

**PROCEDURES FOR  
TESTING AND MONITORING  
SOURCES OF AIR POLLUTANTS**

**[REVISED: March 31, 2019]**

## Introduction

### **PART I: GENERAL PROVISIONS**

- Section 1.1 - Applicability
- 1.2 - Performance and Compliance Testing
- 1.3 - Compliance with Standards and Maintenance Requirements
- 1.4 - Monitoring Requirements
- 1.5 - Notification and Record Keeping
- 1.6 - Incorporations by Reference
- 1.7 - General Control Device Requirements
- 1.8 - Required Overall Emissions Reduction Efficiency
- 1.9 - General Notification and Reporting Requirements

### **PART II: SOURCE CATEGORIES**

- Section 2.1 - Fuel Burning Equipment
- 2.1b - Industrial-Commercial-Institutional Steam Generating Units (Constructed after June 19, 1984)
- 2.1c - Small Industrial-Commercial-Institutional Steam Generating Units (NSPS)
- 2.2 - Incinerators
- 2.2b - Municipal Waste Combustors
- 2.3 - Portland Cement Plants
- 2.4 - Nitric Acid Plants
- 2.5 - Sulfuric Acid Plants
- 2.6 - Asphalt Concrete Plants
- 2.7 - Petroleum Refineries
- 2.8 - Storage Vessels for Petroleum Liquids and External Floating Roof Tanks
- 2.8a - Storage Vessels for Petroleum Liquids (Constructed after May 18, 1978)
- 2.8b - Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels-- After July 23, 1984)
- 2.9 - Secondary Lead Smelters
- 2.10 - Secondary Brass and Bronze Ingot Production Plants
- 2.11 - Iron and Steel Plants

- 2.11a - Iron and Steel Plants (Secondary Emissions)
- 2.12 - Sewage Treatment Plants
- 2.13 - Primary Copper Smelters
- 2.14 - Primary Zinc Smelters
- 2.15 - Primary Lead Smelters
- 2.16 - New Primary Aluminum Reduction Plants
- 2.22 - Coal Preparation Plants
- 2.23 - Ferroalloy Production Facilities
- 2.24 - Steel Plants: Electric Arc Furnaces
- 2.24a - Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels  
(Constructed after August 7, 1983)
- 2.25 - Metallurgical Melting - Cupola Furnaces
- 2.28 - Existing Kraft Pulp Mills
- 2.29 - New Kraft Pulp Mills
- 2.30 - Glass Manufacturing Plants
- 2.31 - Grain Elevators
- 2.33 - Surface Coating of Metal Furniture
- 2.34 - Stationary Gas Turbines
- 2.35 - Lime Manufacturing Plants
- 2.39 - Lead-Acid Battery Manufacturing Plants
- 2.40 - New Automobile and Light-Duty Truck Surface Coating Operations
- 2.42 - New Bulk Gasoline Terminals
- 2.43 - Paper Coating (All Sources)
- 2.44 - Graphic Arts Industry: Publication Rotogravure Printing (NSPS Sources)
- 2.45 - Graphic Arts Industry: All Sources
- 2.46 - Pressure Sensitive Tape and Label Surface Coating Operations (NSPS Sources)
- 2.47 - Metal Coil Coating
- 2.48 - Asphalt Processing and Asphalt Roofing Plants
- 2.49 - Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry

- 2.50 - Industrial Surface Coating of Large Appliances
- 2.51 - Beverage Can Coating
- 2.52 - Surface Coating of Miscellaneous Metal Parts
- 2.53 - Wire Coating
- 2.54 - Rubber Tire Manufacturing Industry (NSPS Sources)
- 2.55 - Paper Coating Operations
- 2.56 - Industrial Cleaning Solvents
- 2.59 - Flexible Vinyl and Urethane Coating and Printing
- 2.60 - Equipment Leaks of VOC in Petroleum Refineries
- 2.62 - Synthetic Organic Chemical Manufacturing Industry (SOCMI) - Air Oxidation Unit Processes
- 2.67 - Synthetic Organic Chemical Manufacturing Industry (SOCMI) - Distillation Operations
- 2.68 - Non-Metallic Mineral Processing Plants
- 2.69 - Wool Fiberglass Insulation Manufacturing Plants
- 2.73 - Surface Coating of Plastic Parts for Business Machines
- 2.74 - Calciners and Dryers in Mineral Industries
- 2.99 - Visible Emissions
- 2.100 - Granular and Mixed Fertilizer Manufacturing Plants
- 2.101 - Normal Superphosphate Facilities
- 2.102 - Kaolin and Fuller's Earth Manufacturing Processes
- 2.103 - Cotton Gins
- 2.104 - General Manufacturing Processes
- 2.105 - Ammonium Nitrate Fertilizer Processes
- 2.106 - Ammonium Sulfate Processes
- 2.107 - Metallic Mineral Processing Plants
- 2.108 - Synthetic Fiber Production Facilities
- 2.109 - Fabric and Vinyl Coating (All Sources)
- 2.110 - Gasoline Transport Vehicles
- 2.111 - Major Stationary Sources of VOC

