DuPont™ EKC162™

Resist Remover

Care and Handling Guide

Overview

DuPont EKC Technology is the leading manufacturer and supplier of high purity patented and proprietary chemicals for wafer level packaging (WLP) cleaning, surface preparation and photoresist removal to the semiconductor and related industries. The DuPont EKC Technology product line includes positive photoresist removers, negative photoresist removers, universal photoresist removers, special purpose cleaners, post-etch cleaners and post-CMP cleaning products.

DuPont™ EKC162™ resist remover for WLP is an aqueous organic mixture, formulated to effectively remove thick photoresist used in wafer bumping and WLP.

When DuPont™ EKC162™ resist remover for WLP is handled and used properly, it can offer users many benefits and advantages in WLP. Safe and responsible use, handling, storage and disposal of this product is advised, and appropriate procedures should be used at all times. This document is intended to complement, not replace, the Material Safety Data Sheet (MSDS) for DuPont™ EKC162™ resist remover. Refer to the MSDS for more detailed information. In the event of a conflict or inconsistency between this document and the MSDS for this product, the MSDS should be followed to the extent of any such conflict or inconsistency.

Product Storage

DuPont™ EKC162™ resist remover for WLP contains hydroxylamine, and is shipped and stored in containers with vented bungs. Hydroxylamine decomposes slowly over time. The decomposition components are primarily nitrogen gas and small amounts of ammonia. The vented bungs are intended to prevent pressure buildup inside containers. The recommended storage facility is a dry, well-ventilated area with a temperature range of between 40 °F and 90 °F (5 °C and 32 °C).

Product Odor

One of the active ingredients in DuPont™ EKC162™ resist remover for WLP is a quaternary ammonium hydroxide, R_4NOH. It is characteristic of compounds of this type to react very slowly to form small quantities of trimethylamine, $(CH_3)_3N$, which confers a unique amine odor (sometimes described as a strong "fishy" odor) to the product over its shelf life according to the following reaction, known as the Hofmann degradation:

$(CH_3)_4NOH \rightarrow (CH_3)_3N + CH_3OH$

(example shown for tetramethylammonium hydroxide)[1]

The American Conference of Governmental Industrial Hygienists, Inc. (ACGIH®) has set exposure limits for trimethylamine of 5 ppm as an 8 hour time weighted average and 15 ppm for a 15 minute short term exposure limit. These limits were set to prevent upper respiratory tract irritation.[2] However, people are capable of detecting its presence in air at extremely low levels—around 0.21 ppb.[3] Users of DuPont™ EKC162™ resist remover for WLP are likely to detect a fishy aroma during handling and use of the product.

Product Stability and Reactivity

DuPont™ EKC162™ resist remover for WLP is stable at normal conditions of storage and use, provided that the storage, handling and use recommendations for the product are followed. Due to the unique chemistry of DuPont™ EKC162™ resist remover, direct contact of the product with heavy metal and iron salts, strong oxidizing agents, acids and ketones should be avoided as chemical reactions with heat release may occur.

Fire Safety

Fire Hazards

DuPont™ EKC162™ resist remover for WLP has a flash point above 212 °F (100 °C) and therefore is considered non-flammable. However, due to the unique chemistry, care must be exercised in handling and disposal of spill cleanup materials and wipes. All absorbent materials and wipes which come into contact with the product must be saturated with water before disposal in approved HDPE, covered and vented waste containers. Failure to saturate with water may cause smoldering and presents a fire hazard due to the unique chemical characteristics of hydroxylamine. For this reason, all absorbent materials and wipes which come into contact with the product must be segregated from other flammable and combustible waste products.

[1]Eagleson, M. Concise Encyclopedia Chemistry. Walter de Gruyter Publishing, Berlin (1994) p. 497

[2]ACGIH® Threshold Limit Values (TLVs®), 2010.

[3]Leonardos, G., Kendall, D., Bardard, N. "Odor threshold determinations of 53 odorant chemicals." J. Air Pollut. Control Assoc. 19, 91–95, 1969.

