10 CSR 10-6.040 Reference Methods

(1) The percent sulfur in solid fuels shall be determined as specified by American Society of Testing and Materials (ASTM) D4239 – 17 *Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion*, as approved and published in 2017, as specified in section (36) of this rule.

(2) The heat content or higher heating value (HHV) of solid fuels shall be determined by use of the Adiabatic Bomb Calorimeter as specified by ASTM D5865 - 13 *Standard Test Method for Gross Calorific Value of Coal and Coke*, as approved and published in 2013, as specified in section (36) of this rule.

(3) The heat content or HHV of liquid hydrocarbons shall be determined as specified by ASTM D240 - 17 *Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter*, as approved and published in 2017, as specified in section (36) of this rule.

(4) The methods for determining the concentrations of the following air contaminants shall be as specified in 40 CFR 50, Appendices A–R or equivalent methods as specified in 40 CFR 53. The provisions of 40 CFR 50, Appendices A–R and 40 CFR 53, both promulgated as of July 1, 2018, apply and are hereby incorporated by reference in this rule, as published by the Office of the Federal Register. Copies can be obtained from the U.S. Publishing Office Bookstore, 710 N. Capitol Street NW, Washington DC 20401. This rule does not incorporate any subsequent amendments or additions.

(A) The concentration of sulfur dioxide shall be determined as specified in 40 CFR 50, Appendix A—*Reference Method for the Determination of Sulfur Dioxide in the Atmosphere (Pararosaniline Method)* or an equivalent method as approved by 40 CFR 53, as incorporated by reference in section (4) of this rule.

(B) The concentration of total suspended particulate shall be determined as specified in 40 CFR 50, Appendix B—*Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method)*, as incorporated by reference in section (4) of this rule.

(C) The concentration of carbon monoxide shall be determined as specified in 40 CFR 50, Appendix C—*Measurement Principle and Calibration Procedure for the Measurement of Carbon Monoxide in the Atmosphere (Non-Dispersive Infrared Photometry)* or equivalent methods as approved by 40 CFR 53, as incorporated by reference in section (4) of this rule.

(D) The concentration of ozone shall be determined as specified in 40 CFR 50, Appendix D—*Measurement Principle and Calibration Procedure for the Measurement of Ozone in the Atmosphere* or equivalent methods as approved by 40 CFR 53, as incorporated by reference in section (4) of this rule.

(E) *Reserved*

(F) The concentration of nitrogen dioxide shall be determined as specified in 40 CFR 50, Appendix F—*Measurement Principle and Calibration Procedure for the Measurement of Nitrogen Dioxide in the Atmosphere (Gas Phase Chemiluminescence)* or equivalent methods as approved by 40 CFR 53, as incorporated by reference in section (4) of this rule.

(G) The concentration of lead shall be determined as specified in 40 CFR 50, Appendix G—*Reference Method for the Determination of Lead in Suspended Particulate Matter Collected From Ambient Air* or in 40 CFR 50, Appendix Q—*Reference Method for the Determination of Lead in Particulate Matter as PM_{10} Collected From Ambient Air* or equivalent methods as approved by 40 CFR 53, as incorporated by reference in section (4) of this rule.

(H) Compliance with the one (1) hour ozone standard shall be determined as specified in 40 CFR 50, Appendix H—*Interpretation of the 1-Hour Primary and Secondary National Ambient Air Quality Standards for Ozone*, as incorporated by reference in section (4) of this rule.

(I) Compliance with the eight (8) hour ozone standards shall be determined as specified in 40 CFR 50, Appendix I—*Interpretation of the 8-Hour Primary and Secondary National Ambient Air Quality Standards for Ozone*, as incorporated by reference in section (4) of this rule.

(J) The concentration of particulate matter 10 micron (PM_{10}) shall be determined as specified in 40 CFR 50, Appendix J—*Reference Method for the Determination of Particulate Matter as PM_{10} in the Atmosphere*, or an equivalent method as approved in 40 CFR 53, as incorporated by reference in section (4) of this rule.