- 2.112 - Automobile and Light-Duty Truck Surface Coating Operations (All Sources)
- 2.113 - Flat Wood Paneling
- 2.114 - Municipal Solid Waste Landfills
- 2.115 - Gasoline Dispensing Facility - Stage I
- 2.116 - Electric Utility Steam Generation Units
- 2.117 - Hospital/Medical/Infectious Waste Incinerators
- 2.118 - Aerospace Manufacturing and Rework Facilities
- 2.119 - Fuel Burning Equipment
- 2.120 - Stationary Gas Turbines and Stationary Engines used to Generate Electricity
- 2.121 - Large Stationary Combined Cycle Gas Turbines
- 2.122 - Commercial and Industrial Solid Waste Incineration (Constructed before November 30, 1999)
- 2.123 - VOC Emissions from Extruded Polystyrene Products Manufacturing Utilizing an Injected Blowing Agent
- 2.124 - Multipollutant Control for Electric Utility Steam Generating Units
- 2.125 - Sulfur Dioxide Emissions from Electric Utility Steam Generating Plants
- 2.126 - Surface Coating of Miscellaneous Plastic Parts and Products
- 2.127 - Surface Coating of Miscellaneous Industrial Adhesives
- 2.128 - Surface Coating of Pleasure Craft
- 2.129 - VOC Emissions from Fiberglass Boat Manufacturing

- 2.130 - Sewage Sludge Incineration Units

### **PART III: HAZARDOUS AIR POLLUTANTS**

- Section 3.0 - General Provisions
  - 3.1 - Asbestos
  - 3.2 - Beryllium
  - 3.4 - Mercury
  - 3.5 - Ethylene Dichloride, Vinyl Chloride, and PolyVinyl Chloride Plants
  - 3.21 - Equipment Leaks (Fugitive Emission Sources)
  - 3.27 - Benzene Transfer Operations

### **PART IV: APPENDICES**

- Appendix A - Part I - Test Methods:
  - Method 1 - Sample and Velocity Traverses for Stationary Sources
  - Method 1A - Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts
  - Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)
  - Method 2A - Direct Measurement of Gas Volume Through Pipes and Small Ducts
  - Method 2B - Determination of Exhaust Gas Volume Flow Rate from Gasoline Vapor Incinerators
  - Method 2C - Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stacks or Ducts (Standard Pitot Tube)
  - Method 2D - Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts
  - Method 2E - Determination of Landfill Gas Production Flow Rate
  - Method 2F - Determination of Stack Gas Velocity And Volumetric Flow Rate With Three-Dimensional Probes
  - Method 2G - Determination of Stack Gas Velocity and Volumetric Flow Rate With Two-Dimensional Probes
  - Method 2H - Determination of Stack Gas Velocity Taking Into Account Velocity Decay Near the Stack Wall
  - Method 3 - Gas Analysis for the Determination of Dry Molecular Weight
  - Method 3A - Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources [Instrumental Analyzer Procedure]
  - Method 3B - Gas Analysis for the Determination of Emission Rate Correction Factor or Excess Air

Method 3C	- Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources
Method 4	- Determination of Moisture Content in Stack Gases
Method 5	- Determination of Particulate Emissions from Stationary Sources
Method 5A	- Determination of Particulate Emissions from the Asphalt Processing and Asphalt Roofing Industry
Method 5D	- Determination of Particulate Matter Emissions from Positive Pressure Fabric Filters
Method 5E	- Determination of Particulate Emissions from the Wool Fiberglass Insulation Manufacturing Industry
Method 5F	- Determination of Nonsulfate Particulate Matter from Stationary Sources
Method 5T	- Determination of Particulate Emissions from Stationary Sources - Total Dry and Wet Catch Method
Method 6	- Determination of Sulfur Dioxide Emissions from Stationary Sources
Method 6A	- Determination of Sulfur Dioxide, Moisture, and Carbon Dioxide Emissions from Fossil Fuel Combustion Sources
Method 6B	- Determination of Sulfur Dioxide and Carbon Dioxide Daily Average Emissions from Fossil Fuel Combustion Sources
Method 6C	- Determination of Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)
Method 7	- Determination of Nitrogen Oxide Emissions from Stationary Sources
Method 7A	- Determination of Nitrogen Oxide Emissions from Stationary Sources (Ion Chromatography)
Method 7B	- Determination of Nitrogen Oxide Emissions from Stationary Sources (Ultraviolet Spectrophotometry)
Method 7C	- Determination of Nitrogen Oxide Emissions from Stationary Sources (Alkaline-Permanganate/Ion Colorimetric Method)
Method 7D	- Determination of Nitrogen Oxide Emissions from Stationary Sources (Alkaline-Permanganate/Ion Chromatographic Method)
Method 7E	- Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)
Method 8	- Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources
Method 9	- Visual Determination of the Opacity of Emissions from Stationary Sources
Method 10	- Determination of Carbon Monoxide Emissions from Stationary Sources
Method 10A	- Determination of Carbon Monoxide Emissions in Certifying Continuous Emission Monitoring Systems at Petroleum Refineries

