

A Place for UV/EB in the Composites Industry Regulations

By Rita Loof

The significant level of interest in UV/EB technology in the composites industry gave rise to the question of how regulations, targeted toward traditional styrene-based technologies, accommodated UV/EB.

The Southern California composites industry consists mainly of manufacturers of bathware products, vanity installations, hulls for recreational and commercial watercraft, bodies for recreational vehicles, building panels

more than 20 tons per year are subject to Rule 1132 (adopted in 2001).

Rule 1132

As first proposed, Rule 1132—Further Control of VOC Emissions from High Emitting Spray Booth Facilities—did not accommodate UV/EB technology. The rule required 65% reduction from spray booth facilities emitting VOCs in excess of 20 tons per year. The SCAQMD estimated that 81 composite fabricators in Southern California, with total emissions of 1,288 tons per year of VOCs, would be impacted. Members of the Composites Fabricators Association asserted that 300 facilities were not on the District's "radar screen" and thus the rule's impact would be greater than originally anticipated. During the rule-making process, it became obvious that innovative approaches such as UV/EB were not incorporated in the rule. In fact, initial proposals focused strictly on traditional (afterburners, lower monomer content, vapor suppression) means of VOC reduction.

Rule 1132(c) requires that composite fabricators use one of these options:

- 1) Emissions control systems with an overall efficiency of at least 65% by weight;
- 2) VOC-containing materials that have a VOC content at least 65% lower than any applicable rule limit in effect as of Jan. 19, 2001;
- 3) A combination No. 1 and No. 2 that reduces the VOC emissions by at least 65% by weight.

Composite fabricators in Southern California are affected by two air rules, Rule 1162 (Polyester Resin Operations) and Rule 1132 (Further Control of VOC Emissions from High Emitting Spray Booth Facilities) promulgated by the South Coast Air Quality Management District (SCAQMD).

and appliances, automotive, aerospace and aircraft components, and structural components for chemical process equipment and storage tanks. Composite fabricators in Southern California are affected by two air rules, Rule 1162 (Polyester Resin Operations) and Rule 1132 (Further Control of VOC Emissions from High Emitting Spray Booth Facilities) promulgated by the South Coast Air Quality Management District (SCAQMD). Rule 1162 was first adopted in 1987 and amended in 2001 to include more stringent requirements. Composite fabricators with Volatile Organic Compound (VOC) facility emissions of

TABLE 1

Effective dates for Rule 1132 compliance for alternative compliance options

VOC Reduction Commitment	Effective Requirement Dates	Compliance Plan Due Date	Permit Application Due Date
65%	July 1, 2004	Jan. 1, 2002	Jan. 1, 2003
85%	Dec. 31, 2004	Jan. 1, 2002	July 1, 2003
75% (facilities emitting more than 50 tons per year of VOCs)	July 1, 2003	Jan. 1, 2002	Jan. 1, 2002
75% (facilities emitting over 20 and less than 50 tons per year of VOCs)	July 1, 2004	Jan. 1, 2002	Jan. 1, 2003

But, what about UV/EB operations that started out with the same monomer content as traditional styrene formulations, but achieved reductions during the cure portion of the operation? These were not considered compliant according to the staff's preliminary proposals. RadTech explained to the SCAQMD that rule language should be added to allow for alternative means of compliance. The SCAQMD agreed to add an alternative compliance section to the rule (Rule 1132 (d)) that now allows composite manufacturers to propose any VOC reducing measure that achieve 65% emission reductions at the facility. The downside is that this is a "case-by-case" determination where each facility must make an equivalent demonstration and obtain District approval prior to implementing the changes. Since UV/EB operations are not specifically named in the rule, the regulatory process presents a barrier to the embracement of the technology by composite fabricators. "The current rules are targeted toward traditional technologies such as afterburners and lower monomer styrene formulations. Cal Spas encountered many difficulties with

SCAQMD when first proposing an alternative to conventional approaches. The current rules are not well structured for innovative pollution prevention approaches," said Mary J. Stine, Environmental Health and Safety administrator of Cal Spas in Southern California.

