

Environmental Protection Agency

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Symbol	Quantity	Unit	Unit symbol	Base SI units
m	mass	kilogram	kg	kg
\dot{m}	mass rate	kilogram per second	kg/s	kg · s ⁻¹
ν	viscosity, kinematic	meter squared per second	m ² /s	m ² · s ⁻¹
N	total number in series			
n	amount of substance	mole	mol	mol
\dot{n}	amount of substance rate	mole per second	mol/s	mol · s ⁻¹
P	power	kilowatt	kW	10 ³ · m ² · kg · s ⁻³
PF	penetration fraction			
p	pressure	pascal	Pa	m ⁻¹ · kg · s ⁻²
ρ	mass density	kilogram per cubic meter	kg/m ³	kg · m ⁻³
r	ratio of pressures	pascal per pascal	Pa/Pa	1
R^2	coefficient of determination			
Ra	average surface roughness	micrometer	µm	m ⁻⁶
$Re^{\#}$	Reynolds number			
RF	response factor			
$RH\%$	relative humidity	0.01	%	10 ⁻²
σ	non-biased standard deviation			
S	Sutherland constant	kelvin	K	K
SEE	standard estimate of error			
T	absolute temperature	kelvin	K	K
T	Celsius temperature	degree Celsius	°C	K-273.15
T	torque (moment of force)	newton meter	N · m	m ² · kg · s ⁻²
t	time	second	s	s
Δt	time interval, period, 1/frequency	second	s	s
V	volume	cubic meter	m ³	m ³
\dot{V}	volume rate	cubic meter per second	m ³ /s	m ³ · s ⁻¹
W	work	kilowatt hour	kW · h	3.6 · 10 ⁻⁶ · m ² · kg · s ⁻²
w_c	carbon mass concentration	gram per gram	g/g	1
x	amount of substance mole fraction ²	mole per mole	mol/mol	(¹)
\bar{x}	flow-weighted mean concentration	mole per mole	mol/mol	1
y	generic variable			

¹ See paragraph (f)(2) of this section for the values to use for molar masses. Note that in the cases of NO_x and HC, the regulations specify effective molar masses based on assumed speciation rather than actual speciation.
² Note that mole fractions for THC, THCE, NMHC, NMHCE, and NOTHC are expressed on a C1 equivalent basis.

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(g) *Other acronyms and abbreviations.* This part uses the following additional abbreviations and acronyms:

ASTM American Society for Testing and Materials
 BMD bag mini-diluter
 BSFC brake-specific fuel consumption
 CARB California Air Resources Board
 CFR Code of Federal Regulations
 CFV critical-flow venturi
 CI compression-ignition
 CITT Curb Idle Transmission Torque
 CLD chemiluminescent detector
 CVS constant-volume sampler
 DF deterioration factor
 ECM electronic control module
 EFC electronic flow control
 EGR exhaust gas recirculation
 EPA Environmental Protection Agency
 FEL Family Emission Limit
 FID flame-ionization detector
 IBP initial boiling point
 ISO International Organization for Standardization
 LPG liquefied petroleum gas
 NDIR nondispersive infrared
 NDUV nondispersive ultraviolet
 NIST National Institute for Standards and Technology
 PDP positive-displacement pump

PEMS portable emission measurement system
 PFD partial-flow dilution
 PMP Polymethylpentene
 pt. a single point at the mean value expected at the standard
 PTFE polytetrafluoroethylene (commonly known as Teflon™)
 RE rounding error
 RMC ramped-modal cycle
 RMS root-mean square
 RTD resistive temperature detector
 SSV subsonic venturi
 SI spark-ignition
 UCL upper confidence limit
 UFM ultrasonic flow meter
 U.S.C. United States Code

§ 1065.1010 Reference materials.

Documents listed in this section have been incorporated by reference into this part. The Director of the Federal Register approved the incorporation by reference as prescribed in 5 U.S.C. 552(a) and 1 CFR part 51. Anyone may inspect copies at the U.S. EPA, Air and Radiation Docket and Information Center, 1301 Constitution Ave., NW.,

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Room B102, EPA West Building, Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(a) *ASTM material.* Table 1 of this section lists material from the American

Society for Testing and Materials that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the American Society for Testing and Materials, 100 Barr Harbor Dr., P.O. Box C700, West Conshohocken, PA 19428 or www.astm.com. Table 1 follows:

