Friday
October 29, 1982

Part X

Environmental Protection Agency

Standards of Performance for New Stationary Sources; Surface Coating of Metal Furniture

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-2053-7]

Standards of Performance for New Stationary Sources; Surface Coating of Metal Furniture

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Standards of performance for surface coating of metal furniture were proposed in the **Federal Register** on November 28, 1980 (45 FR 79390). This action promulgates standards of performance for surface coating of metal furniture. These standards implement Section 111 of the Clean Air Act and are based on the Administrator's determination that metal furniture surface coating facilities cause, or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. The intended effect of these standards is to require all new, modified, and reconstructed metal furniture surface coating facilities to control emissions to the level achievable through use of the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

EFFECTIVE DATE: October 29, 1982.

Under Section 307(b)(1) of the Clean Air Act, judicial review of this new source performance standard (NSPS) is available *only* by the filing of a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

ADDRESS: *Background Information Document.* The background information document (BID) for the promulgated standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Surface Coating of Metal Furniture—Background Information for Promulgated Standards" (EPA-450/3-80-007b). The BID contains (1) a summary of all the public comments made on the proposed standards and the Administrator's response to the comments, (2) a summary of the changes made to the standards since proposal, and (3) the final environmental impact statement which summarizes the impacts of the standards.

Docket. A docket, number A-79-47, containing information considered by EPA in development of the promulgated standards, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section (A-130), West Tower Lobby, Gallery 1, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Gene W. Smith, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5624.

SUPPLEMENTARY INFORMATION: OMB control number: (2000-0649).

The Standards

Standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> * * * application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated [Section 111(a)(1)].

For convenience, this will be referred to as "best demonstrated technology" or "BDT."

The promulgated standards apply to new, modified, or reconstructed metal furniture surface coating operations for which construction was commenced after November 28, 1980. Existing facilities are not subject to the regulation unless modified or reconstructed as defined in 40 CFR 60.14 or 60.15. The promulgated standards will limit emissions of volatile organic compounds (VOC) from each metal furniture surface coating operation consisting of application station(s), flash-off area, and curing oven. A metal furniture surface coating operation may be either a prime coat or topcoat operation within a metal furniture plant where metal furniture parts or products are being coated with organic coatings. Powder coatings, however, are excluded from the definition of organic coatings. Emissions of VOC from each affected facility will be limited to a monthly average of 0.90 kilogram of VOC per liter of coating solids applied. The Agency has identified as the best demonstrated technology the use of either high solids coatings, waterborne coatings, or powder coatings (with the appropriate application equipment). The emission limit is based on the use of 62 percent by volume solids coating applied at 60 percent transfer efficiency and an assumed solvent density of 0.88 kilogram per liter. Compliance could also be achieved with add-on control devices, a combination of add-on control devices and a low organic solvent coating, or any combination of coating and transfer efficiency that limits emissions to 0.90 kilogram of VOC per liter of coating solids applied.

Following the initial 1 month performance test, the owner or operator must calculate and record the VOC emissions from each affected facility for each calendar month. Each monthly calculation is considered a performance test. The information necessary to perform the monthly calculation can be obtained from company records and data supplied by the manufacturer of the coating or by an analysis of the coating by Reference Method 24. Equations and transfer efficiencies for calculating the emissions for each affected facility are provided in the standards. Reference Methods 1, 2, 3, 4, and 25 will be used to determine the percentage reduction of VOC emissions achieved through the use of a capture system and control device.

Recordkeeping requirements include those data necessary to substantiate the monthly calculations of emissions. These data must be retained at the source for a period of 2 years. The regulation contains no reporting requirements in addition to those required by the General Provisions to 40 CFR Part 60 relative to the initial performance test.

Summary of Environmental, Energy, And Economic Impacts

The metal furniture industry is composed of approximately 1,400 plants, many of which have multiple surface coating operations. The EPA estimates that the promulgated standards will affect 800 new and 1,200 modified or reconstructed sources within the first 5 years after the standard is effective. The typical "uncontrolled" metal furniture manufacturer applies paint that contains about 35 percent by volume solids. In contrast, a control techniques guideline (CTG) document, entitled "Control of Volatile Organic Emissions from Existing Stationary Sources, Volume III: Surface Coating of Metal Furniture" (EPA-450/2-77-032) which defines reasonably available control technology (RACT), recommends that a 60 percent by volume solids coating be adopted by States into their State implementation plans (SIP's). The same metal furniture manufacturer applying a CTG complying

coating would emit about 60 percent less VOC compared to the uncontrolled coating. It is estimated that this CTG recommendation could reduce emissions of VOC from about 49.8 megagrams per year to about 19.4 megagrams per year. The promulgated standards would reduce VOC emissions to about 18.0 megagrams per year for the typical plant (assuming two affected facilities per plant) which is an additional 7 percent emission reduction below the CTG recommendation. This represents an industrywide annual reduction in the fifth year of 1,400 megagrams per year.

Standards of performance have other benefits in addition to achieving reductions in emissions beyond those required by a typical SIP. They establish a degree of national uniformity, which precludes situations in which some States my attract new industries as a result of having relaxed air pollution standards relative to other States. Further, standards of performance provide documentation which reduces uncertainty in case-by-case determinations of best available control technology (BACT) for facilities located in attainment areas, and lowest achievable emission rates (LAER) for facilities located in nonattainment areas. This documentation includes identification and comprehensive analysis of alternative emission control technologies, development of associated costs, an evaluation and verification of applicable emission test methods, and identification of specific emission limits achievable with alternate technologies. The costs are provided in an economic analysis that reveals the affordability of controls in an unbiased study of the economic impact controls on an industry.

The rulemaking process that implements a performance standard assures adequate technical review and promotes participation of representatives of the industry being considered for regulation, government and the public affected by that industry's emission.

The impact of the promulgated standards on water pullution would depend on the control option selected. For example, water use in spray booths would be unnecessary when powder coatings are used. Therefore, there would be a decrease in wastewater discharged when the promulgated standards are met by employing powder coatings. Wastewater discharges could be expected not to increase for plants which utilize higher solids and waterborne coatings. The quality of wastewater discharged is expected to remain the same for plants that apply higher solids coatings when compared to that from plants that employ solvent-borne coatings. However, the quality of wastewater discharged from plants applying waterborne coatings could be reduced because these coatings contain water-miscible solvents. Finally, where incineration is used, the water pollution impact would depend on the type of coating used.

The impact on solid waste generation also depends on the control option selected. Powder coatings are generally recycled so that there is little waste. Higher solids and waterborne coatings produce about the same amount of solid waste as solvent-borne coatings. The use of an incinerator on a bake oven would have no effect on the amount of solid waste generated from the types of coatings applied.

For a typical metal furniture manufacturer complying with the recommended CTG, energy requirements would vary depending upon which control option is employed to meet the promulgated standards. Energy consumption would decrease by about 20 percent (15 gigajoules) if powder coatings were used. Energy consumption would increase, however, with the use of waterborne coatings or with incineration plus a CTG coating by about 3 percent (2.3 gigajoules) and 7 percent (5.2 gigajoules), respectively.

The economic impact summary presented in this section is based on the total anticipated costs of constructing and operating a new coating facility. Many of the control options considered involve a redesigning of the coating facility rather than simply adding equipment to an existing design. Usually powder coatings and waterborne coatings, for example, could not be applied in a facility equipped to use a solvent-based coating. For this reason, the capital and annualized costs represent a comparison of the total cost of each type of controlled facility rather than an incremental difference in the cost of each type of facility.

For a new typical spray coating plant with two coating lines, the initial capital and annualized costs do not vary significantly regardless of which control option would be employed to comply with the promulgated standards. Capital costs for each of the different control options are expected to range from about $960,000 (higher solids coatings) to about $1,200,000 (waterborne coatings). The capital cost for a typical CTG coating facility or a typical uncontrolled coating facility would be about $960,000. The annualized costs for the different control options would range from about $600,000 to $700,000. These annualized costs would be comparable to the annualized costs for a typical CTG coating facility ($620,000) and a typical uncontrolled facility ($630,000).

