

**GENERAL INSTRUCTIONS
SURFACE COATING OF METAL FURNITURE
ALTERNATIVE QUESTIONNAIRE**

The Alternative Questionnaire forms in this package were designed specifically for gathering information for the development of Maximum Achievable Control Technology (MACT) Standards for the emissions of Hazardous Air Pollutants (HAPs) from nine surface coating categories, as required under Section 112 of the Clean Air Act (CAA) as amended in 1990. These regulations are expected to be promulgated in November of the year 2000. The nine categories are:

- ! **Automobile and Light-duty Trucks*** - Surface coating of automobile and light duty truck bodies at assembly plants, or other facilities and associated operations including the mixing and storage of coatings, and treatment of wastewater generated from coating operations. Off-line coating of non-body parts is not included. Other HAP and/or VOC using operations at assembly plants, including the application of adhesives, and fluid fills are included.
- ! **Fabric** - This source category includes textile manufacturing operations with potential HAP emissions performed in the production or conversion of yarn and thread; woven, knit, and non-woven fabric; and carpet. The operations include, but are not limited to, non-woven fabric bonding, slashing, preparation, printing, dyeing, wet finishing (including carpet back coating), coating, laminating, and spot cleaning.
- ! **Wood Building Products*** - This source category involves the surface coating of interior paneling produced from plywood with a hard wood surface; or wood composite panels that are resurfaced using techniques such as printing that produce a decorative appearance.
- ! **Large Appliances*** - The surface coating of Large Appliances manufactured from various metals, coiled or sheet metal, pre-coated coil, and pre-cut, powder-precoated pieces.
- ! **Metal Can** - This source category includes facilities that coat or print metal cans or metal parts for any type of can (e.g., metal ends for composite cans). It includes the coating/printing of metal sheets for subsequent processing into cans or can parts, but not the coating of metal coils for cans or can parts. (Coil coating for cans and can parts is included in the Metal Coil source category.) For purposes of this data-gathering effort, this source category also includes the coating/printing of metal decorative tins, crowns, and closures (except for coil coating). Note that the coating/printing of pails and drums falls in the Miscellaneous Metal Parts and Products source category.
- ! **Metal Coil** - Coating done on a continuous metal substrate which is greater than 0.006" thick.
- ! **Metal Furniture*** - The surface coating of furniture manufactured from various metals. The metal furniture industry is typically classified under the following Standard Industrial Classification (SIC) codes: 2514, 2522, 2531, 2542, 2599, 3429, 3469, 3495, 3499, 3645, 3646, 3821, 3843, 3999, and 7641. See Appendix A for a description of each SIC code.
- ! **Miscellaneous Metal Parts and Products*** - This category encompasses all metal parts and products not covered in one of the other categories in which the surface coating of metal parts or products are included (Aerospace, Automobile and Light-duty Trucks, Boat Manufacturing, Large Appliances, Metal Can, Metal Coil, Metal Furniture, or Shipbuilding).
- ! **Plastic Parts*** - The surface coating of plastic parts produced by either machining from stock plastic, or casting and molding.

* Indicates source categories also subject to Section 183(e) requirements.

The coatings in seven of these categories will also be subject to the regulations for Volatile Organic Compounds (VOCs) being developed under Section 183(e) of the CAA. The format was designed to be specific to coating operations. This complete packet (the Questionnaire, the Section 114 Letter, and all the attachments and enclosures) is referred to as the "Questionnaire Packet" in these instructions.

This Alternative Questionnaire is the best opportunity for industries that will be regulated under these requirements to describe their surface coating operations and ancillary activities so that the regulations will be

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logistically workable, technically effective, and cost effective. It is the hope of the EPA that all targeted industries will respond in the time allotted, with information that will allow the EPA to develop regulations that make sense to the industries being regulated. The Questionnaire requests detailed information about your facility, materials usage, and emissions; however, you are not required to perform monitoring or emission testing in order to respond to this request. Your response need only include that information which is readily accessible to you or may be reasonably calculated, including estimates. In addition, you may respond "Not Applicable" to any question that does not apply to your facility.

To Whom were the Questionnaire Packets Sent?

The mailing list was developed through the efforts of the project teams on each of the 10-Year Surface Coating MACT Categories, and were derived from the facilities listed in databases from the EPA and State and Local agencies, from the mailing lists of trade associations, and from individual companies that have been members of the stakeholder groups for the various projects. The Questionnaire packets have been addressed to the Corporate Environmental Official, and not to the individual facilities for several purposes: 1) to alert corporate owners of the data collection effort and allow them the opportunity to provide a coordinated response from all of their facilities, 2) to reduce the amount of mailing to individual facilities, and 3) to ensure that individual facilities are not missed.

Guidelines for Completing the Alternative Questionnaire

Dependent upon your corporate/company structure, it may be that responses for individual facilities will be completed at the facilities themselves or from some corporate level. Regardless of how the forms are completed, there are some general guidelines that should be followed.

- Each response (one per facility/plant) should have a unique Facility Tracking Number. The initial Facility Tracking Number can be found on the mailing label and on the cover letter sent with this Questionnaire Packet. If you are reporting for one facility, simply use the Facility Tracking Number assigned. If you are reporting for more than one facility, add a letter to the end of the assigned Facility Tracking Number to create a unique ID. For example, if the assigned Tracking Number is ABC001, and you are reporting for three facilities, their individual Tracking Numbers would be ABC001A, ABC001B, and ABC001C.
- Each copy of each page of a Form should have the Tracking Number at the top of the page.
- All information provided on the forms should be in metric units. For your convenience, a conversion chart is provided in Appendix B. Please ensure that all units are marked clearly on the forms.

Format of the Questionnaire

The Questionnaire consists of several forms that are interrelated. Figure 1 shows the basic types of information being requested, and how that information relates to the Questionnaire forms. As mentioned previously, there will be one Form A (Facility General Information) for each response. A separate copy of Form B is needed for each material (or group of like-materials) used in the facility that can contribute to the emissions of HAP and/or VOC materials. The information on Form B is not limited to only coatings and coating components (although it is expected that most materials will be coatings), but includes materials or products used in surface preparation, cleaning operations, etc. Forms D through H are designed to describe the types of operations/activities that are most expected to contribute to emissions (Coating Application, Surface Preparation, Storage, Mixing, and Cleaning Operations). Control Devices (Form C) are treated separately due to the wide variety of ways that they may be configured for use with an individual operation that may be described in Forms D through H, or with a combination of operations. A single copy of Form I is expected per response to describe the Waste and Wastewater handling throughout the facility.

Except for Form A (Facility General Information), and Form I (Waste and Wastewater), the Forms are expected to be copied as needed for each facility. Only one copy of Form A and Form I are needed per facility.

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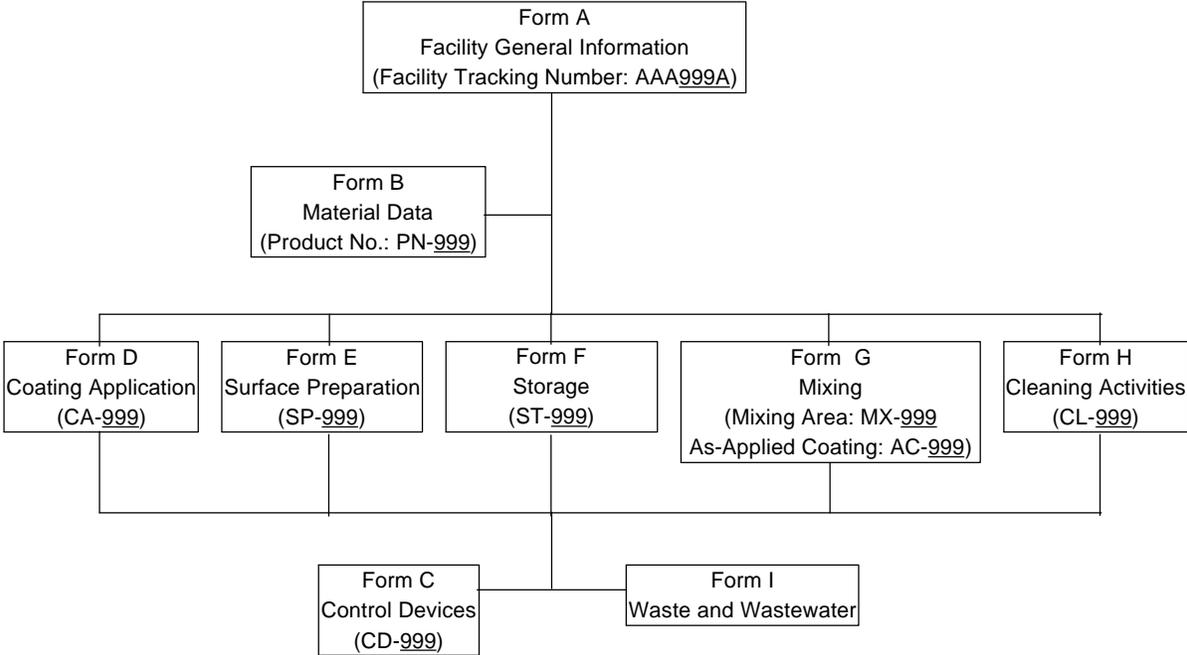


Figure 1. Alternative Questionnaire Organization

There is a space provided at the top of each form to indicate the Facility Tracking Number and it will probably be most expedient to have the Tracking Number entered at the top of the forms prior to copying. (This is handled automatically in the electronic version of the Forms.) Many Forms consist of more than one page, and this is also indicated at the top of each page, as shown in this set of instructions. To distinguish individual “copies” of each Form, a space has been provided to indicate a “Sheet” number and the total number of sheets/copies for any particular Form; this was done to ensure no information is lost in handling.

A single standardized “Comments Sheet” was developed for use where needed with any of the Forms. Please use a separate Comments Sheet for each individual “Sheet” in a set of forms, where one is needed. If more than one Comments Sheet is needed for an adequate response, please number and indicate the total number of Comments Sheets used for that particular comment.

Form D (Coating Application) has the greatest variability between projects, which is due to the specific characteristics of each of the nine different industries being polled. For example, many of the questions regarding coating application for a metal part will be irrelevant to the dyeing of fabric, and vice versa. However, each of the

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critical elements needed for EPA to complete the needed analysis of data are represented in each version of Form D. The other operations described in the other Forms are much more generic and differ far less between the various industry categories than does the coating application itself.

Form D also requests additional information regarding collocation of unit operations between other surface coating source categories. The most evident concern is collocation between Miscellaneous Metal Parts and Miscellaneous Plastic Parts (refer to Page 4 of Form D).

Unit Operation System Diagrams

Emissions and material use data are being collected using the *unit operation system (UOS)* approach.¹ For the purpose of identifying and quantifying the possible sources of pollution, a plant (or facility) is considered to consist of several levels of production activity, consisting of departments, which are divided into work areas, which in turn are composed of one or more unit operation systems. The term *UOS* refers to a formalized concept for performing a material balance. A unit operation system means the ensemble on which the material balance is performed. If the purpose of the material balance is to determine emissions due to the coating of metal parts, for example, it encompasses all possible points and sources leading to evaporative emission losses associated with each primary *unit operation*, including losses during coating application, flashoff from the coated part itself, and from the oven or final drying area. Depending on the plant configuration, it may also include mixing and storage of coatings and solvents.

Figures 2 through 4 are example diagrams of several potential UOS's provided to help you understand how to group individual unit operations into a unit operation system for your industry. Figure 2 reflects a surface preparation unit operation system, Figure 3 shows a coating preparation (mixing) unit operation system, and Figure 4 shows a coating application and drying unit operation system. We have developed these generic figures to the best of our ability, realizing that individual facilities have a range of production approaches. Please modify these example UOS diagrams (or create new diagrams as necessary) to reflect the actual HAP- or VOC-emitting processes at your facility. For each UOS, indicate the time rate of both HAP and VOC entering and leaving the UOS (e.g., kg/hr), as well as the coating coverage rate (e.g., m²/hr). In the examples, F and L reflect liquid or solid materials, while V indicates volatile emissions.

HAP and VOC Information

For facilities with unit operations that have negligible HAP and VOC emissions, please indicate clearly on the required forms that no HAP or VOC material is used and indicate the basis for the determination (i.e., MSDS, product data sheet, source test, etc.). No further information will be required at this time for these operations.

¹ "Standardized Accounting for a Formal Environmental Management and Auditing System," Chapter 20 in Waste Minimization through Process Design, A.P. Rossiter, ed., McGraw-Hill, Inc. 1995.

