

## Recycling of flame retardant plastics from WEEE, technical and environmental challenges

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### ABSTRACT

The European Flame Retardant Association (EFRA) combines leading companies offering the largest spectrum of flame retardants (FRs). EFRA conducted many studies on the recycling of FRplastics. This study concerns the recycling of plastics from liquid crystal displays (LCDs) and addresses the RoHS and WEEE directives (Restriction on Hazardous Substances and Waste Electrical and Electronic Equipment), requiring a higher tonnage of recycled plastics. Recycling standards are developed within the committee IEC TC111. A new technical report IEC/TR 62635 Ed1.0: "Guidelines for End-of-Life information provision from manufacturers and recyclers, and for recyclability rate calculation of Electrical and Electronic Equipment", aims for better and higher quality of recycled materials. EFRA cooperated with REWARD, a project in the ECO-INNOVATION program of FP7, with partners Recycling Consult, Coolrec/PHB and BRGM. Due to higher external fire safety requirements for TV housings in Europe, more FR-plastics need to be recycled following the recast of the WEEE directive. As a consequence WEEE plastics need to be processed by mechanical recycling instead of energy recovery. The EFRA and REWARD study describe composition, characterization, identification, size reduction and separation techniques. This article provides guidance to achieve the required plastic qualities and its limitations due to separation constraints and miscibility problems of the different plastics. A separation route on paper is developed for plastics from back covers of LCDs. It is found that a combination of mild size reduction, density separation and sensor based sorting gives the best results. Fractions are tested for their miscibility with virgin plastics by producers. The findings are of importance since presently solutions for FR-plastic separation are hardly offered.

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