

Energy-Cured Coatings – Health & Safety Precautions

<p>Scope</p>	<ul style="list-style-type: none"> - Energy-Cured (Ultraviolet/'UV' & Electron Beam/'EB') coatings are formulated with a different chemical composition than conventional lithographic over-print varnishes, waterbased coatings or solvent lacquers. - The difference in the chemical make-up of Energy-Cured coatings necessitates that different material handling and safety precautions are employed: <ul style="list-style-type: none"> • UV/EB coatings are potential skin 'sensitizers' and precautions should be taken to prevent skin and eye contact. • Most UV/EB coatings act like penetrating liquids and are quickly absorbed when they contact skin or clothing. • Unlike other chemicals that are irritants, UV/EB coatings do not have good warning signals to indicate immediate or short-term contact: <ul style="list-style-type: none"> □ Unlike many other chemical skin irritants, UV/EB coatings do not produce 'early warning signs' such as itching, burning, or stinging immediately or shortly after direct skin contact. □ Since UV/EB coatings do not usually produce these warning signs, direct skin contact may go temporarily unnoticed. □ If UV/EB coating material is not washed off the skin promptly/properly, a rash, blistered area or burn may occur – this may last several hours or a few days. • UV/EB materials as skin sensitizers: <ul style="list-style-type: none"> □ An individual could become allergic to the materials when repeatedly exposed over a period of time – this increases the probability and severity of a reaction. □ Most people do not become 'sensitized' or allergic to UV/EB materials – contact avoidance is always a best practice.
<p>Safety Data Sheets (SDS)</p>	<ul style="list-style-type: none"> - Read and understand the Safety Data Sheet (SDS) for each specific Energy-Cured coating product being used – valuable information for potential hazards, safety, handling and clean-up are contained in the SDS sheet. - SDS sheets can be acquired by: <ul style="list-style-type: none"> • Contacting your INXCAC Technical Sales Representative • Through our website at www.inxcacoatings.com – for SDS access through our website, membership is required. • Make an email request at info@cacoatings.com.
<p>Contact Avoidance</p>	<ul style="list-style-type: none"> - The best way to avoid the possibility of becoming 'sensitized' to UV/EB material is to avoid all skin contact: <ul style="list-style-type: none"> • Wear personal protective equipment (PPE) and follow adequate personal hygiene habits. • Hands are the most common skin area to come in contact with UV/EB materials: <ul style="list-style-type: none"> □ Good quality gloves such as nitrile rubber should be worn when handling these materials. □ Gloves should be discarded as soon as they are removed – use new gloves, don't reuse gloves that have been exposed. • Avoid spilling any material onto clothing/shoes or transferring the material which can unknowingly cause secondary contamination. • The use of disposable safety clothing can be used to protect personal clothing from contamination.
<p>Personal Hygiene</p>	<ul style="list-style-type: none"> - Personal hygiene procedures such as washing hands after handling Energy-Cured coating materials should be routinely followed when the possibility of contact exists: <ul style="list-style-type: none"> • Soap and cold water should be used for washing. • Solvents should never be used to wash hands/skin – this will enable penetration of the coating into the skin. • Conventional 'waterless' hand cleaners should be avoided: <ul style="list-style-type: none"> □ Solvents and waterless hand cleaners will dry out the skin in addition to opening the skins pores which allows the absorption of Energy-Cured materials.

