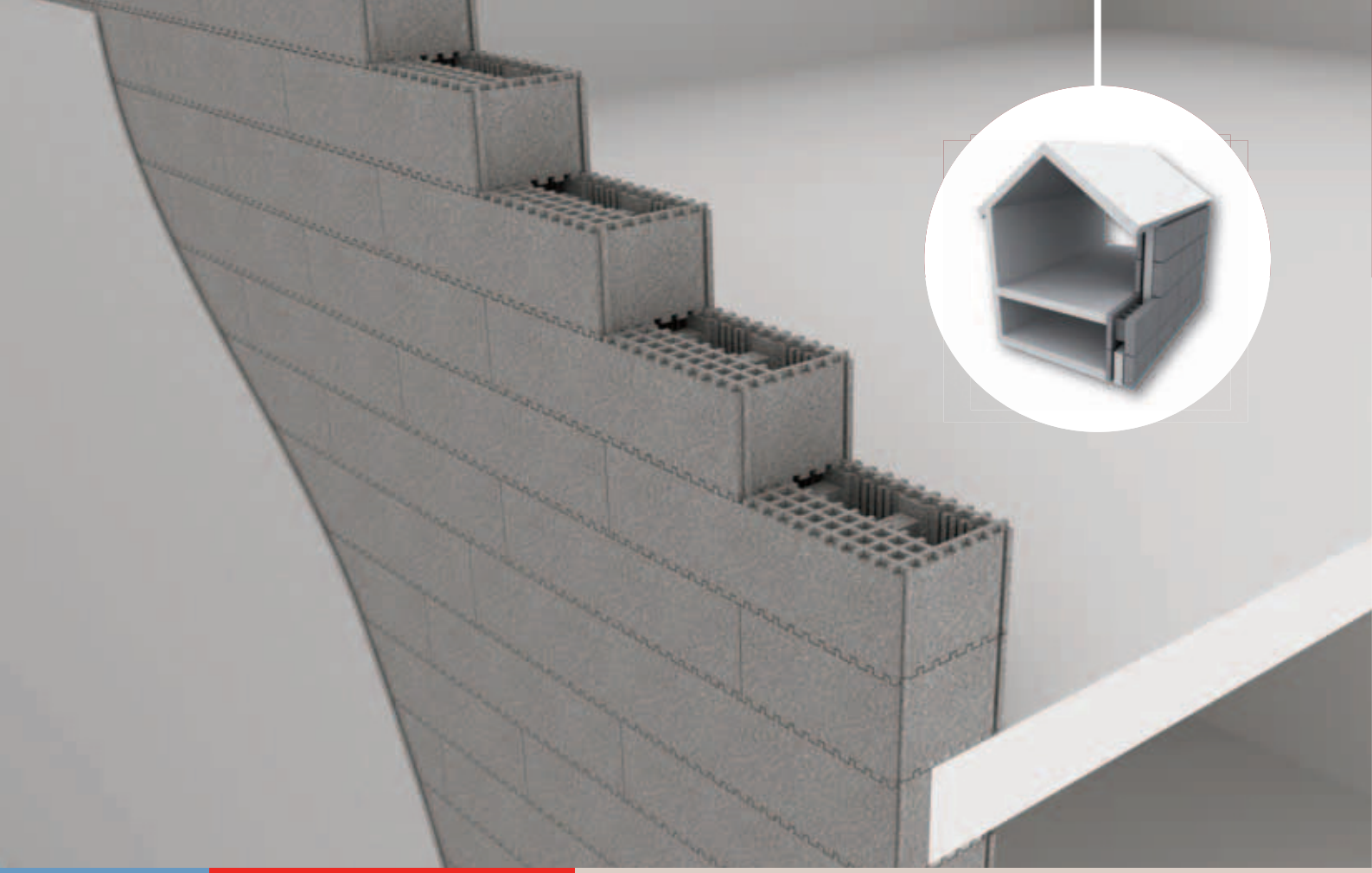
1995 Neopor®

Patent for Neopor®

1920 1925 1930 1940 1950 1960 1970 1980 1990 2000 2005

1951 Styropor®

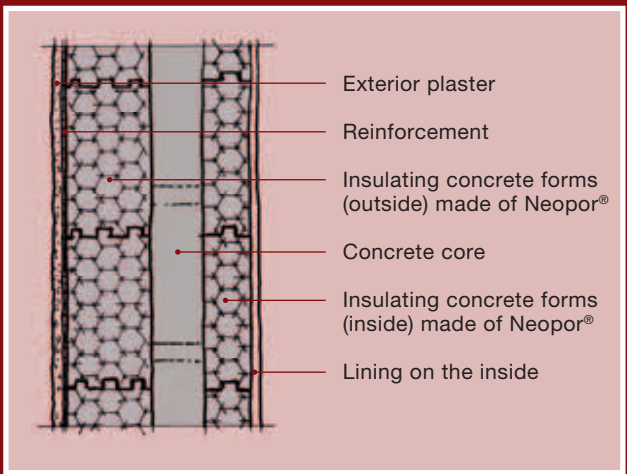
Patent for expandable polystyrene (EPS, Styropor®)



Neopor®—The Simple Way of Building and Insulating With Insulating Concrete Forms (ICF)

Insulating concrete forms made of Neopor® can be produced with special molding forms. They are used as wall and ceiling elements. Thanks to the special connection system, the elements are easily assembled on the construction site and can then, with or without reinforcement, be filled with concrete. The finished interior and exterior walls are monolithically molded concrete walls with very good insulating properties. This construction system is cost-efficient, fast, and earthquake-safer.

Insulating concrete forms made of Neopor have also proven to be extremely suitable in the construction of low-energy and passive houses. With Neopor, it is possible to achieve significantly higher insulating properties than with conventional EPS for those building components where the heat insulating properties are of special importance.



Wall construction with insulating concrete forms made of Neopor®

Insulating Concrete Forms Made of Neopor®

