

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION**

JANUARY 10, 2006

**PERMIT TO INSTALL
NO. 57-04A**

**ISSUED TO
CHRISTENSEN FIBERGLASS, LLC**

**LOCATED AT
126 ANILINE AVENUE
HOLLAND, MICHIGAN 49424**

**IN THE COUNTY OF
OTTAWA**

**STATE REGISTRATION NUMBER
N5883**

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environmental Quality. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

| | |
|---|------------|
| DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: 12/21/2005 | |
| DATE PERMIT TO INSTALL APPROVED: 1/10/2006 | SIGNATURE: |
| DATE PERMIT VOIDED: | SIGNATURE: |
| DATE PERMIT REVOKED: | SIGNATURE: |

ERMIT TO INSTALL

Table of Contents

| Section | Page |
|---|-------------|
| Alphabetical Listing of Common Abbreviations / Acronyms | 2 |
| General Conditions | 3 |
| Emission Unit Identification | 5 |
| Flexible Group Identification..... | 5 |
| Emission Unit Special Conditions for EULAMINATION..... | 5 |
| Emission Unit Special Conditions for EUGELCOAT..... | 7 |
| Emission Unit Special Conditions for EUCLEANUP..... | 8 |
| Flexible Group Special Conditions for FGFIBERGLASS..... | 9 |
| Appendix A..... | 10 |

Common Abbreviations / Acronyms

| Common Acronyms | | Pollutant / Measurement Abbreviations | |
|------------------------|---|--|--|
| AQD | Air Quality Division | Btu | British Thermal Unit |
| BACT | Best Available Control Technology | °C | Degrees Celsius |
| CAA | Clean Air Act | CO | Carbon Monoxide |
| CEM | Continuous Emission Monitoring | dscf | Dry standard cubic foot |
| CFR | Code of Federal Regulations | dscm | Dry standard cubic meter |
| COM | Continuous Opacity Monitoring | °F | Degrees Fahrenheit |
| EPA | Environmental Protection Agency | gr | Grains |
| EU | Emission Unit | Hg | Mercury |
| FG | Flexible Group | hr | Hour |
| FRP | Fiberglass Reinforced Plastic | H ₂ S | Hydrogen Sulfide |
| GACS | Gallon of Applied Coating Solids | hp | Horsepower |
| GC | General Condition | lb | Pound |
| HAP | Hazardous Air Pollutant | m | Meter |
| HVLP | High Volume Low Pressure * | mg | Milligram |
| ID | Identification | mm | Millimeter |
| LAER | Lowest Achievable Emission Rate | MM | Million |
| MACT | Maximum Achievable Control Technology | MW | Megawatts |
| MAERS | Michigan Air Emissions Reporting System | NO _x | Oxides of Nitrogen |
| MMA | Methyl Methacrylate | PM | Particulate Matter |
| MAP | Malfunction Abatement Plan | PM-10 | Particulate Matter less than 10 microns diameter |
| MDEQ | Michigan Department of Environmental Quality | pph | Pound per hour |
| MSDS | Material Safety Data Sheet | ppm | Parts per million |
| NESHAP | National Emission Standard for Hazardous Air Pollutants | ppmv | Parts per million by volume |
| NSPS | New Source Performance Standards | ppmw | Parts per million by weight |
| NSR | New Source Review | psia | Pounds per square inch absolute |
| PS | Performance Specification | psig | Pounds per square inch gauge |
| PSD | Prevention of Significant Deterioration | scf | Standard cubic feet |
| PTE | Permanent Total Enclosure | sec | Seconds |
| PTI | Permit to Install | SO ₂ | Sulfur Dioxide |
| RACT | Reasonable Available Control Technology | THC | Total Hydrocarbons |
| ROP | Renewable Operating Permit | tpy | Tons per year |
| RTM | Resin Transfer Molding | µg | Microgram |
| SC | Special Condition Number | VOC | Volatile Organic Compounds |
| SCR | Selective Catalytic Reduction | yr | Year |
| SRN | State Registration Number | | |
| TAC | Toxic Air Contaminant | | |
| VE | Visible Emissions | | |

* For High Volume Low Pressure (HVLP) applicators, the pressure measured at the HVLP gun air cap shall not exceed ten (10) pounds per square inch gauge (psig).

