SCHEDE INFORMATIVE (FACT SHEETS)

EPS airpop

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INTRODUZIONE

Il presente documento contiene le Fact Sheets (schede informative) in inglese sull'EPS airpop, realizzate dall'EUMEPS per analizzare sinteticamente svariate tematiche legate all'EPS:

- Proprietà e caratteristiche principali
- Sicurezza
- Ambiente (riciclo, risparmio energetico)
- Comportamento al fuoco e ritardanti di fiamma
- Efficienza economica
- ETICS

EPS saves valuable energy

Whether for new buildings or renovation of existing buildings, thermal insulation made of EPS helps save energy. This not only cuts heating costs, but also decreases dependence on the import of energy, often from areas of conflict.

- The first passive house project involving the installation of 27.5 cm EPS insulation in the outer walls of the building was successfully completed at Kranichstein (Germany) as early as 1991.

Source: Passivhaus Institut

Project data

Year built: 1991

Floor area: 624 m²

Heat demand: 10.5 kWh/m²a

- The renovation of a multi-family dwelling in Vienna using expanded polystyrene insulation demonstrates impressively that it is possible to slash the heat demand by 95 % compared with the previous level.

Source: Andreas Kronberger

Project data

Year built: 1888 / renovation: 2012 - 2014

Floor area as-built: 618 m²

Floor area loft extension: 215 m²

Heat demand prior to renovation:
178 kWh/m²a

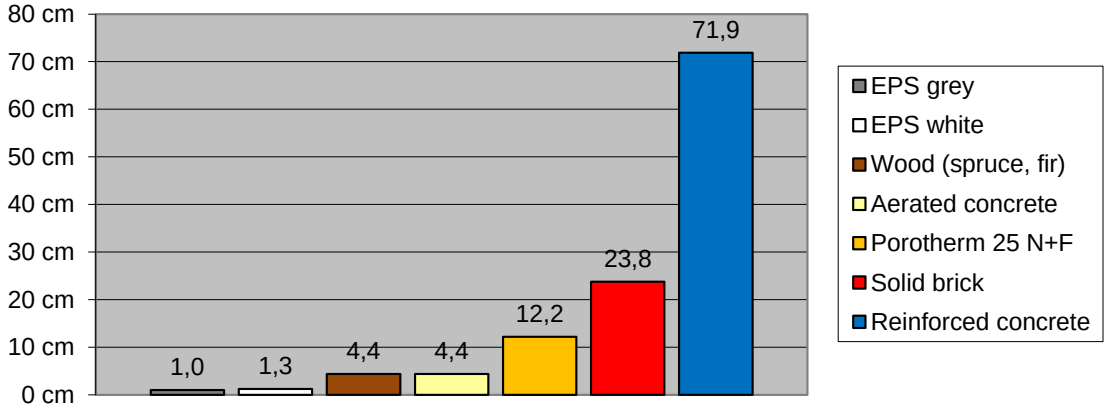
Heat demand following renovation:
7.6 kWh/m²a

- The EU directive governing the energy performance of buildings, which came into force on 7 June 2010, aims for a 20 % cut in energy consumption in the Member States by 2020. In addition, by 31 December 2020 all new buildings must be designed as so-called nearly zero energy buildings.

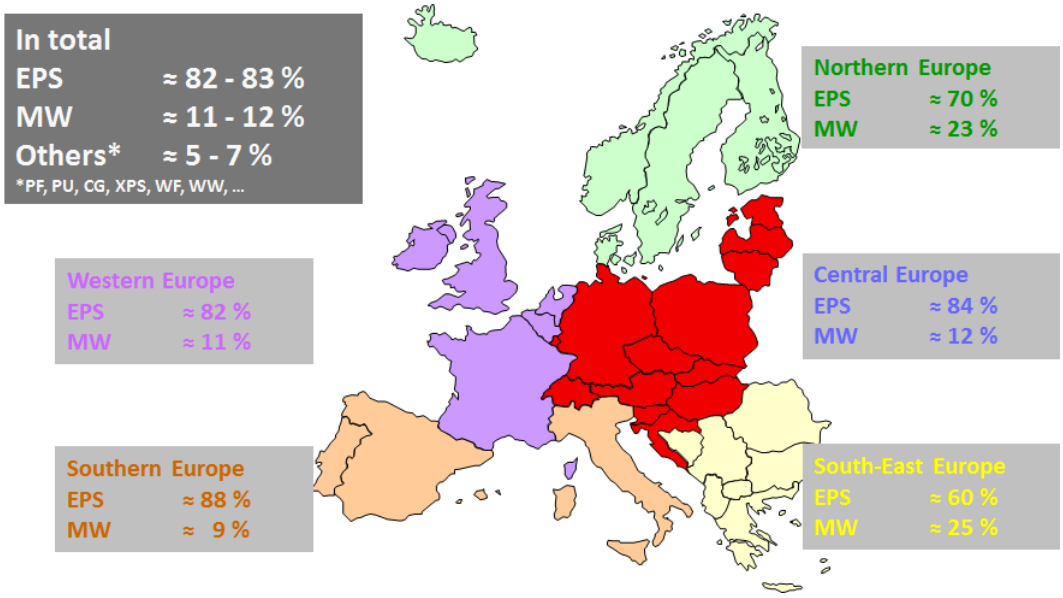
EPS offers outstanding insulation properties

Air is an extremely poor heat conductor. This is why birds puff up their feathers in the cold in order to increase the amount of trapped air and insulate themselves better. And EPS owes its outstanding insulation properties to the fact that 98 % of it is just air, enclosed in small cells in the structure.

