The feasibility of a demo plant for PolyStyrene Dissolution

The basis for discussion during the Rotterdam Conference on Circular Economy 8./9. December 2016
Participants Workshop Oct 2016
PolyStyreneLoop Stakeholders

European Regulators

Trade associations: Plastics Europe, EUMEPS, EXIBA, EFRA

Value Chain: FR and PS producers, converters recyclers, waste companies

NGO's
Project PolyStyreneLoop (1)

• Using a **dissolution process** for EPS to separate plastics from restricted substances (POPs-SVHCs) to be able to recycle PolyStyrene and convert the POP into a raw material for re-use

• Demonstrating the feasibility of destructing HBCD, recovering the bromine and recuperating the PolyStyrene from waste
Project PolyStyreneLoop (2)

- Unique process for plastics with POPs
- Right timing linked to hazardous waste classification
- Complete value chain involved within Europe
- Commitment from the value chain and strong support authorities
- Destruction of a POP within the PolyStyreneLoop process
- POP converted into bromine and PolyStyrene recovered
- Time for a demo plant due to an upcoming growing EPS waste stream with the option of further roll out over Europe
Project PolyStyreneLoop
Objectives

- Facilitate the transition to a sustainable, circular PS foam industry
  - Demonstrate that PS foam can be recycled in a sustainable manner
  - Logistics/regulatory optimism along the value chain
  - Legal status of PS foam construction waste
  - Reliable sorting and collection systems
- Ensure long term use of a compliant PS foam insulation system
- Demonstrate long term economic and technical viability
- Have a PolyStyreneLoop based demo plant UP AND RUNNING in 2018 with a capacity of 3000 mtons/y in the Netherlands
- Roll out over Europe once sufficient PS foam waste is available
Solvent based material recovery: The CreaSolv process

- Suitable for all thermoplastics
- Specific, effective solvents
- Separation of contaminants/impurities

- Free of foreign polymers
- Free of contaminants/impurities
- Properties of virgin plastics
EPC Engineering: First Layout

EPS & XPS

PS

Bromine
Planned location of PolyStyreneLoop Demo Plant 2018
Removal efficiency - BRU

- HBCD concentration increases via the CreaSolv® dissolution process:
  - from a range of 0,01-1,5% in PS foams concentrated to 20-30% HBCD containing sludge
- HBCD removal efficiency:
  - 99.7 % as a pre-treatment step
- Remaining concentration of HBCD in the recovered PS:
  - below UTC limit of 100 ppm
  - completely recovered for use in new Bromine-containing products
Destruction efficiency - BRU

- The sludge containing 20-30% HBCD is sent under best practice conditions to a Hazardous Waste incinerator
- HW incinerator (2002) with bromine recovery, operating at >1100 °C
- HBCD Destruction Efficiency in HW incinerator
  - >99.999 %
- Halogenated Dioxin/Furans emissions:
  - below emission limit value of 0.1 ng TEQ/Nm3
- Bromine from HBCD
  - completely recovered for use in new Bromine-containing products
PolyStyreneLoop project status 12/2016

• Non-profit foundation PolyStyreneLoop established Jan 2016
• Business case looks positive pending PS price/costs of waste
• Preparing investment consortium: Dec 2016
• Mapping waste streams containing HBCD for NL
• LCA study PolyStyreneLoop versus incineration Feb 2017
• Basel Convention pre-treatment text → Geneva 2017
• Demolition guideline and HBCD analysis
Contact

For more information website:

www.polystyreneloop.org


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Contacts:

Lein.Tange@icl-group.com