INK, HEART & SOUL

SIEGWERK

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 a chlorine content ranging from 5 to 50%. Some pertinent examples are listed in the table below.

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	ß-Naphthol, Ba	Pigment Violet 23	Dioxazine
Pigment Red 146	Naphthol AS		

The reason for the chlorine content of these pigments is their synthesis route and, most importantly, the required coloristic 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 color 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 in principle not used by the printing ink industry.

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