- Grey EPS 1 cm thick offers the same insulation performance as 72 cm reinforced concrete!



- It is not only thanks to their outstanding insulation properties, but also due to their fast, simple processing using material without any health hazards, that insulation boards made of EPS form part of the highest percentage of external thermal insulation composite systems in Europe.



Source: European Association for External Thermal Insulation Composite Systems (EAE)

EPS saves precious fossil resources

It is absolutely essential to reduce the amount of oil we consume. Although polystyrene is an oil-based product, only an extraordinarily small amount of this precious natural resource is required to produce it. This is because expanded polystyrene (EPS) effectively consists of 98 % air and only 2 % polystyrene, the cells which contain the air. For every litre of oil that is used to manufacture EPS building insulation, up to 200 litres of heating oil is saved over the life of the product. Thus, there is almost no better use for oil than the production of insulating material!

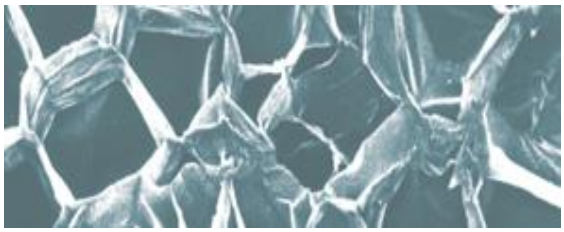


Photo: Cell structure of EPS under a microscope

- The primary non-renewable energy input value of EPS stated in the current Environmental Product Declarations (EPD) developed in accordance with the standard ISO 14025 clearly show that EPS requires the use of far fewer fossil resources (oil, gas, coal, etc.) than the "ecological alternatives" mineral foam and wood fibre.

Insulation for ETICS	PED n.r. MJ *)	EPD-No.
EPS grey	39,36	ECO-EPS-00050101-1106
EPS white	47,34	ECO-EPS-00010101-1106
Hemp fibre	56,80	baubook-No. 1383 io
Mineral foam	63,72	XEL-2009212-D
Mineral wool (MW)	77,40	DRW-2008112-D
Bricks filled with MW	*93,36*	*POR-2011311-D*
Wood fibre	98,45	PAV-2013254-CBG2-DE

*) per functional unit (= 1 m² area of equivalent insulation performance)

Source: Environmental Construction Products Organisation (ECO) and Institut Bauen und Umwelt e.V. (IBU)

- Only 0.1 % of total oil consumption is used for the manufacture of EPS.

The EPS manufacturing process is energy efficient

The European Union has set itself the goal of reducing the amount of energy used in buildings. At the same time, insulation materials should also be produced in a way that minimises the consumption of energy. Due to the low input of raw material (98 % air, 2 % polystyrene) and the energy-efficient production process, the manufacture of EPS on the whole requires less energy than the production of the "ecological alternatives" mineral foam and wood fibre. Further information can be obtained from the current Environmental Product Declarations (EPD) developed in accordance with ISO 14025.

Insulation for ETICS	Production energy MJ *)	EPD-No.
EPS grey	**39,84**	ECO-EPS-00050101-1106
EPS white	**47,84**	ECO-EPS-00010101-1106
Mineral foam	**72,32**	XEL-2009212-D
Mineral wool (MW)	**78,00**	DRW-2008112-D
Hemp fibre	**115,15**	baubook-No. 1383 io
Bricks filled with MW	***179,06***	*POR-2011311-D*
Wood fibre	**310,06**	PAV-2013254-CBG2-DE

*) per functional unit (= 1 m² area of equivalent insulation performance)

Source: Environmental Construction Products Organisation (ECO) and Institut Bauen und Umwelt e.V. (IBU)

- Production energy (including raw material input) includes total renewable and non-renewable ("fossil") primary energy as well as energy from secondary sources. Once EPS has reached the end of its life, there are plenty of options for recycling it. The resulting energy credits are not included in the values provided above.

- If a house that was built in the 1970s is thermally insulated with EPS insulating boards all the energy used to produce them is recouped within 2 to 4 months. Over the life of the product up to 200 times more energy is saved than was used to produce the material. Thus each cubic metre of EPS saves the same amount of energy that a car would need to travel over 30,000 km.

EPS has excellent eco-properties

Due to the low input of raw material (98 % air, 2 % polystyrene) and energy-efficient production process, EPS has an excellent eco-balance. An analysis of the current Environmental Product Declarations (EPD) with regard to the three values "Input of Non-Renewable Primary Energy", "Global Warming Potential (GWP100)" and "Acidification Potential (AP)", summarised in the ΔOI3-Index, clearly illustrates that EPS is quite on a level playing field with the "ecological alternatives" mineral foam and wood fibre.

