MANUFACTURING AND COATING OF MISCELLANEOUS METAL PARTS AND PRODUCTS PERMITTING AND COMPLIANCE PROCEDURES

Discussion: These procedures follow the guidance of several exchanges and letters from Mr. Mann that Article 34 (Rule 4-34) regulates facilities that manufacture and coat miscellaneous metal parts and products, not facilities that apply maintenance (resurface or restore) coatings to miscellaneous metal parts (SIC 7--- series, specialized repair or service shops). The CTG used for Article 4-34 defines the manufacturing process and has a footnote about maintenance coatings to be covered under another guideline. Article 34 was designed along with other Articles in Chapter 40 to control emissions from the manufacturing industry (magnet wire coating, can coating, metal coil coating, etc.). Article 34 is very specific to the manufacturing industry and is not a catch all for every metal surface coating operation. These procedures do not apply to the operational maintenance and repair (OM&R) shop surface coating operations for miscellaneous metal parts, nor such things as when a facility buys some painted miscellaneous metal part and re-coats it in the OM&R shop to a new color that fits the company's image.

I. PURPOSE

To specify requirements for permit applicability and approval for the coating of miscellaneous metal parts and products during the manufacturing process.

The boilerplate is meant to provide a guideline for the minimum requirements of the Department of Environmental Quality. More stringent requirements may be imposed if necessary to demonstrate compliance with the NAAQS or other special requirements. This boilerplate does not apply to PSD or Nonattainment permit review, to facilities defined as major stationary sources or major modifications (as defined in 9 VAC 5-80-10 of the Regulations), or to facilities subject to NSPS or NESHAP.

II. REFERENCES

Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution: Chapter 40, Article 34 (9 VAC 5-40-4760 et seq.); Chapter 80, Part I (9 VAC 5-80-10 and 9 VAC 5-80-11)

John Seitz memo of Jan 1995: Options for Limiting the Potential to Emit (PTE) of a Stationary Source under Section 112 and Title V of the Clean Air Act.

EPA-450/2-78-015. Control of Volatile Organic Emissions From Existing Stationary Sources. Volume VI: Surface Coating of Miscellaneous Metal Parts and Products.

III. DEFINITIONS

The following definitions are for use in this guideline and do not necessarily have the same meaning in other portions of the regulations.

coating application system - any operation or system where a surface coating of one type or function is applied, dried or cured and which is subject to the same emission standard. May include any equipment which applies, conveys, dries or cures a surface coating, including, but not limited to spray booths, flow coaters, flashoff areas, air dryers, drying areas and ovens. It is not necessary for a coating application system to have an oven, flashoff area to be included in this definition.

coating applicator - an apparatus used to apply a surface coating.

dip coating - a process in which metal parts are immersed into a coating bath. After withdrawal, the excess coating is allowed to drain back into a tank.

electrostatic spray coating - a process in which an electrical charge is applied to the atomized coating particles, either by the creation of an ionized zone within the spray cone area, or by imparting a charge to the coating stream prior to its release from the spray gun. The charged, atomized coating particles are attracted to the metal part being coated by the electrostatic potential between the coating and the metal part.

flame coating - a unique one step powder coating operation. Oxygen/acetylene are typically used with a powder coating (could also be a metal in special cases). A powder is continuously fed into a flame. The flame is not the atomizing source. Instead, the flame is surrounded by a jet of compressed air or inert gas to propel the powder towards the substrate. The flame provides the heat to melt the powder to provide the desired even film.

flowcoating - a process in which metal parts are conveyed through an enclosed booth. Inside, a series of nozzles (which may be stationary or may oscillate), located at various angles to the conveyor, shoot streams of coating which "flow" over the part. The excess coating drains back into a holding tank for reuse.

