



## Customer Information

# Suitability of Siegwerk printing inks for the production of compostable packaging<sup>1</sup>

### 1. Suitability of printing inks within the present regulatory framework

Under European regulations<sup>2</sup>, packaging can only be called compostable and biodegradable when certified in accordance with the criteria of the European standard EN13432.<sup>3</sup>

This standard covers packaging as a whole. Consequently, printing inks are treated as constituents that cannot be called "compostable" *per se*. Therefore, "compostability" in relation to printing inks for packaging has to be seen in conjunction with the compostability of the substrate. Any reference to "compostable printing inks" isolated from the packaging as a whole is therefore meaningless under existing regulations.

In fact, the compostability of printed packaging largely depends on the properties of the substrate. Printing ink layers are very thin (1 to max. 5 µm) and usually account for only 0.5 to a maximum of 5 percentage by weight (wt%) of the packaging. With regard to printed layers the principal requirements for compostable packaging – biodegradation, disintegration and compost quality – can be achieved by choosing the appropriate printing inks.

Accordingly, as a rule, current printing ink technologies and product families are suitable for the production of printed compostable packaging. Under existing regulations, a fundamentally new formulation of printing inks, comprising of biodegradable and/or natural binders and pigments, is not necessary.

### 2. Requirements for packaging recoverable through composting and biodegradation (EN 13432)

Packaging may be certified as compostable under EN 13432 when the following criteria are met:

#### A. General requirements

Each individual printed package must comply with the specific heavy metal (arsenic, lead, cadmium, chromium, copper, molybdenum, nickel, mercury, selenium, zinc) and fluorine limits. Since the limits for these substances are very low, not only the printed layers but all constituents of the packaging need to be considered. Accordingly, it remains within the printer's responsibility (preferably in cooperation with his customer) to specify the resulting tolerable maximum heavy metal and fluorine content in the printing inks and/or to restrict the maximum grammage for the intended prints.

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<sup>1</sup> Applicable in Europe. Based on the customer information „Biologische Abbaubarkeit von Druckfarbenschichten, October 2016“, German printing ink industry association VdL, <https://www.wirsindfarbe.de/>.

<sup>2</sup> Understanding the CEN Standards on Packaging and Environment“, European, Februar 2006. <https://europa-packaging.eu/>.

<sup>3</sup> “Packaging - Requirements for packaging recoverable through composting and biodegradation – Test scheme and evaluation criteria for the final acceptance of packaging“, EN 13432, September 2000.



These allowed contents should be derived from the highest intended mass share of the printed ink layers on the final package. The thicker the substrate, the thinner the ink layer and/or the lower the ink coverage and grammage, the higher the allowable amount of these substances in the inks.

This is particularly important in cases of green or blue shades, printed with inks containing copper-phthalocyanine pigments, and gold inks using metallic copper-zinc pigments. These inks can easily exceed the limits for copper, even when the packaging substrate is substantial and the coverage of the green/blue/gold ink is low.

B. Selection of printing inks as packaging constituents

For manufacturers of compostable packaging, it is usually best to consider printing inks as a non-biodegradable part of the packaging.

However, the following restrictions apply in this case:

**Each such component (printing ink, adhesive, ...) may have a maximum content of less than 1% by weight of the total packaging and the sum of all such components must be less than 5% by weight.**

Example: 50 g/m<sup>2</sup> fully biodegradable film, 1 g/m<sup>2</sup> ink grammage

- full cover printing with one ink: NOT compliant with EN 13432, as ink share would be approximately 2 wt% (> 1 wt% limit for one component);
- 49% ink coverage: compliant with EN 13432, as ink share would remain <1 wt%;
- full cover four-color printing (same ink share): compliant with EN 13432, as the share of each ink would be 0.5 wt% (< 1 wt% limit for one component) and for the sum of the four inks 2 wt% (< 5 wt% overall limit).

In addition, printing inks need be tested for eco-toxicity on compost in accordance with both tests described in EN 13432 chapter 8.2 and Annex E. There must be no relevant negative effects on plant growth.

The certification of printed packaging is possible on the basis the “non-biodegradable components”, provided that the printing inks have been qualified for the absence of ecotoxicity and the individual printing ink remains restricted to a maximum of 1 wt%. Furthermore, the individual printing inks must be specifically selected according to the requirements for heavy metal and fluorine content mentioned above.

### 3. Notes on composting

Compostable packaging is generally not considered a solution to littering. It must be clearly understood that even compostable packaging should not be disposed of in nature. Such packaging usually needs special composting conditions in industrial facilities for decomposition to take place. In the environment (such as in rivers, the sea or soil) these are not met, so decomposition occurs either very slowly or not at all. In this respect, compostability should not be taken as an invitation to dispose of waste in the natural environment.



While it is of course sensible to dispose of compost bags and similar collection materials together with their biological waste contents in appropriate disposal facilities, other materials should be recycled or properly disposed of as much as possible. Valuable resources (e.g. paper) would otherwise be wasted in the compost. Furthermore, correct recycling or disposal avoids unnecessary release of non-compostable components into compost and consequently the environment.

#### **4. Conclusion**

In support of converters, Siegwerk is able to fine-tune and offer a wide range of printing inks and print solutions which allow the production of packaging certified in accordance with EN 13432. This covers the field of solvent- and water-based inks, as well as oleo-resinous offset inks<sup>4</sup>.

We offer several ink series that are already certified as non-compostable components for use with compostable substrates, according to EN 13432:

- NC 195-series (solvent-based)
- NC 239-series (solvent-based)
- UniT-series (water-based)
- UniBase-series (water-based)

Most products of these series can be used under the OK-Compost “home” and “industrial” certificates, or certification schemes according to EN 13432 of other testing institutes within their applicable use limits (see above).

Please note, in order to meet the maximum allowable concentrations of heavy metals, some compromises in color shades will have to be accepted for gold, blue and green inks. In fact, as a rule, the use of normal copper phthalocyanine-based pigments and gold bronzes made of copper/zinc alloy must be severely limited or avoided, by replacement with less bright or glossy alternatives, in order to meet the copper and zinc thresholds. Please contact your Siegwerk representative prior to using individual inks for compost-certified packaging with regards to these limitations.

**For additional information on these and further products, please contact your Siegwerk representative.**

The information in this document reflects Siegwerk’s policy and commitments. This statement is valid without signature.

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<sup>4</sup> Due to their particular chemical nature as cross-linked and comparatively thick, plastic-like layers that might conflict with disintegration requirements, it is at present uncertain whether UV and EB cured inks are eligible for production of compostable packaging. However, individual customer results indicate that these inks may also be suitable for compostable packaging.