Total annualized costs (savings) vary depending upon which control option would be employed to comply with the promulgated standards for all new, modified, and reconstructed spray coating plants (e.g., large, medium, and small sizes). For these facilities the fifth year industrywide annualized costs, if all affected facilities used a combination of incineration and waterborne coatings, would be about $17 million. An industrywide savings of $18 million would result in the fifth year if high solids coatings were used by all affected facilities. The total industrywide annualized costs for powder coatings could vary from a savings of $2 million to a cost of $126 million depending upon achieved coating thickness and other factors. In the proposal preamble an industrywide annualized fifth-year cost of $11 million was projected. This projection was based on the assumption that higher solids coatings, powder ccatings, and a combination of incineration and waterborne coatings would each be used by one-third of the affected spray coating facilities. It is estimated at this time, however, that 80 percent of the affected spray coating facilities will use higher solids coatings, 10 percent will use powder coatings, and 10 percent will use a combination of incineration and waterborne coatings. Based on this distribution, there is a potential for industrywide annualized savings of $13.9 million in the fifth year after the standard is in effect. These costs (savings) do not include lost opportunity costs (i.e., the profit or return on investment which could be derived by investing in other than air pollution control equipment).

The economic impacts of the promulgated standards were evaluated based upon reduced profitability, inflationary impact, and expected price increases. The highest profit impairment is expected for small metal furniture manufacturers (4,000 liters of coatings consumed annually) regardless of control option. The maximum impact could result in about a 1.3 percent increase in the wholesale price of a metal furniture product from the small manufacturer.

The environmental, energy, and economic impacts are discussed in greater detail in the background information document for the proposed standards, "Surface Coating of Metal Furniture—Background Information for Proposed Standards" (EPA–450/3–80–007a).

Public Participation

Prior to proposal of the standards, interested parties were advised by public notice in the **Federal Register** March 17, 1978, and February 11, 1980) of the meetings of the National Air Pollution Control Techniques Advisory Committee (NAPCTAC) to discuss the surface coating of metal furniture standard recommended for proposal. The first meeting was held on April 5–6, 1978, and an updated NAPCTAC presentation was given on February 27, 1980. The meeting was open to the public and each attendee was given an opportunity to comment on the standards recommended for proposal. The standards were proposed and published in the **Federal Register** on November 28, 1980 (45 FR 79390). The preamble to the proposed standards discussed the availability of the background information document (BID), "Surface Coating of Metal Furniture—Background Information for Proposed Standards" (EPA–450/3–80–007a), which described in detail the regulatory alternatives considered and the impacts of those alternatives. Public comments were solicited at the time of proposal and, when requested, copies of the BID were distributed to interested parties. To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed standards, a public hearing was held on January 9, 1981, at Research Triangle Park, North Carolina. The hearing was open to the public and each attendee was given an opportunity to comment on the proposed standards. The public comment period was from January 9, 1981 to March 10, 1981.

Ten comment letters were received, and four interested parties testified at the public hearing concerning issues relative to the proposed standards of performance for the surface coating of metal furniture. The comments have been carefully considered and, where determined to be appropriate by the Administrator, changes have been made in the proposed standards.

Significant Comments and Changes to the Proposed Standards

Comments on the proposed standards were received from industry, trade associations, and one State air pollution control agency. A detailed discussion of these comments and responses can be found in the BID for the promulgated standards, which is referred to in the **ADDRESSES** section of this preamble. The summary of comments and responses in the BID serve as the basis for the revisions which have been made to the standards between proposal and promulgation. The major comments and responses are summarized in this preamble. Most of the comment letters contained multiple comments. The comments have been divided into the following areas: General, Emission Control Technology, Modification and Reconstruction, Economic Impact, Environmental Impact, Energy Impact, and Reporting and Recordkeeping.

General

Several commenters requested a change in the definition of the affected facility to include all finishing systems within a manufacturing plant or the finishing system necessary to provide a finished product. This would allow a plant to average its topcoat emissions with the much lower emissions from an electrocoat system. One commenter requested that the NSPS allow the option of a plantwide emission reduction plan, particularly as it relates to application of the bubble concept for new and/or modified sources at a given plant.

The choice of the affected facility for this standard (each surface coating operation which includes the application station(s), flash-off area, and bake oven) is based on EPA's interpretation of Section 111 of the Clean Air Act and judicial construction of its meeting. In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards in the particular industrial context involved. EPA must do this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower definition results in bringing replacement equipment under NSPS sooner; if, for example, an entire plant were designated as the affected facility, no part of the plant would be covered by the standard unless the plant as a whole is "modified." If, on the other hand, each piece of equipment is designated as the affected facility, then as each piece is replaced, the replacement piece will be a new source subject to the standard. Since the purpose of Section 111 is to minimize emissions by the application of the best demonstrated control technology (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, there is a presumption that a narrower designation of the affected facility is proper. This ensures that new emission sources within plants will be brought under the coverage of the standards as they are installed. This presumption can be overcome, however, if the Agency concludes that the relevant statutory factors (technical feasibility, cost, energy, and other environmental impacts) point to a broader definition. Since it is technologically feasible to control each surface coating operation and such control would not be exorbitantly costly (as shown in the economic analysis section of the BID accompanying the proposed standards), selecting this narrowest definition of affected facility is most consistent with the purposes of Section 111.

Two other possible definitions of the affected facility for this standard are: all prime coat (or topcoat) operations in a product line and all prime coat (or topcoat) operations within an assembly plant. The product line definition would have reduced the number of affected facilities and would have permitted tradeoffs between different coatings and application technologies. Likewise, defining all prime coating (or topcoating) operations within a plant as the affected facility would have reduced the number of affected facilities and consequently the associated recordkeeping and compliance calculations. However, such a definition would not necessarily result in either the use of the best technology or the minimizing of emissions from new sources.

For these reasons, the Agency has chosen each surface coating operation as the affected facility.

One commenter stated that the metal furniture industry should not be considered as a "significant source of VOC emissions." He pointed out that EPA listed the industry as a minor source of VOC's according to the impact it would have on public health and also that EPA estimates VOC emissions from the industry at 5 percent of the Nation's VOC emissions.

Standards of performance are promulgated under Section 111 of the Clean Air Act. Section 111(b)(1)(A) requires that the Administrator establish standards of performance for categories of new, modified, or reconstructed stationary sources which in her judgment cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. One important purpose of standards of performance is to prevent new air pollution problems from developing by requiring the application of the best technological system of continuous emission reduction which the Administrator determines to be adequately demonstrated. The 1977 Amendments to the Clean Air Act added the words, "in the Administrator's judgment," and the words, "may reasonably be

anticipated," to the statutory test. The legislative history for these changes stresses two points: (1) The Act is preventive, and regulatory action should be taken to prevent harm before it occurs; and (2) the Administrator should consider the role of each single class of sources in contributing to the comulative impact of VOC emissions from all sources.

The 1977 Amendments to the Clean Air Act also required that the Administrator promulgate a priority list of source categories for which standards of performance are to be promulgated. A list for new source performance standards was promulgated at 44 FR 49222 (August 21, 1979). Priority ranking was based on consideration of the source's quantity of emission, the extent to which each pollutant endangers public health and welfare, and the mobility and competitive nature of the source category. The statutory test for listing a category of sources was that it "causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare."

As stated in the preamble for the proposed standards, the surface coating of metal furniture is listed as a minor source category on this listing. This classification as a minor source is due primarily to the fact that individual metal furniture surface coating plants typically emit less than 100 tons of VOC per year. However, the priority list states that "the metal furniture coating industry is also a significant source of VOC emissions, and there are over 300 existing facilities with the potential to emit more than 100 tons per year."

There are approximately 1,400 metal furniture manufacturing establishments in the United States which paint their products. These metal furniture manufactures are located throughout the country and are generally situated in highly populated urban areas. In fact, 70 percent of the industry is concentrated in nine highly populated States.