Definitions continued

manufacturing and coating miscellaneous metal parts and products facility - three types: (1) Facilities that manufacture and coat metal parts and then assemble them to form a final product to be sold. (2) A job shop that manufactures and coats metal parts under contract, and the metal parts are shipped to the final product manufacture to be assembled with other parts into some final product. (3) Facilities that receive newly manufactured metal parts from another plant(s) for assembly into a final product to be sold but apply some type of coating to the final assembled product. This means the parts and products from the following industrial categories: large machinery, small farm machinery, small appliance, commercial machinery, industrial machinery, fabricated metal parts, or any other industrial category which coats metal parts under the SIC code of Major Groups 33, 34, 35, 36, 37, 38, 39, 40, and 41.

operational maintenance and repair (OM&R) facilities - repairs and coats or re-finishes (restores the surface coating) on miscellaneous metal parts and product items from its own facility or from other facilities (The facility may have contract work to re-finish surface coatings for other facilities). The OM&R surface coating operations are not addressed by these procedures.

potential to emit (PTE) - means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitations on capacity of the source to emit a pollutant, including air pollution control equipment, and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation or its effect on emissions is state or federally enforceable. This is not estimating emissions from the spray guns being used at maximum capacity for 8760 hours per year without controls. The coating operation process is the emissions unit. EPA will allow PTE emissions for the facility (total of each coating operation) to be calculated upon the physical and operational design of the facility coating operations (without controls) in the 8760 hours per year. One must identify preparation and drying times, or other inherent limitations to the coating operations for the best PTE estimates. A coating transfer efficiency can be taken into consideration in this calculation.

powder coating - a coating usually applied by a sprayer using a dry powder. After the spray has been applied the coating, the metal part is baked at a sufficiently high temperature to make the powder "flow out" to form a continuous film. Some powder coatings can be applied by dipping to create a thicker film.

Definitions continued

predicted emissions - estimates for the facility using the propose operating schedule and consumption of the coatings, the appropriate transfer efficiencies, and the proper control efficiencies for control equipment.

spray coating - a process in which the liquid coating is atomized into droplets by a spray gun and blown unto the metal parts. This is usually done in a booth which contains the overspray and prevents surface contamination.

uncontrolled emissions - rather than estimating emissions from the spray guns being used at maximum capacity for 8760 hours per year without controls, EPA will allow emissions at the facility (total of each coating operation) to be calculated upon the physical and operational design of the coating operations (without controls) in the 8760 hours per year. One must identify preparation and drying times, or other inherent limitations to the coating operations for the best estimates. A coating transfer efficiency can be taken into consideration in this calculation.

IV. EMISSIONS CALCULATIONS

A. Types of calculations.

The uncontrolled and predicted emissions should be calculated according to procedural definitions to determine the type of permit or exemption.

B. Items for consideration in calculations.

1. Particulate, VOC and toxic pollutant emissions can typically be calculated using information found on the coating Material Safety Data Sheet (MSDS). Parameters such as specific gravity, VOC content, and weight % solids are normally provided. Also, the major components are usually given in % by weight. In some instances, the MSDS is not specific enough, and the manufacturer must supply additional information. Particulate emissions should be calculated from weight % solids when possible, and VOC emissions should be calculated from VOC content. Remember that along with VOC emissions from coatings, the VOC emissions from cure volatiles, various solvents used as coating thinners, in clean-up and purging operations, and metal cleaning in preparation of the coating operation should also be calculated for the facility total emissions.

EMISSIONS CALCULATIONS continued

2. Particulate transfer efficiencies vary according to the size and shape of the item being coated, as well as the type of coating applicator used. For most miscellaneous metal parts and products coating operations, when the source cannot provide an estimate, and when relatively broad, flat surfaces are covered, a 50% particulate transfer efficiency is considered average for non-electrostatic spray operations. Of course, if the coated item is narrow, or has many edges, the transfer efficiency can drop dramatically. Spray equipment types consist of: air-atomized conventional (AAC), airless conventional (ALC), air-assisted airless (AAL), high-volume low pressure (HVLP), high volume, stepped down low pressure (HVSDLP), low pressure, low volume (LPLV), thin film atomization (TFA) and rotary atomizers. The spray equipment can be used in an electrostatic, non-electrostatic, manual or automatic mode. Each operator as well as type of spray equipment, mode of operation, coating type, or spray booth ventilation can cause transfer efficiency to vary with values from 40% to 90%. The conventual systems (AAC or ALC) should not be used. If a non-electrostatic system is being used, then one of the low pressure systems (HVLP, HVSDLP, or LPLV) with higher transfer efficiencies (65% or greater) should be required to reduce overspray and VOC emissions. Flow, dip or roller coating or electrostatic spray coating can yield very high transfer efficiencies, 70% to 90% or more. All transfer efficiencies should be documented by the source when possible.