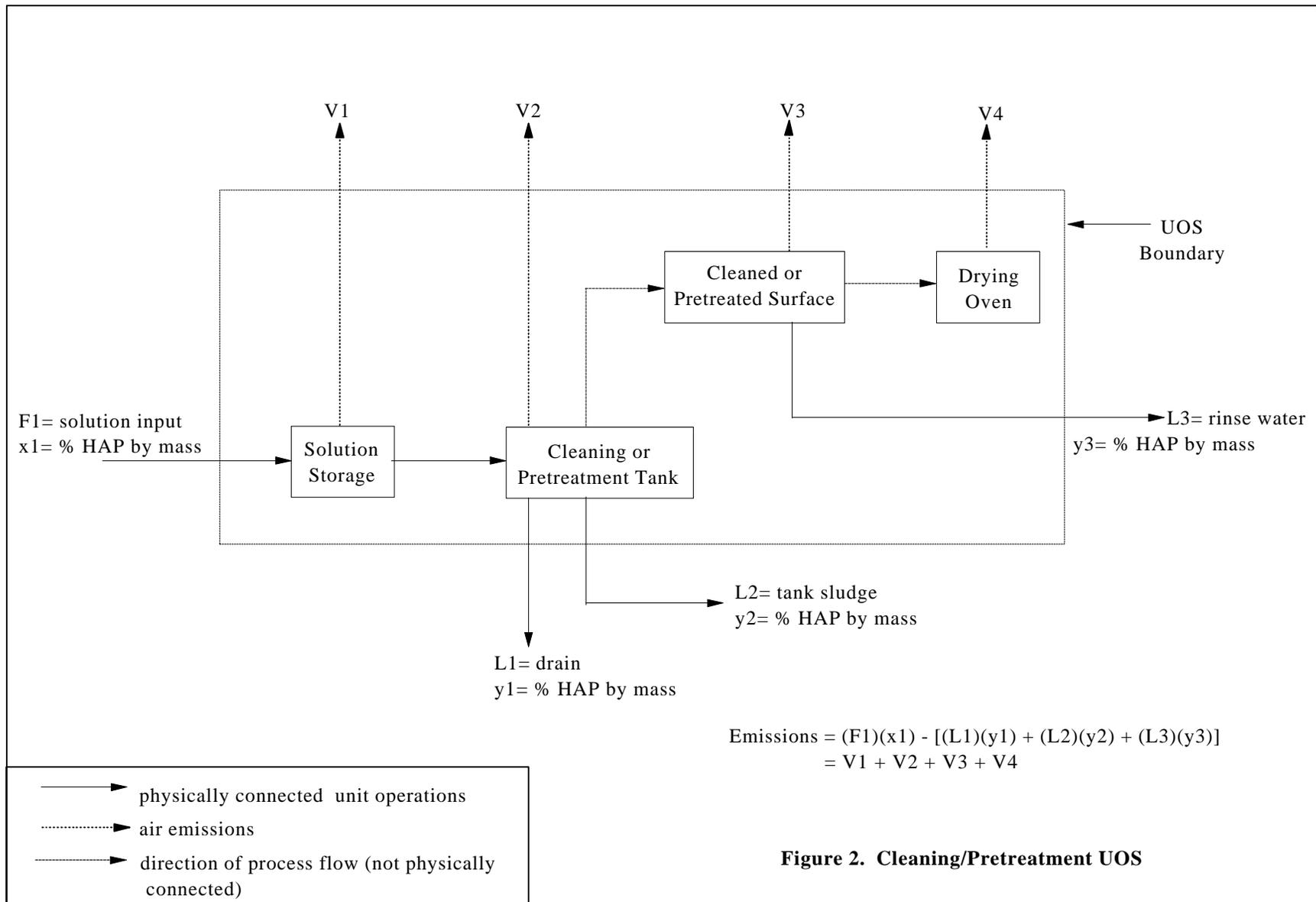


Figure 2. Cleaning/Pretreatment UOS

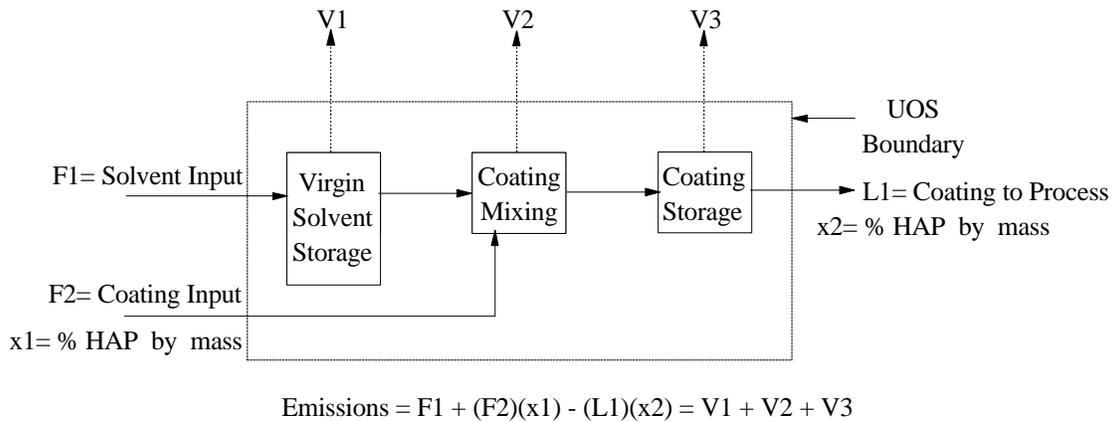


Figure 3. Coating Mixing and Storage UOS (Primer or Topcoat)

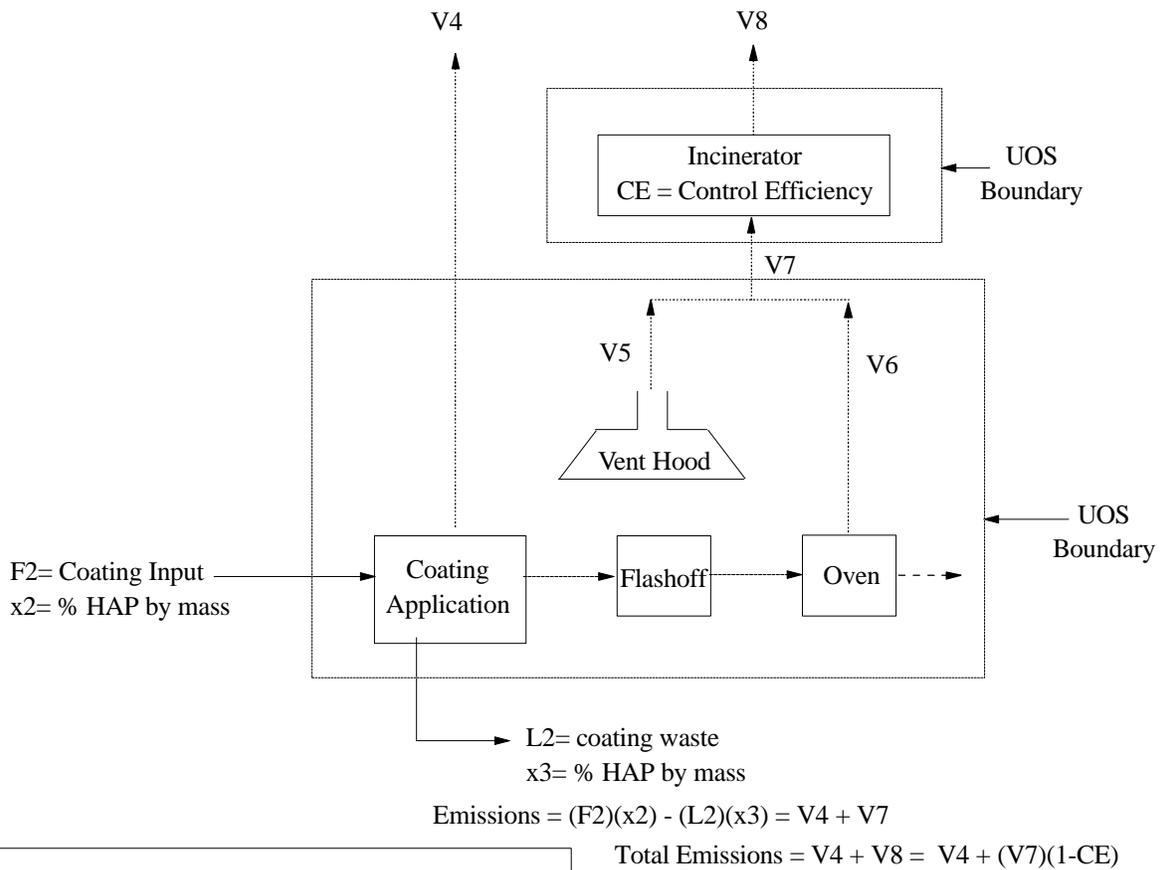
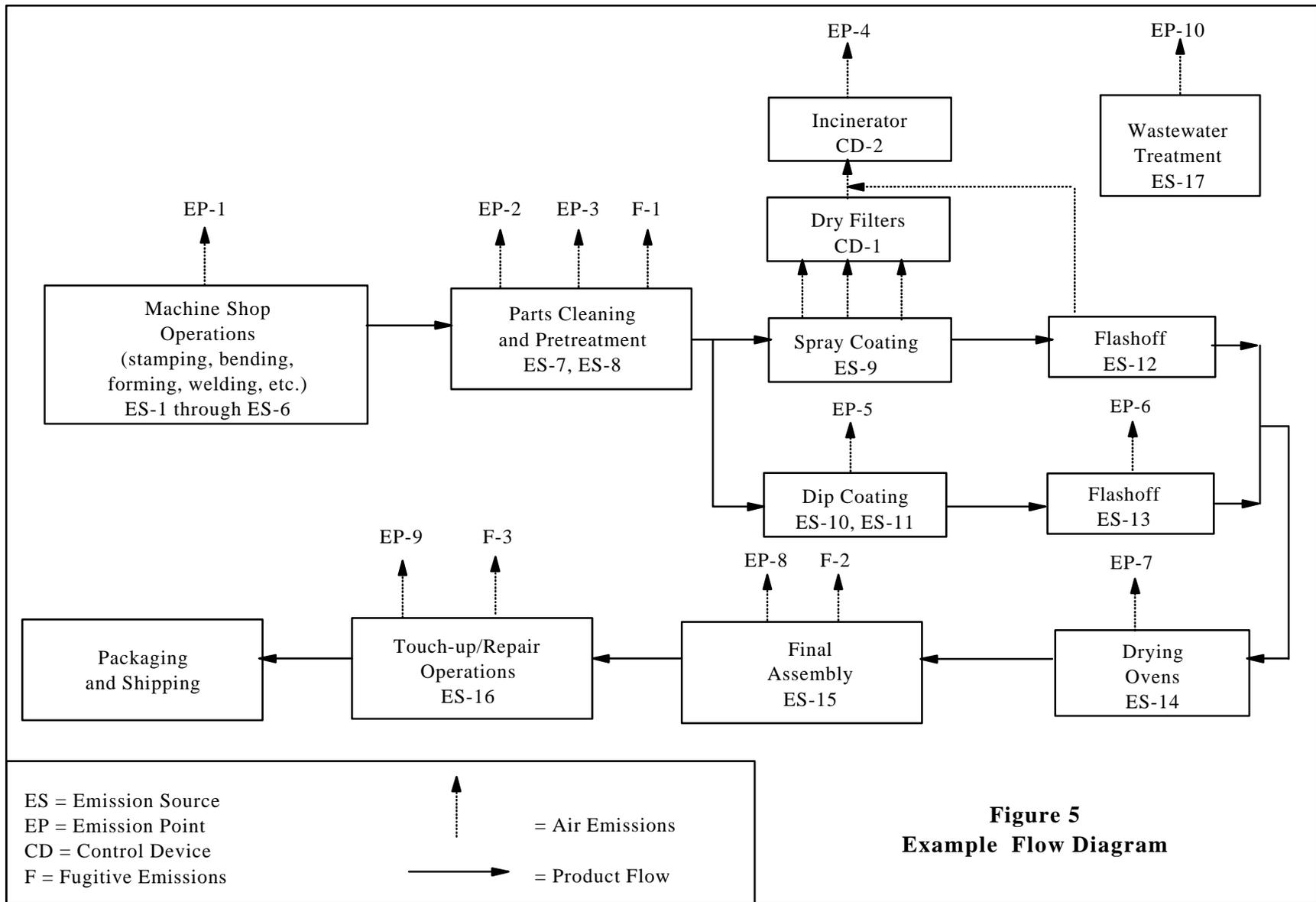


Figure 4. Coating Application/Drying UOS (Primer or Topcoat)

- physically connected unit operations
- ⋯→ air emissions
- ⋯→ direction of process flow (not physically connected)



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Unit Operation System Descriptions

The following unit operations have been identified as typical of a metal furniture manufacturing facility: (1) fabrication, (2) surface preparation, (3) coating storage and mixing (4) coating (primer, topcoat, or one-coat) application and curing, (5) touch-up and rework, (6) paint stripping (of defective parts or conveyor system parts; e.g., racks and hooks), (7) waste handling, (8) wastewater treatment, and (9) cleaning (other than for the purpose of surface preparation prior to coating). Provide a brief description of each unit operation at your facility similar to those provided below.