The metal furniture industry emits about 95.5 gigagrams (1975 data) of VOC per year. The emissions of VOC result from usage of solvent-based coatings by the industry. These coatings contain organic solvent mixtures of aromatics, saturated and unsaturated aliphatics, alcohols, ketones, esters, and ethers. The emissions of these organic solvents contribute to ozone formation in urban atmospheres. EPA has established a national ambient air quality standard (NAAQS) for ozone of 0.12 microgram per cubic meter which is currently exceeded in those States where metal furniture manufacturing establishments are concentrated. Information concerning health and welfare effects associated with ozone can be found in "Air Quality Criteria for Ozone and Other Photochemical Oxidants" (EPA-600/8-78-004).

The Administrator is called upon in the Clean Air Act to evaluate an industry's contribution to air pollution and make a determination as to the significance of the subject industry's emission contribution. In the case of the metal furniture surface coating industry, the Administrator has determined that even though the total amount of emissions from a single plant (like that from many sources which contribute to the inventory of VOC emissions) is by itself a small portion of the Nation's total VOC emissions, this industry would contribute significantly to the Nation's total VOC emissions.

In addition, the metal furniture industry is projected to have an annual growth rate of 4 percent through 1985 and will include about 2,000 new, modified, or reconstructed affected facilities by 1985. Based on this growth, the industry will contribute increasing amounts of VOC to urban atmospheres.

Therefore, industrial surface coating of metal furniture was listed as a "significant contributor". This selection was based upon the number of affected facilities, coating method, the yearly VOC emission rate, the growth rate of the industry, and the location of this industry in or near highly populated urban areas.

One commenter requested that the effective date of the standard be the promulgation date rather than the proposal date.

Section 111(a)(2) of the Clean Air Act states, "The term 'new source' means any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source." Therefore, the statute requires that the applicability date for a new or revised standard be the date of the proposal.

One commenter stated that coatings manufacturers and users have the right to demand the same treatment as other citizens who continue to use pounds and gallons instead of metric equivalents.

It is EPA's policy to use metric units, not English units, in regulations and technical documents. This policy is in conformance with Section 3 of Public Law 94-168, the Metric Conversion Act of 1975, which states that the policy of the United States shall be to coordinate and plan the increasing use of the metric system. Therefore, EPA is now in the process of incorporating the International System of Units (SI) into all of its regulations. EPA is currently using as the basic reference a publication entitled "Standard for Metric Practice" (E 380-76) published by the American Society for Testing and Materials (ASTM). This publication explains the SI units and symbols, their application, and rules for conversion and rounding. It may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103. This document is useful in explaining the abbreviations of units of measurement cited in EPA regulations.

Emission Control Technology

Two commenters objected to statements in the preamble that 68 percent by volume solids coatings are demonstrated in this industry and are readily available for use. They contend that such coatings are not currently being applied by hand-held electrostatic spray equipment and are not available for use by the industry. According to one commenter, stricter regulations on the industry are not justified by the state of the art of the control technology, the situation with the economy, and the high cost of borrowing money. Another commenter stated that EPA is forcing technological changes too rapidly upon an industry at a time when efforts should be going into making coatings more cost effective and energy efficient. Another commenter stated that the high viscosity of coatings with greater than 60 percent by volume solids creates problems in accomplishing rapid color changes and that atomization problems limit the types of spray equipment which can be used. According to one commenter, there is not enough technical basis given for setting the standards at the 68 percent volume solids level. He stated that the proposed control level was apparently derived by merely reducing the CTG emission limit by 30 percent. Another commenter stated that he viewed the proposed emission limit as "an arbitrary level of suspect origin."

The proposed standard was based on an analysis of four alternative levels of controls as described in the preamble. Information obtained during the analysis led to the determination that 68 percent by volume solids coatings were being produced by some coating manufacturers and had been successfully applied in production tests. Therefore, the use of a 68 percent by volume solids coating was selected as the basis for the proposed standards. As a result of the comments concerning the availability and applicability of coatings

with a 68 percent volume solids content, EPA conducted a survey of several coatings manufacturers and users. The results of this survey (see Docket item IV–B–8) indicate that although much laboratory work and some production testing have been done with 68 percent volume solids coatings, there are some problems which must be overcome before these coatings can be considered as the best demonstrated technology. The single most difficult problem appears to be the increase in viscosity of the coating as the solids content approaches 68 percent by volume. Increased viscosity requires more energy for manufacturing, and increases agitation requirements during storing, pumping, and atomization of the coatings. Improper atomization of the coatings by the spray equipment also causes problems with the finish obtained on the metal surface.

Survey results showed that advances are currently being made in the field of higher solids coatings. Several coating manufacturers claim to have coatings, available in a wide range of colors, which can be appied by existing spray equipment and have percent solids contents in the low 60's. Some manufacturers explained that since the States are generally adopting the CTG document recommended emission level based on 60 percent by volume solids, all their efforts have gone toward achieving this level. At this volume solids level, the problems with viscosity can be overcome by increased use of in-line heating and slightly larger recirculation pumps.

Most spray equipment manufacturers contacted during the survey indicated that atomization and application of coatings with a percent solids content above 60 has been demonstrated in production tests. Some of the manufacturers recommended the use of in-line heaters in order to maintain a constant material temperature and indicated that these heaters would not be difficult to install. Several of the equipment manufacturers have stated that much of the problem encountered when applying higher solids coatings is directly related to the operator rather than the equipment. Accordingly to these contacts, the difficulties in obtaining proper film thickness is a result of solids being delivered to the nozzle at a greater rate than operators are accustomed to. This creates a situation in which the operator is using his normal application pattern and is applying more solids to the target than is necessary, resulting in excessive film thickness. The equipment suppliers indicate that this problem can be overcome by proper operator training and more careful control of material flow rates.

Several representatives of the metal furniture industry were contacted during the survey. Most of those contacted have experimented with higher solids coatings in order to achieve the emission limits required by State implementation plans (SIP's). Results of these trials have been mixed, with some plants experiencing viscosity, atomization, and excessive film thickness problems when attempting to apply higher solids coatings with existing coating lines. However, through the use of techniques such as in-line heating, larger diameter piping, reduced material flow rates, and improved operator training, many companies have successfully applied coatings which will comply with the SIP's. Due to the rapid increase in the viscosity of coatings as the solids content increases, these techniques are much less efficient and less cost effective at 68 percent by volume solids level than at 62 percent by volume solids. Three plants are currently using coatings with a least 62 percent by volume solids contents. These three plants are considered typical of the industry; two are manufacturers of office furniture and the other manufactures shelving and store fixtures. This represents a wide range of coating uses and specifications since the appearance of office furniture is very critical and the durability of shelving is important. In-line heating is used to aid in viscosity control at one of the plants, and a wide variety of hand-held and automatic spray equipment is used at these plants. A wide range of colors are applied at these plants and the surface on the product is considered acceptable.

One commenter pointed out that most coatings suppliers are currently offering higher volume solids systems that are basically versions of the old lower volume solids systems. The main limitation of this approach is viscosity, i.e., as the volume solids increases, the viscosity increases. The short-term solution which coating manufacturers are using to solve viscosity problems can cause problems with the quality of the finish on the product. Molecular weight reduction of solvents and coatings also decreases covering.

One of the commenters stated that hand-held electrostatic spray guns are widely used in the metal furniture industry due to the complexity of the metal furniture configuration and the mix of parts. There is some touch-up required for hard-to-reach areas where this type of equipment is necessary. However, hand-held electrostatic spray guns are limited in their ability to atomize 68 percent by volume solids coatings because of their greater viscosity. Therefore, there would be a problem achieving the desired quality of finish.

Another commenter claimed that due to finish specifications for certain types of metal furniture (for example, matching the color and texture of products that were produced during different time periods), automatic electrostatic spray equipment must be used. However, he stated that he has not been able to spray coatings with higher than 60 percent volume solids with this equipment due to the viscosity of these coatings.

