

Guidance for printers on the safe use of energy curing printing inks and varnishes

The purpose of this document is to provide guidance to printers on the safe use of Ultraviolet (UV) / Electron Beam (EB) inks and varnishes. This document is complementary to the respective supplier's safety data sheet (SDS).

Energy curing technology is important in the production of all types of printing applications where their fast drying, durable and high gloss finish make them suitable for immediate use.

For this purpose, two major energy sources are used: ultraviolet lamps and electron beam equipment. Both emit energy, which directly converts appropriate reactive liquids to solids.

1. Product hazards

UV/ EB curing acrylates, which are among the main raw materials in this type of ink, can cause skin and eye irritation. The effect on skin can depend upon intensity and duration of contact as well as individual susceptibility. Certain individuals may develop sensitisation or experience an allergic reaction after repeated exposure and for this reason will need to be removed from the source of contact (e.g. the department/printing machine where such inks are in use).

Since energy-curing products are not corrosive, their presence on the skin may not be noticed immediately. This increases the potential for skin irritation and normal day to day activities may spread the effects to other parts of the body. It would be preferable, at an early stage (e.g. personnel selection prior to hire new employees) to avoid hiring persons known to have a history of skin sensitization, if it is known that the worker will be exposed to these raw materials.

Some products may be eye irritants and care has to be taken to prevent these products from coming into contact with the eyes as well as more sensitive areas such as mouth and nose.

With high-speed printing presses small ink droplets may become airborne. The mist formed has the potential to present a hazard from inhalation and may be irritating to the skin or respiratory tract or sensitising to the skin. Therefore, it is essential that appropriate air extraction, e.g. Local Exhaust Ventilation (LEV), is installed on the printing presses.

2. Safe handling

Skin contact should be avoided. Long-sleeved protective clothing should be worn as it provides adequate protection against the risk. If contaminated it should be changed immediately. Contaminated clothing should be laundered at a commercial laundry before re-use. Do not take contaminated clothing home for cleaning.

Gloves that are resistant to energy curing products must always be worn when direct contact with the material is possible. For advice on the safe use of gloves, refer to suppliers' safety data sheets

and technical information from glove manufacturers. Further information can also be obtained from the websites of ESIG (https://www.esig.org/wp-content/uploads/2018/03/use_gloves-when-working-EN.pdf) and RadTech Europe (<http://www.radtech-europe.com>).

In the event of an accidental contamination of the skin, the affected area should be thoroughly washed with neutral pH soap and water. Solvents must not be used as they will degrease the skin facilitate the passage of chemicals through skin and possibly promote irritation. In case of accidental skin contact avoid concurrent exposure to the sun or other sources of UV light, which may increase the sensitivity of skin. Recommended barrier creams should be applied to clean skin before starting work; they should not be applied after contamination.

Safety glasses or other adequate eye protection (please refer to Section 8 of printing ink SDS for the type) must be worn whenever handling any chemicals. In the case of splashing into the eyes, wash thoroughly with a plenty of water for at least 15 minutes, ensuring that contact lenses, where worn, are previously removed. Refer to product SDS and seek medical advice immediately. Avoid sources of light as they may increase eye sensitivity.

UV lamps emit high intensity UV (and visible and infrared) light. Therefore, it is necessary to ensure that suitable screening is used to protect the operators from possible skin and eye effects. In addition, ozone may be generated from the lamps. It is essential that UV lamp housing extraction is sufficient to provide good working environmental conditions.

Ionising radiation is emitted from EB-curing systems and must therefore be adequately shielded and, furthermore, must meet any national ionising radiation regulations or Approved Codes of Practice.

Accidental ingestion of UV / EB printing inks may occur through poor working practices. Therefore, eating, drinking and smoking should be prohibited in the immediate area where these products are being handled. Hands must always be washed before break periods. In case of accidental ingestion do not induce vomiting, seek medical advice immediately. Take the SDS to the doctor.

3. Spills/Disposal

Good levels of hygiene must be always maintained and spillages must be cleaned up immediately.

Energy curing systems remain wet unless exposed to the appropriate energy, so spillages and accidental contact can spread to other places. Ensure that no material is accidentally transferred to any parts of equipment or other departments through contaminated shoes and clothing.

In common with many other materials, the uncured products are typically classified as "hazardous waste" for disposal purposes; thus waste disposal should be carried out according to national regulations. It is not anticipated that they would have an adverse effect on the disposal process.

Any used wipes from clean-up or wash-up operations should be placed immediately in a separate, labelled container in order to prevent accidental exposure of other personnel in the work area and should be treated appropriately by waste disposal regulation or special laundry. In case of rags that are cleaned by a contractor and then reused, inform the contractor prior to sending them huge amounts of contaminated wipes or rags.

A large spillage should be contained and removed with non-combustible material such as sand, earth or inert inorganic adsorbing medium. The spill area should then be thoroughly washed with hot detergent solution. Since energy curable materials will not dry by evaporation, it is important that

any spill is completely removed, leaving only clean surfaces. Otherwise, these materials will remain wet and this will result in a continuous source of exposure.

With regard to laboratory equipment, if mercury lamps are used, full attention must be paid to their disposal in order to avoid contamination.

4. Conclusion

All types of UV/EB products can be handled safely as long as the user is trained in and observes all recommended safety procedures.

Always refer to the supplier's Safety Data Sheet and take appropriate actions. Seek guidance if necessary. It is the legal responsibility of users to carry out risk assessments based on their specific applications / working conditions. Attention must also be paid to any specific national legislation, code of practice or guidance.

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