

ASHLAND®

UV/EB Safety Training

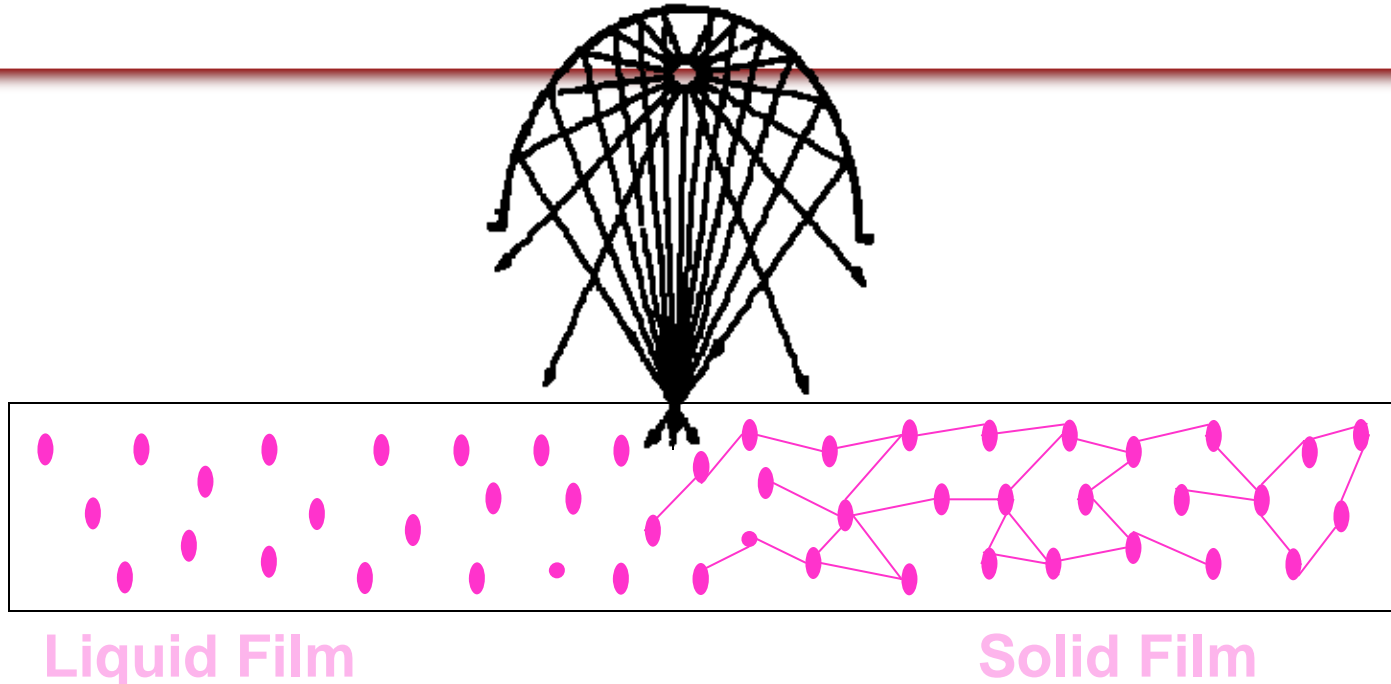
Safety Presentation Contents

- ▶ **General Overview of UV/EB Technology (slides 3-6)**
- ▶ **How to Prevent Exposure (slides 7-9)**
- ▶ **If Exposed, Safe Removal of Material (slide 10)**
- ▶ **If Skin Irritation Develops, Steps for Treatment (slide 11)**
- ▶ **Sensitization (slide 12)**
- ▶ **Housekeeping (slide 15)**
- ▶ **Contamination & Polymerization To Avoid (slide 16)**
- ▶ **Exposure Control Measures (slide 17)**
- ▶ **HMIS Ratings (slides 18-20)**
- ▶ **Storage Considerations (slides 21, 22)**

Components of UV/EB Liquids

- ▶ **Oligomers**: High viscosity resins
(epoxies, urethanes, polyesters, acrylics)
- ▶ **Monomers**: Low viscosity reactive modifiers
- ▶ **Photoinitiators**: Catalysts for reaction
- ▶ **Additives**: (flow agents, release agents, matting powders, defoamers, optical brighteners, etc.)

