Spray Coating Generic Scenario - Furniture
Chemical Engineering Branch
Scott Prothero
February, 1992

NOTE: All numerical estimates in this document are taken from reference (1).

Number of Sites:
Assume: Wood: 500 Metal: 1400

Days/yr operation:
Assume: Wood: 250 (2 8-hr shifts/day)
Metal: 250 (1 to 2 8-hr shifts/day)

Number of Workers/site:
Assume: Wood: 50 to 100 total; 10 to 20 painters (manual)
Metal: 50 to 100 total; 5 to 10 per line (manual), up to 4 lines per site

Working Days/yr:
Assume: same as days/yr operation (1 8-hr shift/day/worker)

Inhalation exposures:
Assume: Wood: 1 to 25 mg/day total mist x PMN conc
Metal: 1 to 240 mg/day total mist x PMN conc
(see reference (1) for organic solvents exposure)

Dermal exposures:
Use standard assumptions

Water releases:
Wood: assume no releases
Metal: if waterwall-type or water-washed booth, assume:
(3.77 to 7.54) x (PMN solubility in H2O in g/L)
kg/site/day for N days/yr where
N = 1 if solvent-based coating; or 4 if water-based coating; or 50 if paint sludge removal efficiency may be low;
(basis 1,000 to 2,000 gallon system; 95% to 99% removal of overspray from ventilation; overspray %ages shown in general info); otherwise, assume no release to water.

Air releases:
Use standard assumptions

Incineration releases:
Assume: none

Land releases:
Assume: for both wood and metal, essentially 100% of overspray is sent to landfill

General Information

NOTE: For more information on exposure/release controls, coating components, etc., see references.

Units/day: Wood: 400 (200 units/shift)
Metal: 500 to 1000 (250 to 750 units/shift)

Coating Volume (avg): 7.6×10^{-5} m^3 (2 m^2 area by 1.5 mil thick)

Coating Compositions (given as % solids):

Wood:

Body Stain - 1% Washcoat - 8-10%
Filler - 40% Sealer (barrier coat) - 14-23%
Glaze - 21-24% Clear Lacquer (topcoat) - 14-15%

Metal:

Solvent-based (conventional) - 14-25%
Solvent-based (high-solids) - 40-60%
Waterborne - 15-25%

Spray/Atomization Technique:

Wood: Air-atomized, Air-assisted, or Air-assisted airless
Metal: Air-atomized, Air-assisted airless, or Electrostatic (air-atomized, air-assisted airless, or rotary)

Overspray (as % of total volume sprayed)

Spray Technique	Wood	Metal
air-atomized	>50%	50% to 75%
airless	<50%	75%
electrostatic (es) manual	n/a	40%
es nonrotational automatic	n/a	30%
es rotational	n/a	5% to 20%

Type of operation:

Wood: manual spraying
Metal: manual and automated (touch-up generally manual)

References

(1) Rodriguez, Vanessa E. Generic Engineering Assessment - Spray Coating Occupational Exposure and Environmental Releases. EPA/OTS/CEB. Rev Oct. 1987.

(2) O'Brien, D.M., and D.E. Hurley. An Evaluation of Engineering Control Technology for Spray Painting. NIOSH. DHHS Pub. NIOSH 81-121. 1981.

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