

Photopolymer Plates: POSSIBLE ROUTES OF EXPOSURE

POSSIBLE ROUTES OF EXPOSURE – Key manufacturers of flexographic plates stress the ‘safe’ and environmentally friendly characteristics of their ‘water wash’ plate products. SDS sheets are incomplete and monomeric ingredients are not known due to patents. However, over the decades, there are continuing reports of legal cases from workers, printers and artists who got sick from supposedly ‘safe’ products and processes related to flexographic photopolymer printing. Caution is advised! Protective measures are essential to safely enjoy the benefits of this unique artistic process.

Multiple users of common flexographic plates reported a varying degree of VOC fume emissions that may occur during the final stages of manual plate making. For example, one print studio stresses that completing the polymerization process by re-exposing the plates to UV light is essential to prevent the off-gassing of VOC emissions (Zea Mays Research). As a plate is lifted out of the bath of wash-out water it is exposed to air, and then there appears to be a strong smelling oxidization reaction during scrubbing outside of the bath. (Some users notice this more than others).

It would appear that for safe and best practice users need to be aware of this, and wear a mask with carbon filter (with organic+acid protection!) especially during that final plate making stage until the plate is fully rinsed and dried. Also, good ventilation/extraction would seem essential throughout the process. A dry, warm environment during plate curing (or working in the sun!) will aid polymerization and may prevent excessive release of fumes. Some flexographic plates are known to emit carcinogenic VOCs such as vinyl chloride, formaldehyde, styrene or benzene, but each manufacturer have their own proprietary process, formula and toxicity. Often the plate chemistry is based on a PVC/Nylon mix (over 50%) with acrylate additions. Caution is always advised when using this process, and the cheapest plates are known to be the most hazardous. The flexographic printing industry themselves voice internal concerns over chemical reactions that may occur on the plate emulsion due to oxidization and contact with air.

REACTIVITY EXPLAINED: flexographic plates contain large quantities of monomer which needs to be activated for curing and made light sensitive through a large amount of powerful photo-sensitizing agents.

Types of chemistry used for photopolymers include styrenic polymers, nitrile rubber and acrylated polyurethanes. Vinyl chloride -based plates may contain traces of mercury.

(<https://photopolymer.com/printing-plates/flexography>)

The most powerful photo initiators used are the highly reactive and dangerous ‘free radical’ type (phosphoryl or fluoride-based; also: benzene derived).

Possible Routes of Exposure during Plate Scrubbing / Wash out, and Example:

The combination of exposure to ambient light, carcinogenic reactive monomers with free radical photo initiators, scrubbing pressure, water and oxygen from ambient air, during the final plate processing stage may create opportunity for the release of highly toxic vapors and mists as the unexposed plate emulsion is scrubbed, stripped away and dissolved; these fumes may be very hard to detect.

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Also of interest may be the fact that industry sometimes employs 'photoacid generators' (PAGs) embedded in the photopolymer that may become active as an emulsion stripping agent during the final stage of processing. Only experts know the exact mechanics and hazards connected to this highly complex chemistry, and formulations change frequently. Caution!

3 HAZARDS IDENTIFICATION (from an older sds sheet): Most Important Hazards Eye contact or skin contact with the material may cause some irritation.

Dermatitis may occur in some serious case.

The material contains small amount of hazardous ingredients or the ingredients of insufficient investigation of hazards.

Inflammable with the existence of ignition sources

Specific Hazards Prolonged inhalation of fumes or gases generated from the material during the processing operations may cause headache, respiratory irritation. Main Symptoms

Dizziness, Headache, Irritation to eyes and skin

always check current SDS information prior to use, or consult with a chemist or industrial hygienist. See below for professional plate processing equipment with extraction.

<https://nontoxic-print.com/>