

EPS and XPS in the EU

This brief provides an overview of the current **expanded and extruded polystyrene (EPS/XPS)** market in the European Union.



Overview

EPS and XPS differences are based on visual appearance, structure and recyclability. The production process of EPS allows it to be moulded into any shape, resulting in more diverse uses such as storage and transport of food produce, disposable food and drink containers, and protective packaging for appliances. XPS, on the other hand, is produced in flat plates and is used in insulation and construction applications and disposable food and drink containers. The molecular structure of XPS makes it more difficult to compress for recycling, where as EPS can be chemically recycled.

In 2015, the EC presented the ‘**EU Action Plan for the Circular Economy**’ in an effort to reduce the use of plastics within the EU25 territory. The actions set out in this plan aim to contribute to the development of a circular economy and reduce environmental pollution caused by plastics.

In 2018, the EU furthered its commitment towards the reduction of plastics through the **Communication: A European Strategy for Plastics in a Circular Economy.** Furthermore, through ‘**The Single-Use Plastics Directive – Directive (EU) 2019/904 of 2019**’, specific single use plastic products made from EPS were **banned.**

Single-Use Plastics Directive

A single-use plastic (SUP) product is defined as a product made wholly or partly from plastic that is not conceived, designed and placed on the market to accomplish within its lifecycle multiple trips or rotations by being returned to a producer for refill or re-used for the same purpose for which it was conceived.

EPS products that are banned are described in Annex Part B of the Single-Use Plastics Directive – Directive (EU) 2019/904 of 2019² as: *“food containers, i.e. food receptacles such as boxes, with or without a cover, used to contain food which:*

- *is intended for **immediate consumption**, either on-the-spot or take away,*
 - *is typically **consumed from the receptacle**,*
 - *is **ready to be consumed** without any further preparation, such as cooking, boiling or heating, including food containers used for fast food or other meal ready for immediate consumption, except beverage containers, plates and packets and wrappers containing food.”*
- as well as” **beverage containers** made of expanded polystyrene, including caps and lids;*
- and **cups** for beverages made of expanded polystyrene, including their covers and lids.”*

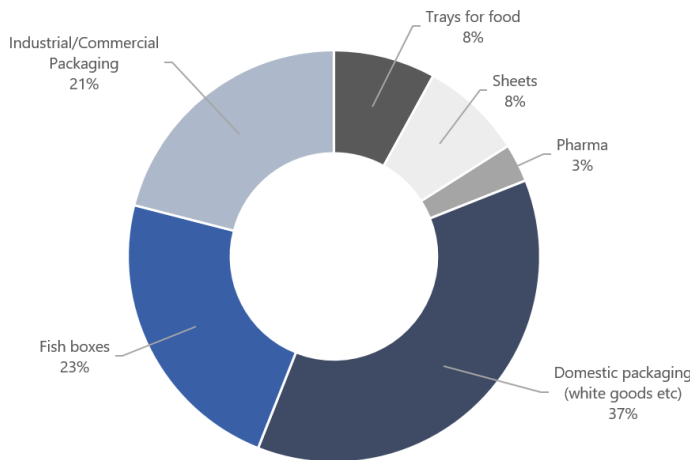
OceanWise will develop a set of long-term measures to reduce the impact of EPS and XPS products in the North-East Atlantic Ocean. This is based on resource-efficiency participatory methods and circular economy principles with the aim of generating new and best practices in the use, manufacturing, recycling and uptake of EPS/XPS.

Industries Using EPS and XPS

The following sectors and industries use EPS & XPS:

Insulation manufacturing, construction industrial applications, engineering industrial applications, vehicle manufacturing, automotive parts manufacturing, electronic goods manufacturing, electrical/white goods manufacturing, seafood & fish processing, aquaculture & hydroponics, seed and plant growing, food processing, food retailing, disposable goods manufacturing, consumer goods manufacturing, pharmaceutical distribution, e-Commerce, custom designs (interiors, events), pontoons (marinas), marine uses (buoys), apiary management (bee-keeping).

EPS Applications in Europe



European EPS applications excluding construction sector³



a) EPS fish boxes by David Gilford, b) XPS food containers in Hong Kong, c) EPS foam peanuts source for transport, d) XPS egg packaging, e) EPS foam bicycle helmet, f) EPS foam mooring buoys (Source: images under creative commons license)

Uses of EPS/XPS

There is a broad spectrum of uses for EPS & XPS. These applications include boards and sheets for insulation and disposable packaging such as takeaway food containers, and certain packaging and product components.

Markets - Annual Figures EU

- EPS demand for all uses: **1.49 million tonnes** (PlasticsEurope, 2017)
- EPS demand for construction and insulation: **1.190 million tonnes**
- EPS demand for consumer packaging : **300,000 tonnes**
- XPS packaging demand: **60,000 tonnes** (Repak, 2019)

Italy produces 40% of EPS packaging for use in the

EU

Suppliers

Approximately **390 companies**; including major petrochemical groups such as Total, BASF, DOW Chemicals, Synthos; specialise in **the production of EPS** raw material in the EU.

Around 290.000 thousand tonnes of EPS are produced in Europe, while **XPS production is more specialized with 36 companies** operating in the EU.

Recycling Barriers

Contamination has been identified as major recycling barrier. EC Regulation No 282/2008⁴ establishes that the use of recycled plastic for food packaging is prohibited. Additionally EPS/XPS used for food packaging is less likely to be recycled due to concerns about quality and standards³.

Research from OceanWise indicates that there are relatively small amounts of recyclable EPS/XPS at a domestic level as most of it is disposable food containers, limiting its recyclability due to contamination concerns. Consequently this lack of scale in domestic waste explains why there are few separate waste collection facilities³.

Recycling

EPS and XPS are **100% recyclable** and improving recycling rates can reduce the risk of these materials becoming marine litter.

XPS is mechanically compacted and then made into another product. EPS is recycled by being reground and added back into a manufacturing process, as well as compacting and chemical processing for the production of polystyrene items.

➤ **EPS recycling rates per year:** 27% (90,450 tonnes) recycled and 40% (134,000 tonnes) recovered (Waste to Energy)

➤ **No data available for XPS recycling rates**

➤ **Approximately 154 EPS recycling companies in Europe (Repak, 2019)**



Processed briquettes



EPS recycling machine at Billingsgate Fish Market in London (photo: Repak)



Compactor at work

Recommendations

- OceanWise research suggests that a significant proportion of SUP take-away food and beverage containers are **made from XPS**, and therefore should be considered for **the restriction list in Annex Part B**.
- **Research and disaggregated data collection is required to address data gaps on XPS product market composition** that allows for informed decision-making and effective interventions to be developed based on a quantitative evaluation.
- Recycling barriers need to be addressed both at the post-industrial and post-consumer ends.
- Consumer awareness on the recyclability of EPS and XPS needs to be increased.

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 MARE


 Sustainn

Université
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ubs

References

[1] European Commission. (2015). Closing the loop—an EU action plan for the circular economy.

[2] Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment.

[3] Repak.(2019) “*State of the art working catalogue/database on the current solutions to recycle, reuse and repurpose*.” (Work Package 5, Action 5.1).OceanWise.

[4] European Commission. (2008). European Regulation (EC) No 282/2008 of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods and amending Regulation (EC)

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