The Main Advantages at a Glance

Fast assembly—The light weight of the form elements made of Neopor® expandable polystyrene beads (EPS) and the simple processing method ensure a quick and economic construction progress. The assembly of the elements is simple and possible without any special construction training and heavy construction equipment. A team of 3-4 experienced workers is able to set up the walls of a average single-family house within a single day.

Rational logistics—The weight per m² of masonry of form elements made of Neopor only amounts to a fraction of that of stones or concrete. This considerably facilitates the logistics on the construction site and speeds up the construction process.

Simple processing method—Form elements can easily be cut to size with a usual handsaw, a knife, or a hot-wire cutter. Holes or slots for electrical and sanitary installations can be formed in a time- and cost-saving manner.

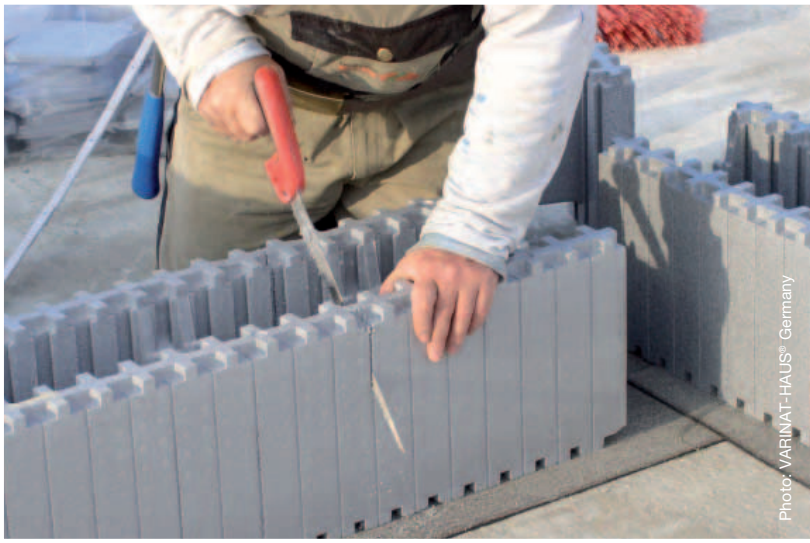
Flexible wall cladding—After filling up with concrete, the walls can be plastered without any additional substrate preparation. Virtually any kind of covering material can also be used for the cladding of interior walls. For instance, tiles can be glued directly onto the form elements.