1. Fabrication Unit Operation

- Drawing - A metal substrate is formed in a press into a cup-like or box-like shape. During this operation, lubricants known as drawing compounds are normally required to prevent scoring and damage from metal-to-metal contact between the metal part and the die.
- Punch press - A machine equipped with cutting, shaping, or combination dies for working on material. This allows for an operation by which the press is forced against a metal substrate to cut a hole in the metal substrate, make an impression, or punch out a part.
- Welding - The operation by which heat is used to fuse (melt) two pieces of metal together.

2. Cleaning and Pretreatment (Parts Cleaners) Unit Operations

Type 1 (solvent system)--

- Miscellaneous Parts Washing - Removal of dirt, oil, grime or other constituents from miscellaneous parts, such as uncoated interior parts, prior to assembly or coating. This may occur in a normally closed container that is continuously agitated and contains a solvent bath or other type of cleaning/treatment agent.

Type 2 (aqueous system)--

- Alkaline or Acid Cleaner - Substrate is washed with an alkaline or acid cleaner for removal of dirt, grime, and oil.
- Water Rinse - After cleaning substrate with alkaline cleaner, substrate is rinsed to remove excess alkaline cleaner.
- Phosphate Pre-conditioner (Zinc or Iron) - After the water rinse, substrate is rinsed with a conditioner to prepare metal substrate for acceptance of zinc or iron phosphate or cohesion.
- Phosphate Rinse (Zinc or Iron) - After conditioning, substrate is rinsed with zinc or iron phosphate to promote corrosion resistance and adhesion by creating a bond between the metal substrate and coating.
- Water (deionized (DI) or tap water) Rinse - Substrate is rinsed with DI or tap water to remove impurities. Usually DI water is used to neutralize metal substrate for low conductivity.

Type 3 (Abrasive Blasting Material)--

- An abrasive material (usually small particles of metal or an inert substance) is projected at high speed at the part to abrasively remove contaminants from the surface of the part.
- Open system
- Closed system

Dryer (Oven) - Chamber or enclosed compartment for the purpose of drying parts.

3. Coating Storage and Mixing Unit Operations

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- Coating Storage - A storage enclosure for solvents, coatings, resins, paste, etc., depending on the type of coating.
 - Coating Mixing - Any combination of mixing the coating with solvents, resins, thinning solvents, paste, etc. prior to transporting coating to the Coating Application and Curing.
4. Coating Application and Curing Unit Operations (one Unit Operation System)
- Coating Application - The unit operation by which the coating mix is applied to the base substrate. This unit operation may include powder, flow coat, spray applications, dipping, etc. Depending on the application method utilized, the following steps may or may not be required.
 - Flashoff area - The portion of a coating operation between the coater and the drying oven where solvent begins to evaporate from the coated base substrate. If powder application is utilized, the flashoff area is omitted.
 - Oven - Chamber or enclosed compartment for the purpose of curing, heating, or drying.
5. Touch-up and Rework Unit Operation
- Total Coating Removal - Refer to Paint Stripping unit operation
 - Material Preparation - May consist of various steps, depending on the type of coating defect (“orange peel”, scratch, etc.). Some common operations are sanding, grinding, wiping part with a dry rag, etc.
 - Coating Application - Refer to Coating Application and Curing UOS.
 - Touch-up Curing - May consist of an enclosure that allows for air drying of the part or may require an oven for curing (refer to Coating Application and Curing UOS for more detail).
6. Paint Stripping Unit Operation
- Fluidized Bed - Utilizes hot air bubbled up through a medium, which is usually a sand bed. The fluidized bed operates at about 427 to 482 °C. Parts to be cleaned are typically loaded into a basket, which is then completely immersed in the sand bed for removal of coating from racks or defective parts.
 - Molten Salt Bath - Utilizes a bath containing inorganic salt mixtures maintained at temperatures between 288 and 482 °C. Parts to be cleaned are typically loaded into a basket, which is then completely immersed in the salt bath for removal of coating from racks or defective parts.
 - Afterburners - Burn coatings off of the coated racks or parts. Afterburners operate at temperatures around 538 to 649 °C.
 - Chemical Stripping - Requires soaking the substrate or coated part in a chemical bath. Usually utilized when the substrate cannot withstand high temperatures.
 - Mechanical Stripping - Involves manual removal of the coating by an abrasive blasting technique.
7. Waste Handling Unit Operation
- Waste Handling - Any intermediate step that is responsible for removing solid and/or liquid waste from a facility.
8. Wastewater Treatment Unit Operation

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- Wastewater Treatment - Removal of solid and liquid waste from any effluent stream through filtration, sedimentation, etc.
9. Cleaning Unit Operations (other than surface preparation prior to coating)
- Miscellaneous Parts Washing - Removal of dirt, oil, grime or other constituents from miscellaneous parts, such as uncoated interior parts, prior to assembly or coating. This may occur in a normally closed container that is continuously agitated and contains a solvent bath or other type of cleaning/treatment agent.

Solvent Tracking System

A solvent tracking system is an integral facility function that is necessary to generate the material balance associated with the UOS system. Accordingly, we are interested in the types of solvent tracking systems that the industry has incorporated. If you have a solvent tracking system in place, briefly describe what information is tracked and recorded.

INSTRUCTIONS
FORM A - GENERAL FACILITY INFORMATION

Revised 5/20/98

The purpose of this form is to provide information regarding each individual facility in your organization which has surface coating operations in one or more of the categories defined in the General Instructions.

If you are reporting for more than one facility, a separate response should be completed for each individual facility, and a unique tracking number should be used with each facility. If reporting for more than one facility, please use the original tracking number provided and add a letter to the end to create a unique Tracking Number (see General Instructions). Instructions for each item or groups of items are provided below to assist in filling in responses. All items are to be considered required unless otherwise indicated by the word "Optional" appearing in parentheses next to the item description in the instructions and underlined in the forms.

Instructions for Specific Items

1. **Facility Name:** Enter the legal name for this facility.
2. **Facility Location**
 - a. **Street:** The street address for the main entrance to the facility.
 - b. **City:** The city in which the facility is located.
 - c. **State:** The State in which the facility is located.
 - d. **Zip Code:** The 5- or 9-digit zip code for the facility location.
 - e. **County:** The county in which the facility is located.
3. **Corporate Owner**
 - a. **Name of Corporate Owner:** The corporate owner of the facility.
 - b.- e. **Mailing Address:** The corporate mailing address.
 - f. **Corporate Annual Sales:** The Corporate annual sales in dollars.
4. **Facility Description**
 - a. Provide a brief description of the facility, including general purpose, types of operations that are performed at this location, products made, and other information discussing the operations of the facility. Please provide additional details on a Comment sheet for this form.
 - b. **Dun & Bradstreet Number:** (optional) The 9-character Dun & Bradstreet identifier for this facility. If unknown enter "Unknown."
 - c. **SARA TRI Facility Id.:** (optional) The SARA TRI Facility Id. number that appears on Forms R. This information allows EPA to cross-reference to the TRIS database. If this facility is not required to fill-out Form R, enter "N/A."
 - d. **Number of Facility Employees:** The number of production personnel employed at the facility in Full-Time Equivalents (FTEs). FTEs are calculated by dividing the total number of man-hours worked at a facility by the number of hours expected from a full-time employee, typically 2,000 hours/year. The equation below demonstrates a FTE calculation.

$$\frac{400,000 \text{ man-hours}}{2,000 \text{ man-hours per FTE}} = 200 \text{ FTEs}$$

INSTRUCTIONS
FORM A - GENERAL FACILITY INFORMATION

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e. **Number of Facility Coating Employees:** Total facility production employees (FTEs) involved in coating operations. See the explanation of FTE for item 4d. If an employee's duties are split between coating and other duties, use the proportion of hours spent on the coating line to calculate FTEs.

f. **Year Plant Originally Constructed:** This is the year the plant originally began operation in the current industry; if the plant was converted from another industry, give year of conversion (changes in ownership do not necessarily constitute conversions).

5. **Product Description:** The principal product(s) made or serviced at this facility.

SIC/NAICS Codes: These refer to the Standard Industrial Classification codes (1987) and their replacements, the North American Industrial Classification System codes (see Appendix A for a listing of SIC and NAICS codes for the metal furniture industry). For more information on SIC and NAICS codes, visit the following Internet site: <http://www.census.gov/epcd/www/naics.html>

End-Use Product: (optional) Check either the "Yes" or "No" check-box if the principal product will be sold on the market as a finished good; if this product is an intermediate in the manufacture of a final product, answer "No." If the product is an "intermediate," note the part name and the final product(s) in which the intermediate product manufactured in this facility is used on a Comment sheet for this form.

Life Expectancy: (optional) How long is the final product expected to last after being acquired by the end-user?

% of Total Product Produced: If multiple types/categories of products are produced, then provide the amount of the individual product produced as a percentage of total products produced.

6. **Technical Contact**

a. **Name:** The name of the person (either for the Corporate Owner or for the individual facility) who is knowledgeable about technical information for the facility (emissions, control devices, coatings, operations, etc.) and should be consulted if questions arise in analysis of this response.

b. **Title:** The position title of the technical contact for this facility.

c. **Telephone:** The telephone number of the technical contact for the facility.

d. **Facsimile:** The facsimile number for the technical contact for the facility.

e. **Electronic Mail Address:** The e-mail address for the technical contact for the facility.

7. **Geographic Coordinates:** Please provide the latitude and longitude for the center of the facility, indicating degrees, minutes, and seconds. If latitude and longitude are not available, Universal Transverse Mercator (UTM) coordinates can be provided on a Comment Sheet for this form.

8. **Reporting Year:** The year of record associated with the reported information for the plant. Data for the year 1997 is expected; please provide an explanation on a Comments Sheet for this form to describe why another year was chosen if 1997 was not used. Also indicate whether information is being reported for the fiscal year or calendar year.

9. **Surface Coating Category:** Check the box(es) to indicate the industry(ies) for which any surface coating operations are associated at this location. Please refer to the definitions of the categories provided at the beginning of this set of instructions.

INSTRUCTIONS
FORM A - GENERAL FACILITY INFORMATION

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10. Other Regulatory Requirements:

a. Please list all other MACT Standards that are applicable to this facility. If there are none, enter "None."

b. **LAER Determinations:** Indicate if a LAER determination has been made on any of the surface coating operations, and if so the date of the most recent LAER determination. Please also list on a Comments sheet for this form the coating operation(s) affected and the appropriate date(s).

11. Research and Development Unit Operations: Indicate whether any Research and Development activities are conducted at this facility. Provide a brief description of any such activities or any activities that you believe may be Research and Development.

12. Pollution Prevention: Provide the requested information for pollution prevention measures implemented in the past four years.

13. Title V Classification: Indicate if your facility has submitted or is preparing an application for a Title V Permit from your State or local regulatory agency. If you are not sure, check the box marked "Unknown." Also provide a brief description of the basis for determining the Title V classification (e.g. for which pollutant(s) is the facility a major source) and whether any co-located operations at the facility influence the Title V status.

14. Facility Emissions: Please list the total actual emissions from the facility for the reporting year. Provide facility-wide totals for HAP and VOC, and for each individual HAP emitted at greater than 0.45 megagrams/year (0.5 tons/year). Please refer to the general instructions and the attached list of HAP materials (Appendix C) for a definition of hazardous air pollutant (HAP). Also provide any facility-wide permit limitations (if any) on emissions of any HAP or for VOC materials, and the maximum design capacity emissions (see definition below).

Maximum Design Capacity Emissions - These are the emissions possible when operating all equipment at its maximum design capacity on a full operational schedule (up to 8,760 hrs/year), and utilizing materials with the highest HAP and/or VOC content currently in use. Note in a Comment sheet for this form the assumptions and example calculations used to arrive at the entered value.

15. Facility-Wide Product Usage: Products are being categorized by very general types for the responses in Form B, but details are being asked for only the highest usage HAP- and VOC-containing products within each "type." The information being requested here is for the total usage of products within a product "type," and the percent of that total reported in detail on Form B.

16. Response Summary: Indicate in the table how many of each Form were completed for the subject facility. EPA also requests that you provide both a schematic drawing of the facility (plant layout), showing the locations of all operations related to surface coating, and a flow diagram showing the flow of products/intermediates from one unit operation to another. Reference, where possible, the Form on which information for a location in the plant layout or step in the flow diagram can be found. An example of a flow diagram has been provided as Figure 5. Use multiple pages if needed to provide clarity, and indicate in the spaces provided the total number of pages for both the Plant Layout and the Flow Diagram(s). Please note that you may simply make changes to Figure 5 if it is similar to your facility, rather than creating a new diagram.

INSTRUCTIONS
FORM B - MATERIAL DATA

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The purpose of the information being collected in this form is to gather information on the materials being used in the surface coating operations, and those operations associated with surface coating at the facility. EPA is requesting that facilities provide information on all materials that represent approximately 90 percent of the material usage within any one "Material Type," as defined under Item B-1d below. Individual respondents may feel the need to report the usage for certain "specialty" materials for which they feel a need for special consideration; please note in a **Comments Sheet** for this form if there are any special considerations for usage of a particular material.