Spill Cleanup

In the event of a spill or leak of this Product, evacuate area and keep personnel upwind. Cut off any source of ignition and ventilate the spill area. Contain spill with absorbent material. Transfer absorbent and other contaminated materials to a UN approved HDPE covered and vented container for disposal. Consult with Federal, State, and local regulatory agencies to determine acceptable clean-up levels. Comply with Federal, State, and local regulations on reporting releases. **Wipes and absorbent materials that are used to clean up small spills must be saturated with water before disposal into HDPE drums. Not doing so may cause smoldering and presents a fire hazard. Solid material contaminated with EKC162™ should be segregated from other wastes, especially flammable and combustible wastes.**

DuPont EKC Technology has conducted compatibility tests on a number of commercially available absorbent materials. Subject in all respects to the particular test parameters and conditions used in the compatibility tests and the recommendations herein regarding handling, storage and disposal of DuPont™ EKC162™ resist remover for WLP and absorbent materials and wipes which come into contact with the Product, the compatibility test results reflected that the following materials were acceptable to use: Hazorb Pillows, Caustic Spill Kits 5-2028 (vermiculite) from Fisher Scientific, vermiculite from Fisher Scientific, Absorb It from Excel Mineral Company, Clean Dry from Excel Mineral Company, Industrial MS from Oil Dri Company.

Fire Suppression

In the event of a fire, water spray, foam, carbon dioxide, and dry chemical may be used as extinguisher media.

Waste Management

Consult 40 CFR, Parts 261 and 268, State, and local regulations for guidance on disposal of this Product. Incineration at a facility with appropriate permits or authorizations is the recommended method of disposal of the Product. Spent product may contain certain contaminants at levels that render the waste hazardous, depending on the end-user's process. Therefore, consult your facility's Environmental Department for proper handling and disposal methods. Spent Product should be segregated from ketones and gamma butyrolactone because Chemical reactions may occur giving off significant amounts of heat. **Wipes, rags and absorbent materials that are used to clean up small spills must be saturated with water before disposal into approved HDPE drums. Not doing so may cause smoldering and presents a fire hazard. Solid materials contaminated with EKC162™ should be segregated from other wastes, especially flammable and combustible wastes. For transportation of spent EKC162™ use only vented drums of HDPE or plastic lined steel drums.**

Empty containers retain product residue. Observe all hazard precautions. Keep away from heat, sparks, and flames. Do not distribute, make available, or reuse empty containers except for storage and shipment of original product. Remove all hazardous product residue, and puncture or otherwise destroy empty containers before disposal. Consult 40 CFR, Parts 261 and 268 for guidance on disposal.

Personal Safety and Health

Personal Protective Equipment

Eye protection and gloves should be worn when handling DuPont™ EKC162™ resist remover for WLP. DuPont™ EKC162™ resist remover may be absorbed through intact skin. Wear chemical goggles or a facemask, neoprene clothing, gloves and chemical resistant boots when DuPont™ EKC162™ resist remover product is being used or there is a probability of liquid contact. The product should be handled under proper ventilation, such as a wet bench or fume hood. If proper ventilation is not available, a NIOSH-approved full-face respirator with canisters or cartridges specifically approved for ammonia should be used.

Health Hazards

In general, the product is irritating or corrosive on contact. For more detailed information on health hazards, refer to the MSDS.

Toxicity Information

DuPont EKC Technology has toxicity test data available regarding various of its products which contain hydroxylamine. Most of the studies examine the effects of short term exposure to large amounts of the product and are intended to help in the development of appropriate warning and other exposure control information for the MSDS. For test results or information pertaining to a specific product, refer to the product MSDS or contact DuPont EKC Technology Customer Service at 1-800-EKC-TECH (352-8324).

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For more information on DuPont™ EKC162™ or other DuPont products, please visit our website.

K-23762-3 (05/19)