Insulation for ETICS	PED n.r. MJ *)	GWP100 kg CO_2-Äquiv. *)	AP kg SO_2-Äquiv. *)	ΔOI3	EPD-No.
EPS grey	39,36	1,31	0,0030	**1,93**	ECO-EPS-00050101-1106
EPS white	47,34	1,56	0,0040	**2,37**	ECO-EPS-00010101-1106
Wood fibre	98,45	-10,08	0,0116	**3,15**	PAV-2013254-CBG2-DE
Hemp fibre	56,80	-2,60	0,0139	**3,32**	baubook-Nr. 1383 io
Mineral foam	63,72	5,74	0,0104	**4,46**	XEL-2009212-D
Bricks filled with MW	*93,36*	*7,45*	*0,0245*	***7,62***	*POR-2011311-D*
Mineral wool (MW)	77,40	6,96	0,0450	**9,74**	DRW-2008112-D

*) per functional unit (= 1 m² area of equivalent insulation performance)

Source: Environmental Construction Products Organisation (ECO) and Institut Bauen und Umwelt e.V. (IBU)

- The ΔOI3 Index uses a scale of 0 to 100, with the lower values being better than the higher ones.

- Attention: Mass-based eco-values (i.e. per kg) cannot be compared with one another, because they do not take into account the amount of air in an insulation material. While only 15 to 18 kg of polystyrene is needed to manufacture one cubic metre of façade EPS, the amount of material required for other types of façade insulation is up to 10 times higher. The bulk density of wood fibre baseboard for example is approximately 180 kg/m³. But even volumic eco-values (i.e. per m³) are not comparable because thermal conductivity also plays a role. For this reason, insulation materials must be compared with one another in functional units and bulk density and thermal conductivity must also be taken into account.

EPS is just as vapour-permeable as wood

One characteristic of vapour-permeable building materials is that they offer little resistance to the transport of vapour molecules. Many people are surprised to learn that the water vapour diffusion resistance of EPS matches that of wood. Therefore, unlike some suggestions you may hear, it is not like living in a plastic bag! Removing moisture from rooms also requires an adequate rate of air change. This is done by means of conventional window ventilation (short intense airing) or controlled domestic ventilation (with heat recovery).

- At an assumed outdoor air temperature of 0 °C the quantity of moisture removed from a room amounts to 245.2 g/h, of which only 3.2 g/h is attributable to vapour diffusion through the exterior wall and a full 242 g/h to air change due to the opening of the windows!

Outdoor air temperature °C	The quantity of moisture removed from a room [g/h]	
	by steam diffusion through the exterior wall	by air change (once)
-20	5,5	436
-10	4,8	378
0	3,2	242
19	0,4	15

Source: Industrieverband Hartschaum

- The water vapour diffusion resistance value (symbol μ) expresses the factor by which the water vapour diffusion resistance of a building material is greater than a layer of air of the same thickness. The greater the μ-value, the vapour-tighter the construction material.

  Examples for μ-values:

  Air ..... μ = 1
  EPS ..... μ = 50 - 60
  Wood (spruce) ..... μ ≈ 54
  Concrete ..... μ = 50 - 100
  Glass ..... μ = 10.000
  PE-foil (0,1 mm) ..... μ = 65.000

- In a properly constructed exterior wall there is almost no exchange of indoor and outdoor air. In this regard, walls made of materials like wood and brick are no different to walls made of concrete and steel.

- The widespread concept of “breathing walls” was refuted as long ago as 1928. The building physicist Erwin Raisch established that 50 times more air passes through a keyhole in an hour than through one square metre of exterior wall!

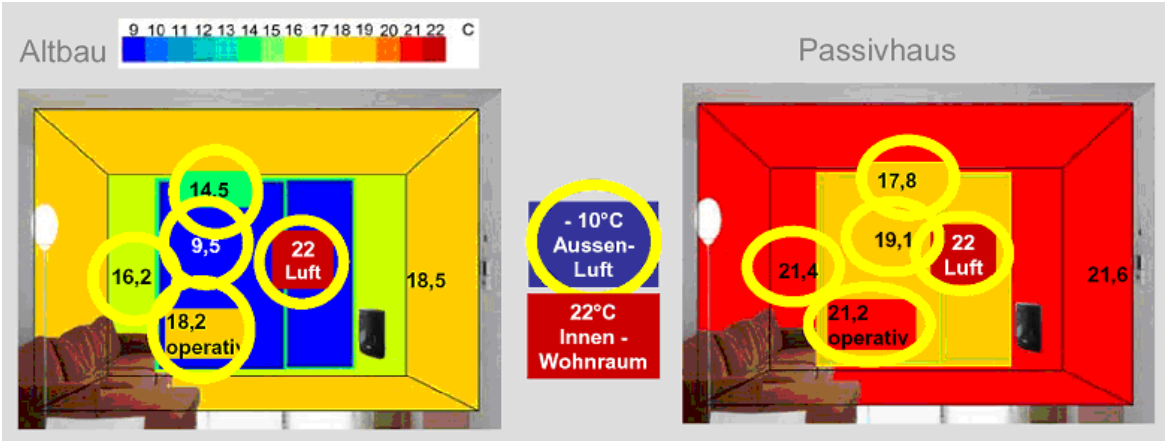
EPS helps prevent mould

The better a house is insulated, the higher the surface temperature on the interior sides of exterior walls and the smaller the risk of mould developing. In properly insulated older buildings, EPS leads to a significant improvement in the indoor climate and to a corresponding reduction in mould spores.

- This phenomenon has a simple physical explanation: warm air can absorb far more moisture than cold air. For example, air with a temperature of 20 °C and a relative air humidity of 60 % contains just as many g/m³ of vapour as air with a temperature of 15 °C and a relative air humidity of 80 %. As exterior walls and window surfaces are always somewhat colder, warm room air cools down in these places, increasing the relative air humidity. Poorly insulated buildings are therefore always vulnerable to mould!