(K) Compliance with particulate matter 10 PM_{10} standards shall be determined as specified in 40 CFR 50, Appendix K—*Interpretation of the National Ambient Air Quality Standards for Particulate Matter*, as incorporated by reference in section (4) of this rule.

(L) The concentration of particulate matter 2.5 micron ($PM_{2.5}$) shall be determined as specified in 40 CFR 50, Appendix L—*Reference Method for the Determination of Fine Particulate Matter as $PM_{2.5}$ in the Atmosphere*, or an equivalent method as approved in 40 CFR 53, as incorporated by reference in section (4) of this rule.

(M) Compliance with particulate matter 2.5 ($PM_{2.5}$) standards shall be determined as specified in 40 CFR 50, Appendix N—*Interpretation of the National Ambient Air Quality Standards for $PM_{2.5}$*, as incorporated by reference in section (4) of this rule.

(N) Compliance with the eight (8)-hour ozone standards shall be determined as specified in 40 CFR 50, Appendix P—*Interpretation of the Primary and Secondary National Ambient Air Quality Standards for Ozone*, as incorporated by reference in section (4) of this rule.

(O) Compliance with the lead standards shall be determined as specified in 40 CFR 50, Appendix R—*Interpretation of the National Ambient Air Quality Standards for Lead*, as incorporated by reference in section (4) of this rule.

(5) The concentration of hydrogen sulfide (H_2S) shall be determined by scrubbing all sulfur dioxide (SO_2) present in the sample and then converting each molecule of H_2S to SO_2 with a thermal converter so that the resulting SO_2 is detected by an analyzer as specified in 40 CFR 50, Appendix A—*Reference Method for the Determination of Sulfur Dioxide in the Atmosphere (Pararosaniline Method)* or an equivalent method approved by 40 CFR 53, as incorporated by reference in section (4) of this rule in which case the calibration gas used must be National Institute of Standards and Technology traceable H_2S gas.

(6) The concentration of sulfuric acid mist shall be determined as specified in the *Compendium Method IO-4.2, Determination of Reactive Acidic and Basic Gases and Strong Acidity of Atmospheric Fine-Particles (<2.5 µm)*, EPA/625/R-96/010a, as published by EPA June 1999 and hereby incorporated by reference in this rule. Copies can be obtained from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield VA 22161. This rule does not incorporate any subsequent amendments or additions.

(A) The concentration of total sulfur shall be determined as specified in section (4) of this rule by sampling for sulfur dioxide without removing other sulfur compound interferences.

(B) The concentration of sulfur dioxide shall be determined as specified by section (4) of this rule.

(C) The concentration of hydrogen sulfide shall be determined as specified by section (5) of this rule.

(7) The percent sulfur in liquid hydrocarbons shall be determined as specified by ASTM D2622 - 16 *Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry*, as approved and published in 2016, as specified in section (36) of this rule.

(8) The amount of solvent present in earth filters and distillation wastes shall be determined as specified by ASTM D322 - 97(2016) *Standard Test Method for Gasoline Diluent in Used Gasoline Engine Oils by Distillation*, as approved and published, as specified in section (36) of this rule.

(9) The atmospheric distillation of petroleum products and liquid fuels shall be determined as specified by ASTM *D86-17 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure*, as approved and published in 2017, as specified in section (36) of this rule.

(10) The pour point of petroleum specimens shall be determined as specified by ASTM *D97-17a Standard Test Method for Pour Point of Petroleum Products*, as approved and published in 2017, as specified in section (36) of this rule.

(11) The vapor pressure of petroleum products shall be determined as specified by ASTM *D323-15a Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)*, as approved and published in 2015, as specified in section (36) of this rule.