Efficient building and insulation—With the comparably thin insulating concrete forms made of Neopor, it is possible to achieve an equally efficient acoustic and thermal insulation as with the significantly thicker "classical" walling materials. This provides for valuable extra living space without changing the exterior dimensions of the building.

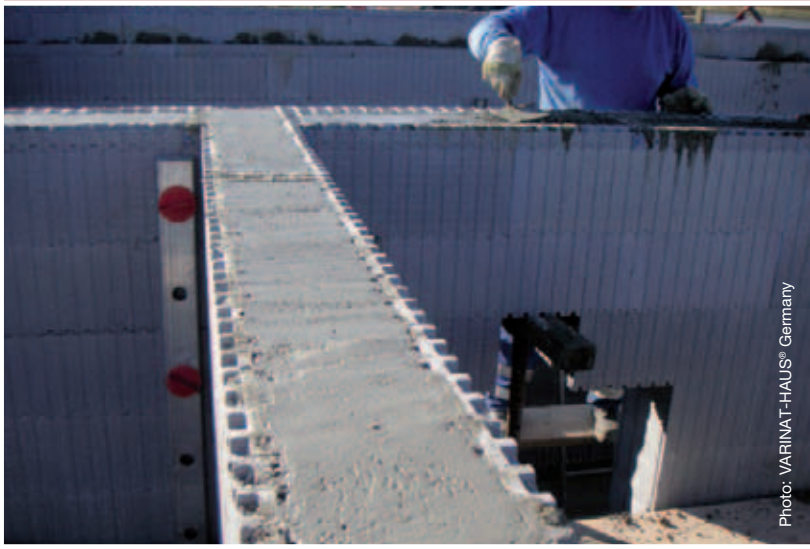
Durable and solid—Due to the massive concrete core, the houses constructed with insulating concrete forms have the same durability and stability as conventional buildings. Furthermore, the insulating layer of Neopor protects the load-bearing concrete against adverse weather conditions. In Europe and the U.S., insulating concrete forms have safely proven their efficacy over decades.

Highly resistant and safe—Robust concrete, an energy-saving insulation and the cost-effective building method make insulating concrete forms made of Neopor the ideal protection against earthquakes, storms, or floods in disaster-prone regions.

