

Specifications guide

Biofuels

Latest update: July 2019

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DEFINITIONS OF THE TRADING LOCATIONS FOR WHICH PLATTS PUBLISHES INDEXES OR ASSESSMENTS

All the assessments listed here employ Platts Assessments Methodology, as published at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/our-methodology/methodology-specifications/platts-assessments-methodology-guide.pdf.

These guides are designed to give Platts subscribers as much information as possible about a wide range of methodology and specification questions.

This guide is current at the time of publication. Platts may issue further updates and enhancements to this guide and will announce these to subscribers through its usual publications of record. Such updates will be included in the next version of this guide. Platts editorial staff and managers are available to provide guidance when assessment issues require clarification.

The following global biofuels guide contains the primary specifications and methodologies for Platts biofuels assessments throughout the world. The various components of this guide are designed to give Platts subscribers as much information as possible about a wide range of methodology and specification issues.

This methodology is current at the time of publication. Platts may issue further updates and enhancements to this methodology and will announce these to subscribers. Such updates will be included in the next version of the methodology. Platts editorial staff and managers will usually be ready to provide guidance when assessment issues require clarification.

ASIA

Assessment	CURRENCY	CODE	Mavg	Wavg	CONTRACT TYPE	CONTRACT BASIS	LOCATION	DELIVERY PERIOD	MIN SIZE	MAX SIZE	UOM
Bioethanol (Fuel Grade)											
Bioethanol CIF Philippines	\$/ cu m	AAWAA00	AAWAA03	AAWAA04	Spot	CIF	Subic Bay, Manila, Batangas		3,000	5,000	cubic meter
Bioethanol CIF Philippines H3	\$/ cu m	AAWAB00	AAWAB03	AAWAB04	Spot	CIF	Subic Bay, Manila, Batangas	30-45 days forward	3,000	5,000	cubic meter
Bioethanol CIF Philippines H4	\$/ cu m	AAWAC00	AAWAC03	AAWAC04	Spot	CIF	Subic Bay, Manila, Batangas	45-60 days forward	3,000	5,000	cubic meter
Bioethanol CIF Philippines H5	\$/ cu m	AAWAE00	AAWAE03	AAWAE04	Spot	CIF	Subic Bay, Manila, Batangas	60-75 days forward	3,000	5,000	cubic meter
Ethanol (Industrial)											
Ethanol Grade B CFR Ulsan	\$/ cu m	AAXVA00	AAXVA03	AAXVA04	Spot	CFR	Ulsan	60-90 days forward	5,000		cubic meter
Biodiesel											
Biodiesel FOB Southeast Asia	\$/mt	AAVSV00			Spot	FOB	Pasir Gudang, Port Klang, Lahad Datu	15-30 days forward	2,000	10,000	metric ton

Asia

Bioethanol CIF Philippines

Platts Asia fuel grade bioethanol assessments are daily assessments basis CIF Philippines based on latest information sourced from the market up to the close of the assessment period at 16:30 Singapore time.

Timing: Platts assesses three time cycles for the CIF Philippines bioethanol arrival. The time cycles are reflective of half-monthly cycles. The daily CIF Philippines marker (AAWAA00) averages the three cycles. The three cycles that Platts publishes are as follows:

- 1) 30-45 days forward
- 2) 45-60 days forward

3) 60-75 days forward

These assessments are rolled over on the 1st and 16th of each month. For example, on April 1, Platts assesses:

- 1) Second half May
- 2) First half June

3) Second half June

These assessments would be rolled over on April 16. They would then read as:

1) First half June

2) Second half June

3) First half July

Basis and locations: CIF Philippines reflect prices basis CIF Subic Bay. Pricing information for other Philippines ports may be taken into account but would be normalized back to the basis location.

Volume: Cargo size of 3,000 – 5,000 cu m, normalised to 3,000 cu m. Other volumes may be taken into consideration but will be normalized back to 3,000 cu m.

Unit: Assessments are published in \$/cubic meters

Terms and conditions: CIF Philippines are assessed Letter of Credit at sight up to 30 days. For deals with usance of greater than 30 days, the value of the extra credit allowance will be normalized.

Quality and Product Purity specifications: Assessments reflect undenatured anhydrous bioethanol and conform to the Philippines National Standard (PNS/DOE QS 007:2005) specifications under the current definitions 3.1 and 3.2 of the standard for use as a blending component in unleaded gasoline.

These specifications include:

Ethanol content/purity: 99.3% min (by volume)

Density at 20 degrees Celsius: 0.7915 kg/liter max

Water content: 0.5% max (by mass)

Methanol: 0.5% max (by mass)

Total acids (as acetic acid): 0.007% max (by mass)

The CIF Philippines assessments reflect product at a temperature of 20 degree Celsius.

