November 05, 2019

Australia Implements New Specifications for Biodiesel, E85 and Automotive LPG

Stratas Advisors

As part of the outcome of the 2015 review of the Fuel Quality Standards Act 2000, which led to the review of legislative instruments made under the Act, the Australian government registered new fuel quality standards which set new specifications for biodiesel (B100), E85 and automotive LPG on Australia's Federal Register of Legislation in September 2019. Besides new fuel specifications, new fuel quality information standards for ethanol blended gasoline and E85, as well as fuel quality standards guidelines for the Register of Prohibited Fuel Additives incorporating changes of administrative nature were also incorporated on the Federal Register of Legislation.

Prior to registration of the abovementioned legislative instruments, new specifications for gasoline, automotive diesel and fuel ethanol were registered on Australia's Federal Register of Legislation on Mar. 28, 2019 (see Reports & Analysis, Apr. 24, 2019).

Since Oct. 1, 2019, all of the above legislative instruments came into effect nationwide, replacing previous legislative instruments which were due to sunset on Oct. 1, 2019 (see table below). Details on the developments of the review are available in the following reports:

- "Better Fuel for Cleaner Air" Draft Regulation Impact Statement Provides Fuel Policy Options for Australia, Mar. 5, 2018
- Australia's "Better Fuel for Cleaner Air" Discussion Paper Proposes Changes to Fuel Specifications, Feb. 24, 2017
- 2015 Review of Australia's Fuel Quality Standards Act 2000, Oct. 28, 2015

Summary of Past and Current Australian Fuel Quality Legislative Instruments

Fuel Type	Past		Current		
	Legislative Instruments Setting Fuel Specifications				
	Implementation Date	Name of Principal Legislative Instrument	Implementation Date	Name of Principal Legislative Instrument	Sunset Date
Gasoline	Jan. 1, 2002	Fuel Standard (Petrol) Determination 2001 [F2006B01339]	Oct. 1, 2019	Fuel Quality Standards (Petrol) Determination 2019 [F2019L00455]	Apr. 1, 2029

Automotive Diesel	Jan. 1, 2002	Fuel Standard (Automotive Diesel) Determination 2001 [F2006C00554]	Oct. 1, 2019	Fuel Quality Standards (Automotive Diesel) Determination 2019 [F2019L00456]	Apr. 1, 2029
Fuel Ethanol	June 28, 2008	Fuel Standard (Petrol) Determination 2001 [F2008C00344]	Oct. 1, 2019	Fuel Quality Standards (Petrol) Determination 2019 [F2019L00455]	Apr. 1, 2029
Biodiesel	Sep. 19, 2003	Fuel Standard (Biodiesel) Determination 2003 [F2006B01373]	Oct. 1, 2019	Fuel Quality Standards (Biodiesel) Determination 2019 [F2019L01268]	Oct. 1, 2029
E85	Nov. 1, 2012	Fuel Standard (Ethanol E85) Determination 2012 [F2012L01770]	Oct. 1, 2019	Fuel Quality Standards (Ethanol E85) Determination 2019 [F2019L01265]	Oct. 1, 2029
Automotive LPG	Mar. 1, 2004	Fuel Standard (Autogas) Determination 2003 [F2006B01378]	Oct. 1, 2019	Fuel Quality Standards (Autogas) Determination 2019 [F2019L01266]	Oct. 1, 2029
Other Legislative Instruments					
Labeling for Ethanol Blends	Mar. 1, 2004	Fuel Quality Information Standard (Ethanol) Determination 2003 [F2006C00551]	Oct. 1, 2019	Fuel Quality Standards (Ethanol) Information Standard 2019 [F2019L01280]	Oct. 1, 2029
Labeling for E85	Nov. 1, 2012	Fuel Quality Information Standard (Ethanol E85) Determination 2012 [F2012L01771]	Oct. 1, 2019	Fuel Quality Standards (Ethanol E85) Information Standard 2019 [F2019L01281]	Oct. 1, 2029
Fuel Additives	Sep. 24, 2003	Fuel Quality Standards (Register of Prohibited Fuel Additives) Guidelines 2003 [F2007B01063]	Oct. 1, 2019	Fuel Quality Standards (Register of Prohibited Fuel Additives) Guidelines 2019 [F2019L01279]	Oct. 1, 2029

