

TradeWinds International, Inc.

1374½ East Colorado Street
Glendale CA 91205-1475
U.S.A.

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TO: All Interested Parties

FROM: Douglass Moody
Director, Technical Support
TradeWinds International, Inc.

SUBJECT: Polymeric Hexamethylene Di-isocyanate (HDI Polyisocyanate)

The Curing Agent (Hardener) for **KrystalKote™**, **KrystalTred™**, **KrystalMarine™**, **MarineTred™**, and **TuffLiner™** is based upon the **POLYMERIC** formulation of HDI, which has a substantially lower level of toxicity than the **MONOMER** equivalent. The maximum amount of HDI Monomer, which may be present in freshly mixed **KrystalKote™**, et al, is less than one-tenth of one percent (<0.1%). Any residual amount of Monomer will react much more rapidly into the polymer chain than the Polymeric formula, leaving virtually no measurable Monomer remaining during ambient air-curing.

The reference book "DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS", Seventh Edition, N. Irving and Richard J. Lewis, Jr., documents toxicity data on Monomeric HDI. The oral LD₅₀ for rats is 738mg/kg, which is considered a fairly high tolerance level. The reference booklet "HEXAMETHYLENE DIISOCYANATE BASED POLYISOCYANATES", Rev 6/92, Miles Inc., Product Safety Department, outlines comparisons of HDI Monomer to HDI Polyisocyanate Inhalation Toxicity. Pertinent excerpts:

- 1.) Sensory Irritation (RD₅₀ - Mouse): "Polyisocyanate is 16 times to 71 times **less** irritating to upper respiratory tract";
- 2.) Three or Four Week Inhalation (NOEL - Rat): "Polyisocyanate is @ 120 times **less** toxic";
- 3.) Three Month Inhalation (NOEL - Rat): "Polyisocyanate is @ 50 times **less** toxic than the Monomer".
- 4.) Summary excerpts: "At concentrations typically found in the workplace, HDI Polyisocyanate is considerably **less** toxic than HDI Monomer".

As a point of reference, nearly all of the top-of-the-line automotive paints on the market today contain the same HDI Polyisocyanate used in **KrystalKote™**, et al. Literally, several thousand people are exposed to this chemical every day. It has a 30-year history of use, and is one of the most documented and monitored chemicals on the professional-use market today.

The extremely low Vapor Pressure and low Volatile Organic Content (VOC) of this Polymeric formula, (VOC: Clear: 2.0 lbs/gal; Tinted: 1.6 lbs/gal; TuffLiner: 1.4 lbs/gal; *SCAQMD Allowances: 2.8-3.5 lbs/gal), makes the amount entering the atmosphere negligible with brush, roller, or Walcom airgun application. However, even with the extremely low amount of air-borne HDI present during spray application, we recommend adequate ventilation and approved respirators to be used, as the solvents, M.E.K. and Toluene, present with conventional air, airless, or HVLP spray guns, are additional health concerns associated with such applications.

This document was reviewed, edited, and the factual content approved, by a Certified Industrial Hygienist in the Product Safety Department of Miles Inc., the manufacturer of the HDI Polyisocyanate and other chemical components used in **KrystalKote™**, et al.

*SCAQMD *Extreme Performance Coating* per Rule 1107 para (12): 3.5 lbs/gal;
Indust. Maint. Graffiti Coating per Rule 1113 para (17): 2.8 lbs/gal;
Automotive Specialty Coatings per Rule 1151 para (b)(40): 2.8 lbs/gal.