One commenter stated that equipment is not available which will spray high solids coatings with their increased viscosity and still maintain the proper film thickness and texture without excessive overspray. Another stated that automatic electrostatic equipment is required to produce a consistent film thickness and that a great deal of manual touch-up is required when the solids content of the coatings is increased.

When the volume solids content of a coating increases, the viscosity also increases. It has been confirmed by several coating manufacturers and users that the higher solids coatings which comply with the proposed standard cause significant problems due to their higher viscosity.

However, the standard is being revised to a level which can be met by available coatings which are acceptable in terms of viscosity and coverage capacity. The emission limit is now based on the use of a coating with 62 percent volume solids content. Hand-held electrostatic spray guns capable of atomizing and applying 62 percent by volume solids coatings are currently being marketed by several well-known manufacturers of spray equipment. Five of the six spray equipment manufacturers recently contacted stated they have equipment available which can satisfactorily apply 62 percent volume solids coatings. Most manufacturers have indicated that automatic electrostatic spray equipment is the most proven method of applying high solids coatings. Three manufacturers contacted recently indicated that they are successfully applying coatings with greater than 60 percent by volume solids contents. The film thickness and touch-up requirement problems are solved, according to the equipment manufacturers, by proper training of operators and more exact process controls. Based on this

information, it is EPA's judgment that hand-held and automatic electrostatic spray equipment can satisfactorily apply 62 percent volume solids coatings.

Some coatings with 68 percent by volume solids are available, but their use is limited to certain products and application with specific equipment which may not be feasible in certain situations. Therefore, EPA is revising the emission limit from 0.7 to 0.9 kilogram of VOC per liter of applied solids. This level is based on the use of a coating with 62 percent by volume solids, a solvent density of 0.88 kilogram per liter, and a transfer efficiency of 60 percent.

According to one commenter, the basic problem with alternative coating systems such as waterbased coatings, powder, electrodeposition, dip and flow coatings (which EPA interprets to mean those systems which would meet the standard) is the difficulty in obtaining color/texture matching with products painted by conventional sprays. Another commenter stated that the alternative coating systems are not applicable for a wide range of uses within the industry, thus limiting the choices of control options available to some segments of the industry.

The Agency has identified as the best demonstrated technology the use of either high solids coatings, waterborne coatings, or powder coatings (with appropriate application equipment). The standard is achievable through the use of these methods; and as a result, the industry has a choice among several methods capable of meeting the standard. For example, a coater desiring a thick film with high durability might choose powder coating for a product. Two coats of a high solids coating, however, might also accomplish the desired results. Powder or EDP might be a coater's choice if only one or two colors are required. Furthermore, even though EPA's economic analysis has shown that waterbased coatings are likely to be the most expensive option for controlling VOC emissions, some metal furniture manufacturers have chosen to use them. Clearly, in an industry which produces such a wide variety of products as the metal furniture industry, there are always a few situations where, due to product specifications, the number of alternative control methods will be limited. Electrodeposition cannot be used on non-conductive materials, for example, and waterbased coatings require extra precaution against corrosion. Products requiring a metallic finish could not be coated with powder coatings. Nevertheless, there is always at least one coating method that can meet the standards and the color/texture requirements of the industry. The Agency has determined, based on the analysis of the most costly method of control, that when only one method applies, the cost of using that method is reasonable.

Several commenters made statements concerning the use of the table of assigned transfer efficiencies in the regulation. One commenter suggested that a production line testing program be used to determine the proper efficiencies and that EPA clarify whether the table values were intended for equipment manufacturers or users. Another commenter stated that the assigned values seemed unrealistic to be used as universal standards. He also stated that if transfer efficiencies are to be assigned, however, then all known application methods should be included in order to avoid the time-consuming process of obtaining approval to use alternative equipment. In his comment, he noted that the continuous coater method and the liquid seal process were not mentioned.

One commenter presented a very detailed alternative to the use of the existing table of transfer efficiencies. He stated that the generic classifications of equipment now in the regulation is very poorly defined and explained that actual transfer efficiency is dependent on many factors such as equipment configuration, operating conditions, the part being coated, the coating being applied, and the operator. He recommended that the variables in design and operation of equipment be considered by defining such parameters as voltage, atomizing pressure, flow rates, etc., of each type of spray equipment. He also suggested that a standardized test method be adopted to determine transfer efficiency of equipment. Equipment could then be "certified" by the manufacturers, and a list of equipment ratings and operating conditions could be supplied to EPA for publication.

EPA believes that to reflect the best demonstrated technology for the metal furniture coating industry, emission limits for new sources must incorporate the use of both high solids coatings and relatively efficient application equipment, but must not at the same time deny industry flexibility to use different types of application equipment and different coatings. For this reason, the Agency has included the key transfer efficiency concept in these standards.

The commenters' claim that all the listed parameters affect transfer efficiency is correct. However, a universally acceptable test method for determining precise transfer efficiency under each conceivable set of variables has not yet been developed. This means that the Agency must either delete this crucial component of BDT or instead include in the standards assigned transfer efficiency values that correlate at least generally to the efficiencies of the application equipment used in the industry. EPA has chosen the latter course. The Agency has included values that are correlated to each piece of equipment and are sufficiently high to ensure that, regardless of coating properties and other relevant variables, each facility will be credited with at least the efficiency its equipment attains with the particular coatings it applies. These transfer efficiencies listed are based on data provided by spray equipment manufacturers and results of tests conducted during standard development. EPA contacted and visited several equipment and coatings manufacturers during the standard development process.

Moreover, the standards provide that if the operator can demonstrate to the satisfaction of the Administrator that other transfer efficiencies are appropriate (e.g., due to variables such as those cited in the comment), the Administrator will approve their use on a case-by-case basis. This provision ensures that a facility using equipment that achieves an efficiency greater than that asigned by the standard is fully credited for the efficiency achieved. The certification of spray equipment by manufacturers can be undertaken by the industries and trade associations without EPA involvement.

The preponderance of metal furniture coating application techniques is addressed in the table. In addition, the regulation contains provisions whereby alternative coating equipment may be approved. Transfer efficiency values for coating methods which are not specifically addressed in the table can be determined in a manner similar to the way the table was developed. Data can be obtained from the manufacturer of the equipment; testing procedures can be submitted; and, based on an analysis of the data, EPA will determine the efficiency to be used in the emission calculations. The Agency does not believe this process of obtaining the Administrator's approval to use alternative equipment would be unreasonably time consuming. Also, this approval need only be obtained once for any one application technique. The values in the transfer efficiency table will be reviewed in the future, and

techniques in general use at that time may be added to the table.

One commenter suggested that key operating parameters of spray equipment be monitored on a regular basis (monthly) to be sure they are within design specifications. He recommended this be done at the same time that monthly determination of VOC emission compliance occurs.

While EPA considers that the proper operation and maintenance of spray equipment should be a routine procedure, the variations in operating parameters are understood to be great. Subpart A of the General Provisions of 40 CFR Part 60, § 60.11(d) states that: "At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source." EPA believes that this general requirement, coupled with economic incentives such as reduced coating use, is sufficient to ensure that coatings users routinely check key operating parameters and maintain application equipment in good condition.

One commenter submitted information concerning the potential for cost effectiveness and performance of regenerative thermal oxidation systems. A system designed by the commenter is claimed to be capable of providing primary heat exchange efficiencies of 85 percent, 90 percent, and 95 percent in the thermal oxidation process. The high thermal energy recovery of this system allows operation in a self-sustaining mode on hydrocarbon concentrations from 3 to 5 percent of the lower explosive limit (LEL). Little or no additional fuel is required. This system virtually eliminates the following problem areas generally associated with incineration systems: (1) Fouling of heat transfer surfaces, (2) corrosion, (3) catalyst poisoning, (4) secondary emissions, and (5) high operating costs with low LEL gas streams. The commenter requested clarification of the potential of regenerative thermal oxidation systems in the documentation for the promulgated standard.

