# Printing Process Chemicals and health effects

The typical printing processes, types of substances associated and their potential health effects.

| ***Process or activity*** | ***Type/name of substance*** | ***Potential health effects*** |
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| Etching, engraving, platemaking, certain photographic reproduction systems, correction of litho plates using deletion fluids | Corrosive acids, eg concentrated nitric and sulphuric acids, hydrofluoric acid | Skin burns and blisters<br>Burns with concentrated hydrofluoric acid are very severe<br>Eye damage |
| Concentrated photographic developer solutions | Hydroquinone | Irritant to eyes but may cause permanent damage<br>Irritant and sensitising to the skin, may cause dermatitis |
| Photographic fixer solutions | Acetic acid, acidic salt solutions (eg sodium thiosulphate) | Irritant to eye/skin |
| Hardener added to photographic fixer solutions | Dilute formaldehyde solution | Irritant to eye/skin<br>Frequent contact may lead to skin sensitisation. Formaldehye may cause cancer. |
| ***Adhesive laminating***<br>Use of polyurethane lacquers | Isocyanate prepolymers | Irritation of airways and lungs (high concentration)<br>Occupational asthma could occur even at low levels |
| ***UV*** and electron beam curable inks, varnishes and lacquers | Reactive acrylates or methacrylates | Corrosive to skin, eyes and mucous membranes<br>Potential for skin sensitisation |
| High-speed printing - ink misting | | Irritation of respiratory tract<br>Potential for occupational asthma |
| ***UV*** lamps for photo processing, UV curing, corona discharge | Ozone | Irritation of the upper respiratory tract<br>Headaches and nausea |
| ***Lithographic*** platemaking, **Gravure** cylinder preparation, photoengraving, photographic bleaches | Dichromates, eg ammonium, potassium and sodium dichromates | Very corrosive<br>In high concentrations can cause deep ulcers<br>Potential for skin sensitisation<br>May cause cancer and may cause harm to the unborn child |
| ***Lithographic*** fount solution, blanket restorers, cleaning solvents | Alcohols such as isopropylalcohol (IPA), white spirit | Dermatitis<br>Dizziness, drowsiness and other effects on the central nervous system |
| ***Lithographic*** blanket restorers, cleaning solvents | Methyl ethyl ketone (MEK) and white spirit | Dermatitis |
| | Chlorinated hydrocarbons e.g dichlormethane<br>Ketones e.g (MEK), | Dizziness, drowsiness and other effects on the central nervous system<br>Cardiac arrhythmia (high concentration)<br>Affects liver and kidneys on long-term exposure |
| ***Gravure / flexographic*** various inks | Ketones (e.g. MEK,), in some gravure inks<br>Alcohols e.g. Trade Specific Denatured Alcohol),IPA, n-propanol<br>Esters (e.g. ethyl acetate, | Dermatitis<br>Dizziness, drowsiness and other effects on the central nervous system |

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| | acetate-propyl acetate)<br>Aromatic hydrocarbons, e.g. toluene, xylene in publication gravure inks | |
| ***Gravure*** -Laser engraving of cylinders | Metal fume | Irritation of respiratory tract, 'flu-like' illness (metal fume fever depending on the metal) |
| ***Flexographic/ letterpress*** making plates | Perchloroethylene | Dizziness, drowsiness and other effects on the central nervous system via inhalation |
| ***Screen*** UV-cured inks | | |
| ***Screen*** Inks | Ketones (e.g. cyclohexanone)<br>Aromatic hydrocarbons (e.g. xylene). Propylene glycol ethers and their esters.<br>Phthalates | Dermatitis<br>Dizziness, drowsiness and other effects on the central nervous system via inhalation<br>May effect male hormones |
| ***Screen*** Cleaning chemicals | Strong alkalis, e.g. concentrated sodium or potassium hydroxide<br>Oxidisers, sodium hypochlorite<br>Solvents | Corrosive to skin, eyes and mucous membrane<br>Dizziness, drowsiness and other effects on the central nervous system |
| ***Digital (ink-jet) printing*** | Methyl ethyl ketone<br>Propanol | Abnormal heart rhythm and rate(high concentration)<br>Affects liver and kidneys on long-term exposure<br>Dizziness, drowsiness and other effects on the central nervous system |
| ***Dyeline printing*** | Ammonium hydroxide | Irritation of respiratory tract (as ammonia vapour) |