China is the Market Driver. Global demand for EPS is high: users everywhere are opting for EPS foam as a reliable material for a wide range of applications from the construction industry to packaging for international trade. However, the main applications vary in the different regional markets.

Expandable Polystyrene (EPS)

Since they were first launched on the market, EPS foams have become an indispensable part of many industries and our everyday lives.

The range of applications covers thermal and sound insulation products in the construction industry, very lightweight but highly effective packaging inserts for impact-sensitive goods, thermally insulating containers for temperature-sensitive items such as fish and numerous specialty applications.

One such application involves load-bearing layers in road construction. The new formula 1 racetrack in Shanghai/China has caused a worldwide sensation because it is laid on EPS blocks (Title picture, Fig. 1). The reason for this is that the racetrack is built on swamp and EPS foam is very lightweight and moisture-resistant. Other materials such as earth or concrete were too heavy. [1]

Capacities and Manufacturers

The diversity of the applications for EPS foam has always ensured high demand. For example, annual global EPS consumption between 1960 and 2004 increased over 100 times from 35 000 to 4 million tonnes. However, the share of the individual regions in the total EPS market has changed in accordance with the overall development of world markets. While Europe headed the statistics as the largest consumer for many years, Asia is now the largest customer with an annual consumption of some 2 million tonnes EPS. It is followed by Europe (1.25 million tonnes) and NAFTA (0.6 million tonnes; Fig. 2).

China – a Growth Market

Despite the good order position and pleasing worldwide growth rates, competition is becoming more intense. Production capacity in Europe last year was about 1.5 million tonnes. This compared with a demand of only 1.25 million tonnes, which meant poor utilisation of production plants for EPS manufacturers.

In assessing future development, the booming Chinese economy is of key importance (Fig. 3). China is already the largest EPS market in the world. By 2004, most of the new EPS capacity in China had already been built. In the coming years, too, China will be the market driver. Up to 65 % of all new EPS capacity in the next few years will be in China, according to various forecasts. China already has 37 % of global EPS production capacity. At the same time, the country accounts for 32 % of global EPS demand. By 2009, these figures will rise to 42 % and 40 % respectively.

Construction Industry – Largest Market for EPS in Europe

Some 70 % of the EPS sold in Europe is used in the construction industry (Fig. 4). The reasons for this are increasing requirements for the thermal and sound insulation of new buildings and the growing importance attached to improving the thermal insulation of old buildings. Successfully established applica-
tions for EPS in the building sector include external wall insulation, structure-borne sound insulation, loft insulation, pitched roof insulation, basement ceiling insulation, insulation of building parts in contact with the ground (perimeter insulation) and the use of EPS as form blocks, roller shutter boxes and in a variety of other special mouldings.

These applications, which have been supplied by conventional EPS over the last 50 years, are now also an outlet for a further development of this material, known as Neopor (manufacturer: BASF) [2]. The greatest advantage of this silvery grey EPS foam is its much lower thermal conductivity as compared with conventional insulating materials. The same insulation efficiency can be obtained with some 15 to 20 % lower insulation thickness. This is achieved with integral infrared absorbers and reflectors, which largely prevent radiant heat loss. With this silvery EPS material, for example, the first multiple family dwelling built to passive house standard have been constructed in Switzerland. In a residential development near Lucerne, the facades of all the loft houses and villettes have been insulated with Neopor (Fig. 5). For the loft houses, 30 cm thick Neopor sheets were used and for the villettes 24 cm sheets. These and other measures made it possible to reduce thermal energy consumption in these houses by around 90 % as compared with conventionally built houses. The results of this energy-saving construction: utilisation of solar energy and the heat output from equipment and occupants generally suffice to keep the houses at a comfortable temperature during the heating period. Only when outside temperatures are well below freezing additional gas heating is necessary.

The current crisis in the German construction industry has had little influence on EPS sales. Although new building investment continues to decline, more owners’ money is going into the modernisation and repair of existing housing stock. The energy-saving regulations in Germany make it a condition that when fairly substantial structural alterations are being carried out, thermal insulation must be post-installed. Since nearly 70 % of the housing stock in Germany is more than 25 years old, the renovation of existing buildings is an application with large growth potential for all EPS insulation manufacturers [3].

### Many Different Applications in the Packaging Sector

Ultra-modern automatic processing lines are available for EPS. These enable the raw materials to be pre-expanded and then foam moulded efficiently into the required parts. For short production runs, automatic cutters are also used to cut out packaging components from foam blocks. For recycling production scrap and post-consumer foam waste, a wide range of further processing capacity is available.

EPS has long had a very good reputation among packagers as a reliable and effective packaging material. The advantages that EPS, in conjunction with economic moulding production processes, offers for the protection of packaged goods are enjoyed worldwide. The versatility of EPS in packaging was recognised early on. Nevertheless, the many different application possibilities for engineers, packagers and designers are by no means exhausted yet. There are still many opportunities for innovative applications using this reasonably priced, highly efficient foam material.

One such challenging application is a transport box for blood donations and transplant organs made from Neopor (Fig. 6). This thermally insulating material meets the high demands of transplant medicine in relation to constant-temperature transport. Transplant organs must be transported within a temperature range of +4 to +8 °C and blood platelets at a constant 22 °C.

### Summary

The global demand for EPS products continues to be maintained. While in the past Europe has been the largest consumer in the EPS market, there has now been a shift to Asia. China, in particular, is the market driver and this region is expected to grow the most in the next few years. The main reasons behind the continuing demand for EPS foam are its proven properties such as moisture resistance, light
weight and very good insulating properties. Applications in the construction sector, especially in the modernisation and repair of the existing housing stock, have greatly increased in importance. In this area, there is large growth potential for all EPS insulation manufacturers in the next few years. In the packaging sector, EPS is regarded as a reliable, efficient material. But, even so, the spectrum of application for this foam material is by no means exhausted yet. New innovations show how versatile EPS is, whether as a constant-temperature transport container in the packaging sector or as a load-bearing material under racetracks.

REFERENCES
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