



Healthy building with EPS



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Expanded Polystyrene (EPS), is a material which is used extensively in the building industry as an insulator, as well as being a natural choice for packaging purposes. EPS has many positive attributes, not the least of which is its proven safety record during all stages of its life cycle - from production, during use, through to re-use or recycling.

*Health and safety are of paramount importance in everyday life. It is therefore not surprising that health and safety take top priority in the building industry. However, the evaluation of building materials is not only concerned with technical specifications, but with factors such as **total environmental impact**. The increasing demand for sustainable buildings means that the building industry has had to take a fresh look at the materials it uses, and the way it uses them.*

Insulation is of course a necessity in any building. But most materials used for insulation are not readily associated with safety and good health. This is due in part to the fibres associated with mineral wool, and the perceived problems with radon and quartz. There is one insulation material however, which scores particularly high when it comes to health and safety: EPS, whose physical properties make it an ideal insulation material.

Conclusion: EPS does not present a risk to health during production, handling, to occupants or during demolition and renovation.



Health during production

During the manufacturing of EPS, emission levels are negligible, due in part to the fact that its volume constitutes 98% air.

The component parts of EPS are as follows:

Styrene

Extensive research has shown that Styrene monomer, the raw material for the production of expandable polystyrene, is perfectly safe in use. Polystyrene has a maximum styrene content of only 0.1% by weight, and since EPS contains only 2% polystyrene by volume, this minute trace of styrene monomer poses no threat to health whatsoever.

Pentane

About 6% of pentane is incorporated into the expandable polystyrene granules as a blowing agent. It is a saturated hydrocarbon, not to be confused with (H)CFCs. Pentane is non-toxic and constitutes no threat to the ozone layer.

Fire retardant

EPS is available either with or without the fire retardant hexabromocyclododecane (HBCD), which constitutes a weight of maximum 0.5% of the final product. It is a cycloaliphatic fire retardant and not comparable with the aromatic fire retardants (PBBs and PBBOs). HBCD is present in EPS in such a minute quantity that it poses no risks to health whatsoever. Moreover, it remains within the closed cells of EPS and does not dissolve in water.

Conclusion: EPS does not present a risk to health during production.

Fibres and dust

The insulation manufacturing industry continuously evaluates its products. Research into fibres and dust in production premises is mainly concentrated in mineral wool plants, where it may be assumed sufficient protective measures are taken. However, the situation is less satisfactory in the handling of insulating materials on the building site, or in demolition and renovation work. Perhaps the practical inconvenience of wearing protective equipment during work goes some way to explain this. Workers do not always follow safety regulations which can cause health problems, and will make the work slower, and therefore less profitable. The structure of organic plastics such as EPS is very different from the inorganic fibre structure of mineral wool, so no fibres whatsoever are released. This explains why ***no protective equipment is necessary when working with EPS.***

There are virtually no physiological or toxic effects of EPS and EPS dust will therefore have no adverse effects on health, beyond the minor nuisance associated with any dust –such as sneezing.

Radiation and radioactivity

Misunderstandings about radiation in plants manufacturing insulation materials have arisen, possibly as a result of recent discussions on radon and mineral building products.

Natural geological processes can cause higher than average concentrations of radioactive isotopes to be present in certain minerals. This means that in many mineral building materials, radioactivity can be detected. Extensive scientific research has shown however, that no radioactivity is emitted by EPS, nor does it contain radon or cause radon emission.

Health during handling on the building site

Close supervision on the building site is often difficult. As a result health and safety regulations are not always fully complied with. Moreover it is here at the handling stage, when personnel is in direct contact with building materials, and can suffer most from the effects of harmful products and substances.

Fibres and dust

Sawing, cutting, and just touching certain building products can lead to irritation of the skin, eyes and respiratory tract. The degree of irritation depends on how the products are handled and the level of ventilation in the area. Although this is not life-threatening, it is of course essential to minimise any risk to workers in the building industry. **EPS is universally recognised as a pleasant material to work with.** It does not sting hands, skin, or mucous membranes. EPS does not have any of the adverse effects on health often associated with some other building products.

