

Emissions Estimate for Powder Coat Operations

Parts Cleaning:

Parts cleaning is performed using an aqueous parts cleaner. No solvent is employed.

Dry-Off Oven:

Compressed air is used to remove the majority of water from the cleaned parts. Parts are dried of remaining water in an electric dry-off oven. This activity is not a source of combustion products.

Powder Coat Booth Emissions:

average annual powder coating usage = ~1,500 lbs total

average operating hours: 8 hrs/day, 5 days/week, 50 weeks/yr = 2000 hrs/yr

per AP-42, transfer efficiency for powders ~93%; taking 7% powder coating usage as overspray powder coating operations performed in an enclosed system (paint booth) where overspray collected for recycle/reuse; estimated 80% capture efficiency for overspray collection system

estimated average annual fugitive particulate emissions from powder coating:

$$(1,500 \text{ lbs av. powder coating usage}) \times (7\% \text{ overspray}) = 105 \text{ lbs}$$

$$(105 \text{ lbs}) \times (1 - 80\% \text{ capture efficiency}) = 21 \text{ lbs PART} = 0.0105 \text{ TPY PART}$$

average estimated emission rate:

$$(105 \text{ lbs PART}) / (2000 \text{ hrs/yr}) = 0.05 \text{ lbs PART per hour}$$

PTE based upon estimated hourly emission rate:

$$(0.05 \text{ lbs PART / hour}) \times (8,760 \text{ hrs max per year}) = 438 \text{ lbs PART} = \sim 0.22 \text{ TPY PART}$$

Please note: as no organic HAPs are contained in the powder coatings used, the Misc. Metal Parts & Products NESHP (Subpart Mmmm) does not apply to this coating operation.

Powder Cure Oven:

natural gas-fired IR oven used to cure powder coating

Calculation of Maximum Natural Gas Usage:

maximum firing rate = 0.15 mmBTU/hr

maximum operating hours = 24 hr/day, 365 days/yr = 8,760 hrs/yr

max natural gas usage = $(0.15 \text{ mmBTU/hr})(8,760 \text{ hrs/yr}) / (1,000 \text{ BTU per cft natural gas})$
= 1.314 mmcft /yr

Calculation of Maximum Emissions from Natural Gas Combustion:

maximum firing rate = 0.15 mmBTU/hr

max emissions using AP-42 emissions factors:

NO_x: $(0.15 \text{ mmBTU/hr})(100 \text{ lb NO}_x/\text{mmcft}) / (1000 \text{ BTU/cft})$
= 0.015 lb NO_x/hr $(8,760 \text{ hrs/yr}) / (2000 \text{ lbs/ton}) = 0.066 \text{ TPY NO}_x$

CO: $(0.15 \text{ mmBTU/hr})(84 \text{ lb CO}/\text{mmcft}) / (1000 \text{ BTU/cft})$
= 0.0126 lb CO/hr $(8,760 \text{ hrs/yr}) / (2000 \text{ lbs/ton}) = 0.055 \text{ TPY CO}$

PM: $(0.15 \text{ mmBTU/hr})(7.6 \text{ lb PM}/\text{mmcft}) / (1000 \text{ BTU/cft})$
= 0.00114 lb PM/hr $(8,760 \text{ hrs/yr}) / (2000 \text{ lbs/ton}) = 0.005 \text{ TPY PM}$

VOM: $(0.15 \text{ mmBTU/hr})(5.5 \text{ lb VOM}/\text{mmcft}) / (1000 \text{ BTU/cft})$
= 0.0008 lb VOM/hr $(8,760 \text{ hrs/yr}) / (2000 \text{ lbs/ton}) = 0.004 \text{ TPY VOM}$

SO₂: $(0.15 \text{ mmBTU/hr})(0.6 \text{ lb SO}_2/\text{mmcft}) / (1000 \text{ BTU/cft})$
= 0.0001 lb SO₂/hr $(8,760 \text{ hrs/yr}) / (2000 \text{ lbs/ton}) = 0.0004 \text{ TPY SO}_2$

NH₃: $(0.15 \text{ mmBTU/hr})(3.2 \text{ lb NH}_3/\text{mmcft}) / (1000 \text{ BTU/cft})$
= 0.0005 lb NH₃/hr $(8,760 \text{ hrs/yr}) / (2000 \text{ lbs/ton}) = 0.002 \text{ TPY NH}_3$

Overall PTE Emissions Estimate:

no HAP emissions

max pollutant: particulate = ~0.225 TPY < 5 TPY

Therefore, the powder coating operations qualify as an insignificant activity.