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **[R336.1201(1)]**
2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environmental Quality, P.O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **[R336.1201(4)]**
3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to R336.1210, operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **[R336.1201(6)(b)]**
4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **[R336.1201(8), Section 5510 of Act 451, PA 1994]**
5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to R336.1219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of R336.1219. The written request shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environmental Quality. **[R336.1219]**
6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **[R336.1901]**
7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **[R336.1912]**
8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.
10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.
11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of R336.1301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with R336.1303. **[R336.1301]**
 - a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
 - b) A visible emission limit specified by an applicable federal new source performance standard.
 - c) A visible emission limit specified as a condition of this permit to install.
12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in R336.1370(2). **[R336.1370]**
13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with R336.2001 and R336.2003, under any of the conditions listed in R336.2001. **[R336.2001]**

SPECIAL CONDITIONS

Emission Unit Identification

| Emission Unit ID | Emission Unit Description | Stack Identification |
|---|---|-----------------------------|
| EULAMINATION | Resin lamination process to construct miscellaneous rigid products. Resin materials are hand-applied (manual) and mechanically applied. The resin application will occur in the production area and/or booth vented by the booth exhaust system. Hardener/catalyst materials may be used; emissions included here. Mold release materials may be used; emissions included here. | SV-FIBERGLASS |
| EUGELCOAT | Gelcoat materials applied to molds. Air atomized applicators are used for gelcoat application. The gelcoat application will occur in the production area and/or booth vented by the booth exhaust system. Catalyst materials may be used; emissions included here. | SV-FIBERGLASS |
| EUCLEANUP | Acetone used for cleanup of processes. | SV-FIBERGLASS |
| Changes to the equipment described in this table are subject to the requirements of R336.1201, except as allowed by R336.1278 to R336.1290. | | |

Flexible Group Identification

| Flexible Group ID | Emission Units Included in Flexible Group | Stack Identification |
|--------------------------|--|-----------------------------|
| FGFIBERGLASS | EULAMINATION, EUGELCOAT, EUCLEANUP | SV-FIBERGLASS |

The following conditions apply to: EULAMINATION

Emission Limits

| | Pollutant | Equipment | Limit | Time Period | Testing/ Monitoring Method | Applicable Requirements |
|---|----------------------------|------------------|--------------|---|---|------------------------------------|
| 1.1 | VOC (including styrene) | EULAMINATION | 5.9tpy | 12-month rolling time period as determined at the end of each calendar month. | SC 1.8 | R336.1225, R336.1702(a) |
| The emission limits are based upon the emission factors in Special Condition No. 1.2a and 1.2b and includes molds release.. | | | | | | |

| | Material | Application Method | Styrene Emission Factor (lb emitted per lb material applied) |
|--|-----------------|---------------------------|---|
| 1.2a | Resin | Manual-Atomized | 0.177 |
| 1.2b | Resin | Manual | 0.090 |
| The emission factor listed is for a worst case 50 percent styrene content resin. The emission factor will vary depending on the styrene content of the resin. Refer to the Unified Emission Factor (UEF) Table in Appendix A for addition emission factors. [R336.1225, R336.1702(a)] | | | |

Material Usage Limits

1.3 The styrene content of all resins used in EULAMINATION shall not exceed 50 percent by weight. **[R336.1225, R336.1702(a)]**

Equipment

1.4 The permittee shall not operate EULAMINATION unless its respective exhaust filter is installed, maintained and operated in a satisfactory manner. **[R336.1225, R336.1702(a), R336.1901]**

1.5 The permittee shall not operate EULAMINATION unless the resin application is in the production area vented through the booth or the booth, and the booth exhaust fan is operating in a satisfactory manner during resin application. **[R336.1225, R336.1702(a), R336.1901]**

Recordkeeping/Reporting/Notification

1.6 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. **[R336.1225, R336.1702]**

1.7 The permittee shall keep a separate record of the VOC and styrene monomer content for each shipment of resin received. The permittee shall keep all records on file for a period of at least five years and made available to the Department upon request. **[R336.1225, R336.1702(a)]**