Source: Stratas Advisors, October 2019

Biodiesel

Several amendments to the biodiesel specifications were made through the implementation of Fuel Quality Standards (Biodiesel) Determination 2019 [F2019L01268]. Significant changes include the addition of new limits for monoglycerides, diglycerides and triglycerides to ensure vehicle operability and a new limit for cold soak filterability to ensure cold flow performance of the resulting biodiesel blend. Other changes include the relaxation of the maximum density limit, tightening of limits for acid value, phosphorus and oxidation stability, inclusion of a new limit for water, as well as the removal of requirements for cetane number and water and sediment (see table below). The changes also align Australia's biodiesel specifications more closely with EU's biodiesel specifications set under EN 14214:2012, with the exception for cold soak filterability, which was set based on ASTM D 6751-18 of the U.S. (see EU's Biofuels Specifications and U.S. Biofuels Specifications).

Changes for Biodiesel Specifications

Spec Name	Fuel Quality Standards (Biodiesel) Determination 2019 [F2019L01268]
Grade Category	On-Road
Effective Date	Oct. 1, 2019
Properties	
Cetane number, min	51.0(1) --> 51.0(2)
Density @ 15°C (60°F), kg/m^3, max	890 --> 900
Water and sediment, vol%, max	0.050 --> Not regulated
Water, mg/kg, max	Not regulated --> 500
Acid value, mg KOH/g, max	0.80 --> 0.50
Monoglycerides, wt%, max	Not regulated --> 0.7
Diglycerides, wt%, max	Not regulated --> 0.2
Triglycerides, wt%, max	Not regulated --> 0.2
Phosphorus, ppm, max	10 --> 4.0
Oxidation stability @ 110°C, hour, min	6 --> 8.0
Cold Soak Filterability, sec, max	Not regulated --> 360

Notes:

(1) Or derived cetane number: 51.0 min

(2) Derived cetane number

Source: Department of the Environment and Energy, September 2019

Current Biodiesel Specifications

	2019	2019
Spec Name	Fuel Standards (Biodiesel) Determination 2003	Fuel Quality Standards (Biodiesel) Determination 2019
Grade	-	-
Grade Category	On-road	On-road
Effective Date	Feb, 2006	Oct, 2019
Source	Department of the Environment	Department of the Environment and Energy
Additional Comments		
Properties		
Cetane number, min	51.0 (1)	51.0 (2)
Ester content (concentration), wt%, min	96.5	96.5
Sulfur, ppm, max	10	10
Density @ 15°C (60°F), kg/m3, max	890	900
Density @ 15°C (60°F), kg/m3, min	860	860
Viscosity @ 40°C, cSt, max	5.0	5.0
Viscosity @ 40°C, cSt, min	3.5	3.5
Flash Point, °C, min	120.0	120.0
Carbon residue 10%, wt%, max	0.30	0.30
Water and sediment, vol%, max	0.050	

	2019	2019
Water, vol%		(3)
Sulfated Ash, wt%, max	0.020	0.020
Total contamination, ppm, max	24	24
Copper corrosion, 3hr @ 50°C, merit (class), max	1	1
Acid value, mg KOH/g, max	0.80	0.50
Alcohol		
Methanol, vol%, max	0.20	0.20
Monoglycerides, wt%, max		0.7
Diglycerides, wt%, max		0.2
Triglycerides, wt%, max		0.2
Glycerol		
Free Glycerol, wt%, max	0.020	0.020
Total, wt%, max	0.250	0.250
Phosphorus, ppm, max	10	4.0
Alkali, Group I (Na, K), ppm, max	5	5
Metals, Group II (Ca, Mg), ppm, max	5	5
Distillation		
T90, °C, max	360	360
Oxidation stability @ 110°C, hour, min	6	8.0
Cold Soak Filterability, sec, max		360

(1) Or derived cetane number: 51.0 min

(2) Derived cetane number

(3) 500 mg/kg max

E85

Since Oct. 1, 2019, Fuel Quality Standards (Ethanol E85) Determination 2019 [F2019L01265] tightened the sulfur limit for E85 from 70 ppm to 52 ppm max, accounting for the sulfur reduction from 30 ppm to 10 ppm max in the fuel ethanol specifications from Oct. 1, 2019. Other notable specifications changes include the tightening of the maximum RVP limit to improve consistency, relaxation of the inorganic chloride limit to align with fuel ethanol specifications, and removal of requirement for C3-C8 alcohols to align with U.S. E85 specifications in ASTM D 5798 (see table below and U.S. Biofuels Specifications). Furthermore, the new E85 specifications require the sulfur limit to be further tightened to 10 ppm max starting from July 1, 2027. This is in line with the sulfur reduction deadline for gasoline, which will be implemented at the same time.