UV Process of Curing



100 % Solids System

Near Zero VOC's



High Gloss

High Scuff Resistance

High Solvent Resistance

High Abrasion Resistance

Flexible

UV/EB Liquid Chemistry

- ▶ **Liquid is a skin and eye irritant. Avoid contact with skin. Vapors may be irritating to mucous membranes.**
- ▶ **Repeated prolonged exposure could cause sensitization to acrylate chemistry. See slide 12.**
- ▶ **There are no other known health concerns!**

UV/EB Applications and End Uses

Applications:

Gravure	Screen	Curtain Coater
Flexo	Spray	Dispenser Gun
Roll Coating	Dip	Sublimation
Offset	Vacuum Coater	

End Uses:

Printing and Packaging	Flooring	Dental Fillings
Wood Coatings	Compact Discs	Primers
Automotive	Optical Fibers	Hardcoats
Pipe Coatings	Adhesives	Lens Coatings
Rapid Prototyping	Plastics	Many Others

Potential Routes of Exposure

- I. Skin (slide 8)**
- II. Eyes (slide 9)**
- III. Inhalation (slide 13)**
- IV. Ingestion (slide 14)**

I. Skin Protection

- ▶ **Use barrier creams: apply to the skin prior to handling inks, coatings or adhesives**
- ▶ **Wear gloves: latex, vinyl, neoprene, and replace gloves frequently**
- ▶ **Utilize impermeable, disposable work suits.**
- ▶ **Wear washable aprons.**

II. Eye Protection

- ▶ **Wear safety glasses with side shields or goggles (small quantities).**
- ▶ **Wear a face shield (large quantities).**
- ▶ **Do not wear contact lenses.**

Cleansing Skin and Eyes

- ▶ **Skin**: Wash as soon as possible and thoroughly with cool water and a mild soap or UV hand cleaner. Gradually use warmer water to open skin pores to remove all material.
- ▶ **Eyes**: Flush immediately for at least 15 minutes. Consult a physician. (Place emergency eye / face wash stations in work areas.)

Skin Irritation

- ▶ Ensure skin has been thoroughly cleaned.
- ▶ Protect from sunlight.
- ▶ **Mild Irritation**: Apply 1% hydrocortisone cream (available at a pharmacy). May last several days to several weeks.
- ▶ **Moderate to Serious Irritation**: Consult a physician. May prescribe Silvadene cream (topical steroid cream) to accelerate healing process.

Sensitization

- ▶ **Allergic-type reaction by immune system caused by repeated skin contact to UV/EB liquid chemistry**
- ▶ **Reaction can become progressively worse with each subsequent exposure.**
- ▶ **Symptoms range from skin irritation and redness to respiratory difficulties upon exposure.**
- ▶ **Sensitized individuals may need to be permanently removed from work areas using UV/EB liquids.**
- ▶ **Sensitization can be avoided entirely by preventing skin contact with liquid chemistry.**
- ▶ **A very small percentage of individuals are prone to becoming sensitized.**

III. Inhalation

- ▶ **UV/EB materials are generally low in volatility.**
- ▶ **Very low threshold levels can be detected by the human sense of smell.**
- ▶ **Vapors may accumulate without adequate ventilation.**
- ▶ **Some vapors may irritate the nose, throat and lungs if prolonged: Ozone from lamp causes membrane irritation.**

IV. Ingestion

- ▶ **Highly unlikely route of exposure**
- ▶ **Consult physician if this should occur**

Housekeeping

- ▶ **Use separate tools for UV/EB products (polyethylene or stainless steel).**
- ▶ **Keep work areas clean.**
- ▶ **Remove contaminated clothing or shoes (pre-soak clothing with liquid detergent prior to laundering; discard contaminated shoes.)**
- ▶ **Throw away gloves when contaminated.**
- ▶ **Throw away disposable clothing after use.**