EMISSIONS CALCULATIONS continued

3. Particulate control afforded by cellulose, fiberglass, or polyester paint filters is assumed to be 85%, unless the source can document or demonstrate otherwise. Control by water curtain also exhibits a control efficiency of about 85%. VOC control afforded by incineration or carbon adsorption is generally between 90% and 99%+ in a well-designed system. The source should document all efficiencies. For wet coating operations in small booths (less than 10,000 gal/yr), PM/PM10 calculations need not be accomplished if control efficiency is at least 85% With such small thruputs, normal transfer efficiencies, and controls, the amount of PM/PM10 emissions is usually below permit inclusion. PM/PM10 emissions should be calculated for powder coating operations.

V. REQUIREMENTS

A. Applicability for VOC control areas:

This boilerplate is applicable to construction, reconstruction, modification or relocation of facilities that manufacture and coat miscellaneous metal parts and products.

1. If the uncontrolled emissions are below the levels of 9 VAC 5-80-11, B.12 (8 lb/hr, 40 lb/day, and 7 ton/yr) and the predicted emissions are below Article 4-34 (9 VAC 5-40-4760 et seq. 3 lb/hr, 15 lb/day, and 2.7 ton/yr) levels, then an exemption is granted.

2. If the uncontrolled emissions are below the levels of 9 VAC 5-80-11, B.12 (8 lb/hr, 40 lb/day, and 7 ton/yr) but the predicted emissions for a facility are above Article 34 (9 VAC 5-40-4760 et seq. 3 lb/hr, 15 lb/day, and 2.7 ton/yr), then issue 10 B permit for VOC limit at 7 tons/yr using compliant coatings as listed in Article 34

3. If the uncontrolled emissions are more than 9 VAC 5-80-11, B.12 (8 lb/hr, 40 lb/day, and 7 ton/yr), the predicted emissions for a facility are above Article 34 (9 VAC 5-40-4760 et seq. 3 lb/hr, 15 lb/day, and 2.7 ton/yr), and the predicted emissions are below 9 VAC 5-80-11, B.12 (8 lb/hr, 40 lb/day, and 7 ton/yr), then issue 10 B permit for VOC limit at 7 tons/yr using compliant coatings as listed in Article 34.

EMISSIONS CALCULATIONS continued

4. If the uncontrolled and predicted emissions for the facility are above 9 VAC 5-80-11, B.12 (8 lb/hr, 40 lb/day, and 7 ton/yr), issue permit using this boilerplate for compliant coatings or controls to achieve compliance with emission standards of Article 34.

B. Applicability for non-control VOC areas:

This boilerplate is applicable to construction, reconstruction, modification or relocation of facilities that manufacture and coat miscellaneous metal parts and products.

1. If the uncontrolled emissions are below the levels of 9 VAC 5-80-11, B.12 (8 lb/hr, 40 lb/day, and 7 ton/yr), then an exemption is granted.

2. If the uncontrolled emissions are more than 9 VAC 5-80-11, B.12 (8 lb/hr, 40 lb/day, and 7 ton/yr), then one has an option of issuing 10 B permit or using this boilerplate.

VI. PERMIT CONDITIONS

A. Permit Limits

Permit limits are necessary for each criteria pollutant having emissions equal to or greater than 0.5 tons/yr. Permit limits for toxic pollutants shall be assigned according to current policy guidance. The permit should include both hourly and annual emission limits.

