

# PolyStyreneLoop

## Circular Economy in action

Closed-loop recovery of HBCDD-containing polystyrene foam waste



### Background

HBCDD is a brominated flame retardant used in Polystyrene (PS) foam insulation boards. It is classified as a substance of very high concern (SVHC) under the EU REACH Regulation, and is also listed as a persistent organic pollutant (POP) under the UNEP Stockholm Convention. Consequently, HBCDD is subject to very strict waste management requirements.



### HBCDD in PS Foams

Since the 1970s, a substantial amount of HBCDD has been used in PS foam boards. The service life of PS Foam boards ranges from 30 to 100 years, and PS Foam only becomes waste at deconstruction of the buildings. As of 2020, there will be an increase in HBCDD-containing PS foam waste from deconstruction. Best practice handling of such waste is essential.



### The PolystyreneLoop project

The PolystyreneLoop Foundation was established in early 2016 to demonstrate the technical and economic feasibility of the safe recovery of HBCDD-containing PS foam, and the destruction of HBCDD. Its members include actors from across the whole PS foam value chain.

The project provided a large scale demonstration plant using the CreaSolv dissolution process; this technology, combined with the high-temperature incineration of HBCDD and a bromine recovery unit (BRU), will ensure:

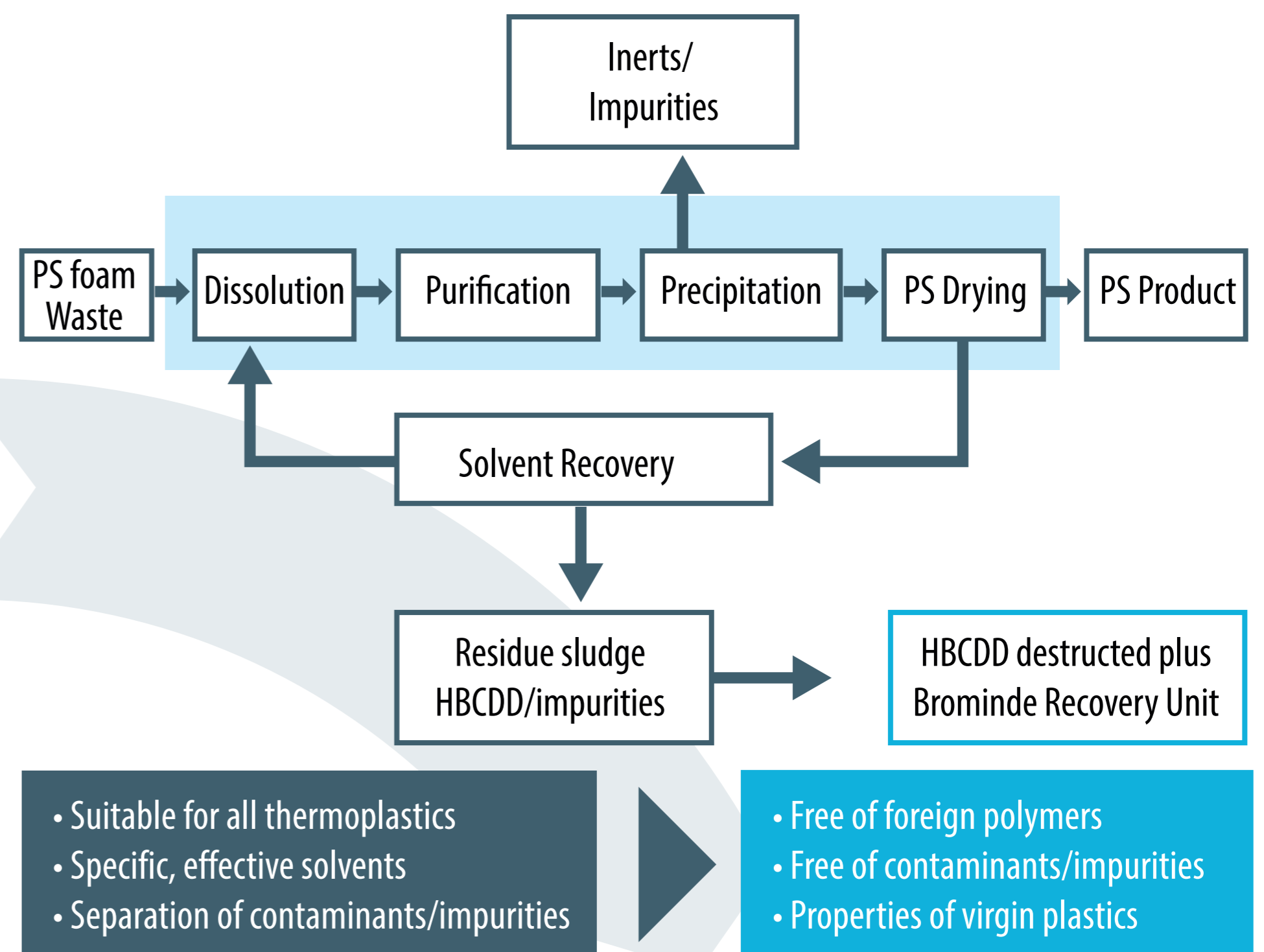
- the recycling of HBCDD-containing PS foam waste into manufacturing grade polystyrene
- the full and safe destruction of HBCDD, and
- the recovery of the bromine present in the HBCDD

The demonstration plant is planned for construction at the ICL-IP site in Terneuzen (NL); by 2018, it will have the capacity to handle 3000t/yr of PS foam waste.

### An important waste management option

The combination of these processes constitutes one of the key options available for dealing with the growing volumes of construction PS foam waste expected to come from the demolition of buildings in the coming decades. It provides a safe, controlled method of POP destruction while ensuring a significant contribution to society's ambitions as regards the circular economy.

### PSLoop -CreaSolv® PROCESS: solvent-based material recovery



### Closing the loop

HBCDD-containing PS Foam waste is first collected, sorted and compacted. After compaction, the PS foam is dissolved, and HBCDD is removed by way of the CreaSolv® dissolution process. This process, developed by the Fraunhofer Institute and CreaCycle GmbH is the technology chosen for the recycling of PS foam waste; the resulting high-quality polystyrene recyclate can be used to produce new PS foam. The removed HBCDD is destructed in an existing hazardous waste incinerator operating at a temperature of 1100 °C located at ICL-IP Terneuzen, and further processed in the adjoining bromine recovery unit (BRU), where bromine is recovered for further re-use.

### From collection to material recovery