This form has been designed to contain information for a single material or group of materials (see discussion that follows on grouping materials). It is intended that a copy of an original (preferably with the Facility Tracking Number previously entered) be filled out separately for each material/material group being reported. Please note at the top of each page the "Sheet" number and total number of "Sheets" in the response packet for this facility. "Sheets" refers to the number of copies of Form B, and will be used to verify that all information provided in the response has been received.

Rules for Grouping Materials

The option is being given to respondents to group like materials (e.g., different color coatings with similar HAP and VOC content), and report information on the grouped materials on a single Form B. However, the following limitations must be followed when grouping materials:

- S All materials within a group must have a similar formulation, not varying from one to another by more than 5 percent in Total HAP or Total VOC.
- S All materials should have similar, if not identical, speciated ingredients.
- S Only materials of the same type can be grouped together (e.g., Coatings/Coating Components separate from Cleaning Solvents and Thinning Solvents).
- S Only coatings of the same resin-type or coating technology may be grouped together.
- S All materials in the group must use the same Units of Measure (either mass units or volume units) or be converted prior to being combined.

Definitions

Adhesive - A substance capable of holding materials together by surface attachment. Various descriptive adjectives are used with the term adhesive to indicate certain characteristics: physical (liquid adhesive, tape adhesive), chemical type (silicate adhesive, resin adhesive), materials bonded (paper adhesive), and conditions of use (hot-set adhesive).

Cleaning Solvents - Organic solvents used for cleaning. Cleaning solvents used in surface preparation of the part or product to be coated are reported on Form E. Those used in cleaning operations are reported on Form H.

Coating - A protective, decorative, or functional film applied as a thin layer to a substrate or surface and which cures to form a continuous solid film. This term applies to paints such as lacquers or enamels, but also is used to refer to films applied to paper, plastics, or foil. It also applies to other coatings that do not have a resin. Adhesives and Caulks are being treated as Coatings in this Questionnaire; however, these may be reported separately as an "Other" Product Types if desired.

Coating Components - Products that are combined to create a coating (e.g., catalyst and resin in multi-component coatings). Thinning solvents are not included in this definition as a coating component, but are reported separately.

Coating Technologies - The basic composition and chemistry of a coating. Some of these technologies are specific to the substrate being coated (Fabric-Specific Coatings and Flatwood-Specific Coatings), while others are based on the carrier (Solvent-borne and Water-Reducible), the resin used, or application technique (Powder).

Resin Type - The basic chemical classification of the coating solids.

INSTRUCTIONS
FORM B - MATERIAL DATA

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Thinning Solvent - Organic solvent used to thin the coating material prior to being applied to the part or product being coated.

Item-Specific Instructions

Material Number: This will be assigned by the respondent, starting with one (1) for the first and going on in sequence for each product or product group being reported.

1. **Material Identification** - This information is being requested to define the material or group of materials that will be reported upon in other forms.
 - a) **Product Name:** The name of the material (brand names are acceptable) or group of materials.
 - b) **Manufacturer's/Supplier's Name:** Report the name of the manufacturer or supplier listed on the product label and/or on the MSDS for this product. If grouping like materials from more than one manufacturer or supplier, enter "Grouped Materials - Various," and note the names, manufacturer/supplier names, and stock numbers for all grouped materials on the **Comments Sheet**.
 - c) **Manufacturer's/Supplier's Stock Number:** Enter the Stock Number listed on the product package by the manufacturer or supplier.
 - d) **Product Type:** Indicate which one of these broad categories of products does this specific material or group of materials belong. (See the definitions previously provided.) If a Coating/Coating Component, also indicate whether the material is used as primer, base coat, etc., and use these coating-specific sub-types for grouping purposes.

2. **Material Usage**
 - a) **Amount Used in Reporting Year:** Give the quantity of the material used for the year indicated on Form A. Please specify units.
 - b) **Percent of Usage for All Materials of this Type:** What is the proportion (expressed as a percentage) of the total quantity of all of the materials of this type (Item 1d of this form) that is represented by this one material or group of materials.
 - c) **Is material thinned, mixed, or formulated before use?** If the material is modified before use (e.g., combined with other components to form a final coating), please further define these in Form G, Item 4.

3. **Coating-Specific Details** - Details which are needed to better compare like materials. First choose the General Coating Type, then the Coating Technology, and the Resin Type, where applicable. Note the definitions provided previously in the instructions for this form.

4. **General Composition/Formulation Data** - This information is being collected to determine the contribution of the material to the emissions of HAP and VOC materials, and to allow comparisons between similar materials.
 - a) **Material Density:** Product density is needed to convert mass percents to mass units. Please specify the density in units of kilograms/liter.
 - b) **Source of Data:** Indicate the source of the data being reported in Items 4 and 5 of this form. The preference for data sources are Test Data first, followed by Certified Product Data Sheets; Material Safety Data Sheets (MSDS); then any other data sources available. Please provide a copy of whatever information source is available. If no good source of data is available, please be certain that you have identified the manufacturer/supplier and their stock number (Items 1b and 1c) adequately.
 - c) **Solids Content:** Report the solids content on both a mass-percent and volume-percent basis. This information has been used in other MACT Standards (grams HAP/grams coating solids).

INSTRUCTIONS
FORM B - MATERIAL DATA

Revised: 5/20/98

- d) **Total VOC Content:** Report the VOC content on a mass-percent basis. Please indicate in a **Comments Sheet** for this form if there is any deviation from this guidance. The amount reported here should be greater than or equal to the total of all speciated VOC reported in Item 5 of this form.
 - e) **Water Content:** Indicate the mass-percent of water in the product.
5. **Speciated Components** - List each individual organic constituent of the material (whether it is a HAP, VOC, or neither) and any inorganic HAP constituents. List all that are present at greater than one percent, or at greater than 0.1 percent for carcinogens. This information should be readily available from the preferred data source (indicated in Item 4b of this form) or should be attainable from the manufacturer or supplier of the material. It is critical that a CAS Registry Number be given when one is available; this will allow the EPA to ensure that adjustments for any HAP or VOC component that may be delisted in the future can be made, and avoid the need for another data collection effort. A good reference on the Internet for finding CAS Registry Numbers is ChemFinder® (<http://chemfinder.camsoft.com/>). Also note whether this individual constituent has been considered as a HAP or VOC in this response.

INSTRUCTIONS

FORM C - ADD-ON CONTROL DEVICE

Revised 5/20/98

Use this form to report information on the design parameters and capture and control efficiency of each add-on control device. Complete one form for each add-on control device. The GENERAL INFORMATION section should reflect actual operating conditions and be completed for all add-on control devices. For the subsequent sections, complete only the section which corresponds to the type of add-on control device being reported. The OTHER CONTROL DEVICE section should be completed only if this particular add-on control device is not listed in any of the previous sections. A complete description of your add-on control device may include other parameters not on this form. It is important that you attach manufacturer's specification, schematics, and any other drawings necessary to provide a complete description of this add-on control device and its relationship to its emission source(s).

In some situations, the operating parameters (e.g., control device efficiency, inlet flow rate) vary over a wide range during normal facility operations. If you believe it is important to show how the performance of this add-on control device varies with varying operating parameters, then report the relevant information on the Comments Sheet. Include the range over which each parameter varies and how this variation affects the performance of the add-on control device.

Please note at the top of each page the "Sheet" number and total number of "Sheets" in the response packet for this facility. "Sheets" refers to the number of copies of Form C, and will be used to verify that all information provided in the response has been received. Also enter the Add-on Control Device ID No. as specified on the facility flow diagram.

1. GENERAL INFORMATION

- a) **Position in Series of Controls** - If there are several devices operating in a series, indicate in what position this device is located. If the exhaust air stream goes through this unit and then through a second unit then this would be the #1 of 2 units.
- b) **Controls Emissions from which Emission Source ID No.(s)** - List all emission source ID numbers whose emissions are controlled by this device. These ID numbers must correspond to those listed on Forms D through H.
- c) **Describe Control System** - Give a brief description of the add-on control device. Include such information as other devices used in conjunction with this device, number of compartments, etc.
- d) **Pollutant(s) Collected** - Enter the pollutants being collected. If speciated data are not available, then enter total HAP and total VOC.
- e) **Capture Method** - Enter the method used to capture the pollutant listed in Item 1-d (i.e., hood, lip exhaust, total enclosure, etc.).
- f) **Capture Efficiency** - Enter the capture efficiency in percent (mass of pollutant emitted/mass of pollutant captured) for the pollutant listed in Item 1-d (capture efficiency may not be the same for all pollutants in an exhaust stream).
- g) **Control Device Efficiency** - Enter the control/removal efficiency in percent (mass of pollutant entering control device/mass of pollutant exiting control device) of the add-on control device for the pollutant listed in Item 1-d.
- h) **Inlet Flow Rate (acmm)** - Enter the actual air flow rate in actual cubic meters per minute (acmm) entering the control device during normal operation.
- i) **Pressure Drop (kPa) Min/Max** - Enter the minimum and maximum operating pressure drop across the device in kilopascals during normal operation needed to maintain the desired efficiency.
- j) **Inlet Temperature (C) Min/Max** - Enter the minimum and maximum inlet temperature in degrees Celsius during normal operation.

- 2. **BASIS OF CAPTURE AND CONTROL DEVICE EFFICIENCY** - Describe the basis used to determine the capture efficiency and control device efficiency (e.g., source test, manufacturer's specifications, engineering judgement, etc.).

INSTRUCTIONS
FORM C - ADD-ON CONTROL DEVICE

Revised 5/20/98

3. FABRIC FILTER

Use this section for fabric filters. A fabric filter removes particulates from a gas stream by passing the stream through a porous fabric (e.g., bagfilter, baghouse, HEPA filter). Dust particles form a more or less porous cake on the surface of the fabric.

- a) **Filter Surface Area (m²)** - The total square meters of filter surface area. Round off to nearest whole number.

4. ELECTROSTATIC PRECIPITATOR

Use this section for electrostatic precipitators (ESP). An ESP removes particulate matter from a gas stream by passing the gas stream through discharge electrodes and collection plates. Most particulates become charged and are collected on the plates.

- a) **Ash Analysis** - Enter the Mass Mean Diameter of the inlet particle distribution in micrometers, and the resistivity of the particles in ohm-cm.
- b) **Type** - Check the appropriate description for the type of ESP used. If none of the choices adequately describes this ESP, then check "Other" and provide a description on the Comments Sheet.

5. THERMAL OR CATALYTIC INCINERATOR

Use this section for thermal or catalytic incinerators. A control device which operates by thermal (non-catalytic) and catalytic incineration can oxidize hydrocarbons and/or toxic pollutants into carbon dioxide and water. Temperature and residence time must be sufficient to obtain the desired oxidation results

- a) **If Catalyst Used**
Type - Enter the type of catalyst material (e.g., palladium on ceramic honeycomb design).
Catalyst Space Velocity (1/hr) - Enter the catalyst space velocity. This is the volumetric gas rate divided by the volume of catalyst (this should be available from the manufacturer).
- b) **Inlet Oxygen Content (%)** - The amount of oxygen in the inlet stream, expressed as a percentage.
- c) **Inlet Moisture Content (%)** - Give the maximum percentage of moisture in the inlet emission stream.
- d) **Fuel(s) Used** - Enter the type(s) of fuel(s) used in the device.
- e) **Actual Annual Fuel Use** - Indicate the actual annual amount of fuel consumed during the reporting year. Include units for your response.
- f) **Combustion Temperature (C)** - Enter the minimum temperature in degrees Celsius in the combustion chamber during normal operation.
- g) **Total Maximum Firing Rate (million joules/hr)** - Enter the total maximum firing rate in joules per hour for all burners based on input.

6. MECHANICAL COLLECTOR

Use this section for mechanical collectors, such as settling chambers, cyclones, and multicyclones, that utilize gravity and inertia to separate particulates from a gas stream.

- a) **Particle Density (kg/m³)** - Enter the average particle density entering the control device in kilograms per cubic meter.

INSTRUCTIONS
FORM C - ADD-ON CONTROL DEVICE

Revised 5/20/98

7. CARBON ADSORBER

Use this section for carbon adsorbers. Adsorption is a control method where gaseous pollutants are extracted from the gas phase and concentrated at the surface of a solid. Carbon is commonly used to adsorb volatile organic compounds from an airstream. If an adsorbent other than carbon is used, complete this form but explain the specifics of the control device, including the adsorbent used, on the Comments Sheet.