B. Particulate Emissions

Although there is no BACT emission limit established for PM/PM10 from coating application systems, use of a fabric filter, water curtain or other control device shall be required for spray booths. An 85% control efficiency should be the minimum expected from filtration by fiberglass or any other media. A scrubbing device or water curtain should provide a comparable degree of control; otherwise, another control method should be used. An average 50% transfer efficiency should be assumed unless otherwise documented. Higher transfer efficiency should be expected for unenclosed coating operations where use of a normal control device is not feasible. (The average 50% transfer efficiency and 85% control efficiency provides an overall control efficiency of 92.5% for particulate emissions. For unique operations without

any particulate control devices, transfer efficiency should try to reach 90% or better.)

PERMIT CONDITIONS continued

C. VOC Emissions

1. VOC control areas.

VOC emission limits required by Article 34 (9 VAC 5-40-4760 et seq.) will be the minimum standards for this boilerplate. In most cases this will be achieved through the use of compliant coatings, which are presumed to be BACT for meeting the standards. These compliant coatings may be called Awaterborne≅ or Ahigh-solids≅ coatings. Powder coatings would be included in the compliant coating category. The permittee may instead choose to achieve the emission standards through supplemental or sole use of a control method such as electrodeposition, carbon adsorption, incineration or another method. The coating type or control method shall be specified in the permit. VOC emissions from cleaning or purging operations must also be minimized in accordance with Article 34 (9 VAC 5-40-4760 et seq.) guidelines. Allowable methods include the use of capture and control devices, non-volatile cleaning methods, minimization of the quantity of volatile compounds used, and adjustment of production schedules to minimize coating changes.

2. Non-control VOC areas.

VOC emission limits required by Article 34 (9 VAC 5-40-4760 et seq.) should be the minimum standards unless requested otherwise by the source and determined justified by the region in the engineering analysis. In most cases, this will be achieved through the use of compliant coatings, which are presumed to be BACT for meeting the standards. These compliant coatings may be called Awaterborne≅ or Ahigh-solids≅ coatings. Powder coatings would be included in the compliant coating category. The permittee may instead choose to achieve the emission standard through supplemental or sole use of a control method such as electrodeposition, carbon adsorption, incineration or another method. The coating type or control method shall be specified in the permit. VOC emissions from cleaning or purging operations must also be minimized in accordance with Article 34 (9 VAC 5-40-4760 et seq.) guidelines. Allowable methods include the use of capture or control devices, non-volatile cleaning methods, minimization of the quantity of volatile

compounds used, and adjustment of production schedules to minimize coating changes.

PERMIT CONDITIONS continued

D. Toxic Pollutant Emissions

The number and type of toxics emissions can vary widely depending upon the coating being used. The more common solvents are to be expected, but various particulate emissions can result as well. In some cases, particulates having low TLVs may not comply with Rule 5-3 (9 VAC 5-50-160 et seq.), even at 85% control and 50% transfer. Coatings for miscellaneous metal parts and products rarely contain any heavy metal components listed on the Priority List of Air Quality Program Policies and Procedures (AQP) #5. Exemption determinations as well as compliance with Rule 5-3 (9 VAC 5-50-160 et seq.) should follow current agency policy and AQP-5.

E. Opacity

Visible emissions shall not exceed five (5) percent opacity with the one six minute exception at ten (10) percent. This condition shall apply at all times, except in the case of malfunctions, start up, and shut down.

F. Emissions Monitoring (CEMS)

Emissions monitoring is not generally required but may be if the permittee chooses to achieve the Article 34 (9 VAC 5-40-4760 et seq.) VOC emission standards can be met through supplemental or sole use of add-on control equipment. CEMs may be considered on a case-by-case basis if the permittee is using the monitoring system to demonstrate daily line by line compliance or at facilities with permitted emissions close to triggering PSD or Nonattainment review. There are two performance specification which now apply to VOC CEMs performance specification #8 and #9. In order to insure accuracy and precision a facility using CEMs for these purposes should be required to meet one of the performance specification.