Easy unloading and transport thanks to its light weight



Precise and fast cutting to size with a handsaw



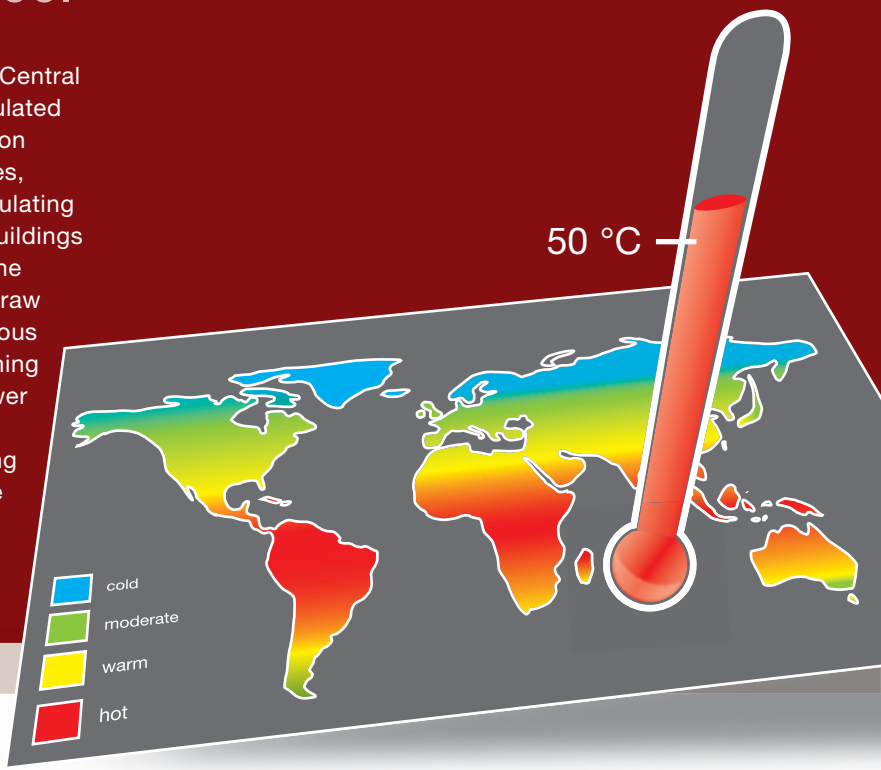
Wall filled up with silo technology or concrete skips

Large-scale construction project of a housing complex in the typical local architectural style with insulating concrete forms made of Neopor®

Photos: BASF SE

Neopor®—Keeping cool

In regions with a rather cool climate, such as Central Europe, buildings have been successfully insulated against cold for decades. But thermal insulation is also of increasing importance in hot climates, such as in GCC countries. Here, however, insulating materials are mainly used for the cooling of buildings to counteract penetrating heat. Considering the increasing worldwide shortage of energy and raw materials, this allows for a cut of the tremendous cooling energy costs incurred by air-conditioning systems as well as of investments for the power plants necessary for their operation. In Dubai City, for instance, the use of efficient insulating materials for new buildings is in the meantime required by law.



Thermal Insulation Against Heat

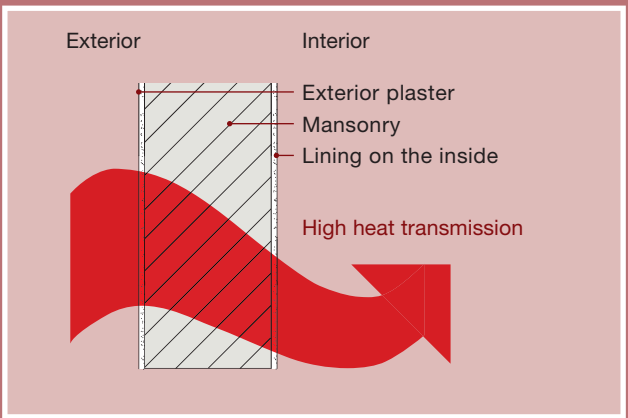
for a Pleasant Indoor Climate with Neopor®

The purpose of thermal insulation in hot climates is to reduce the heat input resulting from direct exposure to solar radiation in order to keep the interior pleasantly cool. The outside temperature constantly rises from the early morning hours until the afternoon, the room temperature reaching the external temperature after a certain delay. The longer the heat flux through the outer envelope into the interior of the building takes, the better the rooms are protected against undesirable overheating.

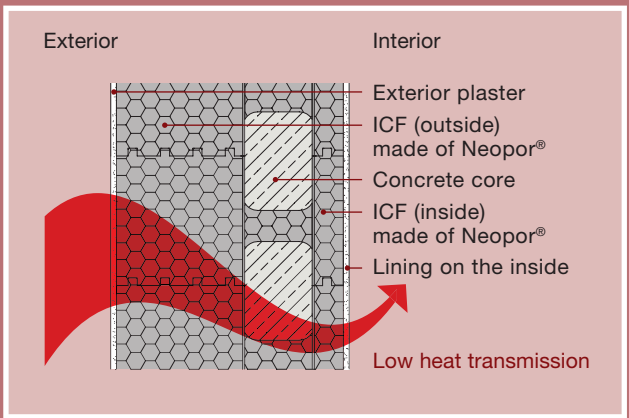
Massive and highly insulated wall constructions generally respond rather slowly to temperature changes and keep the room temperature at a constant level. This provides for a pleasant indoor climate.