- a) **Volatile Concentration Entering Unit (ppmv)** - Specify the total VOC concentration of the gas stream entering the adsorber unit in parts per million by volume (volumes of VOC per million volumes of gas stream).
- b) **Breakthrough Capacity (kg vapor/kg adsorbent)** - Provide the breakthrough capacity in kilograms of vapor per kilogram of adsorbent. This is the capacity of the bed at which unreacted vapors begin to be exhausted.
- c) **Number of Carbon Beds** - Enter the total number of carbon beds in the system, including any beds used as standby or backup.
- d) **Describe Carbon Regeneration Procedure and How Emissions are Controlled During Regeneration** - Describe the procedure used to regenerate the carbon, including disposition of recovered solvent. Also describe any method used to capture and control emissions produced from the regeneration of the adsorbent.

8. PACKED OR PLATE COLUMN ABSORBERS

Use this section for packed or plate column absorbers where one or more selected gaseous pollutants are removed by absorption by bringing the pollutants in contact with a liquid. Packing material or plates are used to increase the surface area on which this contact occurs.

- a) **Type of System** - Specify type of gas absorbing system used (e.g., spray tower, cyclone spray chamber, packed columns, plate columns, venturi scrubber, sparging tank).

PACKED COLUMNS - Complete Items 8-b through 8-d only if the absorbing system is classified as a packed column system. This absorbing system is a continuous operation where the gas and liquid phases flow through the system in a continuous manner with intimate contact throughout.

- b) **Type of Packing Used** - Specify packing used in your packed tower (e.g., partition tricklers, pall rings, berl saddles, tellerettes).
- c) **Column Length (m)** - Enter the length in meters of the packed column.
- d) **Column Diameter (m)** - Enter the column diameter in meters.

PLATE COLUMNS - Complete Items 8-e through 8-g only if the absorbing system is classified as a plate column system. This absorbing system is a staged operation on plates or trays where the liquid and gas are contacted in stepwise fashion in the vertical cylinders.

- e) **Plate Spacing (cm)** - Enter the distance in centimeters between the plates in the absorbing tower.
- f) **Column Length (m)** - Enter the length in meters of the packed column.
- g) **Column Diameter (m)** - Enter the column diameter in meters.
- h) **Total Gas Pressure (kPa)** - Specify the total inlet gas pressure in kilopascals (gauge).
- i) **Gas Dew Point (C)** - Enter the temperature in degrees Celsius at which the gas stream first changes into liquid phase.
- j) **Gas Velocity (m/sec)** - Enter the maximum gas velocity in meters per second through the net column cross-sectional area.
- k) **Additive Liquid Scrubbing Medium** - Specify what kind of liquid is used. Include the name of the additives (e.g., propanol, detergents, etc).

INSTRUCTIONS
FORM C - ADD-ON CONTROL DEVICE

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- l) Percent Recirculated** - If the absorber is operated with recirculating slurries, specify the percentage (by volume) of the liquid returned to the system.
- m) Total Liquid Injection Rate (liters/min)** - Enter the total volumetric flow rate in liters per minute of the liquid.
- n) Make Up Rate (liters/min)** - Specify the amount of new liquid in liters per minute that must be added to the system due to evaporation or discharge to a disposal system.
- o) Additive (liters/min)** - Specify the amount in liters per minute of new additive(s) that must be added to the system due to evaporation or discharge.

9. WET SCRUBBER

Use this section for wet scrubbers that are used to separate particulates (sometimes gases) from an airstream. Scrubber liquids are introduced for particle collection.

- a) Additive Liquid Scrubbing Medium** - Specify what kind of liquid is used. Include the name of the additives (e.g., propanol, detergents, etc).
- b) Total Liquid Injection Rate (liters/min)** - Enter the total volumetric flow rate in liters per minute of the liquid.
- c) Make Up Rate (liters/min)** - Specify the amount in liters per minute of new liquid that must be added to the system due to evaporation or discharge to a disposal system.
- d) Additive Rate (liters/min)** - Specify the amount in liters per minute of new additive(s) that must be added to the system due to evaporation or discharge.

10. CONDENSER

Use this section for condensers that are used to remove organic compounds by cooling the gas stream and condensing out the pollutants.

- a) Temperature of Inlet Coolant (C)** - Enter the temperature in degrees Celsius of the coolant entering the condenser.
- b) Temperature of Condensation (C)** - Enter the temperature in degrees Celsius of the condensed pollutant.
- c) Refrigeration Capacity (joules/hr)** - Enter the capacity in joules per hour of the condenser.

11. OTHER CONTROL DEVICE

Use this form to describe any control device not included in one of the above sections. Use the Comments Sheet to provide additional information, if necessary.

- a) Filter Media** - Enter the type of filter media used, if applicable.
- b) Collection Surface Area (m²)** - Enter the area of filter media in square meters, if applicable.
- c) Fuel Used** - Enter the type(s) of fuel(s) used in the device.
- d) Fuel Usage Rate** - Enter the maximum fuel usage rate on an hourly or annual basis. Provide units for your response.
- e) Describe any Auxiliary Materials Introduced into the Control System** - Describe any auxiliary materials (e.g., lime, caustic, acid, etc.) introduced into the control system.

- 12. MONITORING** - Describe the monitoring performed on this control device to assure compliance with a regulatory or permit limit. Include the frequency at which the monitoring is performed, the parameter being monitored, and averaging time (if applicable).

INSTRUCTIONS
FORM D - COATING APPLICATION

Revised 5/20/98

This form is designed to obtain information related to coating application. A coating is defined as a protective, decorative, or functional film applied as a thin layer to a substrate or surface and which cures to form a continuous solid film. This term applies to paints such as lacquers or enamels, but also is used to refer to films applied to paper, plastics, or foil. It also applies to other coatings that do not have a resin. Adhesives and caulks are being treated as coatings.

1. **Description and Location:**

- a) **Description of Coating Application Unit Operations:** Briefly describe the Coating Application Unit Operation (e.g., Continuous conveyor system through spray booth with two automatic spray guns and one manual spray gun. All spray guns are electrostatic).
- b) **Location ID in the Plant Layout Diagram:** Provide the Location ID that you assigned to this unit operation on the Plant Layout Diagram.
- c) **ID No. in the Flow Diagram:** Provide the ID No. that you assigned to this unit operation on the Facility Flow Diagram.

2. **Method of Application:** Check the method(s) of application that apply to this specific coating application operation.

3. **Coatings Applied in this Unit (Include Adhesives and Caulks as Coatings):**

- Coating ID - Provide the coating identification number.
- General Type of Coating - Check the appropriate box for the coating type applied.
- Average Thickness Applied - Specify the average dry film coating thickness applied. This represents the target dry film coating thickness to be achieved, on average, across the entire surface of the part.
- Resin Type - Describe the resin type for this coating (see Form B, Item c-3).
- 1997 Usage - Provide the 1997 coating usage in liters.

4. **Regulation of Adhesive Usage:** Identify any regulatory standard (federal, state, or local) that regulates adhesives used at this facility.

5. **Part(s)/Product(s) Coated by this Coating Application Unit:**

- Part/Product Name - Describe the part or product coated.
- Estimated Surface Area of the Metal Substrate Being Coated - Provide an estimate of the total surface area of metal substrate coated. If a part is coated two or more times in this unit operation (e.g., primer and topcoat, or two applications of the finish coat), then the surface area should be counted only one time.
- Specific Substrate Type - Identify the specific substrate type.
- Coating Requirements for the Part/Product - Check all applicable requirements for the Part/Product coated.

6. **Coating Application Unit Component Equipment:**

- Component Type/ID's - Identify the component type and its identification number from the Facility Flow Diagram.
- Equipment - Provide the manufacturer and model number of the equipment.
- Number in Application Unit Operation - Identify the number of this equipment type in the application unit operation.
- Add-on Control Device ID No. - Provide the control device identification number as listed on Form C.

INSTRUCTIONS
FORM D - COATING APPLICATION

Revised 5/20/98

- Emissions - Provide the total HAP and total VOC emissions from the component equipment for 1997 in megagrams per year. Provide the permit specified limit (if applicable) and the maximum design capacity in megagrams per year.

7. Waste and Wastewater Generation:

- Waste Type - Identify the waste type by checking each appropriate box.
- Quantity Generated - Identify the quantity of waste generated in the appropriate units listed.
- Total HAP Concentration: Provide the total HAP concentration in mg/L or mg/kg, as specified.
- Total VOC Concentration: Provide the total VOC concentration in mg/L or mg/kg, as specified.

Questions 8 - 10 should be completed only if there are collocated unit operations for the surface coating of Miscellaneous Plastic Parts (MPP) or Miscellaneous Metal Parts (MMP) at this facility. For MPP unit operations, complete questions 8 - 10. For MMP unit operations, complete only question 10.

8. Provide additional information for each plastic part coated in this unit operation:

- Part/Product Name - Provide a name for each part you coat.
- Part Shape - How complex are the shapes of the parts: simple (1-4 continuous surfaces); intermediate (5-9 continuous surfaces); or complex (10 or more continuous surfaces). Put "N/A" if complexity is not a critical factor)
- Longest Dimension - What is the longest dimension of this part? Include units. Put "N/A" if dimension is not a critical factor.
- Flexible or Rigid? - Indicate whether the part is flexible or rigid. Put "N/A" if flexibility is not a critical factor.
- Interior or Exterior? - Indicate whether the part is an interior or exterior part. Put "N/A" if interior versus exterior is not a critical factor.

9. Identify your coatings (including adhesives, caulks, etc.) applied in this unit operation:

- Coating ID - Provide the coating manufacturer's identification for this coating.
- Number of Coats - Indicate the number of coats typically applied. If the number of coats varies depending on the type of part coated (or some other factor), please explain on a Comments sheet for this form.
- Performance Specifications - Indicate whether performance specifications are critical to the use of this coating. Typical performance specifications include:
 - Chemical resistance
 - Appearance
 - Abrasion resistance
 - UV exposure
 - Ease of application
 - Corrosion resistance

INSTRUCTIONS
FORM D - COATING APPLICATION

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- Regulatory Specifications - Indicate whether regulatory specifications are critical to the use of this coating. Typical regulatory specifications include:
 - Department of Defense (DOD), Chemically Active Resistant Coating (CARC), or other military
 - Federal Communications Commission (FCC)
 - Federal Highway Administration (FHWA)
 - National Transportation and Safety Board (NTSB)
 - National Highway Transportation Safety Administration (NHTSA)
 - Potable water regulations / Safe Drinking Water Act (SDWA)
 - Federal Aviation Administration (FAA)
 - Food and Drug Administration (FDA)

Use a comment sheet to describe any non-typical regulatory specifications that are critical factors.

10. Describe how the coatings are applied in this unit operation:

- Spray booth description - Briefly describe each spray booth or other application area.
- Conveyance - Are your parts conveyed into and out of the application area manually or by some automated method?
- Enclosure - Under what type of enclosure does this application method operate? Indicate whether the area is fully or partially enclosed. Indicate if the area is hooded or not.
- Vent - Where is the exhaust from this application area vented? Indicate if exhaust is routed to the building interior, atmosphere, or control device. If exhaust is routed to a control device, provide the control device number (refer to Form C).
- PM/Overspray Control - How are particulate matter and/or overspray controlled in this application area? Indicate type of controls, if any, such as dry filters, waterwash, etc.

INSTRUCTIONS
FORM E - SURFACE PREPARATION

Revised 5/20/98

This form is designed to collect information related to the preparation of the surface of a part or product prior to the application of a surface coating. Other types of cleaning (e.g., cleaning of the equipment used in surface coating operations) are to be reported on Form H, Cleaning Operations. Surface preparation is defined as the removal of contaminants from the surface of a substrate, or the activation or reactivation of the surface in preparation for the application of a coating.

1. **Description and Location:**

- a) **Description of Surface Preparation Unit Operations:** Briefly describe the Surface Preparation Unit Operation (e.g., Aqueous surface preparation line prior to coating line #3).
- b) **Location ID in the Plant Layout Diagram:** Provide the Location ID that you assigned to this unit operation on the Plant Layout Diagram.
- c) **ID No. in the Flow Diagram:** Provide the ID No. that you assigned to this unit operation on the Facility Flow Diagram.

2. **Surface Preparation Description**

- a) **Identify Activities:** Indicate each activity used in surface preparation operations. If any activity other than those listed is used in surface preparation, please describe this activity in the space provided.
- b) **Describe in Detail the Surface Preparation Operation:** Provide a description of each step of the operation (e.g., 5-stage operation consisting of alkaline cleaner, water rinse, iron phosphate treatment, water rinse, DI water rinse).

3. **Equipment, Tools, and Throughput:** List equipment and tools used to prepare the surface.

4. **Materials Used:** Materials listed in this table should cross-reference to Form B.

5. **Solvent-based Surface Preparation Materials Containing HAP Material:** Please answer each question and give your assessment of alternatives, if applicable.

6. **Estimated Emissions and Emission Limitations:** List total HAP and total VOC emitted, and each specific HAP associated with surface preparation operations.