G. Emissions Testing

Emissions testing and/or determination of capture efficiency are not generally required but may be if the permittee chooses to achieve the Article 34 (9 VAC 5-40-4760 et seq.) VOC emission standard through supplemental or sole use of add-on control equipment. Testing for such purposes should be conducted in accordance with 9 VAC 5-10-20, AQP-1, and/or AQP-3. In addition, the possibility of testing for a specific

criteria or toxic pollutant should not be ruled out entirely.

H. Training, Operation, and Maintenance

All operators must receive training in the proper operation of the coating application system and the pollution control device. Training shall consist of review and familiarization of the manufacturer's operating instructions, at a minimum. In addition, the permittee must maintain on site operation and maintenance procedures. These procedures shall be based on the manufacturer's recommendations, at a minimum. Training must be documented in the recordkeeping requirements.

I. Notification

The owner or operator of all facilities must submit notification of the following:

a. the date of commencement of construction, installation, or reconstruction;
[b. the anticipated date of startup;] (optional, use if needed)
c. the actual date of startup; and
[d. (if applicable) the anticipated date of performance tests.]

The notification shall only be submitted to the appropriate Regional Office of the DEQ.

J. Recordkeeping

1. VOC control areas:

The standard boilerplate condition states that the permittee should keep any records "necessary to demonstrate compliance". Records of daily **or** monthly and annual emissions should be required. Follow AQP-4 if daily records for VOC emissions are required. Monthly and annual records of any other pollutant which has a permit limit should also be required. In the case of multiple coating application systems, records of emissions per system may be necessary for tracking emissions.

2. Non-control VOC areas:

The standard boilerplate condition states that the permittee should keep any records "necessary to demonstrate compliance". Records of daily **or** monthly and annual VOC emissions should be required as needed. Monthly and annual records of any other pollutant which has a permit limit should also be required. In the case of multiple

coating application systems, records of emissions per system may be necessary for tracking emissions.

PERMIT CONDITIONS continued

K. Reporting

Requirements for reports submitted by the permittee may vary depending upon the pollutants being emitted and the compliance history of the company. If a particularly hazardous compound is emitted in significant quantities, or if one of the NAAQS or a SAAC is approached, the region may wish to more closely track certain emissions by requiring periodic reports. Reporting of annual emissions of VOCs or any pollutant which has a permit limit may be required.

L. Modeling

There are currently no screening models in use at the DEQ regional offices which are appropriate for modeling VOC emissions as ozone. Particulate emissions should be modeled according to the guideline for modeling non-PSD sources. Toxics modeling should be conducted according to current modeling policy guidelines.

M. Permit Approval

Approval authority is given to the Regional Office. The Regional Permit Manager may sign for the Executive Director.

VII. POLLUTION PREVENTION

Pollution prevention is recognized as the most-effective form of environmental protection. Pollution prevention is an environmental management strategy that emphasizes elimination or reduction of wastes at the source of generation. This not only includes the type of spray coating equipment used or degreasing equipment but all of the operating practices and shop policies to achieve source pollution reductions. This can be achieved through material substitution, process and equipment modifications, better operating practices, or recycling. The DEQ Office of Pollution Prevention is a source of literature or is available for site visits to help institute an environmental management strategy for pollution prevention.

VIII. INSTRUCTIONS FOR THE ATTACHED BOILERPLATE

Comment fields have been incorporated in the boilerplate to provide guidance on use of optional conditions. These comments are displayed on your screen but will not be printed.

APPENDIX A – MISC. METAL PARTS COATING CALCULATIONS

I. To determine lbs VOC emitted per unit time, use the following formulas:

Gallons of "as applied" coating used/unit time x lbs VOC/gallon

OR

Gallons of "as applied" coating used/unit time x coating density in lbs/gallon x percent volatile by weight.

