



ACUMEN

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Occupational Exposure Investigation

KrystalKote Application

CalTrans District 7



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Prepared for :

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CalTrans Contract 21V717

1.) Introduction

The purpose of this report is to discuss the findings of an industrial hygiene investigation Acumen Industrial Hygiene, Inc. (Acumen) conducted at CalTrans District 7 during the application of KrystalKote, an anti-graffiti product. The objective of this investigation was to evaluate potential airborne exposure to organic solvents during application of this product. Appendix A of this report contains a material safety data sheet (MSDS) for this product.

Mr. Michael Connor, CHH, CSP, of Acumen, conducted this study on 14 October 1994. Mr. Ted Brucker, Headquarters Safety Officer, assisted in this investigation which took place at the manufacturer's facility in Glendale, CA.

2.) Sampling and Analytical Methods

This study consisted of evaluating airborne potential exposures to butyl acetate, methyl ethyl ketone (MEK), toluene and xylene through the collection of a personal air sample, while Mr. Douglass Mookly, the manufacturer's representative, applied this product during a demonstration. The product MSDS shows that it contains 12.5% xylene and an equal proportion of n-butyl acetate. Approximately 4 gallons of KrystalKote were applied with a Wagner 650 airless sprayer during the product test. Additionally, an unspecified amount of MEK and toluene were used to clean the spray gun and related equipment during the sampling period.

The personal air sample was collected with a calibrated personal air sampling pump into a 100/50 mg charcoal tube. The air sample flow rate was set before and after the sampling period with a precision rotameter. Appendix B contains additional details on the air sampling procedures. The samples were submitted to EMS Laboratories, Inc., of Pasadena, CA. This laboratory holds accreditation from the American Industrial Hygiene Association (AIHA). Appendix C (Table 1) contains the laboratory results.

3.) Results and Discussion

Table 1 shows the results obtained. As shown in Table 1, measured airborne exposures were low. Assuming the same rate of exposure for a full shift, the results would represent 8 hour time weighted averages (8h-TWAs) of exposure, which can be compared directly to Cal-OSHA Permissible Exposure Limits as promulgated in 8CCRS155. Table 1 shows the results expressed as a percentage of the appropriate PEL based on this assumption. As indicated, exposure to the substances detected represented less than 5% of the corresponding PELs. The applicator's actual exposure on the day of the test would have been approximately 4 times lower on an 8h-TWA basis, if it is assumed he did not apply the product the rest of the day.

The other relevant finding, is that the product-related solvents (xylene and n-butyl acetate) were present in the lowest amounts relative to their PELs. In fact, measured exposure to

both was less than 1% of their respective PELs under the conditions evaluated. By contrast, measured airborne exposure to the two solvents in the cleaning solution (MEK and toluene) were up to 3% of their respective PELs. Although this is relatively low, this finding suggests that use of the cleaning solvent would be a more important source of worker exposure than application of the product itself. Potential exposures during cleaning operations could be reduced through the use of less volatile ingredients.

4.) Recommendations

The principal recommendation relevant to the findings of this investigation is to make this information available to CalTrans employees who may be considering purchase of this product. If the product is purchased, it would be of interest to monitor application exposures during longer (and possibly more typical) conditions of use. The information obtained in this study would suggest that exposures are unlikely to exceed the PELs of the two volatile KrystalKote ingredients. However, it is possible that use of the cleaning solvent could result in more occupationally significant, but still low, worker exposures. It would be worthwhile to discuss this issue with the product manufacturer to determine whether there are alternative cleaning solutions or methods.

5.) Conclusions

This investigation found that a short application of KrystalKote did not result in occupationally significant airborne exposures to either of its volatile components or the two solvents present in the cleaning solution. The data obtained indicates that use of the cleaning solution, rather than application of the KrystalKote, is more likely to result in worker exposure. This can be corrected through the use of a cleaning solution which contains less volatile ingredients.

Table 1
 Air Sample Results
 KrystalKote Demonstration
 Glendale, CA
 October 1994

Substance	Result	% PEL
n-Butyl acetate	0.6	0.4
Methyl ethyl ketone	5.2	2.6
Toluene	3.0	3.0
Xylene	0.7	0.7

All results reported in parts per million in air (ppm).

% PEL indicates results expressed as percentage of current Cal-OSHA Permissible Exposure Limit (PEL), as promulgated in 80003135, assuming the same exposure rate for 8 hours.

The relevant PELs are as follows:

n-Butyl acetate	150 ppm
Methyl ethyl ketone	200 ppm
Toluene	100 ppm
Xylene	100 ppm