

A smart and effective way of recovering wash-out solvents

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Flexo is the dominant process in package printing. It utilises flexible printing formes fixed on sleeves or cylinders by means of special cushion mounting tapes. The raised printing areas on the flexo plates are initially inked by an anilox roller and the plate then transfers the ink to the substrate. In flexo package printing mainly solvent-based inks are used because they offer a fast drying and water-resistant ink layer. Solvents, however, are also used for the flexo platemaking process.

The main exposure provides the flexo plate with a positive relief image. During this process the formation of the printing elements starts at the plate's surface and results in the creation of conical structures. They are characterised by sharp conical flanks that ensure sufficient stability during printing.

Wash-out solvents

During the wash-out process, the unexposed and therefore non-polymerised non-printing areas are removed from the plate by means of special solvents (e.g. DuPont Cyrel Flexosol / Flint Nylosolv) and me-

chanical processing by suitable brush systems. This results in print-ready flexo plates provided with fully-polymerised printing elements according to the original image.

Disposal or recovery?

The use of special solvents poses an economic challenge to the process of flexo platemaking. This is due to the fact that decisions have to be made whether the contaminated solvent should be disposed or recovered.

Ordering wash-out solvents on market usual terms may result in

monthly purchase costs running to tens of thousands of euros – and that figure doesn't include the costs of disposal (incineration) of the contaminated solvent. Such a combination of purchase and disposal costs means a considerable financial burden on such companies. However, over the long term, it is a thoroughly uneconomic process.

Are there any alternatives?

Compared with disposal, the recovery of contaminated wash-out solvent is not only the most economical but also the most environmentally friendly solution. The installation of a solvent recovery plant is therefore an investment that will quickly pay for itself.

However, when it comes to planning the project and investing in the most suitable recovery plant, the customer needs to clarify the following issues with the respective manufacturer:

- How high is the daily solvent consumption?
- What is the daily running time of the distillation system?
- What is the source of solvent contamination? What is the level of contamination?
- How will the contaminated solvent be transported to the distillation system (for example, will it be piped and/or transported in drums, barrels or other containers)?

The Ofru ASC-500 and tank system for the distillation of wash-out solvent used in the flexo platemaking process.



Source: Ofru

- Is there a requirement for automated solvent distillation?
- How to ensure consistent distillation quality?
- How much are the overall investment and operating costs?

Solvent contamination

According to German company Ofru experience shows that the level of contamination of wash-out solvents range from 3% to 6%. More than 90% of the contaminated solvent can be recovered through distillation, and solvent that has been recovered and cleaned in this way can be reused in further wash-out processes without any restrictions.

Distillation plants for contaminated wash-out solvents

For in-house recovery of contaminated wash-off solvents, Ofru has built a distillation plant that is capable of distilling over 2000 litres of solvent per day in a fully automatic way.

Solvent contaminated with unexposed photopolymer residues is initially piped from the platemaking plant to a 2000-litre collection tank. This buffer tank is as an integrated part of the ASC-500 solvent recovery plant.

The wash-out solvent is heated in the distillation system and evaporated under vacuum conditions. This process leaves behind the photopolymer plate residues which are then expelled from the system and disposed of. The clean solvent vapour is cooled and condensed and the raw distillate is then fed into another tank, which also has a capacity of 2000 litres.

However, the evaporating of solvent mixtures with components of different boiling points may alter

Thinking in cycles

German company Ofru Recycling GmbH & Co. KG is a medium-sized manufacturer of solvent recovery plants manufacturer based in Alzenau on the edge of the Rhein-Main district. Founded in 1978, this still family-owned company can draw on four decades of distillation technology experience.

Today, Ofru is one of the world's leading manufacturers of solvent recovery plants. Its product range includes state-of-the-art distillation or vacuum distillation plants for combustible and aqueous solvents. As well as small plants that can process up to 50 litres of contaminated solvent per day, it also offers fully automatic evaporators capable of recovering up to 2000 litres per hour.

Its recovering plants are suitable for a broad range of solvents, including the ones typically used in flexo printing such as ethyl acetate and ethanol, toluene, which is used in gravure printing, and all the familiar organic wash-off solvents for flat flexo plates or sleeve mounted flexo plates.

The company's ongoing success is built on a comprehensive technical know-how of processes in many industries. Its well-equipped and state-of-the-art research and development department is responsible for technical innovations that have benefited printers, ink manufacturers as well as the chemical industry in general.

the overall composition of the distillate and, as a result, the properties of the recycled solvent may change. To counter this effect, the raw distillate needs to be adjusted accordingly. Appropriate test procedures and solutions to allow these adjustments to be made are available from the manufacturers of the respective chemicals.

Adjustment of the recovered solvent

Following distillation, a sample is taken from the raw distillate container in order to determine the amount of fresh solvent necessary for adjustment. This is due to the fact, that the solvent may lose its "cleaning power" because low boilers may evaporate in the continuous process of distillation. In order to re-achieve the original solvent quality, the specified quantity of fresh solvent is transferred from a drum to the raw distillate container and then mixed using a pump. The cleaned and thus adjusted recovered solvent is then pumped into a 2000 litre storage container and from there it is piped as needed to

the plate washing plant. As a result, solvent distillation is a closed-loop and environmentally friendly recycling process.

Summary

The concept of solvent recovery through distillation offers two major advantages. The only solvent that needs to be purchased is the one necessary to perform the aforementioned adjustments. In addition, the quantity of waste to be disposed is cut by 90%. As far as the platemaking process is concerned, this results in a considerably improved solvent balance in both economic and environmental terms.

Against this background, prepress companies also make a significant contribution to protecting the environment by cutting the considerable amount of CO₂ that would otherwise be emitted when incinerating contaminated solvents.

In summary, any investment in distillation plants such as the ASC-500 makes sense not just financially but is also a clear ecological contribution to conserving resources.

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