- Moisture removal from rooms must be ensured by an adequate rate of air change. This is done by means of conventional window ventilation (short intense airing) or controlled domestic ventilation (with heat recovery).

- Well insulated homes offer their owners excellent levels of comfort. The surface temperature of the exterior walls approximates the indoor temperature, even when it is very cold outside.



Source: Helmut Krapmeier, Energieinstitut Vorarlberg

- In any case, thermal bridges should be avoided both during planning and when handling and installing the materials. The Processing Guidelines of the Quality Group for Thermal Insulation Systems should be applied when handling thermal insulation composite systems.

EPS does not release environmentally-harmful gases

EPS cells contain nothing but air. Chlorofluorocarbons (CFC) and hydro-fluorocarbons (HCFC) have never been used in the production of polystyrene. EPS insulation panels manufactured in accordance with European guidelines release no environmentally-harmful gases and can therefore also be used indoors.

- During the production of EPS, polystyrene granules containing an expansion agent are heated with steam and inflated by up to 50-times their original volume. This expanding agent, pentane, has rather the same effect as baking powder when baking a cake. This substance also occurs naturally (natural gas) and, as it is not a greenhouse gas, it does not harm the ozone layer in the stratosphere.

Content of Several Substances in the Atmosphere	
Substance	**Concentration in ppb***
Carbon dioxide CO_2	34 600
Methane CH_4	1 700
Pentane C_5H_{12}	2
* 1 ppb (part per billion) Example: A family of five is 1 ppb of the global population of currently more than 5.0 billion people.	

Source: Industrieverband Hartschaum

- The Forschungsinstitut für Wärmeschutz e.V. Munich has determined the emissions from volatile organic components (VOC) from EPS insulation panels (Test Report No. L1-07-094 of 06.12.2007). All the products that were tested satisfied the requirements regarding the safe use of building products indoors.

EPS does not present a health risk

Cakes, ice cream and meat are all packed in EPS; nursing pillows are filled with EPS beads... If there were even the slightest risk that EPS might constitute a health risk, ministries of health and food safety authorities would immediately prohibit its use in such sensitive areas.

- Even highly biologically sensitive bee colonies appreciate polystyrene. EPS beehives are extremely durable and require little care. The bees are happy in poly hives and quickly start to make honey.

Source: Wikimedia Commons

Photo: EPS beehive

EPS has excellent mechanical properties

Although it weighs very little EPS is an extremely stable material: Depending on the type of product, insulation boards can withstand pressures of 1.5 to 6 t/m² (at 2 % deformation). The quality of façade insulation boards depends to a large extent on their tensile strength. This tensile strength – defined as the greatest stress that the material can stand without breaking – is 15 t/m².

- One excellent example that demonstrates the compressive strength of EPS is the construction of road embankments on difficult substrates. The entire Formula 1 course in Shanghai, including the stands, was built on a metre-thick layer of EPS.

Photo: Grandstands for the Shanghai Formula 1 course under construction

- Due to their high horizontal tensile strength, EPS façade insulation boards can easily withstand wind suction forces. On new wall surfaces (building bricks and honeycomb bricks, hollow blocks and solid concrete blocks, cinder blocks, haunching concrete) it is possible to dispense with dowels completely and boards can be mounted using an adhesive.

EPS is pleasant and easy to handle

Building professionals all agree: EPS is extremely pleasant and easy to handle. On the one hand, it is ultra-light – an insulation package with roughly a quarter of a cubic metre weighs only 3.5 to 6 kg. In addition, it can be cut to shape quickly and cleanly.

- The construction of large flat roofs requires considerable manipulation. For this reason, roofing professionals swear by light-weight EPS insulation boards.

Photo: Pitched roof

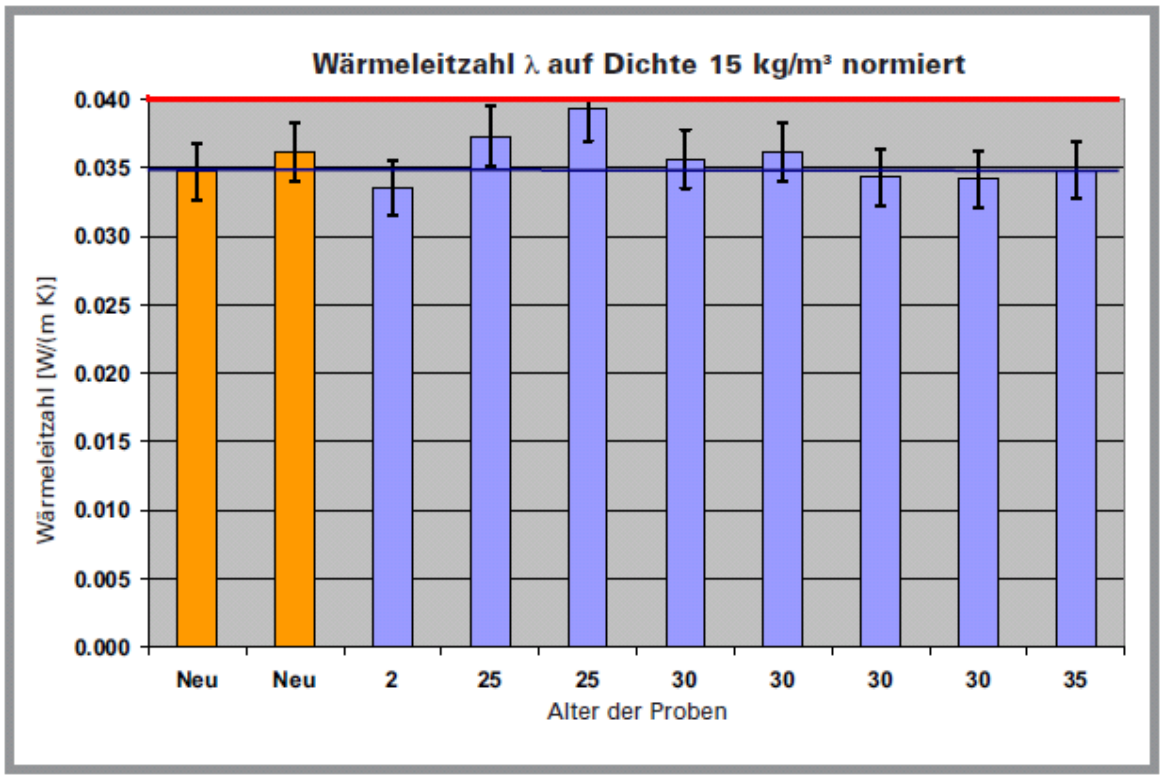
- Façade insulation boards for thermal insulation composite systems (ETICS) can be precision-cut to size and shape quickly and with no dust.