Exceptionally light weight

Another benefit of EPS in respect to safety, health and well-being is its exceptional light weight. Even assembled EPS building products do not normally cause heavy work for construction personnel.

Conclusion: EPS does not present a risk to health during handling on the building site.

The effects of binders

Binders are used to stabilise and strengthen many of the building materials used today. These binders may be given off during handling of materials on the building site, which can lead to health problems. Unlike other insulating materials, EPS does not contain binders of any kind. This is because the loose EPS beads are bonded together with only the help of *steam* to produce the familiar EPS building products, so **nothing more than pure water is used.**

Protective equipment

Building workers generally find protective equipment unpleasant and inconvenient to wear. So in practice protective equipment is frequently not used. From a health point of view, this is quite difficult to understand. However if you consider having to wear gloves, a dust mask, overalls, safety goggles, a P2 mask, a P3 mask, and cream during the working day it is understandable that some personnel will take risks. Because none of these precautions are needed with EPS, it therefore scores highly in terms of safety, health and well-being.

Health in use-indoor environment

Indoor climate quality is of prime importance when a building is in use, both for the health of the occupants and for the continued stability of the building itself. Good thermal insulation is known to contribute to a comfortable interior, and it is recognised that insulation and ventilation should go hand in hand.

When the right materials are used, the lifespan of a building increases considerably.

In considering climate quality the following parameters come into play:

Moisture

Moisture in buildings is one of the greatest problems faced by builders. It can lead to fungal growth, undermining the integrity of the structure, and creating a poor, unhealthy indoor environment. Remarkably, EPS is virtually insensitive to moisture, and will absorb almost no water even when immersed for long periods. This means that moisture has virtually no effect on EPS insulating products after installation, and the original insulation value of EPS is therefore guaranteed for a long time.

Pests

Although an unpleasant thought, insulating materials can be attacked by pests. As far as is known EPS insulation is not attacked by pests whereas this is not always the case when alternative insulating materials are used.

Conclusion: EPS does not present a risk to health to occupants.

Emissions in use

German research in 1987 showed that styrene emissions from EPS are very low, even less than 1% of the Maximum Admissible Concentration (MAC) value in Germany at the time (100 mg/m³). Even when the detection limit of 0.05 mg styrene/m³ was lowered to 0.01 mg/m³, no styrene was measurable. The fire retardant which may be present in EPS is insoluble in water, and does not leach out of the product. **There is widespread use of EPS as packaging in the food industry, an industry which must adhere to the most stringent hygiene and safety standards.** Even accidental ingestion of EPS has no effect on humans or animals, since it will pass straight through the digestive tract and remain unchanged.

Health during demolition and renovation

Insulating material has been used to an increasing extent in Europe since the 1960s. Slowly but surely some of the building stock from that period is now reaching the demolition stage. In the future, selective demolition should ensure that insulating materials are carefully removed and recycled for appropriate re-use, which will mean some changes for workers involved in demolition or renovation. An example of this change came with the comprehensive regulations on removal of asbestos, which by now are very familiar. But it is absolutely clear from what we have seen that there need be no fears on health grounds about the removal of EPS after a building has reached the end of its useful life.

Conclusion: EPS does not present a risk to health during demolition and renovation.



Who is EUMEPS?

EUMEPS stands for the European Manufacturers of Expanded Polystyrene (EPS). It reflects the interests of all of Europe's leading EPS manufacturers through national associations.

There are two interest groups within the organisation: EUMEPS Packaging and EUMEPS Construction.

EPS comprises 35 percent of the total building and construction insulation market with 10,000 people directly employed in the EPS industry.

Founded in 1989, EUMEPS now has the support of 95 percent of the European EPS industry.

EUMEPS acts as an intra-industry task force, monitoring and co-ordinating a continuous process of improvement in European EPS manufacture with 'cradle to grave' responsibility for the products. This is achieved via working groups focused on:

- Health, Safety and the Environment
- Standardisation
- Fire safety
- Communications.

EUMEPS is a partner on a European level for economic, political and technical issues to relevant parties including the building and construction industry, legislative authorities, architects, engineers, developers and consumers.

Further information on EPS for the construction industry is available from

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