How much heat arrives into the interior also depends on the efficiency of the insulation material used. With its low thermal conductivity, the high-performance insulating material Neopor® limits the penetration of heat from the warm to the cold side of a building in a particularly efficient way—from the inside outward at low temperatures and from the outside inward at high temperatures.

Heat transfer through walls in hot climates



Uninsulated wall



Insulated wall with ICF made of Neopor®

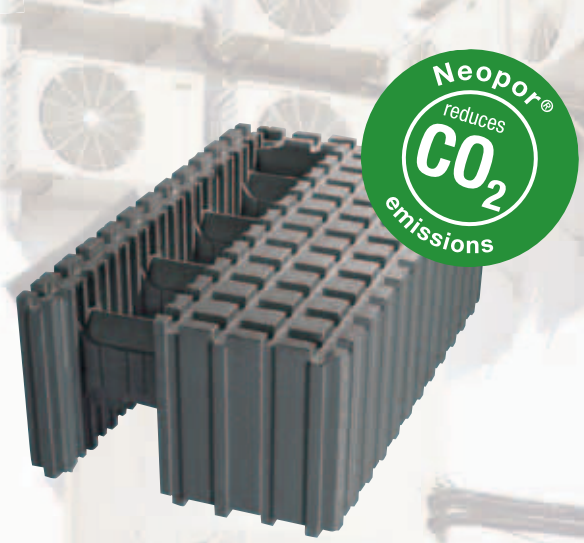
Reduction of Cooling Energy Consumption

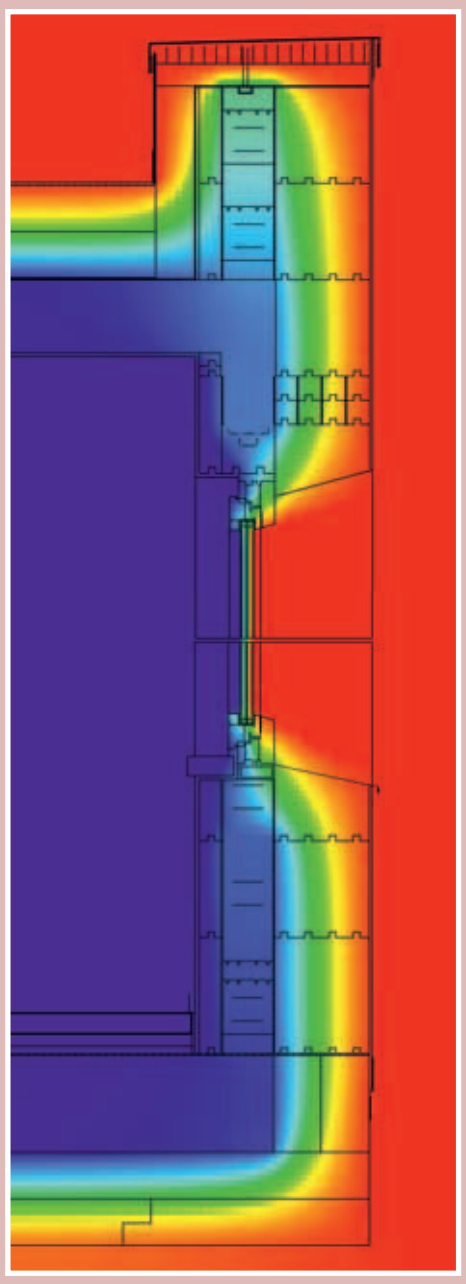
Insulating Concrete Forms (ICF) Made of Neopor®

Infrared absorbers and reflectors contained in Neopor® reduce heat dissipation and allow for an improvement of the insulating performance by 20% in comparison to standard EPS. Calculations carried out by the renowned Passivhaus Institut Darmstadt in Germany have shown that in hot climates, a building envelope insulated with Neopor both decreases the excess heating frequency and the hours of active cooling required. Depending on the respective house and construction type, this results in a reduction of energy consumption for cooling by at least 40% and a decrease in CO_2 emissions.