Photo: EPS blank

Photo: WDVS processing

EPS is durable

EPS has been used successfully for decades and lasts a building's lifetime. This has been clearly proven by a Swiss study about the long-term behaviour of EPS.

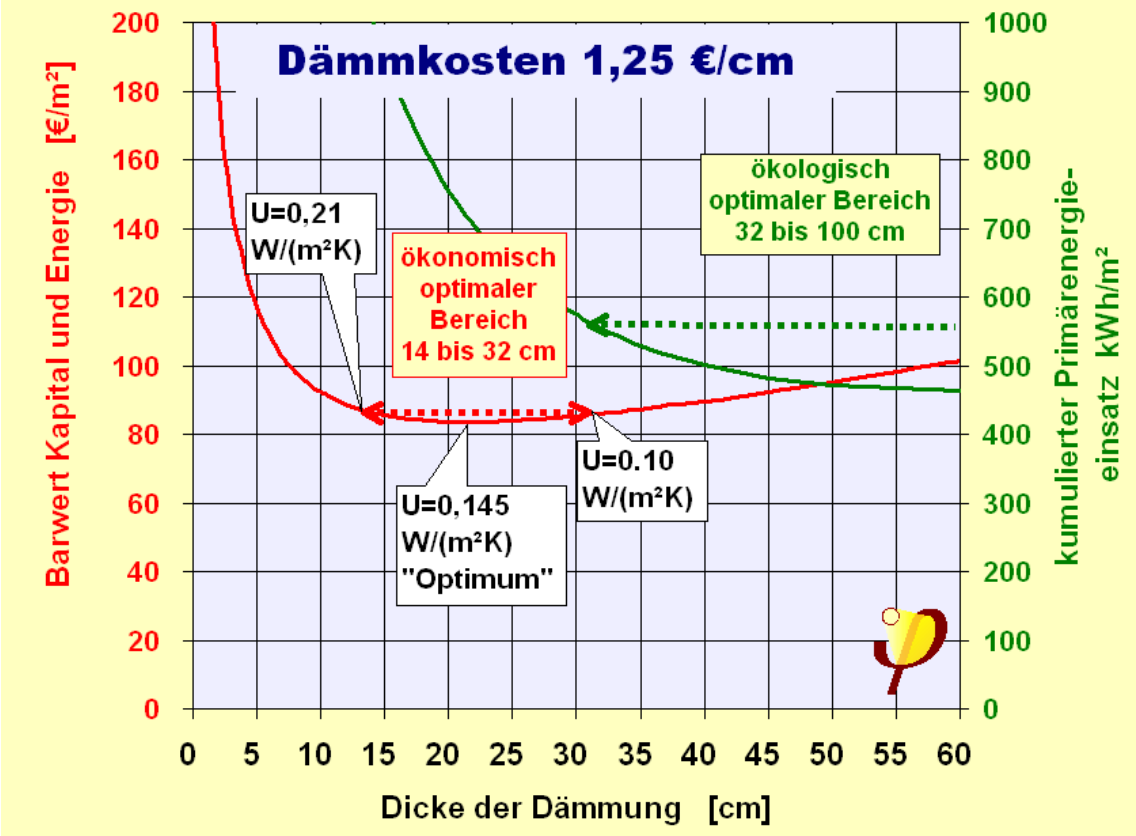


Source: Study "Resistance of EPS to ageing, using long-term evidence"
written by Carbotech AG, Basel in cooperation with S-E-E.ch, St. Gallen

- According to the Environmental Product Declaration EPD-IVH-2009311-D, properly installed EPS insulation products display long-term stability in terms of their dimensions (length, width, thickness) and their building physical properties. They are water resistant and are not degraded by micro-organisms. If properly handled and installed EPS insulation materials will last as long as the building they insulate.

EPS is cost efficient

EPS offers good value for money, guaranteeing optimum thermal insulation at moderate cost. Economically speaking, the best insulation thickness is between 14 and 32 cm. From an ecological viewpoint, even thicker insulation would be desirable.