7. **Emissions Capture and Add-on Control:** Please identify all devices used for capture of emissions associated with surface preparation operations. Provide the capture efficiency for the device(s), the Add-on Control Device ID No.(s) from Form C to which the air stream is sent (where applicable), and the Equipment ID No.(s) within the capture device.

8. **Effect of Surface Preparation on Subsequent Surface Coating Operations:** Please answer as applicable.

INSTRUCTIONS
FORM F - STORAGE FORM

Revised 5/20/98

The purpose of this form is to provide information regarding the storage of materials used in surface coating operations. Please complete one of these forms for every storage area located in this facility. Provide the Storage Area ID number for each area on a separate "sheet" or copy of this form.

1. **Description and Location:**
 - a) **Description of Storage Unit Operations:** Briefly describe the Storage Unit Operation (e.g., ten 150-liter covered storage tanks for central distribution to coating lines 1, 2, and 3).
 - b) **Location ID in the Plant Layout Diagram:** Provide the Location ID that you assigned to this unit operation on the Plant Layout Diagram.
 - c) **ID No. in the Flow Diagram:** Provide the ID No. that you assigned to this unit operation on the Facility Flow Diagram.

2. **Method of storage for coatings/coating components:** Indicate all methods used to store coatings and/or coating components. If a method other than those listed is used, please describe that method.

3. **Storage Tank Parameters:** Please provide the requested information for each storage tank located in this storage area. If an estimate of HAP and/or VOC emissions are provided, please provide an explanation of the estimation method used on the Comments Sheet.

4. **Capture of Emissions:**
 - a) **Are Emissions from this Storage Area Captured:** Check the appropriate box. If you checked "yes," then answer (b) and (c).
 - b) **Are Emissions Captured From:** Indicate whether emissions are captured from each individual tank or from the room in which the tanks are located.
 - c) **If They are Vented to a Control Device:** Enter the control device ID No. as listed on Form C.

INSTRUCTIONS
FORM G - MIXING OPERATIONS

Revised 5/20/98

The purpose of this form is to provide information regarding the mixing of paints for facilities with surface coating operations. Please complete one of these forms for every mixing area located in this facility. Provide the Mixing Area ID number for each area on a separate "sheet" or copy of this form.

1. **Description and Location:**

- a) **Description of Mixing Unit Operations:** Briefly describe the Mixing Unit Operation (e.g., Central mixing room for coating lines 1, 2, and 3. Consists of five 250-liter covered mixing tanks that are continually agitated.).
- b) **Location ID in the Plant Layout Diagram:** Provide the Location ID that you assigned to this unit operation on the Plant Layout Diagram.
- c) **ID No. in the Flow Diagram:** Provide the ID No. that you assigned to this unit operation on the Facility Flow Diagram.

2. **Mixing Equipment:**

Equipment Type Description: Provide a brief description of the type of mixing equipment for each type that may be found in the mixing area. For example, if there are five (5) similar 50-gallon mixing vats and three (3) similar 10-gallon, agitated mixing vats in the Mixing Area, make two entries on Form G.

Number of this Type: How many of each type of mixing equipment are located in this Mixing Area.

Capacity: Indicate the capacity of the mixing equipment (include units).

Emissions Capture Device: If emissions are captured, indicate the type of capture device (e.g., hood, total enclosure, room, etc.) and the estimated capture efficiency.

Integrated Emission Controls: These refer to emission controls that are an integral part of the equipment, such as a cover. Indicate any add-on control devices to which captured emissions are vented in Item 3-c of this form.

Estimated Emissions for the Reporting Year: Indicate the Total HAP and Total VOC emission estimates for this type of equipment in this Mixing Area (include units).

3. **Emission Capture and Add-on Control Devices**

- a. **Is capture of emissions by mixer or for the room?:** Indicate method of emissions capture.
- b. **Exhaust is Vented to?:** Check the appropriate box. If vented to a control device, then provide the control device ID No. from Form C.
- b. **Exhaust Flowrate:** Indicate the exhaust flow rate from the room in actual cubic meters per hour.
- c. **Add-on Control Devices:** Enter the control device ID No. as listed on Form C.

4. **Mixing/Formulation/Thinning of Components to Yield "As-Applied" Coatings:** This table is designed to provide information to define coatings in the form they are applied, from "as-supplied" components defined from Form B (Material Data).

INSTRUCTIONS
FORM G - MIXING OPERATIONS

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“As-Applied” Coatings: Each “as-applied” coating will be given a unique ID, using the AC- prefix (as opposed to the MN- prefix for “as-supplied” components).

Operation Description: Indicate if this operation is mixing, formulating, or thinning in nature. Definitions of each are provided below:

Mixing - Simple combining of two or more components to create an “as-applied” coating, such as mixing of a resin and catalyst in a two-component coating.

Formulation - Creation of a coating “from scratch,” using the most basic components, as is performed in creating batches of specialty coatings.

Thinning - Simple addition of a thinning solvent to an “as-supplied” coating to provide an appropriate viscosity, density, etc.

Components: Identify the components used to create the as-applied coating, using the appropriate ID (e.g., MN-999) from Form B (Material Data). Indicate the amount of material used and specify units. Please use the same units (if possible) for all components within a mixture.

Final Yield: Indicate the estimated amount mixed in the reporting year and specify units.

Pot Life: Many mixtures have a limited time in which they may be used. Indicate how long (hours) the mixture may remain mixed before being unusable. If this is not applicable, enter N/A.

Coating Application ID(s): Indicate the Coating Application Area(s) in which the As-Applied Coating is used, cross-referencing the area defined in Form D (Coating Application) using the ID number (e.g., CA-999).

INSTRUCTIONS
FORM H - CLEANING OPERATIONS
(for purposes other than for surface preparation prior to coating)

Revised 5/20/98

This form requests information on cleaning operations not covered in Form E. Cleaning operations to be reported on this form include cleaning of spray booths; spray guns; mixing, storage, and dip tanks; parts not subsequently coated; and cleaning of parts or assemblies after they are coated. Do not report janitorial activities.

Please note at the top of each page the "Sheet" number and total number of "Sheets" in the response packet for this facility. "Sheets" refers to the number of copies of Form H, and will be used to verify that all information provided in the response has been received.

Item-Specific Instructions

1. **Description and Location:**
 - a) **Description of Cleaning Unit Operations:** Briefly describe the Cleaning Unit Operation (e.g., cleaning of spray guns from coating lines 1, 2, and 3 in an open sink).
 - b) **Location ID in the Plant Layout Diagram:** Provide the Location ID that you assigned to this unit operation on the Plant Layout Diagram.
 - c) **ID No. in the Flow Diagram:** Provide the ID No. that you assigned to this unit operation on the Facility Flow Diagram.
 - d) **Associated Operation(s):** Enter the ID No. of the coating or production operation(s) most closely related to this cleaning operation.
2. **Type of Cleaning Operation** - Choose the description that most closely matched this cleaning operation. If you choose "Other," provide a brief description of the cleaning operation.
3. **Materials Used** - List the names of the cleaning materials used in this cleaning operation. If the material is a brand-name product, enter the name of the manufacturer. Also enter the annual usage for this operation of each cleaning material.
4. **Pollution Prevention** - Indicate whether any of the broad pollution prevention categories have been investigated or implemented for this cleaning operation. If "Yes" was indicated for choices a), b), or c), then describe the results of your assessment under d). If the pollution prevention measure was actually implemented at this cleaning operation, provide a qualitative estimate of the emission reduction achieved.
5. **Emissions** - Enter the reporting year total HAP and total VOC actual emissions for this cleaning operation. Also enter the estimated annual emissions for this activity at maximum design capacity, and any permit limitations, if applicable. Where the data are available, also provide the emissions of each individual HAP and VOC.
6. **Emissions Capture and Control** - Indicate any capture devices (hood, lip exhaust, vent, total enclosure, etc.) used to capture emissions from this cleaning operation. If the captured emissions are vented to an add-on control device, enter the ID No. listed on Form C for this add-on control device.
7. **If Rags or Wipes Are Used** - Describe the handling, storage, and disposal of rags or wipes used in this cleaning operation.

INSTRUCTIONS
FORM I - WASTE AND WASTEWATER

Revised: 5/20/98

The purpose of this form is to provide information regarding waste and wastewater generation, treatment, and/or disposal for facilities with surface coating operations. Report information for the entire facility on this one form.

1. Waste Generation

- a. **Waste Type:** Indicate each type of waste generated at this facility. If this facility generates a type of waste other than those listed, please provide a detailed description of that waste. The following definitions pertain to this section.

Wastewater - any operation waters or cleaning waters should be considered wastewater at the point/time they leave the generating operation.

Sludge - the solids generated from any operation (surface preparation, coating, mixing, etc.) that requires disposal, either on-site or off-site.

Waste Solvents - solvents that have been used in another operation (mixing, cleaning, etc.) that are collected for either recycling or disposal.

Waste Coatings - coating materials from equipment cleaning, excess prepared coating materials, etc. that must be treated and/or disposed.

If your facility has a combined waste stream (e.g. waste coatings and waste solvents), please estimate the amount of each contributed to the waste stream and include in Item 1-b. Note these combined streams and any other pertinent details in a Comments Sheet for this form.

- b. **Quantity Generated:** Give the amount of each type of waste generated in this facility in the appropriate units. If alternate units are used, state in comments section.
- c. **Is this waste treated on-site?** Please indicate by checking yes or no.
- d. **Are air emissions controlled?** Indicate if any method for controlling emissions of HAP or VOC to the air is used, including use of covers, add-on control devices, etc.
- e. **Sources of Waste:** Identify, by the Unit Operation ID taken from other forms (e.g., CA-999, SP-999), each type of waste generated at this facility.
- f. **Estimated Total HAP Emissions:** If available, provide an estimate of the total HAP emissions from each waste type for the reporting year. Provide a description of the estimation method on the Comments Sheet.
- g. **Estimated Total VOC Emissions:** If available, provide an estimate of the total VOC emissions from each waste type for the reporting year. Provide a description of the estimation method on the Comments Sheet.

INSTRUCTIONS

FORM I - WASTE AND WASTEWATER

Revised: 5/20/98

2. **Mode of wastewater transport** - Indicate how wastewater is transported from the point of generation.

Mode definitions:

Open Trench - uncovered trench in which wastewater flows from point of generation to another point.

Open Pipe - covered trenches and pipes with openings to the open air at each end and/or through vents, manholes, etc.

Closed Pipe - completely closed piping with no opening to the atmosphere

Holding Tank - storage tank in close proximity to the point of generation which holds wastewater but does not reuse it in the operation.

Definitions
Surface Coating of Metal Furniture
Information Collection Request

Add-on control device efficiency - The ratio of the (pollutant) emissions recovered or destroyed by an add-on air pollution control device to the total (pollutant) emissions that are introduced to the control device, expressed as a percentage.

Adhesive - A substance capable of holding materials together by surface attachment. Various descriptive adjectives are used with the term adhesive to indicate certain characteristics: physical (liquid adhesive, tape adhesive), chemical type (silicate adhesive, resin adhesive), materials bonded (paper adhesive), and conditions of use (hot-set adhesive).

As-applied - The condition of a coating at the time of application to the substrate, including any added thinning solvent. Multi-component coatings are supplied as individual components that have to be mixed prior to application.

As-supplied - The condition of a coating as purchased and delivered to the user. Multi-component coatings are supplied as separate components and later mixed according to manufacturers instructions (e.g., 1:3). The mixing ratio affects the pollutant emissions from the final coating product (i.e., the *as-applied* product).

Capture efficiency - The fraction of all HAP material or other pollutants generated by a process that are directed to an add-on air pollution control device expressed as a percentage.

Caulk - Material used to fill, close, or plug cracks and spaces within or between components.

Clean - To remove foreign material from a substrate.

Clean Air Act (CAA) - The Clean Air Act, as amended in November 1990, provides the foundation for EPA's efforts to improve air quality. The Clean Air Act, building on earlier legislation, was passed in 1970.

Cleaning activity - Action used to clean a substrate. This term focuses on how the substrate is being cleaned, and includes actions such as wiping, brushing, flushing, spraying, or dipping.

Cleaning operation - A unit operation in which a substrate is cleaned. This term focuses on what is being cleaned (e.g., spray booth cleaning operation or parts cleaning operation). Cleaning may be performed to prepare a surface for coating (Form E) or for other purposes (Form H).

Cleaning Solvent - Organic solvent used for cleaning.

Coating - A protective, decorative, or functional film applied as a thin layer to a substrate or surface and which cures to form a continuous solid film. This term applies to paints such as lacquers or enamels, but also is used to refer to films applied to paper, plastics, or foil. It also applies to other coatings that do not have a resin. Adhesives and Caulks are being treated as Coatings.

Coating Categories:

Automobile and Light-duty Trucks - Surface coating of automobile and light duty truck bodies at assembly plants, or other facilities and associated operations including the mixing and storage of coatings, and treatment of wastewater generated from coating operations. Off-line coating of non-body parts is not included. Other HAP and/or VOC using operations at assembly plants, including the application of adhesives, and fluid fills are included.

