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Water-based inks: Chemical category findings

Four water-based ink product lines were assessed in the flexo ink study. This chapter addresses the health concerns that were analyzed in the study for the general population and for flexo workers.

To be considered "water-based," an ink must contain less than 25% VOCs by volume. However, the range of VOCs in water-based inks can be very large. For example, the VOC content of the water-based inks in the study ranged from 1% to 14%. Some of the water-based inks also contained HAPs.

General population

No chemical categories with *clear risk concern* to people living near a printing facility were identified in the water-based systems that were studied, and most categories presented a negligible concern. Alcohols (functioning as solvents) in two water-based formulations showed *potential concern*, based on toxicological data. The use of press-side additions increased concern for some formulations.

The general population was not found to be at clear risk concern, in part because the study design made specific assumptions that resulted in little anticipated exposure to people living near facilities. For example, the surrounding population was assumed to live a minimum of 100 meters distant from the facility. If in actuality people live closer to a facility than 100 meters, and/or if a facility operates under conditions that result in substantial VOC emissions, neighbors could be at risk for health effects.

Flexo workers

Table 9 lists the chemical categories in water-based inks that were predicted to pose a clear risk concern for workers under conditions of the study. Five categories had chemicals showing clear concerns for health risk via dermal exposure, and three categories contained chemicals showing clear risks via inhalation. Alcohols, amides or nitrogenous compounds, and ethylene glycol ethers showed risk concerns for *both* dermal and inhalation exposure.

Chemicals in these categories were predicted to drive worker health concerns. When assessing inks at a flexo facility or developing new formulations, you might start with these categories.

TABLE 9 Clear Occupational Health Risk Concerns of Water-based Inks

Chemical Categories of Clear Risk Concern*	Function in Ink	Exposure Route**
Alcohols	Solvent	dermal, inhalation
Amides or nitrogenous compounds	Multiple	dermal, inhalation
Ethylene glycol ethers	Solvent	dermal, inhalation
Organic pigments	Colorant	dermal
Organometallic pigments	Colorant	dermal

*These chemical categories might be associated with different risks, or with no risk at all, under different study conditions. A category is included in the table if at least one chemical in the category posed a clear risk under the conditions of the study. Not all chemicals in these categories were found to present risk concerns.

**Only pressroom workers were assumed to have exposure via inhalation. Both prep-room and pressroom workers were assumed to have dermal exposure.