

# The world of Styrenics

A versatile family of synthetic polymers bringing value to our societies and economies\*.

## WHAT ARE STYRENICS?

Styrenics constitute a versatile family of synthetic polymers, including polystyrene (PS), expanded polystyrene (EPS), extruded polystyrene (XPS), acrylonitrile butadiene styrene (ABS) and styrene acrylonitrile resin (SAN).

They offer a wide range of sustainability and societal benefits, such as:



- 1** Recyclability and excellent circularity capacity
- 2** Low weight and associated fuel and GHG emission savings during transport and production
- 3** Insulation and associated reduction of food waste, energy and GHG emission savings
- 4** Affordability and durability

The styrenics sector employs about:

**5,000** people directly in production

**60,000** employees in polymer converters

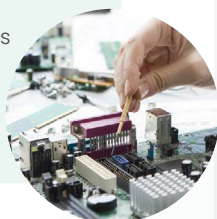


## RECYCLABILITY

Styrenics possess a unique circularity potential which the industry is advancing.

- 1** Styrenics are one of the world's most **easily sortable** and **recyclable** materials
- 2** Styrenics excel in closed-loop recycling, maintaining **high quality** and **safety standards**
- 3** Efforts are progressing towards full circularity of styrenics:
  - PSLoop project in the Netherlands is recycling EPS insulation removing additives
  - In France, PS value chain co-signed the **ChartePS**, committing to achieve full circularity of PS packaging
- 4** A recent Life Cycle Assessment Study found that **recycling PS food packaging** delivered up to:

**80%** savings of CO<sub>2</sub> emissions



## APPLICATIONS

Styrenics are used across a wide range of applications, but the following represent the **largest and most impactful uses**:

### Construction

Due to their **durability** and excellent **insulative** properties, styrenics make **buildings more energy efficient**. PS, EPS and XPS are also cheaper and more durable than other alternatives, offering solutions to challenges of affordability of sustainable housing (UN SDG 11).

**95%** reduced heat demand

**27 tons** of CO<sub>2</sub> emissions are saved per year

**€7,000** of heating costs per year

### Packaging

Styrenics offer unmatched characteristics in food packaging, providing a safe and affordable solution to keep food fresh and hygienic, **ensuring consumer safety while contributing to food waste reduction**. Very lightweight, they also contribute to save **transport-related emissions**.

Using EPS boxes to transport **20%** of all fishery products consumed in the EU per year

= fuel savings of **~1.2 million** litres, CO<sub>2</sub> emission savings



### PS dairy applications

PS is particularly suited for so-called **form, fill, seal (FFS)**, where dairy producers make their own packaging from PS sheets, **rather than being supplied with pre-formed, empty plastic pots**. FFS with PS **saves** about:

**30%** plastic material, as pre-formed pots need to be thicker to not be deformed when supplied empty

**50%** of the production process energy

**75%** of the truck loads to supply empty, pre-formed pots.

Furthermore, PS yoghurt pots are about **10-15x lighter** than glass jars.

### Healthcare

Styrenics are an effective enabler of healthcare access across the world. They offer reliable **safe, hygienic and consistent medical product packaging**.



**~80%** of petri dishes

+ **50%** of medical inhalers & drug delivery devices are made using styrenics

### Electrical equipment

Styrenics provide thermal, electrical and stress resistance combined with light weight, representing a key component for **safe, long-lasting and energy efficient devices**.



### Automotive applications

Styrenics are widely used in vehicle components like panels, trims and linings. Due to their lightweight properties, they offer considerable **weight, fuel and emissions savings**, while ensuring a **high level of passenger safety and comfort** – due to **impact resistance and absorption** and excellent insulation qualities. The use of PS enables the final components to be very durable, hence increasing the lifetime of a vehicle, while water and chemical resistance of EPS prevents degradation of components.

**300,000** tonnes of styrenic polymers

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**€500 million** were sold for use in the automotive sector in Europe in 2019

\*Wood Group UK Limited, Socio-economic analysis of styrene-based food contact materials, commissioned by Plastics Europe, December 2021. Report available upon request

# Closing the loop to achieve full circularity

Across Europe, efforts have been made by governments and the industry to realize the potential of using high-quality recycling. This shows that PS recycling is effective and only improving across Europe as part of significant efforts to upgrade capacity

## BELGIUM



Indaver launched its **Plastic2Chemicals (P2C)** plant in the Port of Antwerp, to close the loop on PS yoghurt pots. Indaver launched its Plastic2Chemicals (P2C) plant in the Port of Antwerp, to close the loop on PS yoghurt pots. Capacity will be increased to **65,000 tons per year**, collaborating with Plastics Europe members producing recycled styrenics plastics from the output of the plant. Other advanced recycling plants across Europe are in the pipeline to meet ambitious EU recycled content targets in food packaging. (+)

For more information on styrenics see here



## SWEDEN



It is one of the world leaders in plastic recycling – it has invested heavily in **Site Zero**, a facility which will use cutting-edge technology to recycle all plastic packaging from Swedish households, including polystyrene and EPS, and **make plastics completely circular – without any CO2 emissions.**

## NETHERLANDS



**PSLoop** is a pioneering project that successfully proved that solvent-based recycling technology can remove the legacy additives from EPS waste, allowing reuse and **reducing CO2 emissions by 50%.** (+)

## AUSTRIA



A strategic partnership of three industry players has launched an investment of **60 million euros\*** in a state-of-the-art sorting plant for lightweight packaging – including PS – in Ennschafn, Upper Austria. Equipped with the latest sensor technology, the plant is fully digitized and will have a sorting capacity of **100,000 tons** per year, covering **50% of Austria's** lightweight packaging sorting capacity



A 2024 UNEP report “Plastic Pollution Science” confirmed that **EPS transport packaging is one of the few packaging formats being recycled at scale and in practice on a global level.**

## FRANCE



In France, the polystyrene value chain signed the **Charte PS**, a stepwise commitment aiming for **100% polystyrene** packaging collecting and sorting **by 2025**. French producer responsibility organization (PRO) Citeo opened three sorting centers to ensure optimal sorting and recycling with over 90% material rate purity, and process **70,000 tonnes** of plastic packaging annually.

## ITALY

New sorting plant in Turin closes the loop further for plastics, including PS. With an annual capacity of **100,000 tons**, it is the largest of its kind in Italy. It integrates innovative solutions to automatically sort 17 types of plastics, aluminum, and ferrous materials, returning up to **80% of input materials** to the recycling loop. Italian National Recycling Association of Plastic Recyclers and Regenerators' (**ASSORIMAP**) 2023 annual report on mechanical recycling highlights the sector's success in isolating and recycling non-foamed PS from municipal waste, with continued progress over the past two years. (+)



The German Environmental Agency has found that the recycling rate for all plastic packaging in 2021 was **48.4%**. In comparison, for PS household packaging waste, the study confirmed a post-sorting recycling efficiency of **75%**; it is surpassed only by EPS – with a recycling efficiency of **87.5%**. (+)

This shows that PS recycling is effective and only improving across Europe as part of significant efforts to upgrade capacity (+)