(12) The specification for fuel oil shall be determined as specified by ASTM *D396-17 Standard Specification for Fuel Oils*, as approved and published in 2017, as specified in section (36) of this rule.

(13) The gloss measurement rating shall be determined as specified by ASTM *D523-14 Standard Test Method for Specular Gloss*, as approved and published in 2014, as specified in section (36) of this rule.

(14) The specification for diesel fuel oils shall be determined as specified by *ASTM D975-17 Standard Specification for Diesel Fuel Oils*, as approved and published in 2017, as specified in section (36) of this rule.

(15) The specification for emulsified asphalt shall be determined as specified by ASTM *D977-17 Standard Specification for Emulsified Asphalt,* as approved and published in 2017, as specified in section (36) of this rule.

(16) The chemical composition reformed and similar gases shall be determined as specified by ASTM *D1946-90(2015)e1 Standard Practice for Analysis of Reformed Gas by Gas Chromatography*, as approved and published in 2015, as specified in section (36) of this rule.

(17) The practice for the reduction and division of gross or divided samples and the preparation of composite samples shall be determined as specified by ASTM *D2013/D2013M-12 Standard Practice for Preparing Coal Samples for Analysis*, as approved and published in 2012, as specified in section (36) of this rule.

(18) The procedure for collection of samples shall be determined as specified by ASTM *D2234/D2234M-16 Standard Practice for Collection of a Gross Sample of Coal*, as approved and published in 2016, as specified in section (36) of this rule.

(19) The specification of grades of cationic emulsified asphalt shall be determined as specified by ASTM *D2397/D2397M-17 Standard Specification for Cationic Emulsified Asphalt*, as approved and published in 2017, as specified in section (36) of this rule.

(20) The properties of fuels shall be determined as specified by ASTM *D2880-15 Standard Specification for Gas Turbine Fuel Oils*, as approved and published in 2015, as specified in section (36) of this rule.

(21) The formulas that allow analytical data to be expressed in various bases shall be determined as specified by ASTM *D3180-15 Standard Practice for Calculating Coal and Coke Analyses from As-Determined to Different Bases*, as approved and published in 2015, as specified in section (36) of this rule.

(22) The procedures and equipment for manually obtaining samples of liquid petroleum and petroleum products shall be determined as specified by ASTM *D4057-12 Practice for Manual Sampling of Petroleum and Petroleum Products*, as approved and published in 2012, as specified in section (36) of this rule.

(23) The determination of H_2S in gaseous fuels shall be determined as specified by ASTM *D4084-07(2012) Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method)*, as approved and published in 2012, as specified in section (36) of this rule.

(24) The determination of sulfur in samples of coal or coke shall be determined as specified by ASTM *D4239-17 Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion*, as approved and published in 2017, as specified in section (36) of this rule.

(25) The determination of the heat of combustion of hydrocarbon fuels shall be determined as specified by ASTM *D4809-13 Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method)*, as approved and published in 2013, as specified in section (36) of this rule.

(26) The determination of gasoline and gasoline-oxygenate blends shall be determined as specified by ASTM *D4953-15 Standard Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)*, as approved and published in 2015, as specified in section (36) of this rule.

(27) The use of automated vapor pressure instruments to determine the total vapor pressure shall be determined as specified by ASTM *D5191-15 Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method)*, as approved and published in 2015, as specified in section (36) of this rule.

(28) The determination of speciated volatile sulfur-containing compounds in high methane content gaseous fuels shall be determined as specified by ASTM *D5504-12 Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence*, as approved and published in 2012, as specified in section (36) of this rule.

(29) The determination of the gross calorific value of coal and coke shall be determined as specified by ASTM *D5865-13 Standard Test Method for Gross Calorific Value of Coal and Coke*, as approved and published in 2013, as specified in section (36) of this rule.