The analysis of incineration found in Chapter 3 of the proposal BID (EPA-450/3-80-007a) reveals that this option has a significantly greater capital investment and an increase in energy consumption, over other control options. Although the annual operating costs and energy use of a regenerative thermal oxidation system may be lower, the initial capital investment is large compared to that for low solvent coatings technology. The reduction in total organic solvent emissions realized by controlling the topcoat oven is small because only 20 to 30 percent of these emissions are concentrated in the oven. The remaining 70 to 80 percent of the emission are from fugitives from the application and flashoff areas. The small percentage of emissions available for reduction by incineration makes any incinerator difficult to justify on a cost basis when compared to low solvent coatings. Therefore, the Administrator does not believe that further clarification of the potential of regenerative thermal oxidation systems is necessary.

Modification and Reconstruction

Several commenters expressed concern that expenditures made to comply with a State implementation plan (SIP) could bring the facility under the NSPS as a reconstruction. They requested that this situation be avoided by exempting SIP-related expenditures from the reconstruction provisions included under the General Provisions of 40 CFR Part 60.

It is possible that when an existing facility is modified to meet a State requirement the capital costs incurred could be large enough to trigger the reconstruction provisions of the Federal regulations, thereby forcing compliance with the more restrictive Federal requirement. This was a valid issue at the time the standard was proposed with an emission limit that was considerably more restrictive than most State regulations. Since proposal, however, the recommended standard has been revised so that it is now based on the use of a coating only two percent higher in volume solids content than the coating recommended in the CTG document. Because the technologies required to comply with the two emission limits are similar and no additional equipment would be required to apply an NSPS complying coating versus a CTG complying coating, the commenters' situation is no longer considered to be an issue.

Economic Impact

One commenter stated that continued development of inflexible standards will impact the growth of the industry and result in loss of job opportunities. The commenter continued by saying that the cost to comply with the proposed standards will be much higher than projected. These increased costs are due to higher construction, operating, and energy costs. A comparison of cost and energy requirements for a plant built in 1977 versus a plant built in 1980 was submitted by the commenter.

It is definitely true that costs of construction, raw materials, labor, and energy have increased significantly since the economic analysis portion of the proposal BID was completed. Many of these costs, however, will not be any greater for a complying high solids coating system than for a conventional solvent coating system. If line heating, larger diameter recirculation lines, or more powerful agitation equipment is specified, there would be an increase in costs. However, these costs are considered to be reasonable. A recent Society of Manufacturing Engineers (SME) technical paper (FC81-237) reported that both operating and energy costs can actually be reduced by using high solids coatings rather than conventional solvent based coatings. The BID also indicates that a potential for savings in annualized costs exists with the use of higher solids coatings. This savings results from a decrease in the energy required to dry the coatings and lower labor and maintenance costs. Materials costs are also reduced because with higher solids coatings, even though the price per gallon may be higher, fewer gallons of coating are needed.

One commenter stated that the types of application equipment necessary to apply high solids coatings in order to meet the standards is exceedingly costly to the industry. Another commenter claimed that the electrostatic equipment is much more expensive than conventional spray equipment now being used.

The economic impacts discussed in the BID are based on the use of electrostatic equipment to apply higher solids coatings. Although electrostatic spray equipment is more expensive than conventional equipment, EPA believes its advantages outweigh the costs. The projected payback time for an average size plant purchasing electrostatic equipment in lieu of conventional equipment is less than one year. Most of the newer plants contacted during development of the standard were using electrostatic equipment (automatic and hand-held) because of the improved efficiency. Since the standard applies only to new sources and sources undergoing modification of reconstruction, it is anticipated that many affected facilities would use

electrostatic equipment even in the absence of the standard.

Energy Impact

A comment was received which stated that installation of incinerators on all spray booth stacks and oven vents to obtain compliance with the standards would be an expensive waste of energy due to the fuel which would be required to sustain combustion of the exhausted solvents.

Even though incineration is expected to have limited use in this industry as a means of controlling emissions, EPA did perform an analysis of the impacts of this alternative. The analysis of incineration as a means of emissions control indicated a substantial impact on energy consumption relative to other control technologies. This was the primary reason that incineration was not considered to be the best demonstrated control technology even though it is a control technology available at reasonable cost. EPA recognizes, however, that incineration of oven vents used in conjunction with coatings having a volume solids content less than 62 percent could be an alternative to using a 62 percent by volume solids coating system. Manufacturers using systems with partial incineration would have more flexibility in their selection of coatings and coating manufacturers and, by returning the available heat from the incinerator back to the process, would not experience a drastic increase in energy costs.

Reporting and Recordkeeping

Several commenters stated that they viewed the reporting and recordkeeping requirements as an unnecessary and expensive burden on both the coating manufacturers and coating users. One commenter stated that monthly recordkeeping to determine compliance would be difficult due to the fact that paint is usually purchased in large volumes and delivered over a long period of time. Another commenter, a coatings supplier, presented a detailed plan for recordkeeping and reporting which is based on data contained in Occupational Safety and Health Administration's (OSHA's) Material Safety Data Sheet (MSDS). The major points of his proposal are as follows:

a. All coatings suppliers submit to users information on their coatings. Every coating, catalyst, reducer, and modifier shipped to the user is described in detail with an MSDS for each coating formulation.

b. Coatings suppliers keep records of all shipments made to each customer, usually by quarterly and annual basis, and many suppliers computerize this information.

c. The recordkeeping counterproposal is to switch from a monthly compliance determination to an annual event, or an "inventory day," somewhere near the end of the year.

d. By using the shipment records and subtracting inventory on hand, a total picture of VOC emissions is determined.

e. High technology industrial coatings are expensive and users will know to the nearest drum or gallon how much was purchased and how much is on hand, perhaps not on a monthly basis but on a quarterly or annual basis.

f. The reporting requirements can be implemented by the following steps:

(1) The coatings and solvent suppliers shall submit a form 20 OSHA approved MSDS with each composition sold to the user.

(2) The individual signing the MSDS for the coating or solvent supplier shall be responsible to the user for the accuracy of the information.

(3) The coatings and solvent suppliers can be asked to supply shipment information upon request of the user on an annual basis for purposes of determining compliance with the regulations.

(4) The user is responsible for the accuracy of the annual usage report of VOC-containing materials.

(5) The EPA may audit the data, but may request no records other than those already required by the IRS, DOT, OSHA, DOE, and the EPA itself under the Major Generator Provisions of the Resource Conservation and Recovery Act (RCRA).

As a result of this comment and others, EPA has been investigating alternative ways of reducing monitoring, recordkeeping, and reporting burdens on owners and operators. The goal is to reduce all recordkeeping and reporting that is not essential to determining compliance or to ensuring proper operation and maintenance. After reviewing the requirements in the proposed standards, EPA determined that monthly compliance tests, monitoring, and the compilation of monitoring data are essential for both the owner or operator and EPA to determine compliance and to ensure proper operation and maintenance. A responsible owner or operator would need monitoring information compiled in a usable form to determine when adjustments in the control system are needed to ensure that it is performing at its intended effectiveness level.

The proposed standard was written with the understanding that much of the data required to complete a compliance determination would be provided to the facility by the coating manufacturers. Some additional information, such as transfer efficiency and dilution solvent added at the plant, would be provided by the facility itself. It would appear that a facility manager would keep records of this type, even in the absence of any requirement to do so, to assure efficient materials utilization. EPA is therefore requiring only the additional step of filing the information in an accessible location. Because EPA judges that monthly compliance tests, monitoring, and recordkeeping are essential for determining compliance and proper operation and maintenance, these requirements have not been changed since proposal. It was judged, however, that reporting is not essential to EPA. In addition, when States are delegated the authority to enforce these standards, they may prefer either not to have reporting or to have reporting on a different schedule than EPA proposed. Therefore, the requirement to report violations of the standard and quarterly incineration reports have been removed since proposal. A State, however, at any time is free to impose its own reporting requirements in conjunction with this regulation.

