



Customer Information

Chlorine and other halogens (fluorine, bromine, iodine) in printing inks

The printing ink industry uses chlorinated organic compounds in different applications. Various pigments, resins, additives or preservatives, as well as substrates for printing inks, are based on “chlorine chemistry”.

Many - but by no means all - chlorinated compounds are classified as hazardous substances due to their toxicological profile. This applies to inorganic chlorinated compounds, which can release chlorine gas or hydrochloric acid, and to chlorinated organic compounds.

Substances that are classified as toxic, or highly toxic, are excluded from intentional use in printing inks via the EuPIA Exclusion Policy. According to Annex XVII REACH Regulation (EC) No. 1907/2006¹, the use of numerous chlorinated compounds in products and thus also in printing inks is prohibited. Siegwerk complies with this ban **worldwide**. In addition, the EuPIA Exclusion Policy prohibits use of other critical chlorinated organic compounds. Siegwerk also complies with this exclusion **worldwide**.

Despite this, the answer to the frequently asked question “Can printing inks contain chlorine?” is often “Yes”.

It is important to point out that when the answer is yes, chlorine is neither free nor biologically available, but is a constituent part of the corresponding molecules. Typical pigments used in inks, which can be considered as the main source of chlorine from printing inks, have a chlorine content of 5 to 50% by weight. Some important examples are summarized in the following table:

Color Index	Pigment type	Color Index	Pigment type
Pigment Yellow 12	Diarylide yellow	Pigment Red 166	Disazo
Pigment Yellow 13	Diarylide yellow	Pigment Red 184	Naphthol AS
Pigment Yellow 83	Diarylide yellow	Pigment Red 242	Disazo
Pigment Orange 34	Diarylide orange	Pigment Green 7	Cu-Phthalocyanine, chlorinated
Pigment Red 53:1	β-Naphthol, Ba	Pigment Violet 23	Dioxazine
Pigment Red 146	Naphthol AS		

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006R1907-20240606>



The reason for using chlorine in these pigments is the required color shades and the desired light fastness of the pigments. Without chlorine, it would be practically impossible to achieve these properties. The complete replacement of pigments based on lead, cadmium, mercury and chromium (VI) in the printing ink industry was only possible due to these pigment advancements.

Other chlorinated raw materials in printing inks can include binders and resins, (e.g. polyvinyl chloride (PVC), or other chlorinated polymers – used as binders for special applications in flexo/gravure printing, screen printing and UV flexo/offset printing), or additives and preservatives usually in very small quantities, if at all.

The question of chlorine in printing inks is usually raised in the context of waste incineration, as there is a connection to the formation of dioxins (more precisely polyhalogenated dibenzodioxins and polyhalogenated dibenzofurans) and regulatory requirements exist in this regard².

Interestingly, there is evidence that the amount of dioxins produced during the waste incineration process is mainly independent of the amount of chlorine in the incinerated waste³. In addition, the technology of incineration plants has been improved to such an extent that the amount of dioxins produced has been significantly reduced. Studies on the situation in French⁴ and Japanese⁵ waste incineration plants are examples of this.

In summary, the following conclusions can be drawn: Chlorinated printing ink components have no significant influence on the toxicology and ecotoxicology of printing inks and materials printed with them.

Other Halogens

In rare cases, pigments and photoinitiators may contain fluorine (not PFAS according to EU definition⁶), bromine or iodine as a structural component.

Other fluorinated organic components can be used by the printing ink industry, but are generally restricted to polytetrafluoroethylene (PTFE) waxes, which give the products a certain slip and abrasion resistance. PTFE waxes fall under the EU definition of PFAS. Siegwerk has committed itself - in consultation with its customers - to remove PTFE from the products it manufactures by the end of 2024.

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

² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02010L0075-20110106>

³ https://www.researchgate.net/publication/248713993_The_Role_of_Chlorine_in_Dioxin_Formation

⁴ <https://hal.science/hal-01632399>

⁵ <https://www.env.go.jp/content/900453393.pdf>

⁶ <https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e18663449b>