Source: Passivhaus Institut

- Thermally rehabilitating a building that was constructed in the 1970s would save approximately € 1,000 to € 2,000 per year.
- Assuming that investment costs that would anyway be necessary for the maintenance of the building (so-called "business as usual costs") are not charged, thermal rehabilitations pay for themselves within about 10 years. Business-as-usual costs include, for example, the cost of scaffolding and rendering work for older facades that anyway have to be renovated. This is explained in a study carried out by the province of Upper Austria.
- With housing construction subsidies thermal rehabilitations pay off even sooner.

Construction EPS is flame retardant

Flame retardant[1] in relation to construction EPS means that the foam melts when brought into contact with a flame without catching fire itself. All construction EPS sold in Austria is flame retardant. However, these strict fire safety requirements do not apply to EPS packaging material.

- During an exercise conducted by the fire service in Mödling, an attempt was made to ignite a block of construction EPS directly with a flame gun and indirectly with burning wooden pallets. Neither attempt succeeded.

Photo: Block of constructional EPS with flame applied

Photo: Burning wooden pallets in front of a block of constructional EPS

- Construction EPS can only be ignited by fires involving other material. For this reason, bitumen sheeting, varnishes, etc. may not be stored in proximity to EPS insulation boards.

- Fire service personnel very much appreciate that EPS does not smoulder in the case of fire.

[1] As per ÖNORM B 3800-1:1988 12 01

EPS waste is 100 % recyclable

At the end of EPS insulation material's very long useful life there are several ecologically and economically sound possibilities to re-use it. One alternative is simply to use the insulation panels again. In most cases, however, EPS waste is mechanically recycled[2] or used for energy recovery[1]. In sufficient quantities, chemical recycling[1] is also an option. For example, in Austria EPS waste is a wanted second-hand material and ends up only in very small quantities, mixed with building rubble, at a landfill site[1]. In fact the demand is so high that more than 100,000 m³ of EPS waste have to be imported every year.

- EPS insulation panels are dismantled for re-use. For example, they are deployed as protection panels or for subordinate thermal insulations.

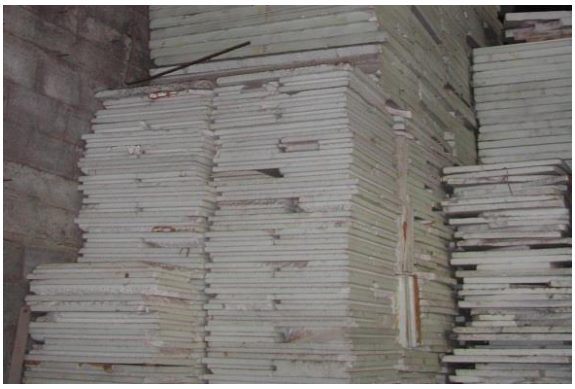


Photo: Used EPS boards

- Ideally, EPS waste is collected separately, since only in this way material recycling can be ensured. If building rubble is collected in a mixed skip, the sorting has to be performed by the disposal company.

Photo: EPS recycling bags

Photo: Waste sorting plant

[1] see separate fact sheets

Mechanical recycling of EPS waste

In the process of mechanical recycling, EPS waste is ground into granulate. It might be added to thermal insulation panels for instance, but also serves as an aggregate for lightweight concrete, bound EPS ballastings and insulating plaster, and acts as a pore inducer in the brick industry.

Photos: Recycling plant

- During the production of thermal insulation panels, up to 20 % of the weight of the recycled product is added which is gained from in-plant EPS waste or non-polluted construction waste.
- Recycling panels consist of 100 % recycled construction and demolition waste.
- The use of ground EPS as aggregate for bound EPS ballastings is standardised in EN 16025-1:2013.

Photo: Bound EPS ballasting

Chemical recycling of EPS waste

During chemical recycling, polystyrene is recovered. The most popular procedure is the CreaSolv® process by the German Fraunhofer Institute for Process Engineering and Packaging that works with solvents. Additional processes include extrusion and synthesis. The currently available EPS insulation waste is too insignificant for this process to be applied economically.

- During the CreaSolv® process a high purity of the polymer polystyrene is recovered due to its specific solubility. The potential of the process lies in the purification of the material on a molecular level. Impurities influencing the quality are gently removed whilst preserving the polymer qualities. With EPS containing HBCD it is possible to separate the flame retardant and recover the bromine in a separate process.

Photo: Pilot plant of Fraunhofer Institute

- During extrusion EPS waste is melted and granulated. The Upper Austrian company EREMA Engineering Recycling Maschinen und Anlagen Ges.m.b.H. produces the extruders that are required for this process. The obtained polystyrene granulate is used to make new products such as park benches, fence posts, shoe soles and the like.

- During synthesis the polystyrene is broken down into its basic petrochemical components, which can then be used to make new plastics or for other purposes.

Energy recovery of EPS waste

The calorific value of EPS is used in incineration plants and cement factories: 1 kg of waste saves 1.3 litres of valuable heating oil. The advantage of this process is that the requirements regarding cleanliness of the EPS waste are low.

Photo: Incineration plant Spittelau (© MA 20 / Steven Duchon)

- In a large-scale test in the Würzburg waste incineration plant[3] in 2013 it was proven that burning EPS containing HBCD has no negative effects on the environment. The flame retardant HBCD is totally destroyed[4]. Even a proportion up to 30 percent by volume of EPS containing HBCD at the waste incineration changes nothing in terms of the composition of the end products such as slag, dust and filtration residues, owing to the high temperature applied.

