6.4 Paint And Varnish

6.4.1 Paint Manufacturing

The manufacture of paint involves the dispersion of a colored oil or pigment in a vehicle, usually an oil or resin, followed by the addition of an organic solvent for viscosity adjustment. Only the physical processes of weighing, mixing, grinding, tinting, thinning, and packaging take place. No chemical reactions are involved.

These processes take place in large mixing tanks at approximately room temperature.

The primary factors affecting emissions from paint manufacture are care in handling dry pigments, types of solvents used, and mixing temperature. About 1 or 2 percent of the solvent is lost even under well-controlled conditions. Particulate emissions amount to 0.5 to 1.0 percent of the pigment handled.

Afterburners can reduce emitted volatile organic compounds (VOC) by 99 percent and particulates by about 90 percent. A water spray and oil filter system can reduce particulate emissions from paint blending by 90 percent.

6.4.2 Varnish Manufacturing

The manufacture of varnish also involves the mixing and blending of various ingredients to produce a wide range of products. However in this case, chemical reactions are initiated by heating. Varnish is cooked in either open or enclosed gas-fired kettles for periods of 4 to 16 hours at temperatures of 93 to 340°C (200 to 650°F).

Varnish cooking emissions, largely in the form of volatile organic compounds, depend on the cooking temperatures and times, the solvent used, the degree of tank enclosure and the type of air pollution controls used. Emissions from varnish cooking range from 1 to 6 percent of the raw material.

To reduce organic compound emissions from the manufacture of paint and varnish, control techniques include condensers and/or adsorbers on solvent handling operations, and scrubbers and afterburners on cooking operations. Afterburners can reduce volatile organic compounds by 99 percent. Emission factors for paint and varnish are shown in Table 6.4-1.
### Table 6.4-1 (Metric And English Units). UNCONTROLLED EMISSION FACTORS FOR PAINT AND VARNISH MANUFACTURING

EMISSION FACTOR RATING: C

<table>
<thead>
<tr>
<th>Type Of Product</th>
<th>Particulate kg/Mg Pigment</th>
<th>lb/ton Pigment</th>
<th>Nonmethane VOC kg/Mg Of Product</th>
<th>lb/ton Of Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint</td>
<td>10</td>
<td>20</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Varnish Bodying oil</td>
<td>—</td>
<td>—</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Oleoresinous Alkyd</td>
<td>—</td>
<td>—</td>
<td>75</td>
<td>150</td>
</tr>
<tr>
<td>Acrylic</td>
<td>—</td>
<td>—</td>
<td>80</td>
<td>160</td>
</tr>
</tbody>
</table>

*a* References 2,4-8.

*b* Afterburners can reduce VOC emissions by 99% and particulates by about 90%. A water spray and oil filter system can reduce particulates by about 90%.

*c* Expressed as undefined organic compounds whose composition depends upon the type of solvents used in the manufacture of paint and varnish.

*d* Reference 4. Particulate mater (0.5 - 1.0%) is emitted from pigment handling.

**References For Section 6.4**


