ASSESSMENT, DEVELOPMENT AND DEMONSTRATION OF LOW-VOC MATERIALS FOR CLEANING ULTRAVIOLET AND ELECTRON BEAM CURABLE COATINGS AND ADHESIVES

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EXECUTIVE SUMMARY

The South Coast Air Quality Management District (SCAQMD) regulates VOC emissions in four counties in Southern California. One of the SCAQMD regulations specifies VOC limits for materials used for cleaning coating and adhesive application equipment. The VOC limit for the materials used for these purposes is 25 grams per liter.

The Institute for Research and Technical Assistance (IRTA) is a nonprofit organization established in 1989 to assist companies and industries in finding alternatives to ozone depleting, toxic and VOC solvents. A major focus of IRTA's work is cleaning alternatives.

In this project, IRTA identified, tested and demonstrated alternative low-VOC materials and methods for cleaning ultraviolet (UV) and electron beam (EB) curable coating and adhesive application equipment. Four facilities participated in the project. The first facility, Sandberg Furniture, is a major wood furniture manufacturer. The company uses UV curable coatings in a flat wood coating operation. The second facility, Medtronic Diabetes, is a medical device manufacturer. Medtronic has several operations that use UV curable adhesives. The third facility, DRS Sensors & Targeting Systems, is an aerospace facility that uses a UV curable conformal coating for electronic devices. The fourth facility, Huhtamaki, applies an EB clear coating to consumer packaging.

The alternative methods and cleaning agents tested during the project included not cleaning at all, plain water, water-based cleaners, acetone and methyl acetate. Acetone and methyl acetate are exempt from VOC regulations. All of the facilities that participated in the project found alternatives that met the VOC limit of 25 grams per liter for cleaning coating and adhesive application equipment. Alternatives were judged to be effective if they cleaned at least as well as the VOC solvents used currently for cleanup.

Table E-1 summarizes the results of the low-VOC alternatives used or tested at each of the facilities that participated in the project. The table lists the facility, the type of cleaning operation and the low-VOC material that performed most effectively in the operation.

Table E-1
Results of Low-VOC Alternatives Testing

Company	Cleaning Task	Low-VOC Alternative
Sandberg Furniture	Routine Maintenance	No Cleaning
	Periodic Maintenance	Acetone
Medtronic Diabetes	CAM/TAM Adhesive Equipment	Acetone
	PATCH Equipment	Water-Based Cleaner
DRS Sensors & Targeting Systems	Conformal Coating Equipment	Methyl Acetate
Huhtamaki	Floor Cleaning	Water
	Clear Coating Station	Water-Based Cleaner

Note: CAM and TAM are automated medical device assembly machines.

The cost of using the alternative low-VOC materials for cleaning UV and EB curable coatings and adhesives from application equipment could not be determined for one of the facilities. For one participating facility, the cost of using the alternatives for cleanup would be lower than the cost of using the high VOC cleaner. For one facility, the cost would be higher and for one facility, the cost would be the same.