Rule 1132 Compliance Schedules

Table 1 summarizes the schedules for operations that utilize the alternative compliance option route.

Rule 1132 mandated that effective Jan. 1, 2002, composite manufacturing facilities:

- Use non-atomized application equipment.
- Do not use clear gel coats with monomer contents in excess of 44% by weight as applied.
- Do not use white and off-white pigmented gel coats with monomer contents in excess of 30% by weight as applied.
- Do not use non-white pigmented gel coats with monomer contents in excess of 37% by weight as applied.

Composite fabricators subject to Rule 1132 that committed to implementation of pollution prevention

strategies by Jan. 1, 2002, were given until July 1, 2004, to demonstrate compliance with the final 65% reduction requirements. Additional time for compliance (until Dec. 31, 2004) was provided to facilities that committed to a reduction of at least 85% through process change.

UV/EB processes fall under the Alternative Compliance section of the rule. The compliance plan-filing deadline (Jan. 1, 2002) has passed. District staff has expressed a willingness to work with facilities that would like to modify their compliance plans to include UV/EB technology, so long as compliance with the rule will be achieved by the specified date. For example, an end-user may request a modification to its original plan (if it did not include UV/EB technology) to reflect the conversion of part or all of the end-user's process to UV/EB.

Rule 1132 Exemptions

The following are exempt from rule requirements:

- Facilities limited by permit conditions to no more than 20 tons per year of VOCs. **UV/EB processes can help facilities stay below**

this threshold, thus avoiding applicability. UV/EB processes offer composite fabricators potential VOC reductions that can help them stay out of rule requirements altogether. The UV/EB industry can have a significant impact in this area.

- Low VOC loading spray booths (defined in Rule 1132 (h)(2)).
- Spray booths with pre-existing emission control systems. There are several conditions (outlined in Rule 1132(h)(3)) associated with this exemption.

The SCAQMD concluded, "Source reduction for fiberglass industry is expected to be a combination of process change, application method change and use of low VOC emitting products."

Brian Yeh, SCAQMD supervising engineer, stressed, "I believe that it is critical for facilities to understand that, once they accept permit conditions limiting their facility emissions to less than 20 tons per year, and thus be exempt from rule requirements, there will be New Source Review implications if they subsequently decide to increase facility VOC emissions and exceed the 20 ton per year limit." UV/EB processes can help a facility make and keep the commitment to a facility limit of 20 tons per year.

Rule 1162—Polyester Resin Operations

Several months after adopting Rule 1132, SCAQMD proposed changes

to Rule 1162, which specifically sought to further reduce emissions of VOCs and Hazardous Air Pollutants from composite operations.

The composites industry in California again faced more stringent requirements including:

- Non-atomization application techniques for spraying gel coat and resin materials.
- Lower monomer content (see Table 2) of the polyester resin materials such as clear gel coat, pigmented gel coat, general-purpose resins, fire retardant and high-strength resins.
- Vapor suppression for tub/shower resin materials.

The District estimated that the requirements would result in

TABLE 2

Rule 1162 monomer content requirements (percentage by weight as applied)

Polyester Resin Material	Monomer % Effective July 1, 2002	Monomer % Effective July 1, 2003
Clear Gel Coats (marble resins)	44%	40%
Clear Gel Coats (other resins)	44%	44%
White and Off-White Pigmented Gel Coat	30%	30%
Non-White Pigmented Gel Coat	37%	37%
Pigmented Gel Coat (Primer)	28%	28%
Specialty Gel Coat	48%	48%
General Purpose Resins		
Marble Resins	35%	10% or 32% as supplied, no fillers
Solid-Surface Resins	35%	17%
Tub/Shower Resins	35%	24% or 35% as supplied, no fillers
Lamination Resins	35%	31% or 35% as supplied, no fillers
Others	35%	35%
Fire Retardant Resins	42%	38%
Corrosion-Resistant Resin	48%	48%
High-Strength Resin	48%	40%

approximately a “68% reduction of the VOC and HAP emissions of all composites facilities in the AQMD.”