Ethanol Grade B CFR Ulsan

Platts Ethanol Grade B CFR Ulsan is a physical spot price assessment made daily based on latest information sourced from the market up to the close of the assessment window at

16:30 Singapore time. In the absence of representative CFR Ulsan price information, Platts may also refer to FOB prices from relevant supply origins using prevailing vessel sizes and spot freight rates.

Timing: Ethanol Grade B CFR Ulsan reflects spot cargoes arriving in Ulsan 60-90 days forward from the day of assessment.

Basis and locations: CFR Ulsan, South Korea.

Unit of measurement: \$/cu m.

Volume: Typical cargo sizes normalized to 5,000 cu m.

Terms and conditions: Industry standard payment terms.

Quality specifications: The assessment will reflect typical grade B ethanol specifications, from non GM sugarcane, normalized to standard Ethanol Grade B at 20 degrees with a maximum of 40mg/100ml of higher alcohols.

Biodiesel FOB Southeast Asia

Daily assessments FOB Southeast Asia are based on the latest information sourced from the market up to the close of the assessment window at 16:30 Singapore time

EUROPE

Assessment	CURRENCY CODE	Mavg	Wavg	CUR CONV	CONTRACT TYPE	CONTRACT BASIS	LOCATION	DELIVERY PERIOD	MIN SIZE	MAX SIZE	UOM	CONV
Ethanol (Fuel Grade)												
Ethanol T2 FOB Rotterdam German Spec	€/cu m	AAVLD00	AAVLD03	AAVLD04	Spot	FOB	Rotterdam	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	2,000	cubic meter	
Ethanol T2 FOB Rotterdam	€/cu m	AAYDT00	AAYDT03	AASLT00	Spot	FOB	Rotterdam	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	2,000	cubic meter	
Ethanol T2 FOB Rotterdam German Spec	\$/cu m	AAVLD10	AAVLD13	AAVLD14	Spot	FOB	Rotterdam	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	2,000	cubic meter	
Ethanol T2 FOB Rotterdam	\$/cu m	AAYDT10	AAYDT13	AAYDT14	Spot	FOB	Rotterdam	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	2,000	cubic meter	
Ethanol T1 FOB Rotterdam	\$/cu m	AAWUQ00	AAWUQ03	AAWUQ04	Spot	FOB	Rotterdam	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	2,000	cubic meter	
Ethanol T1 CIF NWE Cargo	\$/cu m	AAYDS00	AAYDS03	AASLS00	Spot	CIF	Rotterdam	10-25 days forward (Monday-Friday)	3,000		cubic meter	
Ethanol futures												
T2 Ethanol Futures Assessment M1	€/cu m	AAXCL00			Future	Ethanol T2 FOB Rotterdam (AAYDT00)			1,000		cubic meter	
T2 Ethanol Futures Assessment M2	€/cu m	AAXCM00			Future	Ethanol T2 FOB Rotterdam (AAYDT00)			1,000		cubic meter	
T2 Ethanol Futures Assessment M3	€/cu m	AAXCN00			Future	Ethanol T2 FOB Rotterdam (AAYDT00)			1,000		cubic meter	
T2 Ethanol Futures Assessment M4	€/cu m	AAXC000			Future	Ethanol T2 FOB Rotterdam (AAYDT00)			1,000		cubic meter	
T2 Ethanol Futures Assessment M5	€/cu m	AAXCP00			Future	Ethanol T2 FOB Rotterdam (AAYDT00)			1,000		cubic meter	
T2 Ethanol Futures Assessment M6	€/cu m	AAXCQ00			Future	Ethanol T2 FOB Rotterdam (AAYDT00)			1,000		cubic meter	
Biodiesel												
FAME -10 FOB ARA RED	\$/mt	AAWGH00	AAWGH03	AAWGH04	Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
FAME 0 FOB ARA RED	\$/mt	AAWGI00	AAWGI03	AAWGI04	Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
SME FOB ARA RED	\$/mt	AAWGJ00	AAWGJ03	AAWGJ04	Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
RME FOB ARA RED	\$/mt	AAWKK00	AAWKK03	AAWKK04	Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
PME FOB ARA RED	\$/mt	AAXNZ00			Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
Biodiesel Premiums Assessments												
RED FAME 0 FOB ARA	\$/mt	AAXNT00			Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
RED RME FOB ARA	\$/mt	AAXNU00			Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
RED SME FOB ARA	\$/mt	AAXNX00			Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
RED PME FOB ARA	\$/mt	AAXNY00			Spot	FOB	ARA	3-15 days forward (Monday-Tuesday) 5-15 days forward (Wednesday-Friday)	1,000	3,000	metric ton	
Methyl Tertiary Butyl Ether (MTBE)												
Assessed by the Petchems team (and covered in their methodology)												
Ethyl Tertiary Butyl Ether (ETBE)												
Assessed by the Petchems team (and covered in their methodology)												