TECHNICAL RESOURCE INFORMATION

	<ul style="list-style-type: none"> - The following practices should be employed when working with Energy-Cured coating materials: <ul style="list-style-type: none"> • Do not eat, drink or smoke when handling coatings. • Wash hands regularly – prior to breaks/lunch and prior to and after using the restroom. • Wash hands and face with soap and water after handling coatings. • Remove any contaminated clothing or shoes immediately. • Shower as soon as possible after completion of workday.
Clothing	<ul style="list-style-type: none"> - Long sleeved shirts should be worn to protect the arms. - Contaminated clothing should be removed and washed/laundered properly: <ul style="list-style-type: none"> • Contaminated clothing should not be taken home to wash. • If home laundering is essential, then contaminated clothing should be washed separately from all other household items. • Extra precautions should be taken when transporting contaminated clothing – separate/isolate the clothing by placing in a bag, being certain not to get any coating on the outside of the bag. • When emptied, the bag should be discarded to avoid accidental secondary contamination. - If your clothing does become contaminated it should be removed as soon as possible – Energy-Cured coatings act as penetrating liquids and do not dry or evaporate. - Once the clothing is removed and stored properly, the affected skin areas should be washed thoroughly with soap and water. - Special attention should be given to hard to clean areas – hair, under arms, nose and ears.
Shoes	<ul style="list-style-type: none"> - Chemical resistant shoes or disposable covers/‘booties’ should be used when handling Energy-Cured coatings. - Shoes that become contaminated should be discarded if the coating penetrates the shoes and skin contact is possible. - Avoid wearing shoes that are made from high-absorbency materials such as canvas, suede and nubuck – Energy-Cured coatings do not dry and prolonged exposure to skin may cause sensitization.
Personal Protective Equipment	<ul style="list-style-type: none"> - It is recommended to wear the following PPE equipment when handling/cleaning Energy-Cured coatings: <ul style="list-style-type: none"> • Safety glasses/goggles with UV protection. • Chemical resistant gloves. • Chemical resistant safety clothing if skin/clothing contamination is unavoidable. • Respiratory equipment when coating misting/aerosols are present – Energy-Cured coatings can form mists/aerosols at liquid transfer points/nips during application: <ul style="list-style-type: none"> □ Fresh air mask or an organic respirator should be worn whenever aerosols are present if localized exhaust is not present or insufficient to withdraw the vapor.
Housekeeping	<ul style="list-style-type: none"> - General housekeeping procedures should be followed in areas where Energy-Cured coatings will be stored, transported or used: <ul style="list-style-type: none"> • PPE should be available and readily accessible. • Spill and clean-up kits should be available and readily accessible - all spills, leaks, and contamination should be cleaned promptly to avoid accidental exposure. • Designated containers for disposing of contaminated materials should be readily available – determine proper disposal methods for the facility. • Energy-Cured coatings should be stored safely and securely to prevent spills and leaks – containers should always remain sealed. • Areas should be regularly cleaned to avoid any accidental contamination.
Eyes	<ul style="list-style-type: none"> - Flush contaminated eyes and surrounding skin thoroughly with water for at least 15 minutes - see a Physician immediately.
Skin	<ul style="list-style-type: none"> - Use soap and water to clean contaminated skin areas: <ul style="list-style-type: none"> • Remove contaminated clothing/shoes immediately. • Shower immediately.

Inhalation - Remove individuals to fresh air if overcome by vapors/ozone/aerosols.

Ingestion - DO NOT induce vomiting - **obtain medical attention immediately.**

Energy-Cured Coatings – Curing System Safety

UV Energy

- UV lamp equipment areas should be shielded to prevent skin and eye burns during operation, which can occur even with brief exposure:
 - UV burns can take several hours before they are felt, unlike thermal or heat burns, which are felt immediately.
 - Short-term exposure to an intense UV lamp can cause serious injuries, especially if the UV bulb is not properly shielded.
- Proper precautions should be taken to avoid skin or eye exposure.

UV Heat

- In addition to UV energy, UV systems generate IR heat at high temperature levels.
- Maintenance procedures should include regularly scheduled cleaning of the unit to avoid overheating.
- The cooling system should be tested to ensure it is functioning properly.
- Safe handling of the equipment should also include handling hot materials and extreme care should be taken while attempting any maintenance and handling of the UV bulbs.
- Broken UV bulbs should be cleaned up immediately.

Ozone

- Ozone is a pungent smelling and irritating gas that is generated by a reaction of oxygen exposure to UV energy – ozone is a by-product of the UV curing bulb and is created by most UV curing systems.
- Ozone is created whenever the UV system is operational and is not related directly to the UV coating product – symptoms of ozone exposure can include:
 - Dry and scratchy nose and throat
 - Respiratory irritation
 - Nausea
 - Fatigue
 - Headache

Health/Safety Considerations

- Make certain of the following:
 - All informational machine stickers/labels are in place
 - All protective guards/safety switches are in place and functional
 - Protective shielding is in place for the UV bulbs
 - Air/liquid cooling systems for UV bulbs/cassettes are functioning properly
 - All localized air extraction/exhaust systems for the UV bulbs are functioning properly
 - All machine air extraction systems are functioning properly
 - Adequate ventilation is provided for Operators