TABLE 1 OF § 1065.1010—ASTM MATERIALS

Document number and name	Part 1065 reference
ASTM D 86–04b, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure	1065.703, 1065.710
ASTM D 93–02a, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	1065.703
ASTM D 287 92 (Reapproved 2000), Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)	1065.703
ASTM D 323–99a, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method) ..	1065.710
ASTM D 445–04, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)	1065.703
ASTM D 613–03b, Standard Test Method for Cetane Number of Diesel Fuel Oil	1065.703
ASTM D 910–04a, Standard Specification for Aviation Gasolines	1065.701
ASTM D 975–04c, Standard Specification for Diesel Fuel Oils	1065.701
ASTM D 1266–98 (Reapproved 2003), Standard Test Method for Sulfur in Petroleum Products (Lamp Method)	1065.710
ASTM D 1267–02, Standard Test Method for Gage Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method)	1065.720
ASTM D 1319–03, Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption	1065.710
ASTM D 1655–04a, Standard Specification for Aviation Turbine Fuels	1065.701
ASTM D 1837–02a, Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases	1065.720
ASTM D 1838–03, Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases	1065.720
ASTM D 1945–03, Standard Test Method for Analysis of Natural Gas by Gas Chromatography	1065.715
ASTM D 2158–04, Standard Test Method for Residues in Liquefied Petroleum (LP) Gases	1065.720
ASTM D 2163–91 (Reapproved 1996), Standard Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propene Concentrates by Gas Chromatography	1065.720
ASTM D 2598–02, Standard Practice for Calculation of Certain Physical Properties of Liquefied Petroleum (LP) Gases from Compositional Analysis	1065.720
ASTM D 2622–03, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry	1065.703
ASTM D 2713–91 (Reapproved 2001), Standard Test Method for Dryness of Propane (Valve Freeze Method)	1065.720
ASTM D 2784–98 (Reapproved 2003), Standard Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp)	1065.720
ASTM D 2880–03, Standard Specification for Gas Turbine Fuel Oils	1065.701
ASTM D 2986–95a (Reapproved 1999), Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Diocetyl Phthalate) Smoke Test	1065.170
ASTM D 3231–02, Standard Test Method for Phosphorus in Gasoline	1065.710
ASTM D 3237–02, Standard Test Method for Lead in Gasoline By Atomic Absorption Spectroscopy ..	1065.710
ASTM D 4814–04b, Standard Specification for Automotive Spark-Ignition Engine Fuel	1065.701
ASTM D 5186–03, Standard Test Method for Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels By Supercritical Fluid Chromatography	1065.703
ASTM D 5797–96 (Reapproved 2001), Standard Specification for Fuel Methanol (M70–M85) for Automotive Spark-Ignition Engines	1065.701
ASTM D 5798–99 (Reapproved 2004), Standard Specification for Fuel Ethanol (Ed75–Ed85) for Automotive Spark-Ignition Engines	1065.701
ASTM D 6615–04a, Standard Specification for Jet B Wide-Cut Aviation Turbine Fuel	1065.701
ASTM D 6751–03a, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels	1065.701
ASTM D 6985–04a, Standard Specification for Middle Distillate Fuel Oil Military Marine Applications ..	1065.701
ASTM F 1471–93 (Reapproved 2001), Standard Test Method for Air Cleaning Performance of a High-Efficiency Particulate Air Filter System	1065.1001

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(b) *ISO material.* Table 2 of this section lists material from the International Organization for Standardization that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this

part where we reference it. Anyone may purchase copies of these materials from the International Organization for Standardization, Case Postale 56, CH-1211 Geneva 20, Switzerland or *www.iso.org*. Table 2 follows:

TABLE 2 OF § 1065.1010—ISO MATERIALS

Document number and name	Part 1065 reference
ISO 14644-1, Cleanrooms and associated controlled environments	1065.190

(c) *NIST material.* Table 3 of this section lists material from the National Institute of Standards and Technology that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this

part where we reference it. Anyone may purchase copies of these materials from the Government Printing Office, Washington, DC 20402 or download them free from the Internet at *www.nist.gov*. Table 3 follows:

TABLE 3 OF § 1065.1010. NIST MATERIALS

Document number and name	Part 1065 reference
NIST Special Publication 811, 1995 Edition, Guide for the Use of the International System of Units (SI), Barry N. Taylor, Physics Laboratory	1065.20, 1065.1001, 1065.1005
NIST Technical Note 1297, 1994 Edition, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results, Barry N. Taylor and Chris E. Kuyatt	1065.1001

(d) *SAE material.* Table 4 of this section lists material from the Society of Automotive Engineering that we have incorporated by reference. The first column lists the number and name of the material. The second column lists

the sections of this part where we reference it. Anyone may purchase copies of these materials from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096 or *www.sae.org*. Table 4 follows:

TABLE 4 OF § 1065.1010. SAE MATERIALS

Document number and name	Part 1065 reference
"Optimization of Flame Ionization Detector for Determination of Hydrocarbon in Diluted Automotive Exhausts," Reschke Glen D., SAE 770141	1065.360
"Relationships Between Instantaneous and Measured Emissions in Heavy Duty Applications," Ganesan B. and Clark N. N., West Virginia University, SAE 2001-01-3536	1065.309

(e) *California Air Resources Board material.* Table 5 of this section lists material from the California Air Resources Board that we have incorporated by reference. The first column lists the number and name of the material. The

second column lists the sections of this part where we reference it. Anyone may get copies of these materials from the California Air Resources Board 9528 Telstar Ave., El Monte, California 91731. Table 5 follows:

TABLE 5 OF § 1065.1010. CALIFORNIA AIR RESOURCES BOARD MATERIALS

Document number and name	Part 1065 reference
"California Non-Methane Organic Gas Test Procedures," Amended July 30, 2002, Mobile Source Division, California Air Resources Board	1065.805

EFFECTIVE DATE NOTE: At 73 FR 33747, June 30, 2008, § 1065.1010 was revised, effective July 7, 2008. For the convenience of the user, the revised text is set forth as follows:

§ 1065.1010 Reference materials.

Documents listed in this section have been incorporated by reference into this part. The Director of the Federal Register approved the incorporation by reference as prescribed in 5 U.S.C. 552(a) and 1 CFR part 51. Anyone may inspect copies at the U.S. EPA, Air and Radiation Docket and Information Center, 1301 Constitution Ave., NW., Room B102, EPA West Building, Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the

availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(a) *ASTM material.* Table 1 of this section lists material from the American Society for Testing and Materials that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the American Society for Testing and Materials, 100 Barr Harbor Dr., P.O. Box C700, West Conshohocken, PA 19428 or www.astm.com. Table 1 follows:

TABLE 1 OF § 1065.1010.—ASTM MATERIALS

Document No. and name	Part 1065 reference
ASTM D86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure	1065.703, 1065.710
ASTM D93-07, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	1065.703
ASTM D445-06, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)	1065.703
ASTM D613-05, Standard Test Method for Cetane Number of Diesel Fuel Oil	1065.703
ASTM D910-07, Standard Specification for Aviation Gasolines	1065.701
ASTM D975-07b, Standard Specification for Diesel Fuel Oils	1065.701
ASTM D1267-02 (Reapproved 2007), Standard Test Method for Gage Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method)	1065.720
ASTM D1319-03, Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption	1065.710
ASTM D1655-07e01, Standard Specification for Aviation Turbine Fuels	1065.701
ASTM D1837-02a (Reapproved 2007), Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases	1065.720
ASTM D1838-07, Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases	1065.720
ASTM D1945-03, Standard Test Method for Analysis of Natural Gas by Gas Chromatography	1065.715
ASTM D2158-05, Standard Test Method for Residues in Liquefied Petroleum (LP) Gases	1065.720
ASTM D2163-05, Standard Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propene Concentrates by Gas Chromatography	1065.720
ASTM D2598-02 (Reapproved 2007), Standard Practice for Calculation of Certain Physical Properties of Liquefied Petroleum (LP) Gases from Compositional Analysis	1065.720
ASTM D2622-07, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry	1065.703, 1065.710
ASTM D2713-91 (Reapproved 2001), Standard Test Method for Dryness of Propane (Valve Freeze Method)	1065.720
ASTM D2784-06, Standard Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp)	1065.720
ASTM D2880-03, Standard Specification for Gas Turbine Fuel Oils	1065.701
ASTM D2986-95a (Reapproved 1999), Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test	1065.170
ASTM D3231-07, Standard Test Method for Phosphorus in Gasoline	1065.710
ASTM D3237-06e01, Standard Test Method for Lead in Gasoline by Atomic Absorption Spectroscopy	1065.710
ASTM D4052-96e01 (Reapproved 2002), Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter	1065.703
ASTM D4814-07a, Standard Specification for Automotive Spark-Ignition Engine Fuel	1065.701
ASTM D5186-03, Standard Test Method for Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels By Supercritical Fluid Chromatography	1065.703
ASTM D5191-07, Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method)	1065.710
ASTM D5797-07, Standard Specification for Fuel Methanol (M70-M85) for Automotive Spark-Ignition Engines	1065.701
ASTM D5798-07, Standard Specification for Fuel Ethanol (Ed75-Ed85) for Automotive Spark-Ignition Engines	1065.701
ASTM D6615-06, Standard Specification for Jet B Wide-Cut Aviation Turbine Fuel	1065.701
ASTM D6751-07b, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels	1065.701