

INTRODUCTION

SCOPE OF THE STUDY

This series of BRG Business Profiles covers the market for four different types of thermal insulation products for individual countries in Western Europe.

- Mineral Fibre
- Expanded Polystyrene (EPS)
- Extruded Polystyrene(XPS)
- Polyurethane (PU)

and the following countries:

- | | | |
|-----------|-----------|---------------|
| • Austria | • Germany | • Sweden |
| • Benelux | • Ireland | • Switzerland |
| • Denmark | • Italy | • UK |
| • Finland | • Norway | |
| • France | • Spain | |

PRODUCTS

Mineral fibre, or wool, is a non-metallic, inorganic material normally derived from glass or rock. Both glass wool and rock wool can be used in similar applications, except where high temperature resistance and fire protection are required. Rock fibre can withstand temperatures up to 1000°C whereas glass fibre can only be used up to 400°C.

Mineral fibres can be manufactured into a wide variety of physical forms and shapes and to a range of densities, depending upon the intended application. The most common forms are:

- rolls or blanket, for use in loft insulation
- laminated matting, for use in heating, water pipes, ventilation and air conditioning ducts, containers, cooling and tank systems
- rigid slabs for
 - flat & pitched mansard roofs, loft conversions, cavity walls and ceilings
 - concrete floors
 - external wall dry ventilated cladding systems
 - process plant - apparatus engineering, furnace construction and plant engineering
- multi layer lightweight boards with magnesite bound wood wool for improved thermal conductivity and flame resistance
- fibre bonded to plasterboard for dry lining and semi-structural applications
- shells and moulded pipe sections for process plant
- sprayed, for asbestos encapsulation or blown for loft insulation in old or irregularly shaped buildings.

Expanded polystyrene (EPS) is a relatively low cost material with excellent insulating properties. It is lightweight, adding little to structural weight, yet offers high dimensional stability. The foam is closed cell and therefore resistant to water penetration, although it is not a water vapour barrier. EPS does not deteriorate, it is non-toxic, non-irritant, and does not contain blowing agents. EPS has a low thermal conductivity and therefore good thermal insulation properties. Its chief disadvantages are its susceptibility to physical damage and its low flammability and resistance to chemical attack, including substances like dilute acids, alkalis, methanol and i-propanol. EPS foam can also be used at extremely low temperatures without any time restriction.

EPS is typically encountered in three forms:

- as rigid lightweight slab or board for use in wall, floor and roof insulation and cavity fill.
- EPS sheet bonded to plaster for use in dry lining and roofing extensions
- loose fill bead for use in cavity fill and loft insulation

Extruded Polystyrene (XPS) - The most suitable polystyrenes for extrusion are those with a high viscosity, i.e. products with a melt volume index (MVI) of 200/5 in the lower end of the range between 1 and 7 ml/10min.

The physical properties of XPS mean that it can be used in board form in roofing, flooring and walling applications. The low moisture absorption of the material makes it ideal for use in cold storage facilities and refrigerated transport, where it is subjected to freeze thaw cycles. The high compressive strength of the material also makes it ideal for load bearing applications. XPS does not rot and has relatively high thermal insulation properties.

Due to its cost, XPS tends to be used in specialist areas where its particular properties are specifically required.

Polyurethane foams are produced from a mixture of polyols, isocyanates, process additives and blowing agents. Polyurethane foams can provide very high performance insulating products, despite the change from CFC to CFC-free blowing agents. The foam can be produced in a number of ways depending upon its ultimate use:

- continuous and discontinuous production of slabstock which can be cut into flat sheets or shapes
- continuous and discontinuous lamination between two rigid substrates, suitable for structural building applications
- in-situ moulding for refrigerators, pipe sections and cavity walls
- surface spraying for flat roofing and storage tanks.

Polyurethane foams are not as widely used as some other materials due to their relative cost. However its excellent low thermal conductivity and wide operating temperature means that polyurethane can, if specified, be used in virtually all sectors of the construction sector.

Polyurethane is most widely used for the following applications:

- dry lining plasterboard for internal solid wall insulation where space is limited
- external/cavity wall insulation
- suspended/floating floors
- pitched roofing for agricultural buildings
- cold stores and food process plant
- refrigerated transport
- blown in-situ for flat roofs, storage tanks, windows and pipework
- domestic & commercial refrigerators
- rigid pipe insulation

1.1 END-USE SECTORS

We have divided the end use sectors into building and industrial.

Building

This sector includes commercial and domestic building, cold storage and agricultural storage. The building sector takes up to 90% of volume (m³) of the insulation products. Domestic pipe work and air conditioning have not been included in the building market figures. It was found that some respondents could not separate heating and ventilation figures for domestic and commercial building from the usage in industrial buildings and process plant. There is therefore some overlap in the definitions used by the trade, and including everything in pipe lagging eliminated double counting between the two headings.

Industrial

This sector consists of the following:

Pipe lagging

This includes the thermal lagging of industrial pipe work, ducts and plant. Where domestic pipe work has been identified this is also included, as well as insulation of district heating pipes.

Process Plant and Machinery

This section includes all applications in process plant (except the lagging of pipe work and ducts) and in ancillary equipment. A special feature of this end use sector is the requirement for very high temperature insulation in furnaces, ovens, etc.

Domestic and Commercial Appliances

Those studied were refrigerators, freezers, cookers and storage and other heaters. Minor uses, e.g. in irons and commercial presses, were not included in the study.

Transport

Road, rail, and sea transport is considered. However the market size for thermal insulation is relatively small and overlaps with acoustic insulation and structural bonding.