1.8 The permittee shall keep the following information for each calendar month for EULAMINATION:

- a) The identity and amount (in pounds) of each resin used.
- b) The VOC (including styrene) content of each resin used.
- c) The identity and amount (in pounds) of each catalyst/hardener used.
- d) The identity and amount (in pounds) of mold release used.
- d) The appropriate emission factor for each raw material used.
- e) The appropriate emission factor for each raw material used.
- f) VOC (including styrene) emission calculations determining the monthly emission rate in tons per calendar month, and the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1225, R336.1702(a)]

1.9 The permittee shall keep, in a satisfactory manner, records of weekly fan operational checks for EULAMINATION, as required by SC 1.5. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1225,R336.1702(a),R336.1901]

The following conditions apply to: EUGELCOAT

Emission Limits

| | Pollutant | Equipment | Limit | Time Period | Testing/ Monitoring Method | Applicable Requirements |
|---|------------------------|------------------|--------------|---|---|------------------------------------|
| 2.1 | VOC(Including styrene) | EUGELCOAT | 1.9 tpy | 12-month rolling time period as determined at the end of each calendar month. | SC 2.8 | R336.1225, R336.1702(a) |
| The emission limits are based upon the emission factors in Special Condition Nos. 2.2a, 2.2b, and 2.2c. | | | | | | |

| | Material | Application Method | Styrene Content (wt %) | MMA Content (wt %) | Styrene Emission Factor (lb emitted per lb material applied) | MMA Emission Factor (lb emitted per lb material applied) |
|------|--|---------------------------|-------------------------------|---------------------------|---|---|
| 2.2a | Gelcoat (clear, white, colored, tooling) | Atomized | 43 | 5 | 0.251 | 0.038 |
| 2.2b | Sanding Primer (non-gelcoat) | Atomized | 16.5 | NA | 0.073 | NA |
| 2.2c | Speed Patchaid (non-gelcoat) | Atomized | 51 | NA | 0.334 | NA |

The emission factors listed are for worst case styrene and MMA content gelcoats. The emission factors will vary depending on the styrene and MMA contents of the gelcoats. Refer to the Unified Emission Factor (UEF) Table for further information. [R336.1225, R336.1702(a)]

NOTE: The Patch Reducer and Speed Patchaid are not gelcoat materials but they do contain styrene. The emissions of styrene from these materials are treated as gelcoats for purposes of estimating emissions. The appropriate UEF factor should be used when estimating styrene emissions. Other VOC emissions are assumed to be 100% emitted.

Material Usage Limits

2.3 The permittee shall not exceed the styrene the MMA monomer contents listed in Special Condition Nos. 2.2aa, 2.2b. and 2.2c for materials used in EUGELCOAT. . [R336.1225, r336.1702(a)]

Equipment

- 2.4 The permittee shall not operate EUGELCOAT unless its respective exhaust filter is installed, maintained and operated in a satisfactory manner. [R336.1301, R336.1331, R336.1901, R336.1910]
- 2.5 The permittee shall not operate EUGELCOAT unless the gelcoat application is in the production area vented through the booth, and the booth exhaust fan is operating in a satisfactory manner during gelcoat application. [R336.1301, R336.1331, R336.1901]

Recordkeeping/Reporting/Notification

- 2.6 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. [R336.1225, R336.1702(a)]
- 2.7 The permittee shall keep a separate record of the styrene, and MMA monomer contents for each shipment of gelcoat received. The permittee shall keep a file for a period of at least five years and made available to the Department upon request. [R336.1225, R336.1702(a)]
- 2.8 The permittee shall keep the following information for each calendar month for EUGELCOAT:
 - a) The identity and amount (in pounds) of each material used.
 - b) The styrene, MMA and VOC content of each material used.
 - c) The appropriate emission factor for each raw material used.
 - d) VOC (including styrene) emission calculations determining the monthly emission rate in tons per calendar month, and the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file for a period of at least five years and made available to the Department upon request. [R336.1225, R336.1702(a), R336.1901]

- 2.9 The permittee shall keep, in a satisfactory manner, records of weekly fan operational checks for EUGELCOAT, AS REQUIRED BY SC 2.5. The permittee shall keep all records on file for a period of at least five years and make them available to the Department upon request. [R336.1225, R336.1702(a), R336.1901]