Changes for E85 Specifications

Spec Name	Fuel Quality Standards (Ethanol E85) Determination 2019 [F2019L01265]	
Grade	E85	E85
Grade Category	On-Road	On-Road
Effective Date	Oct. 1, 2019	July 1, 2027
Properties		
Sulfur, ppm, max	70 --> 52	52 --> 10
RVP @ 37.8°C (100°F), kPa, max	65 --> 63	-
C3-C8 alcohols, vol%, max	2.0 --> Not regulated	-
Chloride, inorganic, ppm, max	1 --> 10	-

Source: Department of the Environment and Energy, September 2019

Current E85 Specifications

	2019	2019
Spec Name	Fuel Standard (Ethanol E85) Determination 2012	Fuel Quality Standards (Ethanol E85) Determination 2019
Grade	E85	E85
Grade Category	On-road	On-road
Effective Date	Nov, 2012	Oct, 2019
Source	Department of the Environment	Department of the Environment and Energy
Additional Comments		
Properties		
RON, min	100	100
MON, min	87	87
Sulfur, ppm, max	70	52
Lead, g/l, max	0.005	0.005
Benzene, vol%, max	0.35	0.35
RVP @ 37.8°C (100°F), kPa, min	38	38
RVP @ 37.8°C (100°F), kPa, max	65	63
Distillation		
FBP, °C, max	210	210
Oxygenates		
Methanol, vol%, max	0.5	0.5
Ethanol, vol%, max	85	85
Ethanol, vol%, min	70	70
Ethers (5 or more C atoms), vol%, max	1.0	1.0
C3-C5 alcohols, ppm	(1)	
Phosphorus, g/l, max	0.0013	0.0013
Oxidation stability (Induction period), minutes, min	360	360
Water, vol%	(2)	(2)
Existent gum (solvent washed), mg/100ml, max	5	5.0
Chloride, inorganic, ppm, max	1	10
Copper, ppm, max	0.10	0.10

	2019	2019
Sulfate, ppm, max	4.0	4.0
pH, max	9.0	9.0
pH, min	6.5	6.5
Acidity, wt%, max	0.006 (3)	0.006 (3)

(1) C3-C8 alcohols: 2.0 vol% max

(2) 1.0 wt% max

(3) As acetic acid

Automotive LPG

Changes made by the Fuel Quality Standards (Autogas) Determination 2019 [F2019L01266] were largely minor in nature to improve consistency, such as the amendment of parameter names, specification units and the test method for water. There were no changes to the limits in the automotive LPG specifications.

Current Automotive LPG Specifications

	2019	2019
Spec Name	Fuel Standard (Autogas) Determination 2003	Fuel Quality Standards (Autogas) Determination 2019
Grade	Autogas	Autogas
Grade Category	On-road	On-road
Effective Date	Jul, 2013	Oct, 2019
Source	Department of the Environment and Energy	Department of the Environment and Energy
Additional Comments	Incorporating amendments made in Fuel Standard (Autogas) Amendment Determination 2013	
Properties		
MON, min	90.5	90.5
Sulfur, ppm, max	50 (1)	50 (2)
Vapor pressure @ 37.8°C (100°F), kPa, min	800 (3)	800
Vapor pressure @ 37.8°C (100°F), kPa, max	1530 (3)	1530
Composition		
Total Dienes, max	0.3 mol%	0.3 mol%
Pentane and heavier, max	2.0 mol%	2.0 mol%
Evaporative Residue, max	60 ppm (4)	60 ppm
Water, vol%		Pass
Moisture, ppm	(5)	
Hydrogen sulfide, wt%	Negative	Negative
Copper corrosion, 1hr @ 40°C, merit (class), max	1	1
Odor	(6)	(6)

(1) After stenching; Reduced from 100 ppm max from Dec. 1, 2013

(2) After stenching

(3) @ 40°C

(4) Reduced from 100 ppm max from Dec. 1, 2013

(5) No free water at 0°C

(6) Detectable in air at 20% lower flammability limit (LFL)

Stratas Advisors' Views

With the implementation of the new legislative instruments, the review of fuel quality standards by the Australian government is largely complete at this stage. However, the Australian government has yet to set specifications for B20, which is currently used by select mining operators and truck fleets, on the Federal Register of Legislation. It is unclear if the government would do so in the short to medium term, but Stratas Advisors does not expect B20 specifications to be legislated because it is not widely used in Australia.

