A Sustainable Perspective on Styrenics

1. Introduction

As a consortium of organisations focused on the sustainable use and production of Styrene and Styrenic polymers, we recognize the importance of an international framework that addresses plastic pollution. We support the development of an internationally legally binding instrument based on science, emphasizing reuse and recycling. Nevertheless, our assessment of the current text of the Zero Draft suggests there is room for greater emphasis on a circular economy.

In particular, we believe that the approach set forth by the UNEP Secretariat, which suggests the gradual elimination and/or reduction of the supply, demand, and utilization of primary plastic polymers – among which Polystyrene (PS) and Expanded Polystyrene (EPS) are mentioned, is questionable. Polymer-specific measures which do not comprehensively address the root cause of pollution and do not take into consideration the application and possible alternatives are unlikely to yield the desired environmental benefits. On the contrary, they risk unintentionally increasing environmental damage and creating other unintended socio-economic impacts.

We also note the proposal to create a list of so-called “chemicals and polymers of concern”. Given existing Multilateral Environmental Agreements (MEAs) already addressing chemical substances, most notably the Basel, Rotterdam, and Stockholm (BRS) Conventions, it is advisable to refrain from incorporating measures related to the limitation of substances and polymers within the instrument. This serves to avoid duplication of efforts and potential conflicts, while ensuring legal clarity and consistency.

2. Styrenics: An Informed View

Styrene is the precursor for many polymers and rubbers. On an industrial scale, it is manufactured from petroleum and gas derivatives, while it also occurs naturally in small quantities in fruits, vegetables, and nuts.

Polystyrene (PS) and Expanded Polystyrene (EPS) are synthetic polymers made from the Styrene monomer. They are used in a wide range of applications, including packaging in direct contact with food. PS is easily sortable and recyclable, one of the best-suited polymers for closed-loop recycling for food applications, maintaining high quality and safety standards over multiple recycling processes. EPS, a highly versatile material consisting of 98% air, also provides a unique combination of qualities due to its excellent insulation and shock-absorbing properties, making it the material of choice for many insulating packaging and cushioning applications.

2.1 Styrene – Chemical Safety

Styrene has been studied extensively for health effects on the environment, workers and occupational use, and the general public. It is one of the best investigated high-production-volume chemicals. It is used safely in the manufacture of hundreds of consumer products for different applications, among which packaging, electronics and electrical devices, toys, automotive, and protective gear, to name some. Extensive research shows that Styrene dissipates rapidly in the air

and disappears quickly from soils and surface waters and does not persist in the human body. Lot of studies examined the potential impact of styrene exposure on worker health, especially in high-risk environments like the production of reinforced fiber plastics for windmills. However, the findings revealed limited and inconsistent evidence linking styrene to cancer. Despite widespread use of styrene in various industries and previous classifications as possibly carcinogenic to humans, this study did not consistently demonstrate a significant association between styrene exposure and cancer risk. Styrene also occurs naturally in some foods (e.g. strawberries, cinnamon) and there is no cause for concern from exposure from the levels contained in everyday consumer products.

2.2 The unique recyclability of Styrenics polymers

As above-mentioned, PS is easily sortable and recyclable, one of the best-suited polymers for closed-loop food contact recycling over multiple cycles without loss of quality or value to the material. In cooperation with the Fraunhofer Institute, several so-called “challenge tests” confirmed the outstanding cleaning efficiency of the mechanical recycling technology for PS to remove impurities from the use phase and waste streams. Purity levels of 99.9% and more of the PS recyclate were achieved[1].EPS is also 100% recyclable, with noteworthy recycling rates across the globe. EPS protective and insulated packaging is recycled at scale and in practice (above 30%) in at least 38 countries in 4 continents, covering a total population of 4.2 billion. Recent reports by Conversio and the European Commission’s Joint Research Centre (JRC) highlight the remarkable progress achieved in the recycling of PS and EPS. The Ellen MacArthur Foundation confirmed that EPS insulated, and protective packaging meets the definition of 'recyclability in practice and at scale' used in the context of the Global Commitment's 2025 targets.

Furthermore, the European PS and EPS chains have voluntarily committed to further improve recyclability and recycling rates. As one among many actions, they have contributed to RecyClass adopting Design for Recycling (DfR) guidelines for PS and EPS containers. According to these guidelines, which are based on existing infrastructure, many common PS and EPS packaging formats can achieve class A (full compatibility).

2.3 Plastic Pollution

Current methods of assessing plastic pollution are primarily based on OSPAR counting methodology. This does not provide a complete picture as it only includes floating plastic items found on beaches, translated into a metric and a target vale of a number of items found on 100 meters of marine beach. Considering the mandate for the treaty, this methodology and scope seems insufficient and inadequate. We suggest defining a harmonized methodology, aligning with already

[1] As confirmed by so-called challenge tests using the super-cleaning technologies of NGR and Gneuss, performed by SCS in cooperation with the Fraunhofer Institut für Verfahrenstechnik und Verpackung IVV: https://styrenics-circular-solutions.com/styrenics-circular-solutions-demonstrates-mechanically-recycled-polystyrene-is-suitable-for-food-contact.html; https://styrenics-circular-solutions.com/styrenics-circular-solutions-shows-with-further-challenge-test-success-that-polystyrene-can-be-mechanically-recycled-for-food-contact.html

available CEN and ISO vocabulary standards, that includes floating as well as sinking materials, from various sizes, in water soil and air all of them measured by weight.

3. Conclusions

Based on the above, proposals to list Polystyrene and Expanded Polystyrene as so-called “polymers of concern” are neither based on transparent choices nor founded on reliable and accurate information. When developing an internationally legally binding instrument on plastic pollution, it is crucial to make informed decisions supported by a transparent methodology, clear criteria, and accurate, reliable, and transparent data.