The following conditions apply to: EUCLEANUP

Emission Limits

| | Pollutant | Equipment | Limit | Time Period | Testing/ Monitoring Method | Applicable Requirements |
|-----|------------------|------------------|--------------|---|---|------------------------------------|
| 3.1 | Acetone | EUCLEANUP | 4.0 tpy | 12-month rolling time period as determined at the end of each calendar month. | SC 3.3 | R336.1224, R336.1225 |

Recordkeeping/Reporting/Notification

- 3.2 The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and made available by the 15th day of the calendar month, for the previous calendar month, unless otherwise specified in any recordkeeping, reporting or notification special condition. [R336.1224, R336.1225]
- 3.3 The permittee shall keep the following information on a monthly basis for EUCLEANUP:
- a) The amount (in gallons or pounds) of acetone used.
 - b) Where applicable, gallons or pounds of acetone reclaimed.
 - c) Acetone emission calculations determining the monthly emission rate in tons per calendar month, and the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

The records shall be kept in a format acceptable to the AQD District Supervisor. All records shall be kept on file for a period of at least five years and made available to the Department upon request. [R336.1224, R336.1225]

The following conditions apply to: FGFIBERGLASS

Process/Operational Limits

- 4.1 The permittee shall capture all waste cleanup solvent(s), catalyst(s), resin(s), and gelcoat(s) used in FGFIBERGLASS shall be captured and stored in closed containers. The permittee shall dispose of all waste [cleanup solvent(s), catalyst(s), resin(s), and gelcoat(s)] in an acceptable manner in compliance with all applicable state rules and federal regulations. [R336.1224, R336.1702(a)]

Recordkeeping/Reporting/Notification

- 4.2 The permittee shall maintain a current listing from the manufacturer of the chemical composition of each material (i.e lamination resin, gelcoat, catalyst, etc.), including the weight percent of each component. The data may consist of Material Safety Data Sheets, manufacturer's formulation data, or both as deemed acceptable by the AQD District Supervisor. The permittee shall keep all records on file for a period of at least five years and made available to the Department upon request. [R336.1224, R336.1225, R336.1702(a)]

Stack/Vent Restrictions

| | Stack & Vent ID | Maximum Diameter (inches) | Minimum Height Above Ground Level (feet) | Applicable Requirements |
|-----|----------------------------|----------------------------------|---|---|
| 4.3 | SV-FIBERGLASS | 38.0 | 40.0 | R336.12250, R336.19010, 40CFR 52.21 © and (d) |

The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air.

**Unified Emission Factors for Open Molding of Composites
July 23, 2001
Emission Rate in Pounds of Styrene Emitted per Ton of Resin or Gelcoat Processed**

| | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------------|
| Resin/gelcoat, % ⁽¹⁾ | <33 ⁽²⁾ | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | |
| Manual | 0.126 x %styrene x 2000 | 83 | 89 | 94 | 100 | 106 | 112 | 117 | 123 | 129 | 134 | 140 | 146 | 152 | 157 | 163 | 169 | 174 | 180 | ((0.286 x %styrene)) |
| Non-Atomized Resin | Manual emission factor [listed above] x (1 - (0.50 x specific VSR reduction factor for each resin/suppressant formulation)) | | | | | | | | | | | | | | | | | | | |
| Mechanical Atomized | 0.169 x %styrene x 2000 | 111 | 126 | 140 | 154 | 168 | 183 | 197 | 211 | 225 | 240 | 254 | 268 | 283 | 297 | 311 | 325 | 340 | 354 | ((0.714 x %styrene)) |
| Controlled with VSR ⁽³⁾ | Mechanical Atomized emission factor [listed above] x (1 - (0.45 x specific VSR reduction factor for each resin/suppressant formulation)) | | | | | | | | | | | | | | | | | | | |
| Mechanical Controlled ⁽⁴⁾ | 0.130 x %styrene x 2000 | 86 | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 185 | 196 | 207 | 218 | 229 | 240 | 251 | 262 | 273 | 0.77 x ((0.714 x %styrene)) |
| Controlled Spray with VSR | Mechanical Atomized Controlled Spray emission factor [listed above] x (1 - (0.45 x specific VSR reduction factor for each resin/suppressant formulation)) | | | | | | | | | | | | | | | | | | | |
| Non-Atomized | 0.107 x %styrene x 2000 | 71 | 74 | 77 | 80 | 83 | 86 | 89 | 93 | 96 | 99 | 102 | 105 | 108 | 111 | 115 | 118 | 121 | 124 | ((0.157 x %styrene)) |
| Mechanical Non-Atomized with VSR | Mechanical Non-Atomized emission factor [listed above] x (1 - (0.45 x specific VSR reduction factor for each resin/suppressant formulation)) | | | | | | | | | | | | | | | | | | | |
| Application | 0.184 x %styrene x 2000 | 122 | 127 | 133 | 138 | 144 | 149 | 155 | 160 | 166 | 171 | 177 | 182 | 188 | 193 | 199 | 204 | 210 | 215 | ((0.2746 x %styrene)) |
| Controlled with VSR ⁽³⁾ | 0.120 x %styrene x 2000 | 79 | 83 | 86 | 90 | 93 | 97 | 100 | 104 | 108 | 111 | 115 | 118 | 122 | 125 | 129 | 133 | 136 | 140 | 0.65 x ((0.2746 x %styrene)) |
| Application | 0.445 x %styrene x 2000 | 294 | 315 | 336 | 356 | 377 | 398 | 418 | 439 | 460 | 481 | 501 | 522 | 543 | 564 | 584 | 605 | 626 | 646 | ((1.03646 x %styrene)) |
| Controlled Spray Application | 0.325 x %styrene x 2000 | 215 | 230 | 245 | 260 | 275 | 290 | 305 | 321 | 336 | 351 | 366 | 381 | 396 | 411 | 427 | 442 | 457 | 472 | 0.73 x ((1.03646 x %styrene)) |
| Controlled Application ⁽⁶⁾ | SEE Note 9 below | 196 | 205 | 214 | 223 | 232 | 241 | 250 | 259 | 268 | 278 | 287 | 296 | 305 | 314 | 323 | 332 | 341 | 350 | ((0.4506 x %styrene)) |
| Controlled Roll-Out | Non-VSR process emission factor [listed above] x (0.80 for Manual <or> 0.85 for Mechanical) | | | | | | | | | | | | | | | | | | | |
| Controlled Roll-Out | Non-VSR process emission factor [listed above] x (0.50 for Manual <or> 0.55 for Mechanical) | | | | | | | | | | | | | | | | | | | |

Emission Rate in Pounds of Methyl Methacrylate Emitted per Ton of Gelcoat Processed

| | | | | | | | | | | | | | | | | |
|--|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| MMA content in gelcoat, % ⁽⁶⁾ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Gel coat application ⁽⁷⁾ | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 |

Notes

- Including styrene monomer content as supplied, plus any extra styrene monomer added by the molder, but before addition of other additives such as powders, fillers, glass, etc.
- Formulas for materials with styrene content <33% are based on the emission rate at 33% (constant emission factor expressed as percent of available styrene), and for styrene content >50% on the emission rate based on the extrapolated factor equations; these are not based on test data but are believed to be conservative estimates. The value for "% styrene" in the formulas should be input as a fraction. For example, use the input value 0.30 for a resin with 30% styrene content by wt.
- The VSR reduction factor is determined by testing each resin/suppressant formulation according to the procedures detailed in the CFA Vapor Suppressant Effectiveness Test.
- SEE the CFA Controlled Spray Handbook for a detailed description of the controlled spray procedures.
- The effect of vapor suppressants on emissions from filament winding operations is based on the Dow Filament Winding Emissions Study.
- Including MMA monomer content as supplied, plus any extra MMA monomer added by the molder, but before addition of other additives such as powders, fillers, glass, etc.
- Based on gelcoat data from NMMA Emission Study.
- SEE the July 17, 2001 EECS report Emission Factors for Non-Atomized Application of Gel Coats used in the Open Molding of Composites for a detailed description of the Non-Atomized gelcoat testing.
- Use the equation ((0.4506 x %styrene) - 0.0505) x 2000 for gelcoats with styrene contents between 19% and 32% by wt.; use the equation 0.185 x %styrene x 2000 for gelcoats with less than 19% styrene content by wt.