Contamination & Polymerization

Conditions to **Avoid**:

- ▶ **Contact with copper, brass, iron (rust), mild steel, strong acids, bases, peroxides**
- ▶ **High shear pumps such as gear or piston**
- ▶ **Heating above 100°F**
- ▶ **Sparge: oxygen is necessary to remain stable**

Exposure Control Measures

- ▶ **Enclose transfer systems to reduce contact**
- ▶ **Ventilation: Increase where necessary to expel ozone from lamps and fumes from label components.**
- ▶ **Work practices: Maintain clean working environment.**
- ▶ **Wear protective equipment (Slides 8,9)**
- ▶ **Observe HMIS: Hazardous Material Information System Ratings (Slides 18-20)**

Health Hazard Rating Chart

0	Minimal Hazard	No significant risk to health
1	Slight Hazard	Irritation or minor injury may occur
2	Moderate Hazard	Temporary or minor injury may occur
3	Serious Hazard	Major injury likely unless prompt action is taken and medical treatment is given
4	Severe Hazard	Life threatening major or permanent damage may result from single or repeated exposures

Flammability Hazard Rating Chart

0	Minimal Hazard	Materials which are normally stable and will not burn unless heated
1	Slight Hazard	Materials that must be preheated before ignition will occur. Flammable liquids in this category will have flash points (the lowest temperature at which ignition will occur) at or above 200°F. (NFPA Class IIIB)
2	Moderate Hazard	Materials which must be moderately heated before ignition will occur, including flammable liquids with flash points at or above 100°F and below 200°F. (NFPA Class II & Class IIIA)
3	Serious Hazard	Materials capable of ignition under almost all normal temperature conditions, including flammable liquids with flash points below 73°F and boiling points above 100°F as well as liquids with flash points between 73°F and 100°F (NFPA Classes IB and IC)
4	Severe Hazard	Very flammable gases or very volatile flammable liquids with flash points below 73°F and boiling points below 100°F (NFPA Class IA)

Reactivity Hazard Rating Chart

0	Minimal Hazard	Materials which are normally stable, even under fire conditions, and which will not react with water.
1	Slight Hazard	Materials which are normally stable, but can become unstable at temperatures and pressures. These materials may react with water, but will not release energy violently.
2	Moderate Hazard	Materials which in themselves are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water.
3	Serious Hazard	Materials which are capable of detonation or explosive or reaction, but require strong initiating source, or must be heated under confinement before ignition, or materials which react explosively with water.
4	Severe Hazard	These materials are readily capable of detonation or explosive decomposition at normal temperatures and pressures.

Storage Considerations

A Good “Rule of Thumb” for Air Space In a Container:

- Allow ½" for a quart
- Allow 1" in a gallon container
- Allow 2" - 3" in a 5-gallon container
- Allow 3" - 5" in a 55-gallon drum

Storage Considerations

- ▶ **Shield from sources of light**
- ▶ **Maintain storage indoors between 60 - 100°F**
- ▶ **When stored for longer than 6 months, check viscosity**
- ▶ **Rotate inventory**
- ▶ **Do not store in unlined metal containers**

Spill Control

- ▶ **Wear proper protective clothing.**
- ▶ **Absorb with spill granules or towels.**
- ▶ **Place in sealed, marked container.**
- ▶ **Wash area with soap and water.**
- ▶ **Incinerate or dispose via waste can.**

Disposal

- ▶ **Dispose of in accordance with all government regulations.**
- ▶ **These will vary by state.**
- ▶ **Waste is classified as non-hazardous.**

The **Green** Technology

- ▶ **Coatings on paper proven to be completely repulpable.**
- ▶ **No solvents or ammonia used—nearly 100-percent solids.**
- ▶ **Low energy requirements: pound-for-pound, uses 1/3 less than water base chemistry**
- ▶ **Incinerated waste produces only H₂O, CO₂ !!**
- ▶ **No hazardous components given off.**

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