[3] see PlasticsEurope Technical Summary Report „End-of-life treatment of HBCD-containing polystyrene insulation foams“

[4] see Waste Management & Research Article „Destruction of the flame retardant hexabromocyclododecane in a full-scale municipal solid waste incinerator“

Disposal of EPS waste

Usually, EPS waste is mechanically recycled or used for energy recovery. It is too valuable to simply be deposited in a landfill site. EPS has no effect on ground water and poses no threat to the environment. Mixed with building rubble it can be deposited at ordinary construction waste landfills. In this respect, EPS waste is no different from other insulation material waste of organic origin such as cork, wood fibre or hemp.

Photo: Construction waste landfill (© Pfnier)

- The European Waste Catalogue (EWC) allocates waste code number 17 06 04 “insulation material” to EPS waste.
- The Austrian Landfill Directive states that building rubble may contain a maximum of 10 percent by volume of components made of metal, plastic, wood or other organic materials such as paper, cork, etc..
- Hazardous waste is referred to colloquially as "problem materials" or "special waste". The Austrian Waste Designation Directive and Waste Register give information about the various sorts of waste. These show for instance that railway sleepers and liquid crystal displays (LCD) are listed as hazardous waste, whereas packaging EPS or construction EPS is not.

The polymeric flame retardant (pFR)

After many years of research and development, finally a flame retardant has been discovered which can replace HBCD in EPS insulation. Due to its high-polymer structure, this alternative flame retardant is unavailable to biological processes and cannot be accumulated in organisms. In the sense of the world-wide Stockholm Convention (POP convention) it is neither bioaccumulative nor toxic. The new flame retardant pFR thus represents a sustainable solution for EPS insulation.

- On 29.03.2011, Dow Global Technologies LLC (DGTL) announced the development of a new flame retardant. Currently Chemtura, ICL-IP and Albemarle hold licences for the global market.
- The key advantage of the pFR flame retardant is that it is a plastic itself and – like EPS – not water-soluble. This prevents it being taken up by organisms.

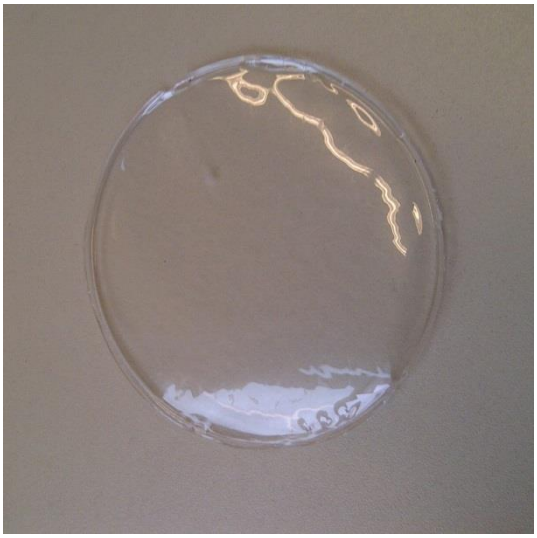


Photo: Platelet of pure pFR

Photo: Platelet of pure pFR (side view)

- The US Environmental Protection Agency (EPA) has confirmed the improved health, safety and environmental profile of the new flame retardant (EPA publication 740R14001).
- Comprehensive test programs undertaken by industry, in collaboration with the association of the plastics manufacturers in Europe (PlasticsEurope) and the German Research Institute for Thermal Protection (FIW), have shown that EPS insulation with the alternative flame retardant pFR not only maintain the reaction to fire properties but also other positive characteristics such as thermal conductivity and mechanical strength remain unchanged.

The flame retardant HBCD

HBCD (hexabromocyclododecane) is a proven flame retardant which has been used effectively in EPS insulation materials for decades. Since HBCD is fully "embedded" in the plastic, the environmentally relevant properties are not transferred to the insulation material. Thus EPS poses no threat to humans or the environment. Since 1 January 2015, producers in some countries (e.g. Austria, Germany and Switzerland) have converted to the new alternative flame retardant pFR[5].

- For decades HBCD has been added to upholstered furniture, decorative materials such as hangings and curtains, leisure equipment such as tents and awnings, domestic textiles such as carpets and bed sheets, (protective) clothing and components for electric and electronic equipment in order to offset the flammability of polystyrene.

- Expert opinions issued by the Fraunhofer Institute for Building Physics have shown that HBCD flame retardant is not released by EPS insulation materials, either into the air or into the water.

- HBCD as a pure substance has been included in Appendix XIV of the REACH regulation and has been listed as a Persistent Organic Pollutant (POP) by the UNEP Stockholm Convention, but can be used without restriction in Europe until the sunset date of 21 August 2015.