The data supplied by the coating manufacturers may be in any format which is agreeable to the plant owner or operator. Likewise, the owner or operator may use any format in maintaining records as long as all the pertinent data is clearly identified, complete, and in the appropriate terms and units. As required in the regulation, a facility must maintain the records for a period of 2 years. Reports prepared for other agencies may be used for EPA requirements if the preceding conditions are met. Since this standard applies to the metal furniture industry, the coatings users and not suppliers are responsible to EPA for the completeness and accuracy of all reports and records.

Information Requirements Impacts

The reporting and recordkeeping requirements of the regulation are assessed in Standard Form 83 and supporting statement, which is included in the docket for public review (reference subcategory IV–H of docket number A–79–47). This documentation contains: (1) A description of the reporting and recordkeeping required by the regulation and the General Provisions, (2) the reasons for the requirements, and (3) an evaluation of the major alternatives considered (including the use of existing sources of information). Approximately 2,000 new, modified, or reconstructed affected

facilities are expected to be subject to the regulation through the first 5 years.

The regulation will require no reports in addition to those required under the General Provisions of 40 CFR Part 60. The General Provisions contain notification requirements that enable the Agency to keep abreast of facilities subject to the regulation and also contain requirements for the conduct and reporting of initial performance tests. Analysis of these reporting requirements indicates that they are both necessary and reasonable considering the savings in Agency time and resources required for effective enforcement.

The resources needed by the industry to maintain records and to collect, prepare, and use the reports through the first 5 years would be about 178 person-years. The resources required by EPA and State and local agencies to process the reports and to maintain records through the first 5 years would be about 8.5 person-years.

The Paperwork Reduction Act of 1980 (Pub. L. 95–511) requires clearance from the Office of Management and Budget (OMB) of certain public reporting/recordkeeping requirements before this rulemaking can be promulgated as final. The reporting/recordkeeping requirements associated with this standard have been approved by OMB, and have been assigned OMB control #2000–0649.

Regulatory Flexibility Analysis

This standard was proposed before January 1, 1981, and therefore is not subject to the requirements of the Regulatory Flexibility Act. However, during the development of the background information document for this standard, the economic impacts for representative small model plants were examined, and there were no significant impacts on these plants.

Docket

The docket is an organized and complete file of all the information considered by EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docket system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and promulgated standards and EPA responses to significant comments, the contents of the docket, except for certain inter-Agency review materials, will serve as the record in case of judicial review (Section 307(d)(7)(A)).

Miscellaneous

The effective date of this regulation is October 29, 1982. Section 111 of the Clean Air Act provides that standards of performance or revisions thereof become effective upon promulgation and apply to affected facilities, construction or modification of which was commenced after the date of proposal (November 28, 1980).

As prescribed by Section 111, the promulgation of these standards was preceded by the Administrator's determination (40 CFR 60.16, 44 FR 49222, dated August 21, 1979) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. In accordance with Section 117 of the Act, publication of these promulgated standards was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies.

This regulation will be reviewed 4 years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for this regulation and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the standards to insure that cost was carefully considered in determining BDT. The economic impact assessment is included in the background information document for the proposed standards.

In addition to the economic impact analysis, the emission reduction and annualized cost for typical facilities expressed for each alternative in terms of dollars per ton of pollutant removed were compared to both the preceding alternative and to Alternative 1. For example, Alternative 4 was compared to Alternative 3 and Alternative 1.

Compared to the uncontrolled plant (Alternative 1), Alternative 2 (62 percent by volume solids coatings and 60 percent average transfer efficiency) results in an emission reduction of 29 megagrams (32 tons) of VOC per year. The annualized cost of Alternative 2 is $3,500 less than the annualized cost of Alternative 1 because of reduced material costs. This level of control results in a potential savings of $110 per ton of emissions reduced. Costs presented here are updated to July 1980 dollars.

Alternative 3 (70 percent by volume solids coatings and 60 percent average transfer efficiency) results in an emission reduction of 37.3 megagrams (41.1 tons) per year greater than Alternative 1. This level of control has an annualized cost of $28,000 less than Alternative 1 for a potential savings of $680 per ton of emissions reduced. Compared to Alternative 2 the application of Alternative 3 results in emission reductions of 8.26 megagrams (9.1 tons), has an annualized cost of $24,000 less, and a potential savings of $2,600 per ton of additional emission reduction.

Alternative 4 (waterborne coatings) results in an emission reduction of 40 megagrams (44.1 tons) per year greater than Alternative 1. This level of control has an annualized cost of $66,000 higher than Alternative 1 and results in a control cost of $1,500 per ton of emission reduction. Compared to Alternative 3, the application of Alternative 4 results in emission reductions of 2.72 megagrams (3.0 tons) per year, increases the annualized costs by $94,000 and has a control cost of $31,300 per ton of additional emission reductions.

In summary, both Alternatives 2 and 3 result in emission reductions and have a lower annualized cost than the uncontrolled plant. Alternative 2 was selected as the promulgated control level because of technological problems encountered with Alternative 3 control techniques. Alternative 4 was rejected because the cost of precluding the use of the much more cost-effective high solids coatings would be unreasonable in light of the amount of additional emission reduction that would be achieved by selecting the Alternative 4. Also, waterborne coatings are not demonstrated for application in all representative situations. Various other control techniques were quickly ruled out of consideration as BDT due to excessive control costs or technological limitations.

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. This regulation is not "major" because: (1) The national annualized compliance costs, including capital charges resulting from the standards total less than $100 million; (2) the standards do not cause a major increase in prices or production costs; and (3) the

standards do not cause significant adverse effects on domestic competition, employment, investment, productivity, innovation or competition in foreign markets. This regulation was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291. Any comments from OMB to EPA and any EPA response to those comments are included in docket number A-79-47. The docket is available for public inspection at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460.

List of Subjects in 40 CFR Part 60

Air pollution control, Aluminum, Ammonium sulfate plants, Cement industry, Coal, Copper, Electric power plants, Glass and glass products, Grains, Intergovernmental relations, Iron, Lead, Metals, Motor vehicles, Nitric acid plants, Paper and paper products industry, Petroleum, Phosphate, Sewage disposal, Steel, Sulfuric acid plants, Waste treatment and disposal, Zinc.

Dated: October 20, 1982.

Anne M. Gorsuch,

Administrator.

PART 60—[AMENDED]

40 CFR Part 60 is amended by adding a new Subpart EE as follows:

Subpart EE—Standards of Performance for Surface Coating of Metal Furniture

Sec.

60.310 Applicability and designation of affected facility.
60.311 Definitions and symbols.
60.312 Standard for volatile organic compounds.
60.313 Performance tests and compliance provisions.
60.314 Monitoring of emissions and operations.
60.315 Reporting and recordkeeping requirements.
60.316 Test methods and procedures.

Authority: Sections 111 and 301(a) of the Clean Air Act, as amended, (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart EE—Standards of Performance for Surface Coating of Metal Furniture

§ 60.310 Applicability and designation of affected facility.

(a) The affected facility to which the provisions of this subpart apply is each metal furniture surface coating operation in which organic coatings are applied.

(b) This subpart applies to each affected facility identified in paragraph (a) of this section on which construction, modification, or reconstruction is commenced after November 28, 1980.

§ 60.311 Definitions and symbols.

(a) All terms used in this subpart not defined below are given the meaning in the Act and in Subpart A of this part.

"Bake oven" means a device which uses heat to dry or cure coatings.

"Dip coating" means a method of applying coatings in which the part is submerged in a tank filled with the coatings.

"Electrodeposition (EDP)" means a method of applying coatings in which the part is submerged in a tank filled with the coatings and in which an electrical potential is used to enhance deposition of the coatings on the part.

"Electrostatic spray application" means a spray application method that uses an electrical potential to increase the transfer efficiency of the coatings.

"Flash-off area" means the portion of a surface coating operation between the coating application area and bake oven.

"Flow coating" means a method of applying coatings in which the part is carried through a chamber containing numerous nozzles which direct unatomized streams of coatings from many different angles onto the surface of the part.

