

§ 1065.703

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TABLE 1 OF § 1065.701—EXAMPLES OF SERVICE-ACCUMULATION AND FIELD-TESTING FUELS—
Continued

Fuel category	Subcategory	Reference procedure ¹
	Jet B wide cut	ASTM D6615–06.
Gas turbine fuel	General	ASTM D2880–03l.

¹ASTM specifications are incorporated by reference in § 1065.1010.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37339, June 30, 2008; 73 FR 59341, Oct. 8, 2008; 75 FR 23057, Apr. 30, 2010]

§ 1065.703 Distillate diesel fuel.

(a) Distillate diesel fuels for testing must be clean and bright, with pour and cloud points adequate for proper engine operation.

(b) There are three grades of #2 diesel fuel specified for use as a test fuel. See the standard-setting part to determine which grade to use. If the standard-setting part does not specify which grade to use, use good engineering judgment

to select the grade that represents the fuel on which the engines will operate in use. The three grades are specified in Table 1 of this section.

(c) You may use the following non-metallic additives with distillate diesel fuels:

- (1) Cetane improver.
- (2) Metal deactivator.
- (3) Antioxidant, de hazer.
- (4) Rust inhibitor.
- (5) Pour depressant.
- (6) Dye.
- (7) Dispersant.
- (8) Biocide.

TABLE 1 OF § 1065.703—TEST FUEL SPECIFICATIONS FOR DISTILLATE DIESEL FUEL

Item	Units	Ultra low sulfur	Low sulfur	High sulfur	Reference procedure ¹
Cetane Number .....	.....	40–50	40–50	40–50	ASTM D613–05.
Distillation range: Initial boiling point	°C	171–204	171–204	171–204	ASTM D86–07a.
10 pct. point .....	.....	204–238	204–238	204–238	
50 pct. point .....	.....	243–282	243–282	243–282	
90 pct. point .....	.....	293–332	293–332	293–332	
Endpoint .....	.....	321–366	321–366	321–366	
Gravity	°API ...	32–37	32–37	32–37	ASTM D4052–96e01.
Total sulfur, ultra low sulfur	mg/kg ..	7–15			See 40 CFR 80.580.
Total sulfur, low and high sulfur	mg/kg ..		300–500	800–2500	ASTM D2622–07 or alternates as allowed under 40 CFR 80.580.
Aromatics, min. (Remainder shall be paraffins, naphthalenes, and olefins)	g/kg	100	100	100	ASTM D5186–03.
Flash Point, min	°C	54	54	54	ASTM D93–09
Kinematic Viscosity	cSt	2.0–3.2	2.0–3.2	2.0–3.2	ASTM D445–09

¹ASTM procedures are incorporated by reference in § 1065.1010. See § 1065.701(d) for other allowed procedures.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37340, June 30, 2008; 73 FR 59341, Oct. 8, 2008; 75 FR 23057, Apr. 30, 2010; 77 FR 2464, Jan. 18, 2012]

§ 1065.705 Residual and intermediate residual fuel.

This section describes the specifications for fuels meeting the definition of residual fuel in 40 CFR 80.2, including fuels marketed as intermediate fuel. Residual fuels for service accumulation

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and any testing must meet the following specifications:

(a) The fuel must be a commercially available fuel that is representative of

the fuel that will be used by the engine in actual use.

(b) The fuel must meet the specifications for one of the categories in the following table:

TABLE 1 OF § 1065.705—SERVICE ACCUMULATION AND TEST FUEL SPECIFICATIONS FOR RESIDUAL FUEL

Characteristic	Unit	Category ISO-F—										Test method reference ¹	
		RMA 30	RMB 30	RMD 80	RME 180	RMF 180	RMG 380	RMH 380	RMK 380	RMH 700	RMK 700		
Density at 15 °C, max.	kg/m ³	960.0	975.0	980.0	991.0	991.0	991.0	1010.0	1010.0	991.0	1010.0	1010.0	ISO 3675 or ISO 12185:1996/Cor 1:2001 (see also ISO 8217:2005(E) 7.1).
Kinematic viscosity at 50 °C, max.	cSt	30.0		80.0	180.0		380.0			700.0			ISO 3104:1994/Cor 1:1997.
Flash point, min ...	°C	60		60	60		60			60			ISO 2719 (see also ISO 8217:2005(E) 7.2).
Pour point (upper):													
Winter quality, max.	°C	0	24	30	30		30			30			ISO 3016.
Summer quality, max.	6	24	30		30		30			30			ISO 3016.
Carbon residue, max.	(kg/kg)%	10		14	15	20	18	22		22			ISO 10370:1993/Cor 1:1996.
Ash, max.	(kg/kg)%	0.10		0.10	0.10	0.15	0.15			0.15			ISO 6245.
Water, max	(m ³ /m ³)% ...	0.5		0.5	0.5		0.5			0.5			ISO 3733.
Sulfur, max	(kg/kg)%	3.50		4.00	4.50		4.50			4.50			ISO 8754 or ISO 14596:1998/Cor 1:1999 (see also ISO 8217:2005(E) 7.3).
Vanadium, max ...	mg/kg	150		350	200	500	300	600		600			ISO 14597 or IP 501 or IP 470 (see also ISO 8217:2005(E) 7.8).

