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## **Recycling of styrene polymers from shredded screen housings containing brominated flame retardants**

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### **Abstract**

Recycling of plastics from screen housing polymers is considered to be helpful to fulfill the requirements of the European waste of electric and electronic equipment directive. However, brominated flame retardants (BFR) and polybrominated dioxins and furans, which are partly limited in marketable products by European and German legislation, have been identified in waste screen housings and need to be eliminated. On application to housing shredder, sink and float was investigated as sorting technology, since BFR-equipped styrene polymers exhibit higher densities compared to corresponding non-BFR types. The feasibility of this concept was proven by database studies and density monitoring of waste screen housing. Laboratory and small-technical scale trials with different mixtures of TV-sets and PC monitor housings revealed that only 5-20% of the original bromine load remained in the target fractions, resulting in bromine levels between 0.18-1.39%. Recycled polymers from fractions rich in HIPS-based TV-set casings did not exceed given threshold limits for PBDD/F and octabromodiphenylether. They were recovered with yields of 52-63% and exhibited mostly virgin-like mechanical properties. In contrast, PC monitor housing fractions were characterized by low yield, high bromine levels in recycled products and brittle recycled polymers. Furthermore, pilot application of another separation approach, the specific swell and float technology, allowed the separation of upgraded HIPS qualities from bromine-reduced TV-set fractions. In contrast, this success has not yet been achieved with waste PC monitors.

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