

25th WHDC Beijing, 16th October 2008

OICA proposal on biofuel specification

Average Reference Fuel

Fuel Specification	USA	EU	Japan	Compromise
Cetane number [-]	40 - 50	52 - 54	53 - 57	45 - 55
Density [kg/m ³]	840 - 865	833 - 837	824 - 840	835 - 845
50 % BP [°C]	243 - 282	min 245	225 - 295	243 - 295
FBP [°C]	321 - 366	max 370	max 370	321 - 366
Viscosity [mm ² /s]	2.0 – 3.2	2.3 - 3.3	3.0 - 4.5	2.0 - 4.0
Sulfur [ppm]	7 - 15	max 10	max 50 (10)	max 15
Aromatics [%]	min. 10	-	max 25	10 - 25
PAH [%]	-	2.0 - 6.0	max 5.0	2.0 - 6.0
Lubricity [µm]	-	max 400	-	-

PROPERTIES	UNITS	ISO	ASTM	JIS	Other
Cetane Number	-	5165	D 613	K 2280	
Density @ 15°C	kg/m ³	3675 12185	D 4052	K 2249	
T50					
T90, T95, FBP	°C	3405	D 86	K 2254	
Viscosity @ 40°C	mm ² /s	3104	D 445	K 2283	
Sulphur content	mg/kg	20846 20884	D 5453 D 2622	K 2541	
Total aromatics content	% m/m		D 5186	EN 12916	
PAH content (di+, tri+)	% m/m		D 2425	EN 12916	
Lubricity (HFRR wear scar diameter @ 60°C)	micron	12156-1.3	D 6079		CEC F-06-A

The following is to be added to reference fuel specifications:

Parameter	Unit	Limits		Test method
		Minimum	Maximum	
Oxidation stability@110°C ^{1,2}	h	20,0		EN14112
FAME ³	%v/v	4,5	5,5	EN14078

¹⁾ Even though oxidation stability is controlled, it is likely that shelf life will be limited. Advice shall be sought from the supplier as to storage conditions and life

²⁾ Oxidation stability can be demonstrated by EN-ISO 12205 or by EN 14214. This requirement shall be reviewed based on CEN/TC19 evaluations of oxidative stability performance and test limits.

³⁾ FAME quality according EN 14214 (USA ASTM D 6751)

WHITE PAPER

ON

**INTERNATIONALLY COMPATIBLE BIOFUEL
STANDARDS**

**TRIPARTITE TASK FORCE
BRAZIL, EUROPEAN UNION &
UNITED STATES OF AMERICA**

DECEMBER 31 2007

The immediate task was to classify the various specifications² into three categories:

- Category A: specifications that are already similar;
- Category B: specifications with significant differences between parameters and methods, but which might be aligned by work on documentary standards and measurement standards; and
- Category C: specifications with fundamental differences, perhaps due to emissions or environmental regulations within one or more regions, which are not deemed bridgeable in the foreseeable future.

Category A <i>similar</i>	Category B <i>significant differences</i>	Category C <i>fundamental differences</i>
sulfated ash	total glycerol content	sulfur content
alkali and alkaline earth metal content	phosphorus content	cold climate operability
free glycerol content	carbon residue	cetane number
copper strip corrosion	ester content	oxidation stability
methanol & ethanol content	distillation temperature	mono, di-, tri-acylglycerides
acid number	flash point	density
	total contamination	kinematic viscosity
	water content & sediment	iodine number
		linolenic acid content
		polyunsaturated methyl ester

2.5.5.6 Annex 3: Biodiesel Specification Requirements

Property	Test Methods			Limits			
	USA ASTM D6751	EU EN 14214	Brazil ANP 42	Units	USA ASTM D 6751	EU EN 14214	Brazil ANP 42
Sulfated Ash	D874	ISO 3987	ABNT NBR 6294/ ISO 3987/ ASTM D874	% mass	0.020 max	0.02 max	0.02 max
Group I Metals (Na + K)	UOP 391	EN 14108/ EN 14109	EN 14108/ EN 14109	mg/kg	5 max	5 max	10 max
Group II Metals (Ca + mg)	UOP 389	EN 14538	EN 14538	mg/kg	5 max	5 max	Report
Methanol or Ethanol Content	-	EN 14110	ABNT NBR 15343/ EN 14110	% mass		0.20 max	0.50 max
Acid Number	D664	EN 14104	ABNT NBR 14448/ EN 14104/ ASTM D664	mgKO H/g	0.50 max	0.50 max	0.80 max
Free Glycerol	D6584	EN 14105/ EN 14106	ABNT NBR 15341/ EN 14105/ EN 14106	% mass	0.02 max	0.02 max	0.02 max
Total Glycerol	D6584	EN 14105	ABNT NBR 15344/ EN 14105/ ASTM D6584	% mass	0.24 max	0.25 max	0.38 max
Copper Strip Corrosion	D130	EN 2160	ABNT NBR 14359/ EN 2160/ ASTM D130	Rating	Class 3	Class 1	Class 1