Total sediment potential, max.	(kg/kg)%	0.10	0.10	0.10	0.10	0.10	ISO 10307-2 (see also ISO 8217:2005(E) 7.6).
Aluminium plus silicon, max.	mg/kg	80	80	80	80	80	ISO 10478 or IP 501 or IP 470 (see also ISO 8217:2005(E) 7.9).
Used lubricating oil (ULO), max.	.....	Fuel shall be free of ULO. We consider a fuel to be free of ULO if one or more of the elements zinc, phosphorus, or calcium is at or below the specified limits. We consider a fuel to contain ULO if all three elements exceed the specified limits.					IP 501 or IP 470 (see ISO 8217:2005(E) 7.7). IP 501 or IP 500 (see ISO 8217:2005(E) 7.7). IP 501 or IP 470 (see ISO 8217:2005(E) 7.7).
Zinc	mg/kg					15	
Phosphorus .....	.....					15	
Calcium .....	.....					30	

¹ISO procedures are incorporated by reference in § 1065.1010. See § 1065.701(d) for other allowed procedures.

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[73 FR 37340, June 30, 2008]

§ 1065.710 Gasoline.

(a) Gasoline for testing must have octane values that represent commercially available fuels for the appropriate application.

(b) There are two grades of gasoline specified for use as a test fuel. If the

standard-setting part requires testing with fuel appropriate for low temperatures, use the test fuel specified for low-temperature testing. Otherwise, use the test fuel specified for general testing. The two grades are specified in Table 1 of this section.

TABLE 1 OF § 1065.710—TEST FUEL SPECIFICATIONS FOR GASOLINE

Item	Units	General testing	Low-temperature testing	Reference procedure ¹
Distillation Range:				
Initial boiling point	°C	24–35 ²	24–36.	ASTM D86–07a.
10% point	°C	49–57	37–48	
50% point	°C	93–110	82–101.	
90% point	°C	149–163	158–174.	
End point	°C	Maximum, 213	Maximum, 212.	
Hydrocarbon composition:				
Olefins	m ³ /m ³	Maximum, 0.10	Maximum, 0.175	ASTM D1319–03.
Aromatics .....	.....	Maximum, 0.35	Maximum, 0.304.	
Saturates .....	.....	Remainder	Remainder.	
Lead (organic)	g/liter	Maximum, 0.013	Maximum, 0.013	ASTM D3237–06e01.
Phosphorous	g/liter	Maximum, 0.0013	Maximum, 0.005	ASTM D3231–07.
Total sulfur	mg/kg	Maximum, 80	Maximum, 80	ASTM D2622–07.
Volatility (Reid Vapor Pressure)	kPa	60.0–63.4 ^{2,3}	77.2–81.4	ASTM D5191–07.

¹ ASTM procedures are incorporated by reference in § 1065.1010. See § 1065.701(d) for other allowed procedures.
² For testing at altitudes above 1,219 m, the specified volatility range is (52.0 to 55.2) kPa and the specified initial boiling point range is (23.9 to 40.6) °C.
³ For testing unrelated to evaporative emissions, the specified range is (55.2 to 63.4) kPa.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37341, June 30, 2008]

§ 1065.715 Natural gas.

(a) Except as specified in paragraph (b) of this section, natural gas for testing must meet the specifications in the following table:

TABLE 1 OF § 1065.715—TEST FUEL SPECIFICATIONS FOR NATURAL GAS

Item	Value ¹
Methane, CH ₄	Minimum, 0.87 mol/mol.
Ethane, C ₂ H ₆	Maximum, 0.055 mol/mol.
Propane, C ₃ H ₈	Maximum, 0.012 mol/mol.
Butane, C ₄ H ₁₀	Maximum, 0.0035 mol/mol.
Pentane, C ₅ H ₁₂	Maximum, 0.0013 mol/mol.
C ₆ and higher	Maximum, 0.001 mol/mol.
Oxygen	Maximum, 0.001 mol/mol.
Inert gases (sum of CO ₂ and N ₂)	Maximum, 0.051 mol/mol.

¹ All parameters are based on the reference procedures in ASTM D1945–03 (incorporated by reference in § 1065.1010). See § 1065.701(d) for other allowed procedures.

(b) In certain cases you may use test fuel not meeting the specifications in paragraph (a) of this section, as follows:

(1) You may use fuel that your in-use engines normally use, such as pipeline natural gas.

(2) You may use fuel meeting alternate specifications if the standard-setting part allows it.

(3) You may ask for approval to use fuel that does not meet the specifications in paragraph (a) of this section,