



Printing

Medium Risk Sector



Applying ink or dye to different materials, predominantly papers of various qualities.

Related Sectors:

- Pulp and Paper
- Chemicals, Plastic and Paints



Production Processes

Printing is the industrial process of producing and reproducing texts and images in multiple copies, typically with ink on paper using a printing press. The main printing techniques include letterpress, flexography, offset lithography, gravure and screen printing.

Letterpress is still widespread in the newspaper industry and for printing books. Usually, the text and images to be printed are set in lead using individual letters. This yields a raised top surface which is inked and then pressed against the substrate to transfer the image.

Flexography is used in the packaging and wrapping industry. The technique is similar to the letterpress, but the image carrier is a plate instead of individual letters. The advantages of flexography are the wider range of usable inks and the possibility of printing on different materials such as cardboard boxes, plastic packaging, paper napkins or wallpaper.

In contrast to flexography, **lithography** is used to print on smooth surfaces, primarily paper. An oil-based image is etched with acid into a surface. Modern techniques derived from traditional lithography include offset printing, photolithography and granolithography.

For **intaglio or (roto-)gravure** the image to be printed is carved or engraved on an image-carrier, usually on copper or zinc plates. After engraving the image-carrier is covered in ink. The ink is then rubbed away from the surface, to remain only in the incisions. The plates are then covered with a damp sheet of paper and run through a printing press which transfers the ink to the paper. Intaglio printing is often used in the production of paper money.

Screen printing, also known as silk-screening or serigraphy, is based on a porous fabric and a stencil. The stencil is produced on the screen either photo-mechanically or manually to protect the non-printing areas. Screen printing is a very versatile printing technique. It will print on substrates of any shape, thickness and size such as paper, plastics, glass, metals, fabrics and wood, and will produce posters, electronic circuit boards, printed textiles, etc...

Risks & Opportunities

- **Solvents, inks, paints and varnishes as well as heavy metals may lead to site contamination.**
Substances used in printing range from (organic, chlorinated) solvents through paints and varnishes to heavy metals such as lead. Handling losses and leaks from machinery may lead to the contamination of buildings, soil or groundwater.
- **Wastewater may be contaminated with (toxic) substances used in printing.**
Wastewaters from printing operations may contain lubricating oils, waste ink, solvents, detergents, photographic chemicals, acids, alkalis, and plate coatings, as well as metals. Appropriate disposal of wastewater and liquid waste mitigates risks to human health and the environment.
- **Volatile substances emitted to the air may be a nuisance and a risk to human health.**
In printing, large amounts of volatile substances are used, such as solvents, solvent-based inks, wetting agents and photographic chemicals. Uncontrolled emissions to the air may result in local air pollution.
- **Hazards arise from chemicals used in the printing process, paper handling and cutting machinery.**
Substances used in printing (solvents, photochemicals and cleaning fluids) present a risk to workers' health. Handling of heavy paper rolls and equipment for cutting paper entail risks of injuries. Standard precautionary measures can minimize most of these risks.

Sustainability Issues

L	Energy
L	Water Use
M	Emissions to Water
M	Waste
M	Emissions to Air
L	Ecosystems
M	Workplace Health & Safety
L	Disaster Risk
H	Site Contamination

Sector Rating

- H** High risk issue
- M** Medium risk issue
- L** Low risk issue