

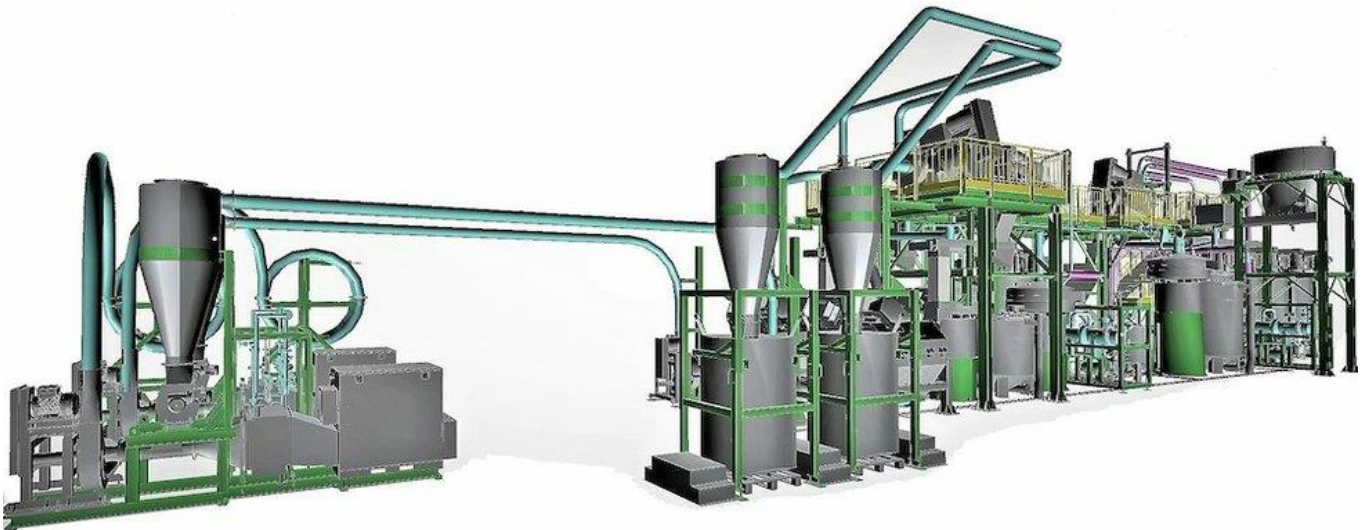
# Ink-redible

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## *Italy-based recycling machinery specialist Sorema discusses its ink-removal technology for plastics recycling plants.*

De-inking (ink removal) is a treatment by which cured ink systems are removed from a plastic substrate to allow the printed plastic packaging to be recycled and reused in the manufacturing process.

Inks and coatings are an integral part of packaging but can represent a serious challenge when trying to enhance materials and to transform packaging waste into a resource. Nowadays, market demand is growing for high-quality recycled material from post-industrial and post-consumer flexible and rigid packaging waste. This situation has highlighted the need for new recycling plants and processes for the economic removal of printing inks.



### Ink-redible

To facilitate a high-quality product, inks must be removed down to a very low level. Inks that remain in the recycled material can alter the colour and/or the transparency of the material, create defects on the final product and degrade to form odour, gassing or migratable species. The flakes and granules contaminated by ink residues are of great concern in their reuse in new food contact packaging. Once inks are removed, the plastic can potentially be recycled back into its' original application.

## Thinking about the ink

Current technologies for the recycling of printed waste rely on processes of thermal degradation of the inks in extrusion with their elimination during the degassing and filtration phase of the melt. As efficient as they may be, these processes are however unable to eliminate a high-ink loads. These can remain in the recycled polymers with consequent limitations in the materials reuse in new packaging. Sorema has therefore introduced a deinking process upstream of the extrusion phase, thus obtaining materials with minimal printing ink residues and allowing the subsequent extrusion operation to produce a high-quality polymer.

After a robust development phase in its R&D department, Sorema is now able to offer a wide range of solutions for ink removal. Technologies had been developed and installed more than 20 years ago, but required modification to address these new technical demands. The technology remains based upon the proven process of batch washing and so ensures a repeatable, defined cleaning of the substrate.

The de-inking module is an advanced washing system for the removal of inks and successfully combines several factors. These include the feeding of the incoming material with volumetric or gravimetric dosage, the controlled and independent dosage of chemical additives, and a high friction of the material in hot water with a defined residence time adjustable to each specific ink and material. In this way, customers have the opportunity to wash rigid and flexible plastic materials on a single plant.

## The missing I-ink

The recycling process is then completed by one or more rinsing and drying phases of the flakes before extrusion into granules. The Sorema de-inking process is mainly applied to post-industrial waste, but it is also being studied for use in post-consumer waste recycling plants.

Very good results have been achieved in numerous applications. Unfortunately, not all types of printing inks are completely removable. For this reason, the pilot plant line in operation at Sorema's laboratory, located in Alzate Brianza, Italy, has been optimised with the necessary full-scale modules for the de-inking.

The Sorema laboratory is available and open to customers for de-inking tests in order to validate the process with their products and optimise the chemical formulation and washing times. These tests can also be completed with the in-house extrusion phase to verify results.

### A. Flexible Packaging printed LDPE



(Before)



(After)

### B. Rigid Packaging printed PP



(Before)



(After)

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Sorema can supply complete turnkey washing and recycling plants, which can manage all stages of the process including cleaning the chemical de-inking circuit and wastewater treatment. For this purpose, Sorema offers the possibility to integrate, in the washing and recycling plant, a solution for the treatment of wastewater coming from the de-inking process. The wastewater treatment phase combines mechanical filtration processes with high-speed centrifuges, sedimentation with chemical adjuvants and purification with ozone and activated carbon treatments.

Sorema and its partners are constantly engaged in the development and improvement of technologies aiming at answering customers' requests and to the ever-changing demands of the market. As with all good recycling processes, Sorema aims to achieve the highest product quality with the lowest economic cost for production to ensure our customers remain competitive.

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