In this regard, the tried and tested insulating concrete forms (ICF) made of Neopor, which are filled with concrete after simple and fast assembly, are particularly cost-effective and efficient.

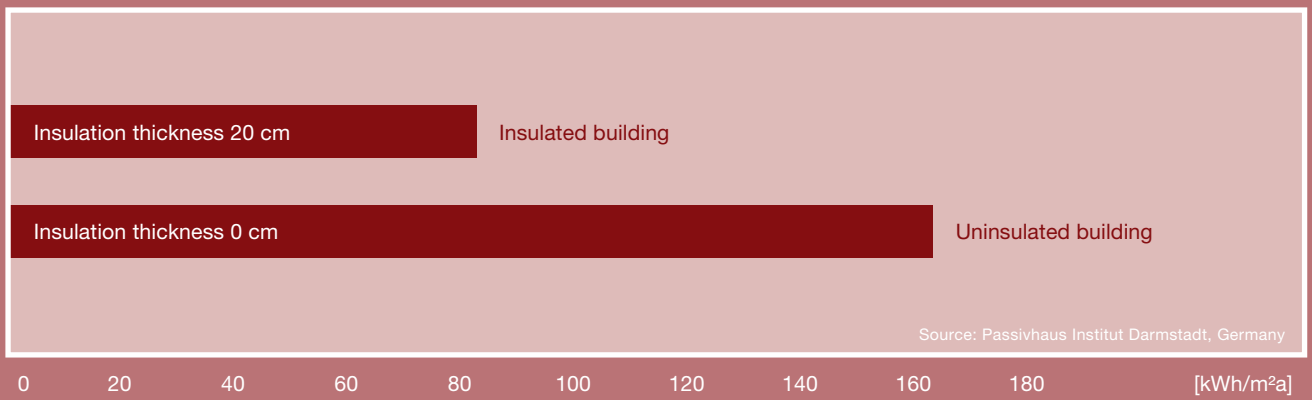
Through the combination of massive concrete and an inner and outer insulation layer, ICF is ideally suited in wall construction in climatically hot regions.





Isotherm profile of an external wall with insulating concrete forms (ICF), base plate foundation, and flat roof