(30) The determination of total mercury in natural gas shall be determined as specified by ASTM *D5954-98(2014)e1 Standard Test Method for Mercury Sampling and Measurement in Natural Gas by Atomic Absorption Spectroscopy*, as approved and published in 2014, as specified in section (36) of this rule.

(31) The determination of individual volatile sulfur-containing compounds in gaseous fuels shall be determined as specified by ASTM *D6228-10 Standard Practice for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatographs and Flame Photometric Detection*, as approved and published in 2010, as specified in section (36) of this rule.

(32) This test method shall be used to determine the total mercury concentration of a natural gas stream as specified by ASTM *D6350-14 Standard Test Method for Mercury Sampling and Analysis in Natural Gas by Atomic Fluorescence Spectroscopy*, as approved and published in 2010, as specified in section (36) of this rule.

(33) The use of automated vapor pressure instruments to determine the vapor pressure exerted in vacuum by volatile, liquid petroleum products, hydrocarbons, and hydrocarbon-oxygenate mixtures shall be determined as specified by ASTM *D6378-10(2016) Standard Test Method for Determination of Vapor Pressure (VPX) of Petroleum Products, Hydrocarbons, and Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method)*, as approved and published in 2016, as specified in section (36) of this rule.

(34) The determination of elemental, oxidized, particle-bound, and total mercury emissions from coal-fired stationary sources shall be determined as specified by ASTM *D6784-16 Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method)*, as approved and published in 2016, as specified in section (36) of this rule.

(35) The determination of the vapor pressure of pure liquids, the vapor pressure exerted by mixtures in a closed vessel at 40 $\pm$ 5% ullage, and the initial thermal decomposition temperature of pure and mixed liquids shall be determined as specified by *ASTM D2879-10 Standard Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope*, as approved and published in 2010, as specified in section (36) of this rule.

(36) All of the documents in sections (1) through (3) and (7) through (35) of this rule are published by the American Society for Testing and Materials (ASTM) and incorporated by reference in this rule. Copies can be obtained from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. This rule does not incorporate any subsequent amendments or additions.

10 CSR 10-6.040

EPA Rulemakings

CFR: 40 C.F.R. 52.1320(c)
FRM: 84 FR 43699 (8/22/19)
PRM: 84 FR 27053 (6/11/19)
State Submission: 1/14/19
State Final: 10 C.S.R 10-6 (12/31/18) effective 1/30/19
APDB File: MO-392; EPA-R07-OAR-2019-0293; effective 9/23/19
Description: This revision updates the state's incorporation by reference of all reference methods found in 40 CFR part 50 appendices A through R, as well as equivalent methods as specified in 40 CFR part 53. The 40 CFR part 50 appendices describe the methods for measuring ambient concentrations of various pollutants for which NAAQS have been established. In addition, the revision updates American Society for Testing and Materials (ASTM) standards and includes numerous ASTM standards that are referenced in separate state rules.

CFR: 40 C.F.R. 52.1320(c)
FRM: 80 FR 11577 (3/4/15)
PRM: 80 FR 11610 (3/4/15)
State Submission: 11/20/14
State Final: 10 C.S.R 10-6 (10/31/14) effective 11/30/14
APDB File: MO-365 EPA-R07-OAR-2015-0005; effective 5/4/15
Description: This revision updates the state requirements to the latest federal equivalency methods (FEMs) by incorporating by reference EPA's latest codified actions for measuring lead, nitrogen dioxide, particulate matter less than 2.5 microns ($PM_{2.5}$), particulate matter less than 10 microns (PM_{10}), particulate matter between 10 and 2.5 microns ($PM_{10-2.5}$). In addition, through incorporation by reference, a new Federal Reference Method (FRM) for measuring lead in total suspended particulate matter was added and designated as a new FEM. Finally, administrative amendments were made throughout the rule relating to the wording used when referring to the determination of concentration of pollutants.