"Organic coating" means any coating used in a surface coating operation, including dilution solvents, from which volatile organic compound emissions occur during the application or the curing process. For the purpose of this regulation, powder coatings are not included in this definition.

"Powder coating" means any surface coating which is applied as a dry powder and is fused into a continuous coating film through the use of heat.

"Spray application" means a method of applying coatings by atomizing and directing the atomized spray toward the part to be coated.

"Surface coating operation" means the system on a metal furniture surface coating line used to apply and dry or cure an organic coating on the surface of the metal furniture part or product. The surface coating operation may be a prime coat or a top coat operation and includes the coating application station(s), flash-off area, and curing oven.

"Transfer efficiency" means the ratio of the amount of coating solids deposited onto the surface of a part or product to the total amount of coating solids used.

"VOC content" means the proportion of a coating that is volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of coating solids.

"VOC emissions" means the mass of volatile organic compounds (VOC's), expressed as kilograms of VOC's per liter of applied coating solids, emitted from a metal furniture surface coating operation.

(b) All symbols used in this subpart not defined below are given the meaning in the Act and in Subpart A of this part.

C_a = the VOC concentration in each gas stream leaving the control device and entering the atmosphere (parts per million by volume, as carbon)
C_b = the VOC concentration in each gas stream entering the control device (parts per million by volume, as carbon)
C_f = the VOC concentration in each gas stream emitted directly to the atmosphere (parts per million by volume, as carbon)
D_c = density of each coating, as received (kilograms per liter)
D_d = density of each diluent VOC-solvent (kilograms per liter)
D_r = density of VOC-solvent recovered by an emission control device (kilograms per liter)
E = VOC destruction efficiency of the control device (fraction)
F = the proportion of total VOC's emitted by an affected facility that enters the control device (fraction)
G = the volume-weighted average mass of VOC's in coatings consumed in a calendar month per unit volume of coating solids applied (kilograms per liter)
L_c = the volume of each coating consumed, as received (liters)
L_d = the volume of each diluent VOC-solvent added to coatings (liters)
L_r = the volume of VOC-solvent recovered by an emission control device (liters)
L_s = the volume of coating solids consumed (liters)
M_d = the mass of diluent VOC-solvent consumed (kilograms)
M_o = the mass of VOC's in coatings consumed, as received (kilograms)
M_r = the mass of VOC's recovered by an emission control device (kilograms)
N = the volume weighted average mass of VOC emissions to the atmosphere per unit volume of coating solids applied (kilograms per liter)
Q_a = the volumetric flow rate of each gas stream leaving the control device and entering the atmosphere (dry standard cubic meters per hour)
Q_b = the volumetric flow rate of each gas stream entering the control device (dry standard cubic meters per hour)
Q_f = the volumetric flow rate of each gas stream emitted directly to the atmosphere (dry standard cubic meters per hour)
R = the overall VOC emission reduction achieved for an affected facility (fraction)
T = the transfer efficiency (fraction)
V_s = the proportion of solids in each coating (or input stream), as received (fraction by volume)
W_o = the proportion of VOC's in each coating (or input stream), as received (fraction by weight)

§ 60.312 Standard for volatile organic compounds (VOC).

(a) On and after the date on which the initial performance test required to be conducted by § 60.8(a) is completed, no owner or operator subject to the provisions of this subpart shall cause the discharge into the atmosphere of VOC emissions from any metal furniture surface coating operation in excess of 0.90 kilogram of VOC per liter of coating solids applied.

§ 60.313 Performance tests and compliance provisions.

(a) Sections 60.8(d) and (f) do not apply to the performance test procedures required by this subpart.

(b) The owner or operator of an affected facility shall conduct an initial performance test as required under § 60.8(a) and thereafter a performance test each calendar month for each affected facility according to the procedures in this section.

(c) The owner or operator shall use the following procedures for determining monthly volume-weighted average emissions of VOC's in kilograms per liter of coating solids applied (G).

(1) An owner or operator shall use the following procedures for any affected facility which does not use a capture system and control device to comply with the emissions limit specified under § 60.312. The owner or operator shall determine the composition of the coatings by formulation data supplied by the manufacturer of the coating or by an analysis of each coating, as received, using Reference Method 24. The Administrator may require the owner or operator who uses formulation data supplied by the manufacturer of the coating to determine the VOC content of coatings using Reference Method 24. The owner or operator shall determine the volume of coating and the mass of VOC-solvent used for thinning purposes from company records on a monthly basis. If a common coating distribution system serves more than one affected facility or serves both affected and existing facilities, the owner or operator shall estimate the volume of coating used at each facility by using the average dry weight of coating and the surface area coated by each affected and existing facility or by other procedures acceptable to the Administrator.

(i) Calculate the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied (G) during each calendar month for each affected facility, except as provided under § 60.313(c)(2) and (c)(3). Each monthly calculation is considered a performance test. Except as provided in paragraph (c)(1)(iv) of this section, the volume-weighted average of the total mass of VOC's consumed per unit volume of coating solids applied (G) each calendar month will be determined by the following procedures.

(A) Calculate the mass of VOC's used ($M_o + M_d$) during each calendar month for each affected facility by the following equation:

$$M_o + M_d = \sum_{i=1}^{n} L_{ci} D_{ci} W_{oi} + \sum_{j=1}^{m} L_{dj} D_{dj}$$

($\Sigma L_{dj} D_{dj}$ will be 0 if no VOC solvent is added to the coatings, as received.)

Where: n is the number of different coatings used during the calendar month and m is the number of different diluent VOC-solvents used during the calendar month.

(B) Calculate the total volume of coating solids used (L_s) in each calendar month for each affected facility by the following equation:

$$L_s = \sum_{i=1}^{n} L_{ci} V_{si}$$

Where: n is the number of different coatings used during the calendar month.

Select the appropriate transfer efficiency from Table 1. If the owner or operator can demonstrate to the satisfaction of the Administrator that other transfer efficiencies other than those shown are appropriate, the Administrator will approve their use on a case-by-case basis. Transfer efficiency values for application methods not listed below shall be determined by the Administrator on a case-by-case basis. An owner or operator must submit sufficient data for the Administrator to judge the accuracy of the transfer efficiency claims.

TABLE 1.—TRANSFER EFFICIENCIES

Application methods	Transfer efficiency (T)
Air atomized spray	0.25
Airless spray	.25
Manual electrostatic spray	.60
Nonrotational automatic electrostatic spray	.70
Rotating head electrostatic spray (manual and automatic)	.80
Dip coat and flow coat	.90
Electrodeposition	.95

Where more than one application method is used within a single surface coating operation, the owner or operator shall determine the composition and volume of each coating applied by each method through a means acceptable to the Administrator and compute the weighted average transfer efficiency by the following equation:

$$T = \frac{\sum_{i=1}^{n} \sum_{k=1}^{p} L_{cik} V_{sik} T_k}{L_s}$$

Where n is the number of coatings used and p is the number of application methods used.

(C) Calculate the volume-weighted average mass of VOC's consumed per unit volume of coating solids applied (G) during the calendar month for each affected facility by the following equation:

$$G = \frac{M_o + M_d}{L_s T}$$

(ii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during the calendar month for each affected facility by the following equation:

$$N = G$$

(iii) Where the volume-weighted average mass of VOC discharged to the atmosphere per unit volume of coating solids applied (N) is less than or equal to 0.90 kilogram per liter, the affected facility is in compliance.

(iv) If each individual coating used by an affected facility has a VOC content, as received, which when divided by the lowest transfer efficiency at which the coating is applied, results in a value equal to or less than 0.90 kilogram per liter, the affected facility is in compliance provided no VOC's are added to the coatings during distribution or application.

(2) An owner or operator shall use the following procedures for any affected facility that uses a capture system and a control device that destroys VOC's (e.g., incinerator) to comply with the emission limit specified under § 60.312.