[5] see fact sheet

ETICS made of EPS

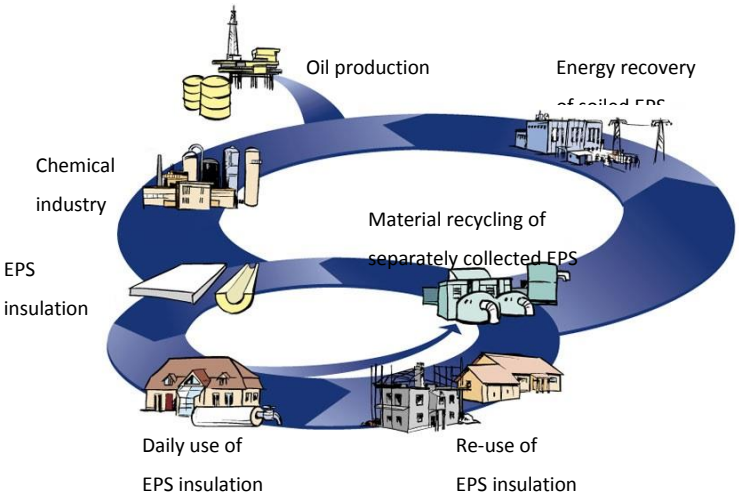
Façade insulations made of EPS already save fossil resources during the production process, save a huge amount of energy and can also be recycled.

- **Saving fossil resources**
  Although polystyrene is an oil-based product, only an extraordinarily small amount of this precious natural resource is required to produce it. This is because expanded polystyrene (EPS) effectively consists of 98 % air and only 2 % polystyrene, the cells which contain the air. For every litre of oil that is used to manufacture EPS building insulation up to 200 litres of heating oil is saved over the life of the product.

- **Fire Safety**
  ETICS do not present a fire hazard. A series of façade fire tests (conducted by Vienna Municipal Department 39 among others,) have proved that thermal insulation composite systems with a thickness of 30 cm have a fire resistance rating of 30 minutes.

- **Durability**
  Properly installed ETICS have been proven to last for many decades. For some time now, double layer construction has been used to achieve optimal state-of-the-art thermal insulation standards.

- **Recyclability**
  The complete removal of the ETICS from the wall is nowadays standard practice. Once the rendering system has been removed („stripping“), the insulation boards are taken off the wall and recycled separately, e.g. in ground form as aggregate for lightweight concrete. In Austria, for example, the demand for EPS waste is so high that each year more than 100,000 m³ have to be imported. Soiled EPS waste is used for energy recovery. Despite this, building rubble that includes EPS can be deposited at ordinary construction waste landfills.



ETICS are an architectural design element

There are attractive and unattractive buildings both with and without ETICS. For some time now, a host of ESP facade profiles such as window and door frames, window sills, fascia profiles, cornices, keystones and bosses as well as decorative elements have been available as architectural design elements for facades. Now nothing stands in the way of the desired objective of attractive new homes or lovingly restored older buildings.

Photo: Spa hotel Lutzmannsburg

- A new facade improves the visual appearance of buildings that are in need of renovation.

Photo: Dwelling house Rankweil-Schleipfweg before renovation

Photo: Dwelling house Rankweil-Schleipfweg after renovation

ETICS are highly durable

Properly installed thermal insulation composite systems have been proven to last for many decades. For some time now, double layer construction has been used to achieve optimal state-of-the-art thermal insulation standards.

Photo: Dwelling house Bahnhofstr. 43, 6890 Lustenau with ETICS made of EPS (year of construction 1966)

- In 1995 Municipal Department 39 – the City of Vienna's Research Centre, Laboratory and Certification Service Centre – stated that the top layer of a thermal insulation composite system can be expected to last at least 30 years, while the insulation material should last much longer. However, this does not mean that the top layer has to be completely renewed after 30 years, as is the case with mineral render. This is also only retouched, buffed and re-coated in places.

- Like a car, ETICS should be regularly inspected. Remedial measures should be taken immediately as soon as it becomes apparent that maintenance work is needed.

- Standards for doubling up an existing ETICS are defined in ÖNORM B 6400:2011, Appendix C. A second, usually thicker, layer of EPS is mounted on an existing thin EPS façade.

ETICS are safe in case of fire

Numerous façade fire tests conducted, inter alia, by Municipal Department 39 (the City of Vienna's Research Centre, Laboratory and Certification Service Centre) have proved that thermal insulation composite systems with a thickness of 30 cm have a fire resistance rating of 30 minutes. This means that within this period there is no fire spread on or beneath the surface of the façade and no large or burning parts drop off.

Photo: Façade fire test

- The fire authority and fire service in Graz conducted several façade fire tests on thermal insulation composite systems (ETICS) at the premises of Tagger. All the systems tested satisfied the requirement that a fire may not spread over the surface of the façade. This proves that ETICS satisfy to the highest degree the protection targets (residents can leave the building by themselves or can be rescued by other means, allowance is made for the safety of the emergency services and the fire can be extinguished effectively).

Photo: Façade fire test (after 27 minutes)

Deconstruction of an ETICS

This can be understood as the complete removal of the insulation system from the wall, nowadays this is a common practice with ETICS made of EPS. Ideal is the so-called selective approach, which does not mix the individual components of the system such as insulating material or rendering. The other option is to scrape or mill the entire ETICS off the building facade. However, in this case the mineral and organic fractions must be subsequently separated in a mixed construction waste separation plant.

- Selective approach: After removal ("stripping") of the rendering system, the insulating boards are taken off the wall and recycled separately. Other procedures such as the thermal peeling of the rendering system are still being developed.

Photos: Deconstruction of an ETICS

- Using the computer-based BIBER® system, the entire ETICS can be stripped from the wall in strips in a single operation using a facade miller. At the same time the building waste is collected for disposal in a container, using a special vacuum cleaner. The milling cutter can be attached to a lifting work platform, telescopic fork-lift truck or excavator.

Photo: Milling cutter in operation