CFR: 40 C.F.R. 52.1320(c)
FRM: 80 FR 11577 (3/4/15)
PRM: 80 FR 11610 (3/4/15)
State Submission: 11/6/13
State Final: 10 C.S.R 10-6 () effective 11/30/13
APDB File: MO-356; EPA-R07-OAR-2015-0005; effective 5/4/15
Description This revision updates the state requirements to the latest federal equivalency methods (FEMs) by incorporating by reference EPA's latest codified actions for ambient monitoring of nitrogen dioxide and fine particulate matter and two FEMs for laboratory analysis of lead. In addition, a number of American Society for Testing and Materials (ASTM) standards in the rule were updated to reflect the latest version available for determining parameters such as fuel sulfur and heat content.

CFR: 40 C.F.R. 52.1320(c)
FRM: 77 FR 58309 (9/20/12)
PRM: 77 FR 58352 (9/20/12)
State Submission: 9/21/2010
State Final: 10 C.S.R 10-6 (4/30/10); effective 5/30/2010
APDB File: MO-297
Description: Effective November 19, 2012, this revision updates Federal reference methods for the new 2008 8-hour ozone standard and the 2008 Pb standard. In addition it removes the incorporation by reference of these reference methods from 10 CSR 10-6.070 to this rule.

CFR: 40 C.F.R. 52.1320(c)
FRM: 71 FR 70468 (12/05/2006)
PRM: 71 FR 70476 (12/05/2006)
State Submission: 03/30/2006
State Final: 10 C.S.R. 10-6 (01/29/2006); effective 02/28/2006
APDB File: MO-242; EPA-R07-OAR-2006-0900
Description: This revision updates adopted Federal reference methods for the new 8-hour ozone and $PM_{2.5}$ NAAQS finalized on July 18, 1997, and mandated by the CAA.

CFR: 40 C.F.R. 52.1320(c)
FRM: 66 FR 52359 (10/15/2001)
PRM: 66 FR 52367 (10/15/2001)
State Submission: 07/24/2001
State Final: 10 C.S.R. 10-6 (06/30/2001)
APDB File: MO-191
Description: Sections (5), (6) and (7) were revised to adopt current EPA methods.

CFR: 40 C.F.R. 52.1320(c)(66)(i)(A)
FRM: 54 FR 31524 (7/31/89)
PRM: None
State Submission: 5/12/88
State Proposal: 13 MR 110 (1/19/88)
State Final: 13 MR 602 (4/18/88)
APDB File: MO-67
Description: The EPA approved revisions to the regulation which: (1) adopted a reference method for PM_{10}, and (2) made other administrative changes.

CFR: 40 C.F.R. 52.1320(c)(47)
FRM: 49 FR 44996 (11/14/84)
PRM: None
State Submission: 8/14/84
State Proposal: 9 MR 328 (2/1/84), 9 MR 670 (4/2/84)
State Final: 9 MR 425 (3/1/84), 9 MR 1134 (7/2/84)
APDB File: MO-53
Description: The EPA approved revisions which updated the references to ambient sampling methods.

CFR: 40 C.F.R. 52.1320(c)(25)(iii)
FRM: 46 FR 20172 (4/3/81)
PRM: 45 FR 84099 (12/22/80)
State Submission: 9/2/80
State Proposal: 5 MR 385 (4/1/80)
State Final: 5 MR 1149 (9/2/80)
APDB File: MO-12
Description: The EPA approved a revision which added a solvent test method.

CFR: 40 C.F.R. 52.1320(c)(13)(ii)
FRM: 45 FR 17145 (3/18/80)
PRM: 44 FR 52001 (9/6/79)
State Submission: 8/28/78
State Proposal: 2 MR 513 (9/1/77)
State Final: 3 MR 91 (2/1/78)
APDB File: MO-03
Description: The EPA approved a new regulation establishing reference methods for determining the sulfur content and heat content of fuels and methods for determining the ambient concentrations of air contaminants.

Difference Between the State and EPA-Approved Regulation

None.