



Customer Information

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

The printing ink industry uses chlorinated organic compounds in many fields of application.

Pigments, binders, some additives and some preservatives as well as substrates for printing inks are based on “chlorine chemistry”.

Many, but by far not all chlorinated compounds are recognized to be hazardous substances due to their toxicological potential. This is true for inorganic compounds that may release chlorine or hydrochloric acid, as well as for chlorinated organic compounds.

Substances which are classified as toxic or highly toxic are excluded under the EuPIA Exclusion Policy as raw materials for printing inks. A number of chlorinated compounds is banned from use in products under the REACH Regulation (EC) No 1907/2006, Title VIII/Annex XVII (formerly regulated by the Directive 76/769/EEC, relating to restrictions on marketing and use of certain dangerous substances and preparations) and its amendments, thus these are banned from use in printing inks as well. Siegwerk applies this ban on a global scale.

Beyond that, the EuPIA Exclusion Policy bans some further critical chlorinated organic compounds. This exclusion is as well globally applied by Siegwerk.

The answer to the frequently asked question “is chlorine contained in printing inks?” has to be answered partially with “Yes”.

It is important to highlight the fact that this “chlorine” is not free and bioavailable, but is a constitutional part of the relevant molecules. Typical printing ink pigments, the main origin of “chlorine”, have the following chlorine contents.



Colour Index	Pigment type	Chlorine content (%)
Pigment Yellow 12	Diarylide yellow	11,3
Pigment Yellow 13	Diarylide yellow	10,4
Pigment Yellow 83	Diarylide yellow	17,4
Pigment Orange 34	Diarylide orange	6,4
Pigment Red 53:1	β -Naphthol, Ba	6,9
Pigment Red 146	Naphthol AS	6,1
Pigment Red 166	Disazo	17,9
Pigment Red 184	Naphthol AS	7,7
Pigment Red 242	Disazo	24,1
Pigment Green 7	Cu-Phthalocyanine, chlorinated	47,9
Pigment Violet 23	Dioxazine	12,5

The reason for the chlorine content of these pigments is their synthesis route and, most importantly, the required colouristic and fastness properties. Only the availability of these pigments made possible the complete replacement of pigments based on lead, cadmium, mercury and chromium(VI). It is practically impossible to achieve the colour shades required by the market without chlorinated pigments.

Further raw materials necessary for the formulation of printing inks, such as binders (resins), plasticizers, oils, solvents, waxes, slip agents and other additives do as a rule not contain “chlorine” as constitutional component.

Exception is polyvinyl chloride (PVC) and its copolymers. PVC and other chlorinated polymers have a certain role as binder for special uses in flexo/gravure packaging, in screen printing and in UV flexo/offset printing inks.

The question as to „chlorine“ in printing inks is normally raised in the context of the incineration of wastes, linked to a potential hazard due to formation of dioxins (more precisely: polyhalogenated dibenzo-p-dioxins and polyhalogenated dibenzofuranes).

However, new knowledge on the mechanism of formation of dioxins has been gained by studies on incineration techniques. In fact, the extent of formation of dioxins during incineration is largely independent from the amount of chlorine-containing material (and as well of copper content) in the waste.



In summary the following conclusion is valid: chlorinated printing ink components have no detrimental effect on the toxicology and ecotoxicology of printing inks and printed articles. Furthermore, an adverse impact on their proper recovery and elimination cannot be construed.

Fluorinated organic compounds are used in certain particular cases by the printing ink industry. These are polytetrafluoroethylene waxes that allow certain slip and rub resistance properties. In these particular cases the concerned products may contain max. 0,5% fluorine.

Brominated and iodinated organic compounds are as a rule not used by the printing ink industry.