(i) Determine the overall reduction efficiency (R) for the capture system and control device. For the initial performance test the overall reduction efficiency (R) shall be determined as prescribed in (c)(2)(i) (A), (B), and (C) of this section. In subsequent months, the owner or operator may use the most recently determined overall reduction efficiency (R) for the performance test providing control device and capture system operating conditions have not changed. The procedure in (c)(2)(i) (A), (B), and (C), of this section, shall be repeated when directed by the Administrator or when the owner or operator elects to operate the control device or capture system at conditions different from the initial performance test.

(A) Determine the fraction (F) of total VOC's emitted by an affected facility that enters the control device using the following equation:

$$F=\frac{\sum_{i=1}^{n} C_{bi} Q_{bi}}{\sum_{i=1}^{n} C_{bi} Q_{bi}+\sum_{j=1}^{m} C_{fj} Q_{fj}}$$

Where n is the number of gas streams entering the control device and m is the number of gas streams emitted directly to the atmosphere.

(B) Determine the destruction efficiency of the control device (E) using values of the volumetric flow rate of each of the gas streams and the VOC content (as carbon) of each of the gas streams in and out of the device by the following equation:

$$E=\frac{\sum_{i=1}^{n} Q_{bi} C_{bi}-\sum_{j=1}^{m} Q_{aj} C_{aj}}{\sum_{i=1}^{n} Q_{bi} C_{bi}}$$

Where: n is the number of gas streams entering the control device, and m is the number of gas streams leaving the contol device and entering the atmosphere.

(C) Determine overall reduction efficiency (R) using the following equation:

$R=EF$

(ii) Calculate the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in paragraphs (c)(1)(i) (A), (B), and (C) of this section.

(iii) Calculate the volume-weighted average of VOC emissions to the atmosphere (N) during each calendar month by the following equation:

$N=G(1-R)$

(iv) If the volume-weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

(3) An owner or operator shall use the following procedure for any affected facility which uses a control device that recovers the VOC's (e.g., carbon adsorber) to comply with the applicable emission limit specified under § 60.312.

(i) Calculate the total mass of VOC's consumed (M_o+M_d) and the volume-weighted average of the total mass of VOC's per unit volume of coating solids applied (G) during each calendar month for each affected facility using equations in paragraph (c)(1)(i) (A), (B), and (C) of this section.

(ii) Calculate the total mass of VOC's recovered (M_r) during each calendar month using the following equation:

$M_r=L_rD_r$

(iii) Calculate overall reduction efficiency of the control device (R) for each calendar month for each affected facility using the following equation:

$$R=\frac{M_r}{M_o+M_d}$$

(iv) Calculate the volume-weighted average mass of VOC's emitted to the atmosphere (N) for each calendar month for each affected facility using equation in paragraph (c)(2)(iii) of this section.

(v) If the weighted average mass of VOC's emitted to the atmosphere for each calendar month (N) is less than or equal to 0.90 kilogram per liter of coating solids applied, the affected facility is in compliance. Each monthly calculation is a performance test.

§ 60.314 Monitoring of emissions and operations.

(a) The owner or operator of an affected facility which uses a capture system and an incinerator to comply with the emission limits specified under § 60.312 shall install, calibrate, maintain, and operate temperature measurement devices according to the following procedures:

(1) Where thermal incineration is used, a temperature measurement device shall be installed in the firebox. Where catalytic incineration is used, a temperature measurement device shall be installed in the gas stream immediately before and after the catalyst bed.

(2) Each temperature measurement device shall be installed, calibrated, and maintained according to the manufacturer's specifications. The device shall have an accuracy of the greater of 0.75 percent of the temperature being measured expressed in degrees Celsius or ±2.5°C.

(3) Each temperature measurement device shall be equipped with a recording device so that a permanent continuous record is produced.

(b) The owner or operator of an affected facility which uses a capture system and a solvent recovery system to comply with the emission limits specified under § 60.312 shall install the equipment necessary to determine the total volume of VOC-solvent recovered daily.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.315 Reporting and recordkeeping requirements.

(a) The reporting requirements of Section 60.8(a) apply only to the initial performance test. Each owner or operator subject to the provisions of this subpart shall include the following data in the report of the initial performance test required under § 60.8(a):

(1) Except as provided in paragraph (a)(2) of this section, the volume-weighted average mass of VOC's emitted to the atmosphere per volume of applied coating solids (N) for a period of one calendar month from each affected facility.

(2) For each affected facility where compliance is determined under the provisions of § 60.313(c)(1)(iv), a list of the coatings used during a period of one calendar month, the VOC content of each coating calculated from data determined using Reference Method 24 or supplied by the manufacturer of the coating, and the minimum transfer efficiency of any coating application equipment used during the month.

(3) For each affected facility where compliance is achieved through the use of an incineration system, the following additional information will be reported:

(i) The proportion of total VOC's emitted that enters the control device (F),

(ii) The VOC reduction efficiency of the control device (E),

(iii) The average combustion temperature (or the average temperature upstream and downstream of the catalyst bed), and

(iv) A description of the method used to establish the amount of VOC's captured and sent to the incinerator.

(4) For each affected facility where compliance is achieved through the use of a solvent recovery system, the following additional information will be reported:

(i) The volume of VOC-solvent recovered (L_r), and

(ii) The overall VOC emission reduction achieved (R).

(b) Following the initial performance test, the owner or operator of an affected facility shall identify and record:

(1) Each instance in which the volume-weighted average of the total mass of VOC's emitted to the atmosphere per volume of applied

coating solids (N) is greater than the limit specified under § 60.312.

(2) Where compliance with § 60.312 is achieved through the use of thermal incineration, each 3-hour period when metal furniture is being coated during which the average temperature of the device was more than 28°C below the average temperature of the device during the most recent performance test at which destruction efficiency was determined as specified under § 60.313.

(3) Where compliance with § 60.312 is achieved through the use of catalytic incineration, each 3-hour period when metal furniture is being coated during which the average temperature of the device immediately before the catalyst bed is more than 28°C below the average temperature of the device immediately before the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under § 60.313. Additionally, when metal furniture is being coated, all 3-hour periods during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference across the catalyst bed during the most recent performance test at which destruction efficiency was determined as specified under § 60.313 will be recorded.

(c) Each owner or operator subject to the provisions of this subpart shall maintain at the source, for a period of at least 2 years, records of all data and calculations used to determine VOC emissions from each affected facility. Where compliance is achieved through the use of thermal incineration, each owner or operator shall maintain, at the source, daily records of the incinerator combustion chamber temperature. If catalytic incineration is used, the owner or operator shall maintain at the source daily records of the gas temperature, both upstream and downstream of the incinerator catalyst bed. Where compliance is achieved through the use of a solvent recovery system, the owner or operator shall maintain at the source daily records of the amount of solvent recovered by the system for each affected facility.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.316 Test methods and procedures.

(a) The reference methods in Appendix A to this part except as provided under § 60.8(b) shall be used to determine compliance with § 60.312 as follows:

(1) Method 24, or coating manufacturer's formulation data, for use in the determination of VOC content of each batch of coating as applied to the surface of the metal parts. In case of an inconsistency between the Method 24 results and the formulation data, the Method 24 results will govern.

(2) Method 25 for the measurement of VOC concentration.

(3) Method 1 for sample and velocity traverses.

(4) Method 2 for velocity and volumetric flow rate.

(5) Method 3 for gas analysis.

(6) Method 4 for stack gas moisture.

(b) For Method 24, the coating sample must be at least a 1 liter sample in a 1 liter container taken at a point where the sample will be representative of the coating material as applied to the surface of the metal part.

(c) For Method 25, the minimum sampling time for each of 3 runs is 60 minutes and the minimum sample volume is 0.003 dry standard cubic meters except that shorter sampling times or smaller volumes, when necessitated by process variables or other factors, may be approved by the Administrator.

(d) The Administrator will approve testing of representative stacks on a case-by-case basis if the owner or operator can demonstrate to the satisfaction of the Administrator that testing of representative stacks yields results comparable to those that would be obtained by testing all stacks.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

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