Property	Test Methods			Units	Limits		
Phosphorus Content	D4951	EN 14107	EN 14107/ ASTM D4951	% mass	0.001 max	0.0010 max	Report
Carbon Residue (on 100% Sample)	D4530	EN 10370	EN 10370/ ASTM D4530	% mass	0.050 max		0.10 max
Ester Content	-	EN 14103	ABNT NBR 15342/ EN 14103	% mass	-	96.5 min	Report
Distillation Temperature, 90% Recovered	D1160	-	D1160	°C	360 max	-	360 max
Flash Point	D93	EN 3679	ABNT NBR 14598/ EN 3679/ ASTM D93	°C	130.0 min	120 min	100 min
Total Contamination	-	EN 12662	EN 12662	mg/kg	-	24 max	Report
Water and Sediment	D2709	-	D2709	% volume	0.050 max		0.050 max
Water Content		EN 12937		mg/kg	-	500 max	
Oxidation Stability, 110°C	EN 14112	EN 14112	EN 14112	hours	3.0 min	6.0 min	6.0 min

Property	Test Methods			Units	Limits		
Monoacylglycerol Content	-	EN 14105	ABNT NBR 15342/ EN 14105	% mass		0.80 max	-
Diacylglycerol Content	-	EN 14105	ABNT NBR 15342/ EN 14105	% mass		0.20 max	-
Triacylglycerol Content	-	EN 14105	ABNT NBR 15344/ EN 14105	% mass		0.20 max	-
Sulfur Content	D5453	EN 20846/ EN 20884	EN 20846/ EN 20884/ ASTM D5453	mg/kg	15/500	10	500 (note 3)
Cloud Point	D2500	EN 23015		°C	Report		
Cold Filter Plugging Point	D6371	EN 116	ABNT NBR14747/ ASTM D6371	°C		(5 max (Grade A) 0 max (Grade B) -5 max (Grade C) -10 max (Grade D) -15 max (Grade E) -20 max Grade F)	
Density at 15°C		EN 3675/ EN 12185		kg/m ³		860 - 900	
Density at 20°C			ABNT NBR 7148/ ABNT NBR 14065/ ASTM D1298/ ASTM D4052	kg/m ³			Report
Linolenic Acid Methyl Ester	-	EN 14103	-	% mass	-	12.0 max	-

Property	Test Methods			Units	Limits		
Polyunsaturated (≥ 4 double bonds) Methyl Esters				% mass	-	1 max	-
Cetane Number	D 613	EN 5165	EN 5165 / D613		47 min	51.0 min	Report
Iodine Value	-	EN 14111	EN ISO14111	g iodine/ 100 g	-	120 max	-

2. Technical data on fuels for testing vehicles with compression ignition engines

Type: Diesel (B5)

Parameter	Unit	Limits ¹		Test method
		Minimum	Maximum	
Cetane number ²		52,0	54,0	EN-ISO 5165
Density at 15 °C	kg/m ³	833	837	EN-ISO 3675
Distillation:				
- 50 % point	°C	245	—	EN-ISO 3405
- 95 % point	°C	345	350	EN-ISO 3405
- final boiling point	°C	—	370	EN-ISO 3405
Flash point	°C	55	—	EN 22719
CFPP	°C	—	- 5	EN 116
Viscosity at 40 °C	mm ² /s	2,3	3,3	EN-ISO 3104
Polycyclic aromatic hydrocarbons	% m/m	2,0	6,0	EN 12916
Sulphur content ³	mg/kg	—	10	EN ISO 20846 / EN ISO 20884
Copper corrosion		—	Class 1	EN-ISO 2160
Conradson carbon residue (10 % DR)	% m/m	—	0,2	EN-ISO 10370
Ash content	% m/m	—	0,01	EN-ISO 6245
Water content	% m/m	—	0,02	EN-ISO 12937
Neutralisation (strong acid) number	mg KOH/g	—	0,02	ASTM D 974
Oxidation stability ⁴	mg/ml	—	0,025	EN-ISO 12205
Lubricity (HFRR wear scan diameter at 60 °C)	µm	—	400	EN ISO 12156
Oxidation stability @ 110 °C ^{4,6}	h	20,0		EN 14112
FAME ⁵	% v/v	4,5	5,5	EN 14078
1 The values quoted in the specifications are 'true values'. In establishment of their limit values the terms of ISO 4259 Petroleum products – Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R (R = reproducibility). Notwithstanding this measure, which is				