DuPont™ Pyralux® Safe Handling Guide

Flexible Circuit Materials

Products

DuPont™ Pyralux® Flexible Circuit Materials comprise a variety of constructions, including copper-clad laminates, bonding sheets, coverlays, and bond plys. The composition of these materials also varies between different products, with polyimide, acrylic, and epoxy being common polymers. Experience shows that Pyralux® sheet and roll goods can easily be handled safely. Pyralux® materials are classified as "articles" in the U.S. and E.U. and are not subject to an SDS requirement. Pyralux® materials have been tested under operating conditions with some found to liberate measurable volatiles only well below acceptable safe limits (e.g., permissible exposure limits). For these materials, we provide an Article Information Sheet (AIS) that covers the vapors that may be liberated during processing.

Copper-Clad Laminates

Copper-clad laminates are supplied in sheet and roll formats. Any adhesive present is fully cured (C-staged) when delivered. DuPont is not aware of any health hazard associated with working with cured materials. As with all thin, copper-clad laminates, sharp edges present a potential hazard during handling. All personnel involved in handling Pyralux® laminates should use suitable gloves to minimize potential cuts.

Bonding Sheets, Coverlays, & Bond Plys

Bonding sheets, coverlays, and bond plys feature B-staged acrylic- or epoxy-based adhesive. B-stage refers to adhesive from which solvent has been removed, but has not yet been fully cured. Since B-staged adhesive contains trace quantities (parts per million) of unreacted monomers, the precautions and recommendations for manual handling in this guide should be heeded.

Manual Handling

Anyone handling DuPont™ Pyralux® Flexible Circuit Materials should wash their hands with soap before eating, smoking, or using restroom facilities. Although DuPont is not aware of anyone developing contact dermatitis when using DuPont™ Pyralux® products, some individuals may be more sensitive than others. Care should be taken to avoid or minimize direct contact. Gloves, finger cots, and finger pads should be changed daily. Protective clothing should be washed frequently.

Processing Lay-up

When DuPont™ Pyralux® materials in sheet or roll format are laid up for lamination, a clean, well-lighted and well-ventilated layup area is recommended. Upon removal of a protective cover film, if present on the product, uncured monomers in B-staged acrylic- and epoxy-based adhesives may impart a mild odor. Air sampling tests indicate either undetectable levels or levels orders of magnitude below protection limits for the volatile materials. To eliminate contact between the skin and adhesives, wear lint-free gloves or fingerpads. This serves a dual purpose: to prevent contaminating the adhesive with organic oils from the skin and to prevent the skin from absorbing any materials from the adhesive.

Ventilation

Adequate ventilation and exhaust need to be provided in press rooms to prevent the build-up of potentially harmful vapors, to remove disagreeable odors, and to dissipate heat. An exhaust hood or canopy placed directly above each press is recommended. This allows the liberated warm vapors to rise and be effectively captured and removed. If there are no hoods, dilution ventilation is required. This can be accomplished by providing adequate room air changes and fresh air input to dilute vapors and remove them from the work area. Room ventilation pattern should be established to draw vapors away from operators. Should ovens be used to heat these materials before or after lamination, they should also be equipped with adequate ventilation.

Lamination

During lamination of DuPont™ Pyralux® materials, utilize a well-ventilated area with a fresh air supply to avoid build-up of trace quantities of volatiles. All-polyimide materials can give off residual solvent (typical of polyimides), which may volatilize during press or nip roll lamination. If the product contains acrylic- or epoxy-based adhesive, these materials will fully cure during lamination. While the chemical reactions that occur during curing do not produce any vapors, there are trace impurities that are volatilized during heating. Airborne monitoring tests indicate concentrations to be extremely low. Press pad systems used during lamination include many different materials (e.g., paper, plastic films, and rubber) which may also liberate vapors during lamination. Contact the manufacturers of such press pad materials for safety information.

*Values for all materials monitored were well below 10% of their accepted limits (permissible exposure limits or threshold limit value). In only one case, did the concentration reach approximately 40% of its limit. This was an oven used to dry the material. This oven drying is not normally used in the process and during the exposure-monitoring test the oven was unventilated. Adequate ventilation is recommended for any heating process.

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Drilling and Routing

Appropriate personal protection equipment should be used, and standard ventilation should be installed, when drilling or routing Pyralux® products. While studies indicate that heavy drilling and routing activity, with standard equipment, does not generate hazardous quantities of airborne particles, DuPont recommends providing adequate vacuum around the drill to minimize worker exposure to generated dust. No additional or unique procedures are required beyond the standard procedures recommended by equipment vendors and required by regulatory standards.

Other Considerations

Presses used for bonding should be operated with adequate safety guards and controls to eliminate pinch points and hot surface hazards. Handling heated and/or heavy press loads also requires special precautions. Press operators should be adequately trained in safety aspects of working with this equipment. Operators handling Pyralux® in chemical or mechanical processes should use adequate eye protection and follow manufacturers' safety recommendations.

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For more information on DuPont™ Pyralux® or other DuPont products, please visit our website.

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