

Wood Finishing Environmental & Regulatory Issues for End Users

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RadTech International

- Environmental Health & Safety Committee
 - Providing information about UV/EB to federal, state and local government
 - Ensuring a place for UV/EB in legislation

Volatile Organic Compound (VOC) regulations

- Federal level: Title V
- State level
- Local level: Local rules and regulations
 - Southern California typically has the most stringent emission requirements

Command and control vs. incentives

- Command and control rules
 - Technology forcing
 - Mandate a specified VOC limit
- Incentives
 - Exemptions from rules
 - Regulatory relief

UV/EB's role

- Avoid applicability
 - Staying below thresholds through VOC reduction
- No need to install air pollution control devices
- UV/EB enables facilities to stay in compliance
- Drastic emission reductions (near zero emissions)
- No secondary adverse impacts (greenhouse gases, combustion contaminants, hazardous waste)

Federal regulations

- Title V- Facility Permit vs. permit unit approach
 - Applies to major sources, definition varies by region
 - Public notification
- How can UV/EB help me comply?
 - Avoiding applicability
 - “De minimus” facility \leq 19,184 gallons/year of UV/EB materials with VOC content $<$ 50 grams/liter
- EPA Control Techniques Guidelines for Flat Wood Paneling Coatings (2006)
 - “This technology is gaining greater acceptance and, where applicable, achieves a near 100 percent reduction of VOC emissions”.

State regulations

- California Air Resources Board
 - Air Toxics Control Measure for composite wood products
 - Reduction of formaldehyde emissions from particle board, medium density fiberboard, hardwood plywood, composite veneer
 - Third-party certifier
- ARB estimates
 - 2.5 billion square feet of composite wood products sold in CA annually
 - 400 tons of formaldehyde generated
- ARB Suggested Control Measure for wood coatings
 - 275 grams per liter limit, mirrors SCAQMD rule

Examples of requirements

- SCAQMD Rule 1136
 - Applies to:
 - Clear & Pigmented Sealers
 - Clear & Pigmented Topcoats
 - Pigmented Primers & Undercoats
 - VOC limit is 275 grams/liter by 7/1/05
 - Shutters (until 7/1/05)
 - Clear Topcoat680 g/l
 - Pigmented topcoat.....600 g/l

Do UV/EB materials comply with limits?

- Yes, typical VOC content of a UV/EB formulation is < 50 grams/liter
 - Generally UV/EB materials do not contain any VOC's
 - Fluctuations in VOC content can be attributable to test methods
 - Measurement of VOC content difficult with low VOC materials

SCAQMD Technical Assessment

■ SCAQMD findings:

- UV /EB wood coatings have been around for over 40 years
- Water & acetone formulations can achieve thinner film depositions
- All application types are available (flow, roller, sprayable)
- Various glosses available
- Stains, other semitransparent materials, pigmented coatings available
- **“UV coating on wood substrate is a viable option to regulatory compliance and coating performance for a wide variety of products.”**

Pollution prevention in lieu of add-on-controls

- Lowest Achievable Emission Rate/Best Available Control Technology (Major Sources)
 - UV/EB defined as “Superclean” (< 5% by wt. VOC)
 - BACT/LAER for:
 - Wood & plastic coatings

Less regulatory hassles with UV/EB

- Reduced SCAQMD recordkeeping for UV/EB
 - Monthly recordkeeping: Materials < 50 grams/liter at all facilities
 - Total exemption from recordkeeping: Materials <50 grams/liter at facilities <4 TPY
- Added flexibility with emission averaging option
Rule 1136 (c)(1)(D)(i)
- NEW Permit exemption for spray booths- Rule 219

SCAQMD plan

- UV/EB identified as an “advanced technology” to help SCAQMD achieve its clean air goals (Chapter 4, page 68)
- “UV and EB curing products can be used on virtually all substrates, from metal and wood to glass and plastic.”
- “Other advantages include the attainment of very high gloss levels, reduction of VOC emissions and solvent odors, and reduced energy consumption.”

SCAQMD and EPA policy

- Superclean materials equivalent to add-on-controls
- Superclean materials comply with source specific rules and BACT/LAER
- San Joaquin District concludes that UV technology is more cost effective than add-on controls

Cost savings

- Less permit costs
 - Permit processing fee for dryer= \$2,949.92
 - Permit processing fee for coating = \$1,865.02
 - Annual Operating Fee = \$1,221.22

Cost savings

Example: Facility using 20 gallons/day @ 275 g/l

$20 \text{ gal/day} \times 2.3 \text{ lb/gal} = 46 \text{ lb/day}$

$46 \text{ lb/day} \times 5 \text{ day/week} \times 52 \text{ weeks/year} = 11,960 \text{ lb/yr}$

$11,960 \text{ lb/yr} \times 1 \text{ ton}/2,000 \text{ lb} = 2.99 \text{ tpy}$

Annual emission fees = $5.98 \text{ tpy} \times \$517.08/\text{ton}$

= **\$3,092.14/year**

■ Emission Reduction Credits **\$15,000/Pound VOC**

[$46 \text{ lb/day} - 22 \text{ lbs/day}^*$] $\times 1.2$ (off set factor) $\times \$15,000/\text{lb}$

= **\$ 432,000**

*Free offsets of 22 lbs/day

Conversion to UV/EB

- = Facility using 20 gallons/day @ 50 g/l

$$20 \text{ gal/day} \times .42 \text{ lb/gal} = 8.4 \text{ lb/day}$$

$$8.4 \text{ lb/day} \times 5 \text{ day/week} \times 52 \text{ weeks/year} = 2,184 \text{ lb/yr}$$

$$2,184 \text{ lb/yr} \times 1 \text{ ton}/2,000 \text{ lb} = 1.09 \text{ tpy}$$

= \$ 0 /year (facilities under 4 TPY do not pay emission fees)

- Emission Reduction Credits (free offsets for processes under 4 TPY)

= \$ 0

Total savings from conversion air quality fees only

- Savings in permitting fees = \$ 4,815
- Savings in operating fees (annual) = \$ 1,221
- Savings in emission fees (annual) = \$ 3,092
- Savings in ERCs (one time fee) = \$ 432,000

Future Steps

- Lower VOC limits
- Regulators will need new test methods to measure very low VOC levels
 - SCAQMD architectural coatings rule R1113, limits of 50 grams/liter
 - Supercompliant definition in R1113 is 10 grams/liter
- Indoor air quality and consumer products regulations
- Greenhouse gas voluntary reduction/regulations
- Increased fees for specific industry
- VOC reactivity

Conclusion

- UV/EB can ease regulatory burdens and help industry stay in compliance and in business.
 - Increased production and VOC reduction can go hand in hand
 - Controls or “Superclean” products?
 - UV/EB can offer process advantages, controls simply destroy VOC’s
 - There are no secondary pollutants (NO_x, SO_x, CO, greenhouse gases) generated with UV/EB

THANK YOU

- Contact information
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- www.radtech.org
- Regulatory resources
 - www.aqmd.gov
 - www.arb.ca.gov
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