

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2002

DateRun: 07/24/2002

Experimenters: Jason Marshall, Fred Youngs

ClientType: General

ProjectNumber: Project #1

Substrates: Other

PartType: Coupon

Contaminants: Paints, Solvent

Cleaning Methods: Low Pressure Spray

Analytical Methods: Drager Tubes

Purpose: To evaluate exposure for traditional spray can and Enviro Caddie system

Experimental Procedure: A 12" x 12" x 12" Acrylic Spray Chamber lined with paper towels was used to contain paint sprayed. Background levels for organic vapor were measured using an OVM, Thermo Environmental Instruments, Inc - Model 580 B. Dragger tubes were used to measure for Acetone, Ethyl Benzene, Toluene & Xylene. Paint was sprayed for 2 seconds into the acrylic chamber. A reading was taken with the OVM at T = 0, at T = 10 seconds and then when level (T ~ 2 minutes). The OVM reading was repeated for each of the 4 Dragger tube measurements. Paper towels were changed between spraying in order to reduce residual vapors. Temperature and humidity were recorded to be 72.2 F and 68%.

Results: The measurements for the Drager tubes for the four compounds resulted in levels. The results are listed in the table below.

| | |
|---------------------------------|---------------------------------|
| Traditional Spray Can | Enviro Caddie System |
| Background Readings | Background Readings |
| OVM 6.7 ppm | OVM 9.6 ppm |
| Acetone No Color Change | Acetone No Color Change |
| Ethyl Benzene No Color Change | Ethyl Benzene No Color Change |
| Toulene No Color Change | Toulene No Color Change |
| Xylene No Color Change | Xylene No Color Change |
| Traditional Spray Can System | Enviro Caddie System |
| OVM | OVM |
| Max: 569 ppm | Max: 1198 ppm |
| Steady State: 567 ppm | Steady State: 1185 ppm |
| Acetone 10 pumps = 2500 ppm | Acetone 10 pumps = 4500 ppm |
| OVM | OVM |
| Max: 570 ppm | Max: Over Range (2000) ppm |
| Steady State: 570 ppm | Steady State: 1151 ppm |
| Ethyl Benzene 6 pumps = 175 ppm | Ethyl Benzene 6 pumps = 185 ppm |
| OVM | OVM |
| Max: 520 ppm | Max: 1215 ppm |

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| | |
|-------------------------------|-------------------------------|
| Steady State: 520 ppm | Steady State: 1215 ppm |
| Toulene 5 pumps = 225 ppm | Toulene 5 pumps = 210 ppm |
| OVM | OVM |
| Max: 569 ppm | Max: 1250 ppm |
| Steady State: 567 ppm | Steady State: 1250 ppm |
| Xylene 2 of 5 pumps = 400 ppm | Xylene 2 of 5 pumps = 350 ppm |
| Corrected Xylene = 1000 ppm | Corrected Xylene = 875 ppm |

The Enviro Caddie paint delivered more Acetone than the traditional system (4500 to 2500). Both systems delivered similar amounts of Ethyl Benzene (185 to 175) and Toluene and (210 to 225). The Enviro Caddie paint had more than twice the total organic vapor than the traditional system did (1200 to 543).

Summary:

Conclusion:

Note: Even though both paints did not contain the same components, readings were obtained for the four chemicals. This would be due to the cross sensitivities of the individual Drager Tubes used.

Cross Sensitivity

Acetone: Other ketones can be indicated but at different sensitivity. Aldehydes are also indicated but not esters.

Ethyl Benzene: A number of petroleum hydrocarbons and aromatic compounds are also indicated at differing sensitivity.

Toluene: Xylenes are also indicated (with less sensitivity). Benzene changes color of the indicator to pale yellow. Petroleum hydrocarbons change the color to a reddish brown.

Xylene: Styrene, vinyl acetate, toluene, ethyl benzene and acetaldehyde are also indicated at lower sensitivity. 400 ppm ethyl acetate does not interfere with reading.