Method 10B	- Determination of Carbon Monoxide Emissions from Stationary Sources
Method 11	- Determination of Hydrogen Sulfide Content of Fuel Gas Streams in Petroleum Refineries
Method 12	- Determination of Inorganic Lead Emissions from Stationary Sources
Method 13A	- Determination of Total Fluoride Emissions from Stationary Sources - SPADNS Zirconium Lake Method
Method 13B	- Determination of Total Fluoride Emissions from Stationary Sources - Specific Ion Electrode Method
Method 14	- Determination of Fluoride Emissions from Potroom Roof Monitors for Primary Aluminum Plants
Method 15	- Determination of Hydrogen Sulfide, Carbonyl Sulfide, and Carbon Disulfide Emissions from Stationary Sources
Method 15A	- Determination of Total Reduced Sulfur Emissions from Sulfur Recovery Plants in Petroleum Refineries
Method 16	- Semicontinuous Determination of Sulfur Emissions from Stationary Sources
Method 16A	- Determination of Total Reduced Sulfur Emissions from Stationary Sources (Impinger Technique)
Method 16B	- Determination of Total Reduced Sulfur Emissions from Stationary Sources
Method 16C	- Determination of Total Reduced Sulfur Emissions from Stationary Sources (Instrumental Analyzer Procedure)
Method 17	- Determination of Particulate Emissions from Stationary Sources (In-Stack Filtration Method)
Method 18	- Measurement of Gaseous Organic Compound Emissions by Gas Chromatography
Method 19	- Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxides Emission Rates
Method 20	- Determination of Nitrogen Oxides, Sulfur Dioxide, and Oxygen Emissions from Stationary Gas Turbines
Method 21	- Determination of Volatile Organic Compounds Leaks
Method 22	- Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares
Method 23	- Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans from Stationary Sources
Method 24	- Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings
Method 24A	- Determination of Volatile Matter Content and Density of Printing Inks and Related Coatings



Method 25	- Determination of Total Gaseous Nonmethane Organic Emissions as Carbon
Method 25A	- Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer
Method 25B	- Determination of Total Gaseous Organic Concentration Using a Nondispersive Infrared Analyzer
Method 25C	- Determination of Nonmethane Organic Compounds (NMOC) in MSW Landfill Gases
Method 25D	- Determination of the Volatile Organic Concentration of Waste Samples
Method 25E	- Determination of Vapor Phase Organic Concentration in Waste Samples
Method 26	- Determination of Hydrogen Chloride Emissions from Stationary Sources
Method 26A	- Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources - Isokinetic Method
Method 27	- Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test
Method 29	- Determination of Metals Emissions from Stationary Sources
Method 30A	- Determination of Total Vapor Phase Mercury Emissions From Stationary Sources (Instrumental Analyzer Procedure)
Method 30B	- Determination of Total Vapor Phase Mercury Emissions From Coal-Fired Combustion Sources Using Carbon Sorbent Traps
Method 101	- Determination of Particulate and Gaseous Mercury Emissions from Chlor-Alkali Plants-Air Streams
Method 101A	- Determination of Particulate and Gaseous Mercury Emissions from Stationary Sources
Method 102	- Determination of Particulate and Gaseous Mercury Emissions from Chlor-Alkali Plants-Hydrogen Streams
Method 103	- Beryllium Screening Method
Method 104	- Determination of Beryllium Emissions from Stationary Sources
Method 105	- Determination of Mercury in Wastewater Treatment Plant Sewage Sludge
Method 106	- Determination of Vinyl Chloride from Stationary Sources
Method 107	- Determination of Vinyl Chloride Content of Process Stream Samples
Method 107A	- Determination of Vinyl Chloride Content of Solvents, Resin-Solvent Solution, Polyvinyl Chloride Resin, Resin Slurry, Wet Resin, and Latex Samples
Method 108	- Determination of Particulate and Gaseous Arsenic Emissions
Method 108A	- Determination of Arsenic Content in Ore Samples from Nonferrous Smelters
Method 108B	- Determination of Arsenic Content in Ore Samples from Nonferrous Smelters