EXAMPLE 1: You use 0.25 gallon hourly of Coating A only. MSDS indicates VOC range of 6.8 - 7.2 lbs/gallon.

Calculations:
0.25 gal A used/hour x 7.2 lbs/gal = **1.80 lbs VOC/hour total.**

NOTE: Where ranges are given, the highest number should be used unless more specific information can be provided by manufacturer.

EXAMPLE 2: You use 1 gallon daily of Coating A and 2 gallons daily of Coating B.

Coating A: MSDS indicates product density of 12 lbs/gallon and 31.9% volatile by weight.

Coating B: MSDS indicates product density of 8.5 lbs/gallon and 15.3% volatile by weight.

Calculations:
1 gal A used/day x 12.0 lbs/gal x 0.319 volatile = 3.83 lbs VOC/day PLUS
2 gal B used/day x 8.5 lbs/gal x 0.153 volatile = 2.60 lbs VOC/day =
6.43 lbs VOC/day from both coatings.

EXAMPLE 3: You use 6 gallons daily of a coating composed of a 1:5 mix of Solvent A and Coating B.

Solvent A: MSDS indicates product density of 7.2 lbs/gallon and 100% volatile by weight.

Coating B: MSDS indicates product density of 14.0 lbs/gallon and 19% volatile by weight.

Calculations:
6 x 1/6 = 1 gal A used/day x 7.2 lbs/gal x 1.00 volatile = 7.2 lbs VOC/day PLUS
6 x 5/6 = 5 gal B used/day x 14.0 lbs/gal x 0.19 volatile = 13.3 lbs VOC/day =
20.5 lbs VOC/day from mixture.

II. To determine lbs VOC per gallon of coating as a daily average, use the following formula:

Pounds of VOC/day) gallons of coating used/day

EXAMPLE: using example 3 above
20.5 lbs VOC/day) 6 gallons/day = **3.4 lbs VOC/gallon as a daily average**

III. UNCONTROLLED CALCULATIONS

These procedures follow the EPA guidance that PTE is not based on the paint gun capacity but the facilities' capacity to coat the manufactured miscellaneous metal parts. The coating operation is the emissions unit not the paint gun. This creates a big difference when calculating uncontrolled VOC emissions and permitting requirements. With this definition, one must document all of the assumptions and operational conditions. Then as changes are made, it can be determined if the changes impact permit determinations or trigger the definition of a modification. An effort must be made document normal operations and extrapolate emissions for 8760 hr/yr. The number of employees may or may not be an appropriate limit because nothing prevents the hiring of more workers in the future, thus increasing PTE. The capacity of the metal fabricating machinery upstream of the paint booth is a basis for limitations. Available work space can certainly be an inherent physical/operational limitation and should be considered in permit applicability decisions, but the risk exists that the source may, without notification to us, increase work area at a later time, thus debottlenecking the paint booth and resulting in an increased PTE. Until EPA provides further guidance on the issue, care should be taken on the interpretation of this concept.

If normal operations (M-F, 10 hr/day, 50 wk/yr, and one to two people working) use 2 gal/hr, 10 gal/day, and 1500 gal of coating per year. Daily factor = (24 hr/day/10 work hr/day). Yearly factor = 8760 hr/yr/2500 work hr/yr (50 hr/wk X 50 wk/yr = 2500 work hr/yr). The uncontrolled emissions = 2 gal/hr; 10 gal/day X (24 hr/10 hr) = 24 gal/day; 1500 gal/yr X (8760 hr/2500 hr) = 5256 gal/yr. The 2 gal/hr, 24 gal/day, and 5256 gal/yr would be used for uncontrolled VOC calculations, etc. If VOC = 3.4 lb/gal, uncontrolled emissions are:
2 gal/hr X 3.4 lb/gal = 6.8 lb/hr
24 gal/day X 3.4 lb/gal = 81.6 lb/day
5256 gal/yr X 3.4 lb/gal X ton/2000 lb = 8.9 tons/yr
unless there is some production restraints that can be documented to show these numbers are unachievable.

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