Fabric - This source category includes textile manufacturing processes with potential HAP emissions performed in the production or conversion of yarn and thread; woven, knit, and non-woven fabric; and carpet. The processes include, but are not limited to, non-woven fabric bonding, slashing, preparation, printing, dyeing, wet finishing (including carpet back coating), coating, laminating, and spot cleaning.

Wood Building Products - This source category involves the surface coating of interior paneling produced from plywood with a hard wood surface; or wood composite panels that are resurfaced using techniques such as printing that produce a decorative appearance.

Large Appliances - The surface coating of Large Appliances manufactured from various metals, coiled or sheet metal, pre-coated coil, and pre-cut, powder-precoated pieces.

Metal Can - This source category includes facilities that coat or print metal cans or metal parts for any type of can (e.g., metal ends for composite cans). It includes the coating/printing of metal sheets for subsequent processing into cans or can parts, but not the coating of metal coils for cans or can parts. (Coil coating for cans and can parts is included in the Metal Coil source category.) For purposes of this data-gathering effort, this source category also includes the coating/printing of metal decorative tins, crowns, and closures (except for coil coating). Note that the coating/printing of pails and drums falls in the Miscellaneous Metal Parts and Products source category.

Metal Coil - Coil manufacturing begins with a coil or roll of bare sheet metal and ends with a coil of metal coated on one or both sides.

Metal Furniture - The surface coating of furniture manufactured from various metals.

Miscellaneous Metal Parts and Products - This category encompasses all metal parts and products not covered in one of the other categories in which the surface coating of metal parts or products are included (Aerospace, Automobile and Light-duty Trucks, Boat Manufacturing, Large Appliances, Metal Can, Metal Coil, Metal Furniture, or Shipbuilding).

Plastic Parts - The surface coating of plastic parts produced by either machining from stock plastic, or casting and molding.

Coating Components - Products that are combined to create a coating (e.g., catalyst and resin in multi-component coatings). Thinning solvents are not included in this definition as a coating component, but are reported separately.

Coating Technologies - The basic composition and chemistry of a coating. Some of these technologies are specific to the substrate being coated (Fabric-Specific Coatings and Flatwood-Specific Coatings), while others are based on the carrier (Solvent-borne and Waterborne), the resin used, or application technique (Powder).

Enamels - Coatings which are characterized by their ability to form a smooth surface; originally associated with a high gloss, but may also include a lower degree of gloss. Also a class of substances having similar composition to glass with the addition of stannic oxide, or other infusible substances to render the enamel opaque. Can be used to describe a coating which forms a film through chemical union of its component molecules during cure and in shop terminology can be used to describe paint which is not a lacquer. All paints that form crosslinking chemical bonds during curing, are considered enamels. The majority of industrial finishes fall into this category.

Epoxies - Binders based on epoxy resins. Epoxy crosslinking is based on the reaction of the epoxide groups with other materials such as amines, alcohols, phenols, carboxylic acids, and unsaturated compounds. Also used as a thermoset powder coating.

Exempt compound - Specific organic compounds that are not considered volatile organic compounds due to negligible photochemical reactivity. Exempt compounds are specified on 40 CFR 51.100(s).

Full-Time Equivalent (FTEs) - FTEs are calculated by dividing the total number of man-hours worked at a facility by the number of hours expected from a full-time employee, typically 2,000 hours/year. The equation below demonstrates a FTE calculation.

$$\frac{400,000 \text{ man-hours}}{2,000 \text{ man-hours per FTE}} = 200 \text{ FTEs}$$

Hand-wipe cleaning activity - Removing contaminants such as dirt, grease, oil, and coatings by physically rubbing it with a material such as a rag, paper, or cotton swab that has been moistened with a cleaning solvent.

HAP - Hazardous Air Pollutant. Means any air pollutant listed in or pursuant to Section 112(b) of the Clean Air Act. The current list of HAPs is attached separately.

High volume low pressure (HVLP) spray equipment - Spray equipment that is used to apply coating by means of a spray gun that operates at 10.0 psig of atomizing air pressure or less at the air cap.

High-solids - Solvent-borne coatings that contain greater than 50 % solids by volume or greater than 62 % (69 % for baked coatings) solids by weight.

Lacquer - Coating composition based on synthetic thermoplastic film-forming material dissolved in organic solvent and dried primarily by solvent evaporation. Typical lacquers include those based on nitrocellulose, other cellulose derivatives, vinyl resins, acrylic resins, etc.

LAER (Lowest achievable emission rate) - Pursuant to Section 171(1) of the Clean Air Act, LAER is that rate of emissions which reflects:

- (a) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of sources, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable; or
- (b) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent.

In no event, however, shall the application of this term permit a proposed new or modified source to emit any pollutant in excess of the amount allowable under applicable new source standards of performance. Areas of the country that have not attained national ambient air quality standards may require LAER on new sources of pollution.

MACT - Maximum Achievable Control Technology, as specified in Section 112 of the Clean Air Act.

Major modifications - Include any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of HAP or VOC materials. Typically, these modifications result in changes in a permit or results in the need to acquire a permit to construct.

Manufacturer's formulation data - Data on a material (e.g., a coating) supplied by the material manufacturer based on knowledge of the ingredients used to manufacturer that material, rather than based on testing of the material. Manufacturers formulation data may include information on density, HAP content, VOC content, solids content, etc.

Material balance - A calculation based on conservation of mass (i.e., the mass of material going into a unit operation is equal to the mass of material which leaves the unit operation). This calculation is often used to estimate volatile emissions.

Maximum Design Capacity Emissions - These are the emissions possible when operating all equipment at its maximum design capacity on a full operational schedule (up to 8,760 hrs/year), and utilizing materials with the highest HAP and/or VOC content currently in use.

Metalized epoxy coating - A coating that contains relatively large quantities of metallic pigmentation for appearance and/or added protection.

Nonvolatiles (Solids) - The nonvolatile portion of the coating that after drying makes up the dry film.

Permanent total enclosure - A permanently installed enclosure that completely surrounds a source of emissions such that all emissions are captured and discharged through a control device. For specific qualifying criteria, see Method 204 (62 FR 32500) (June 16, 1997).

Pollution prevention - Source reduction or in-process recycling activities that reduce emissions of HAP or VOC. Source reduction activities include changes in coating formulation, changes in surface preparation materials or methods, changes in material transfer methods in mixing, changes in storage methods, and changes in materials or methods that would allow re-use of coatings. In-process recycling would include capture and re-use of evaporated solvents within the unit operation.

Polyester - A polymer in which the monomer units are linked by the functional group -COO-. Polyester has been used as thermoplastic powder coating, and as the following thermosetting powder coatings: epoxy polyester hybrid powder, urethane polyester powder, and polyester TGIC powder.

Powder coatings - Any coating applied as a dry (without solvent or other carrier), finely divided solid which adheres to the substrate as a continuous film when melted and fused.

Primer - The first layer and any subsequent layers of identically formulated coating applied to the surface to be coated. Primers are typically used for corrosion prevention, protection from the environment, functional fluid resistance, and adhesion of subsequent coatings. Primers that are defined as specialty coatings are not included under this definition.

Process (Process line) - The aggregate of unit operations necessary for producing a product. The emissions from a process includes all sources of air emissions (e.g., storage, transfer, handling, painting, and packaging).

Research and Development Activities - Research and development into new operations and products, where the activities are operated under the close supervision of technically trained personnel and are not engaged in the manufacture of products for commercial sale in commerce, except in a de minimis manner. For example, research and development activities could include bench scale laboratory work, pilot plants, equipment testing, testing on the production line where the specific purpose of the testing is to create or improve operations or products, and the use of batch process runs for experimental purposes.

Resin Type - The basic chemical classification of the coating solids.

SIC/NAICS Codes - These refer to the Standard Industrial Classification codes (1987) and their replacements, the North American Industrial Classification System codes. For more information on SIC and NAICS codes, visit the following Internet site: <http://www.census.gov/epcd/www/naics.html>

Sludge - The waste solids generated from any process (surface preparation, coating, mixing, etc.) that it is necessary to have disposed, either on-site or off-site.

Solvent - The liquid or blend of liquids used to dissolve or disperse the film-forming particles in a coating and which evaporate during drying. A true solvent is a single liquid that can dissolve the coating. Solvent is often used to describe terpenes, hydrocarbons, oxygenated compounds, furans, nitroparaffins, and chlorinated solvents.

Solvent-borne - Coatings in which volatile organic compounds are the major solvent or dispersant.

Spray gun - A device that atomizes a coating or other material and projects the particulates onto a substrate.

Surface preparation - The removal of contaminants from the surface of a substrate or component or the activation or reactivation of the surface in preparation for the application of a coating.

Temporary total enclosure - An enclosure constructed only to measure the capture efficiency of pollutants emitted from a given source. For specific qualifying criteria, see Method 204: (62 FR 32500) (June 16, 1997).

Thinning solvent - Organic solvent used to thin coating material prior to being applied to the part or product being coated.

Topcoat - A coating that is applied over a primer on a part, product, or component for appearance or protection. Topcoats are typically the last coat applied in a coating system.

Touch-up and repair operation - That portion of the coating operation that is the incidental application of coating used to cover minor imperfections in the coating finish or to achieve complete coverage. This definition includes out-of-sequence or out-of-cycle coating.

Unit operation - An industrial operation, classified or grouped according to its function in an operating environment (e.g., a paint mixing vessel, a spray booth, etc.).

Unit operation system (UOS) - The ensemble of equipment around which a material balance is performed. The "boundary" of a UOS may include one or more unit operations (e.g., a coating line or a coating line plus mixing tanks)." What constitutes a UOS for presenting emissions/waste data needs to be defined on an industry by industry basis. However, common UOS's may be found across industries.

Urethanes - Materials based on resins made by the condensation of organic isocyanates with compounds or resins containing hydroxyl groups. Categories of polyurethane coatings include: single component prereacted-urethane coatings; single component moisture-cured urethane coatings; single component heat-cured urethane coatings; two-component catalyst-urethane coatings, two-component polyurethane coatings; and one-component nonreactive lacquer-urethane solution coatings.

UTM (Universal Transverse Mercator) - A map projection and plane coordinate system that divides the world into 60 north-south zones, each covering a strip 6 degrees wide in longitude.

VOC (Volatile Organic Compound) - Any compound defined as VOC in 40 CFR 51.100(s). This includes any organic compound other than those determined by the EPA to be an 'exempt' compound.

Waste Coatings - coating materials from equipment cleaning, excess prepared coating materials, etc. that must be treated and/or disposed.

Waste Solvents - solvents that have been used in another process (surface preparation, etc.) that are collected for either recycling or disposal.

Wastewater - Any process waters or cleaning waters should be considered wastewater at the point/time they leave the process unit.

Waterborne coatings - Coatings in which water accounts for more than 5 weight percent of the volatile portion.

Work Practice - Specific human activities that lead to a reduction in emissions (or waste) or have the potential to do so. The activities include operator training, management directives, work procedures or techniques for conducting emission (or waste) generating operations or for reducing or eliminating the need for frequency of such operations.

APPENDIX A

**STANDARD INDUSTRIAL CLASSIFICATION CODES AND
NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM CODES
FOR METAL FURNITURE**

TABLE 1. PRIMARY SIC CODES AND RELEVANT PRODUCTS

SIC Code	Title	Relevant Products ^a
2514	Metal Household Furniture	Bookcases, Chairs, Tables, Swings, Kitchen Cabinets, Medical Cabinets, Camp Furniture, Frames for Boxsprings, Cribs, Cots, Garden Furniture, Serving Carts
2522	Office Furniture, Except Wood	Bookcases, Chairs, Tables, Desks, File Cabinets, Wall Cases, Partitions, Modular Furniture, Benches
2531	Public Building and Related Furniture	Benches, Portable Bleacher Seating, Stadium Seating, Theater Seating, School Furniture, Church Furniture, Seats for Autos, Vans, Aircraft, Railroad
2542	Office and Store Fixtures, Partitions, Shelving, and Lockers, Except Wood	Cabinets, Counters, Display Cases, Display Fixtures, Bar Fixtures, Shelving, Showcases, Sorting Racks, Lunchroom Fixtures

^a The following list of products is not intended to be comprehensive.