Composite fabricators expressed concern over the proposals. Specifically, the requirements for gel coats seemed to generate a great deal of discussion. Fabricators asserted that setting the monomer content of gel coats too low would negatively impact product quality. Impacts cited included the creation of pockets on the surface of the product that would be detrimental to its appearance and marketing value. Reductions of thermal-shock resistances, leading to cracking, surface blistering and product failure, were also downsides of the proposed lower monomer content requirements. Based on these comments, the District extended the compliance date to July 1, 2003.

Once again, the initial versions of the rule did not have a placeholder for

show that its UV/EB process can meet the requirements. The Alternative Compliance Option in Rule 1162 also requires consensus by the state and federal agencies. District staff cited lack of data as the reason for this requirement. RadTech is currently working on establishing a boilerplate protocol to prove equivalency so that end-users of UV/EB processes do not have to bear the burden.

Rule 1162 Technical Assessment

In response to the industry’s concern over the non-atomization requirement for gel coats, District staff committed to a technical assessment. The technical assessment answered the question of whether or not non-atomization of gel coats is feasible. According to District staff, the answer is yes. However, the assessment does not look into non-atomization of UV/EB

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UV/EB technology. RadTech argued that the proposal focused on the reduction of VOC monomer content and add-on controls as means of compliance. The rule did not accommodate the use of new emerging technologies. UV/EB processes using formulations with non-compliant monomer contents were not allowed, even if emission reductions could be achieved during the curing phase of the process. It was suggested that a provision be added to allow for equivalent pollution prevention technologies such as UV/EB. District staff agreed with the suggestion and included Section 1162 (g) Alternative Compliance Option, in the rule.

As in the case of Rule 1132, it is the composite fabricator’s responsibility to

gel coats. In addition, it could be construed as an implied requirement. RadTech and various member companies emphasized to District staff that non-atomization of UV/EB gel coats should not be mandated as long as equivalent emission reductions (to Rule 1162 requirements) could be achieved by the technology. District staff agreed that this was indeed its intent and to include language in the technical report that would clarify the issue.

Permit Exemption for UV/EB

In the SCAQMD, UV/EB operations are not required to obtain permits so long as they:

- use less than 6 gallons per day* of UV/EB type material (including cleanup solvents), or

- use unlimited gallons of super-compliant (VOC content less than 50 grams/liter) UV/EB material coupled with super-compliant cleanup solvents, and
- are not conducted inside a spray booth. All spray booths require a District permit.

Since some UV/EB-composite operations start out with the same VOC (usually styrene) content as their conventional counterparts, it becomes difficult to justify that these processes are exempt from air permits. In addition, all spray booths associated with the operation (regardless of the VOC content of the formulation) require permits. There are no permits required for the curing units.

** Usage limits for UV/EB materials can also be specified on a monthly basis.*

Next Steps

RadTech has asked SCAQMD to include changes to Rule 1162 in order to better accommodate UV/EB technology. Various RadTech member companies are providing the District with input on how to refine the Alternative Compliance Option in the rule and ease the UV/EB end-user’s burden of proving equivalency with traditional means of emission reductions. In addition, RadTech hopes to partner with composite fabricators in an effort to increase their awareness about UV/EB technology as a compliance option.

Conclusion

In the last two years, the Southern California composites industry has been affected by stringent regulations. The composites market represents a potential area for growth of UV/EB technology. This is especially true for the Southern California industry, which must find lower emitting processes. The key to success is to create a place for UV/EB technology in the regulations so that it is considered a compliant

equivalent to all requirements. In addition, easing the end-user's burden of having to prove compliance to the regulators will eliminate one of the obstacles to UV/EB's growth.

Although UV/EB technology is not mature in the composites industry, regulators have acknowledged its potential market penetration and worked towards preparing a place for it in the rules. The willingness of the regulatory community to encourage the use of UV/EB technology had been expressed through some relief from permitting requirements as well as record keeping. Reduction of regulatory hassles should be an incentive for composite fabricators considering conversion to UV/EB. ▀

References

- South Coast Air Quality Management District. Rule 1162 —Polyester Resin Operations. November 2001.
- South Coast Air Quality Management District. Rule 1132 —Further Control of VOC Emissions from High Emitting Spray Booth Facilities. Jan. 2001.

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