Method 108C	- Determination of Arsenic Content in Ore Samples from Nonferrous Smelters
Method 200	- Determination of Total Particulate, Free Chlorine, and Total Chlorides from Secondary Aluminum Smelters and Other Stationary Sources
Method 201	- Determination of PM <sub>10</sub> Emissions (Exhaust Gas Recycle Procedure)
Method 201A	- Determination of PM <sub>10</sub> Emissions (Constant Sampling Rate Procedure)
Method 202	- Determination of Condensible Particulate Emissions from Stationary Sources
Method 204	- Criteria for and Verification of a Permanent or Temporary Total Enclosure
Method 204A	- Volatile Organic Compounds Content in Liquid Input Stream
Method 204B	- Volatile Organic Compounds Emissions in Capture Stream
Method 204C	- Volatile Organic Compounds Emissions in Captured Stream (Dilution Technique)
Method 204D	- Volatile Organic Compounds Emissions in Fugitive Stream from Temporary Total Enclosure
Method 204E	- Volatile Organic Compounds Emissions in Fugitive Stream from Building Enclosure
Method 204F	- Volatile Organic Compounds Content in Liquid Input Stream (Distillation Approach)
Method 205	- Verification of Gas Dilution Systems for Field Instrument Calibrations
Method 300	- Determination of Surface Coating Transfer Efficiency
Method 301	- Field Validation of Pollutant Measurement Methods from Various Waste Media
Method 304A	- Determination of Biodegradation Rates of Organic Compounds (Vent Option)
Method 304B	- Determination of Biodegradation Rates of Organic Compounds (Scrubber Option)
Method 305	- Measurement of Emission Potential of Individual Volatile Organic Compounds in Waste
Method 306	- Determination of Chromium Emissions from Decorative and Hard Chromium Electroplating and Anodizing Operations
Method 306A	- Determination of Chromium Emissions from Decorative and Hard Chromium Electroplating and Anodizing Operations
Method 306B	- Surface Tension Measurement and Recordkeeping for Chromium Plating Tanks Used at Electroplating and Anodizing Facilities
Method 307	- Determination of Emissions from Halogenated Solvent Vapor Cleaning Machines using a Liquid Level Procedure
Method 308	- Procedure for Determination of Methanol Emissions from Stationary Sources
Method 310A	- Determination of Residual Hexane through Gas Chromatography
Method 310B	- Determination of Residual Solvent through Gas Chromatography
Method 310C	- Determination of Residual N-Hexane in EPDM Rubber through Gas Chromatography

Method 311	- Analysis of Hazardous Air Pollutant Compounds in Paints and Coatings by Direct Injection into a Gas Chromatograph
Method 312A	- Determination of Styrene in Latex Styrene-Butadiene Rubber through Gas Chromatography
Method 312B	- Determination of Residual Styrene in Styrene-Butadiene (SBR) Rubber Latex by Capillary Gas Chromatography
Method 312C	- Determination of Residual Styrene in SBR Latex Produced by Emulsion Polymerization
Method 313A	- Determination of Residual Hydrocarbons in Rubber Crumb
Method 313B	- The Determination of Residual Hydrocarbon in Solution Polymers by Capillary Gas Chromatography
Method 316	- Sampling and Analysis for Formaldehyde Emissions from Stationary Sources in the Mineral Wool and Wool Fiberglass Industries
Method 318	- Extractive FTIR for Measurement of Emissions from the Mineral Wool and Wool Fiberglass Industries
Method 320	- Vapor Phase Organic and Inorganic Emissions by Extractive FTIR
Method 321	- Measurement of Gaseous Hydrogen Chloride Emissions at Portland Cement Kilns by Fourier Transform Infrared (FTIR) Spectroscopy
Appendix A	- Part II - Field Data Sheets
Appendix B	- Continuous Emission Monitor Performance Specifications
Appendix C	- Quality Assurance Procedures for Gas Chromatography: Procedure 1 - Determination of Adequate Chromatographic Peak Resolution Procedure 2 - Procedure for Field Auditing GC Analysis
Appendix D	- Determination of Emission Rate Change
Appendix E	- Performance Specifications for Flow Monitors
Appendix F	- Quality Assurance Procedures: Procedure 1 - Quality Assurance Requirements for Gas Continuous Emission Monitoring Systems Used for Compliance Determination Procedure 2 - Quality Assurance Requirements for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources Procedure 5 - Quality Assurance Requirements for Vapor Phase Mercury Continuous Emissions Monitoring Systems and Sorbent Trap Monitoring Systems Used for Compliance Determination at Stationary Sources
Appendix G	- Protocols for Determining VOC Capture Efficiency

Appendix H - Calculation of VOC Emissions from Open Molding Fiber-Reinforced Plastics Manufacturing

Appendix I - Performance Test Calculations and Reporting

**PART V: BIBLIOGRAPHY**