TABLE 2. SECONDARY SIC CODES AND RELEVANT PRODUCTS

SIC Code	Title	Relevant Products ^a
2599	Furniture and Fixtures, Not Elsewhere Classified	Hospital Beds, Bowling Center Furniture, Cafeteria Furniture, Factory Furniture, Ship Furniture, Restaurant Carts
3429	Hardware, Not Elsewhere Classified	Furniture Hardware, Convertible Bed Mechanisms
3469	Metal Stampings, Not Elsewhere Classified	Stamped Metal Wastebaskets
3495	Wire Springs	Furniture Springs, Spring Units for Seats
3499	Fabricated Metal Products, Not Elsewhere Classified	Metal Chair Frames, Metal Furniture Parts, Metal Auto Seat Frames
3645	Residential Electric Lighting Fixtures	Chandeliers (Residential), Floor Lamps, Lamps (Residential), Wall Lamps, Desk Lamps, Lamp Shades (Metal), Table Lamps
3646	Commercial, Industrial, and Institutional Electric Lighting Fixtures	Chandeliers (Commercial), Desk Lamps
3821	Laboratory Apparatus and Furniture	Laboratory Furniture, Benches, Tables, Cabinets
3843	Dental Equipment and Supplies	Dental Cabinets, Dentists' Chairs
3999	Manufacturing Industries, Not Elsewhere Classified	Beauty Shop and Barber Shop Furniture
7641	Reupholstery and Furniture Repair	Furniture Repair/Refinishing, Antique Repair Restoration

^a The following list of products is not intended to be comprehensive.

TABLE 3. SIC CODES AND CORRESPONDING NAICS CODES

1987 SIC Code	1987 U.S. SIC Description	1997 NAICS Code	1997 NAICS Description
2514	Metal Household Furniture	337124	Metal Household Furniture Manufacturing
2522	Office Furniture, Except Wood	337214	Nonwood Office Furniture Manufacturing
2531	Public Building and Related Furniture	33636	Motor Vehicle Fabric Accessories and Seat Manufacturing
		337127	Institutional Furniture Manufacturing
2542	Office and Store Fixtures, Partitions, Shelving, and Lockers, Except Wood	337215	Showcase, Partition, Shelving, and Locker Manufacturing
2599	Furniture and Fixtures, Not Elsewhere Classified	339113	Surgical Appliance and Supplies Manufacturing
		337127	Institutional Furniture Manufacturing
3429	Hardware, Not Elsewhere Classified	332951	Hardware Manufacturing
3469	Metal Stampings, Not Elsewhere Classified (Except Kitchen Utensils, Pots and Pans for Cooking and Coins)	332116	Metal Stamping
3495	Wire Springs	332612	Wire Spring Manufacturing
3499	Fabricated Metal Products, Not Elsewhere Classified	337215	Showcase, Partition, Shelving, and Locker Manufacturing
		332439	Other Metal Container Manufacturing
		332999	All Other Miscellaneous Fabricated Metal Product Manufacturing
3645	Residential Electric Lighting Fixtures	335121	Residential Electric Lighting Fixture Manufacturing
3646	Commercial, Industrial, and Institutional Electric Lighting Fixtures	335122	Commercial, Industrial, and Institutional Electric Lighting Fixture Manufacturing

TABLE 3. SIC CODES AND CORRESPONDING NAICS CODES (cont.)

1987 SIC Code	1987 U.S. SIC Description	1997 NAICS Code	1997 NAICS Description
3821	Laboratory Apparatus and Furniture	339111	Laboratory Apparatus and Furniture Manufacturing
3843	Dental Equipment and Supplies	339114	Dental Equipment and Supplies Manufacturing
3999	Manufacturing Industries, Not Elsewhere Classified	337127	Institutional Furniture Manufacturing
		335121	Residential Electric Lighting Fixture Manufacturing
		326199	All Other Plastic Product Manufacturing
		339999	All Other Miscellaneous Manufacturing
7641	Reupholstery and Furniture Repair	81142	Reupholstery and Furniture Repair

APPENDIX B
CONVERSION FACTORS FOR METRIC UNITS

CONVERSION FACTORS FOR METRIC UNITS

In keeping with U.S. Environmental Protection Agency policy, metric units should be used in your response. These units may be converted to common English units by using the following conversion factors:

<u>Metric Unit</u>	<u>Metric Name</u>	<u>Equivalent English Unit</u>
1 m	meter	3.2808 ft (feet)
2.54 cm	centimeter	1 in. (inch)
0.0283 m ³	cubic meter	1 ft ³ (cubic foot)
liter	liter	0.0353 ft ³
dscm	dry standard cubic meter	35.31 dry standard ft ³
scmm	standard cubic meters per minute	35.31 ft ³ /min
kg	kilogram (10 ³ grams)	2.2046 lb (pound)
Mg	megagram (10 ⁶ grams)	2,204.6 lb
metric ton	metric ton (10 ⁶ grams)	2,204.6 lb
1 m ³	cubic meter	264.17 gallons
3.785 liters	liters	1 gallon
1.054 kJ	kilojoule	1 Btu (British Thermal Unit)
1.054 X 10 ⁶ kJ	kilojoule	MMBtu
3514 J/s	Joules per second	1 ton (or 12,000 Btu/hr)
16.02 kg/m ³	kilograms per cubic meter	1 lb/ft ³ (pounds/cubic foot)

T (F) = temperature in degrees Fahrenheit

T (C) = temperature in degrees Celsius or degrees Centigrade

Temperature in degrees Celsius (C) can be converted to temperature in degrees Fahrenheit (F) by the following formula:

$$T (F) = 1.8 T (C) + 32$$

Temperature in degrees Fahrenheit (F) can be converted to temperature in degrees Celsius (C) by the following formula:

$$T (C) = [T (F) - 32]/1.8$$

APPENDIX C

LIST OF HAZARDOUS AIR POLLUTANTS

List of Hazardous Air Pollutants

CAS No.	Chemical Name	CAS No.	Chemical Name
75070	Acetaldehyde	132649	Dibenzofurans
60355	Acetamide	96128	1,2-Dibromo-3-chloropropane
75058	Acetonitrile	84742	Dibutylphthalate
98862	Acetophenone	106467	1,4-Dichlorobenzene(p)
53963	2-Acetylaminofluorine	91941	3,3-Dichlorobenzidene
107028	Acrolein	111444	Dichloroethyl ether (Bis(2-chloroethyl ether))
79061	Acrylamide	542756	1,3-Dichloropropene
79107	Acrylic acid	62737	Dichlorvos
107131	Acrylonitrile	111422	Diethanolamine
107051	Allyl chloride	121697	N,N-Diethyl aniline (N,N-Dimethylaniline)
92671	4-Aminobiphenyl	64675	Diethyl sulfite
62533	Aniline	119904	3,3-Dimethoxybenzidine
90040	o-Anisidine	60117	Dimethyl aminoazobenzene
1332214	Asbestos	119937	3,3'-Dimethyl benzidine
71432	Benzene (including benzene from gasoline)	79447	Dimethyl carbamoyl chloride
92875	Benzidine	68122	Dimethyl formamide
98077	Benzotrichloride (isomers and mixtures)	131113	Dimethyl phthalate
100447	Benzyl chloride	77781	Dimethyl sulfate
92524	Biphenyl	534521	4,6-Dinitro-o-cresol, and salts
117817	Bis(2-ethylhexyl)phthalate(DEHP)	51285	2,4-Dinitrophenol
542881	Bis(chloromethyl)ether	121142	2,4-Dinitrotoluene
75252	Bromoform	123911	1,4-Dioxane (1,4-Diethyleneoxide)
106990	1,3-Butadiene	122667	1,2-Diphenylhydrazine
156627	Calcium cyanamide	106898	Epichlorohydrin (1-Chloro-2,3-epoxypropane)
133062	Captan	106887	1,2-Epoxybutane
63252	Carbaryl	140885	Ethyl acrylate
75150	Carbon disulfide	100414	Ethyl benzene
56235	Carbon tetrachloride	51796	Ethyl carbamate (Urethane)
43581	Carbonyl sulfide	75003	Ethyl chloride (Chloroethane)
120809	Catechol	106934	Ethylene dibromide (Dibromoethane)
133904	Chloramben	107062	Ethylene dichloride (1,1-Dichloroethane)
57749	Chlordane	107211	Ethylene glycol
7782505	Chlorine	151564	Ethylene imine (Aziridine)
79118	Chloroacetic acid	75218	Ethylene oxide
532274	2-Chloroacetophenone	96457	Ethylene thiourea
108907	Chlorobenzene	75343	Ethylene dichloride (1,1-Dichloroethane)
510156	Chlorobenzilate	50000	Formaldehyde
67663	Chloroform	76448	Heptachlor
107302	Chloromethyl methyl ether	118741	Hexachlorobenzene
126998	Chloroprene	87683	Hexachlorobutadiene
1319773	Cresols/Cresylic acid	77474	Hexachlorocyclopentadiene
95487	o-Cresol	67721	Hexachloroethane
108394	m-Cresol	822060	Hexamethylene-1,6-diisocyanate
106445	p-Cresol	680319	Hexamethylphosphoramide
98828	Cumene	110543	Hexane
94757	2,4-D, salts and esters	302012	Hydrazine
3547044	DDE	7647010	Hydrochloric acid
57147	1,1-Dimethyl hydrazine	7664393	Hydrogen fluoride (Hydrofluoric acid)
334883	Diazomethane	123319	Hydroquinone

CAS No.	Chemical Name	CAS No.	Chemical Name
78591	Isophorone	1336363	Polychlorinated biphenyls (Aroclors)
58899	Lindane (all isomers)	1120714	1,3-Propane sultone
108316	Maleic anhydride	57578	beta-Propiolactone
67561	Methanol	123386	Propionaldehyde
72435	Methoxychlor	114261	Propoxur (Baygon)
74839	Methyl bromide (Bromomethane)	78875	Propylene dichloride (1,2-Dichloropropane)
74873	Methyl chloride (Chloromethane)	75569	Propylene oxide
71556	Methyl chloroform (1,1,1-Trichloroethane)	75558	1,2-Propylenimine (2-Methyl aziridine)
78933	Methyl ethyl ketone (2-Butanone)	91225	Quinoline
60344	Methyl hydrazine	106514	Quinone
74884	Methyl iodide (Iodomethane)	100425	Styrene
108101	Methyl isobutyl ketone (Hexone)	96093	Styrene oxide
624839	Methyl isocyanate	1746016	2,3,7,8-Tetrachlorodi-benzo-p-dioxin
80626	Methyl methacrylate	79345	1,1,2,2-Tetrachloro-ethane
1634044	Methyl tert butyl ether	127184	Tetrachloroethylene (Perchloroethylene)
101144	4,4-Methylene bis(2-chloroaniline)	7550450	Titanium tetrachloride
75092	Methylene chloride (Dichloromethane)	108883	Toluene
101688	Methylene diphenyl diisocyanate (MDI)	95807	2,4-Toluene diamine
101779	4,4'-Methylenedianiline	584849	2,4-Toluene diisocyanate
91203	Naphthalene	95534	o-Toluidine
98953	Nitrobenzene	8001352	Toxaphene (chlorinated camphene)
92933	4-Nitrobiphenyl	120821	1,2,4-Trichlorobenzene
100027	4-Nitrophenol	79005	1,1,2-Trichloroethane
79469	2-Nitropropane	79016	Trichloroethylene
684935	N-Nitroso-N-methylurea	95954	2,4,5-Trichlorophenol
62759	N-Nitrosodimethylamine	88062	2,4,6-Trichlorophenol
59892	N-Nitrosomorpholine	121448	Triethylamine
56382	Parathion	1582098	Trifluralin
82688	Pentachloronitrobenzene (Quintobenzene)	540841	2,2,4-Trimethylpentane
87865	Pentachlorophenol	108054	Vinyl acetate
108952	Phenol	593602	Vinyl bromide
106503	p-Phenylenediamine	75014	Vinyl chloride
75445	Phosgene	75354	Vinylidene chloride (1,1-Dichloroethylene)
7803512	Phosphine	1330207	Xylenes (isomers and mixtures)
7723140	Phosphorus	95476	o-Xylenes
85449	Phthalic anhydride	108383	m-Xylenes
		106423	p-Xylenes

CAS No.	Chemical Name
0	Antimony Compounds
0	Arsenic Compounds (inorganic including arsine)
0	Beryllium Compounds
0	Cadmium Compounds
0	Chromium Compounds
0	Cobalt Compounds
0	Coke Oven Emissions
0	Cyanide Compounds ^a
0	Glycol Ethers ^b
0	Lead Compounds
0	Manganese Compounds
0	Mercury Compounds
0	Fine mineral fibers ^c
0	Nickel Compounds
0	Polycyclic Organic Matter ^d
0	Radionuclides (including radon) ^e
0	Selenium Compounds

NOTE: For all listings above which contain the word “compounds” and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical’s infrastructure.

^a X'CN where X = H' or any other group where a formal dissociation may occur. For example KCN or Ca(CN)₂.

^b Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol

R-(OCH₂CH₂)_n-OR' where

n = 1, 2, or 3

R = alkyl or aryl groups

R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH₂CH)_n-

OH

Polymers are excluded from the glycol category

^c Includes glass microfibers, glass wool fibers, rock wool fibers, and slag wool fibers, each characterized as “respirable” (fiber diameter less than 3.5 micrometers) and possessing an aspect ratio (fiber length divided by fiber diameter) greater than or equal to 3, as emitted from production of fiber and fiber products.

^d Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.

^e A type of atom which spontaneously undergoes radioactive decay.