Energy Requirement for Sensible Cooling

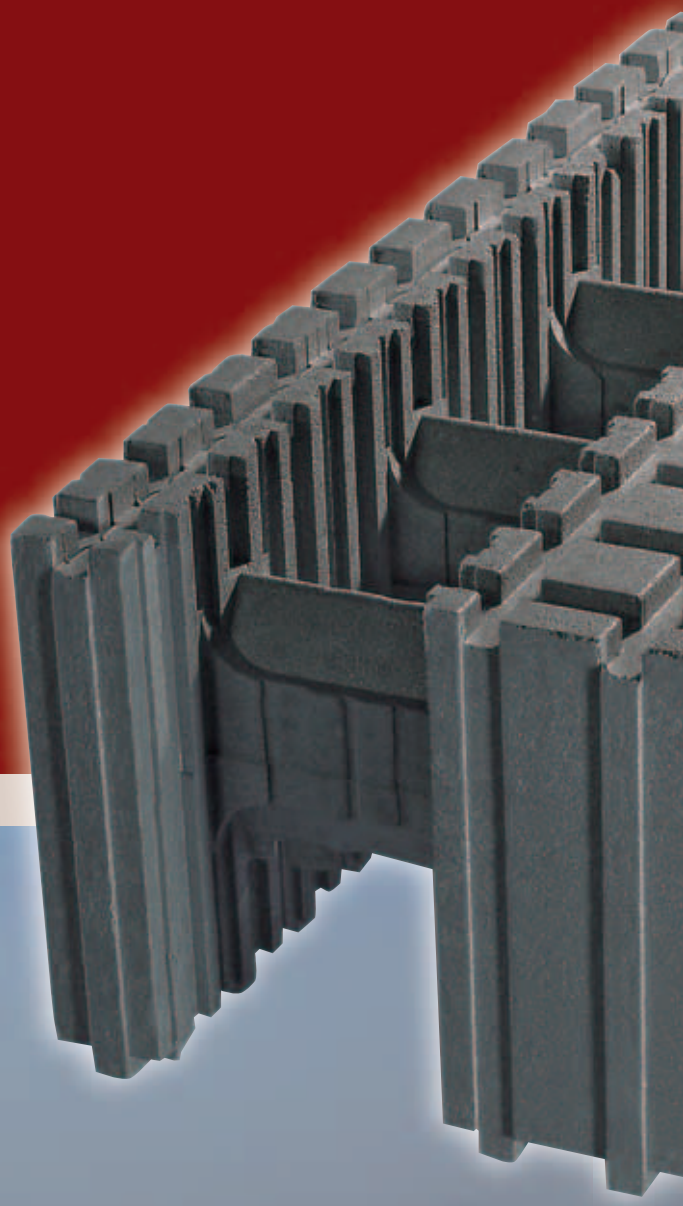


Useful cold requirement as a function of insulation standard for all opaque building elements with Dubai as an example.

International Reference Cases—Individual, Stylish, and Energy-efficient

The construction of buildings with insulating concrete forms has long been more than a vision of the future. The combination of massive concrete, a high-performance insulation layer consisting of Neopor® on both sides, and the fast and simple building method are convincing arguments for builders, planners, developers, and large-scale investors all over the world.

The sample buildings shown here represent only a small selection of the most successful reference cases where insulating concrete forms made of Neopor were used and unmistakably prove the successful application of this energy-efficient and cost-effective building system.



Single-Family House in Florida, U.S.

Low energy demand and "hurricane-proof", all in one

In Florida, where the risk of hurricanes is extremely high, it is of utmost importance to construct "hurricane-safer" buildings. Stability and a sustainable building method achieved with an insulation made of Neopor® can be combined with ICF (Insulated Concrete Form) components manufactured by VARIANT-HAUS®. These form elements are stacked and subsequently filled with concrete. They ensure a perfect insulation, providing for an optimum climatization of the buildings and thereby reducing energy consumption and costs. At the same time they comply with all stability standards and protect the components against destruction by a hurricane.

Photo: VARIANT-HAUS® Germany

Residential Building in Abu Dhabi, United Arab Emirates

Neopor as part of a construction "system"

Neopor is part of a "system" and has been widely used in Abu Dhabi and other parts of the Gulf Region as an important building element. It has also been recognized as one of the major components in the construction of villas using ICF technology. Major contractors and developers have embarked on the concept of ICF technology, using our graphite-based insulation material, and have successfully constructed and launched numerous projects in the Emirate of Abu Dhabi. ICF houses constructed with Neopor as the prime raw material enhance the insulation properties and provide better acoustic values, which ultimately offers the end user technical, environmental, and commercial advantages.

Photo: BASF SE

Nottingham University Creative Energy Homes Initiative

The Creative Energy Homes Project

The Creative Energy Homes project is a showcase of innovative state-of-the-art energy efficient homes of the future being built on the University Park at Nottingham. Five houses will be designed and constructed to various degrees of innovation and flexibility to allow the testing of different aspects of modern methods of construction. The project aims to stimulate sustainable design ideas and promote new ways of providing affordable, environmentally sustainable housing that are innovative in their design. The BASF House is being built on Plot 3, University Park in Nottingham. This structure is designed to meet Sustainable Homes Code Level 5.

Photo: BASF SE