

## Glass waste<sup>3</sup> recovery: new technologies for corks and plastic separation

R. Bellopede<sup>a</sup>, P. Marini<sup>a</sup>, V. Ramon<sup>b</sup>, G. Zanotti<sup>a</sup>

<sup>a</sup> *Department of Environment, Land and Infrastructure, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10139 Torino, Italy*

<sup>b</sup> *SASIL s.r.l*

Corresponding author's e-mail address: [rossana.bellopede@polito.it](mailto:rossana.bellopede@polito.it)

### Abstract

Nowadays the selection and the treatment of the glass waste is implemented in processing plants where, through sorting the foreign bodies and separation from Pb crystal, opaque bodies and the metals, a secondary raw material (SRM) - named cullet - is obtained, suitable for glass products and a glassy waste (glass waste<sup>2</sup>) still not accepted by the glass factories. While the recovery of primary glass waste is already spread and technological known, the secondary glass waste (glass waste<sup>2</sup>) is recovered by few companies in Italy from some years. Consequently the recovery of the waste of this secondary recovery process of glass waste is new (glass waste<sup>3</sup>) and therefore to optimize, in order to reach an economic and sustainable industrial process solution.

With the aim of optimizing the plant of SASIL already existing for the recovery of the "glass waste<sup>3</sup>", innovative technologies have been studied and executed. The major difficulty is in the automatic separation of materials as plastic lightweight, synthetic stoppers and cork stoppers that can nowadays find a market. In particular the solved problem is the separation for materials whose density is  $< 1$ , using non-impacting methods. The particle distribution and characterization of the waste in entrance in plant and the products obtained in different stage of treatment have been used to dimension the new plant and to suggest new kind of treatment. Among the innovative process suggested two density separation have been performed:

- separation by means jig concentrators;
- separation of new method of bath suction.

In this research the jig concentrator, at difference of the previous research don't use floatation principle but only fluid motion (without chemical addition and collectors). The same is for the "bath suction apparatus" that it needs only of water to execute the separation. The separation of efficiencies are major than 80% both for jig concentrators, for the separation of heavy plastic and glass from plastic lightweight and synthetic stoppers and cork stoppers, and for bath suction apparatus that led to separate plastic lightweight from synthetic stoppers and cork stoppers.

On the base of laboratory results, a new treatment plant has been designed and economic evaluation have been made. The materials to be trade as secondary raw materials (SRM) are about 87.5% of the total feeding and they are glass, plastic lightweight, ferrous metals, non-ferrous metals, synthetic stoppers and cork stoppers. These percentage should be related to the high amount of this kind of waste to be valorized (glass waste<sup>3</sup>), landfilled in the plant in Italy and ready to be recovered, after the implementation of the right industrial technology.