Quality: The assessment will reflect palm methyl ester product that conforms to EN 14214 specifications, with a maximum CFPP of plus 13 degrees Celsius, a maximum water content of 350 ppm, and monoglycerides value at 0.5% or lower. The PME assessed adheres to the ISCC certification scheme, in compliance with the EU's Renewable Energy Directive or RED requirements. The assessment reflects PME with Green House Gas (GHG) savings of 48% - 60%. PME with higher or lower GHG than this will be monitored for pricing consistency.

:16:30.

Unit: Biodiesel assessments are published in \$/mt.

Timing: The assessment reflects cargoes loading 15-30 days forward from date of publication.

Basis and location: Assessments include all biodiesel exported on a spot basis from Malaysia at the Malaysian loading ports of Pasir Gudang, Port Klang and Lahad Datu.

Cargo size: 2,000 mt - 10,000 mt. Larger cargo sizes may be taken into consideration but will be normalized back to reference volume range

Europe

T2 Ethanol FOB Rotterdam

Basis and Locations: Prices for T2 ethanol barges are assessed daily on a FOB ARA basis, with nomenclature of FOB Rotterdam. T2 product (duty paid for European-qualified material and free from origin restrictions) in Eur/cu m. Platts also publishes a \$/cu m value for T2 product, using a 16:30 London time assessed value for the Eur/USD exchange rate.

Loading Options: Platts FOB ethanol assessments reflect Amsterdam-Rotterdam-Antwerp loading. The seller will not

incur additional freight costs for loading from ARA loading points, compared to loading from Rotterdam, provided that costs do not exceed standard market rates. The seller will notify the buyer of the port of loading in a time-frame as per standard market practice. The seller must also be prepared to make the volume available through early loading to allow for timing differences between ports to prevent delays and consequent financial losses.

Sustainability Criteria: Platts ethanol assessments reflect fuel ethanol that holds proof of sustainability obtained in the framework of voluntary schemes approved by the EU Commission. Furthermore and upon buyer's request, the seller shall exercise reasonable efforts to provide all necessary documentation for validation of the product batch against Germany's biomass web application system Nabisy. The seller shall also exercise best efforts to provide proof of sustainability documentation within 30 days from barge loading, as per ISCC and Nabisy guidelines. The buyer holds a right to audit the sustainability documentation for the sole purpose of determining the validity and veracity of these documents.

Minimum greenhouse gas saving: Platts FOB Rotterdam T2 and T1 ethanol assessments reflect material with sustainability documentation showing a minimum greenhouse gas saving of 50% when compared to the fossil fuel comparator, as per the European Union's Fuel Quality Directive calculation. This operates in addition to the prevailing Renewable Energy Directive (RED) requirement, with the highest requirement for GHG savings taking precedence.

Timing: Platts ethanol assessments for T2 FOB Rotterdam barges reflect loading 3-15 days forward (Monday-Tuesday) and 5-15 days forward (Wednesday-Friday) from the date of publication.

Volume: Assessments reflects standard, transactable size of 1,000-2,000 mt, normalized to 1,000 mt.

Product Purity Specification: Assessments reflect anhydrous, undenatured ethanol conforming to the latest edition of the

European standard EN 15376 specifications for automotive fuels — ethanol as a blending component for gasoline. The ethanol must also conform to the Netherlands' customs TARIC code of CN 2207 1000, under the European Commission's latest definition of "Undenatured ethyl alcohol of an alcoholic strength by volume of 80% vol. or higher."

Temperature: The European automotive fuel ethanol assessment reflects product at a temperature of 20 degrees Celsius with a reference conversion metric tons to cu m: 0.7887.

Note:

1) The Platts T2 ethanol assessments reflect a barge market, however parties involved in transactions may also opt to load on a vessel or do pump overs. Performance by ship-to-ship transfers can take place as long as mutually agreed. A buyer may opt to nominate a vessel instead of a typical barge, provided the physical dimensions of the performing vessel comply with the requirements of the designated port. Should a buyer opt to nominate a vessel and delay in loading occurs, the seller will face demurrage exposure limited to the transacted size, while the buyer will face demurrage costs consequential to his choice of vessel.

For example, if the sale was done for 3,000 mt and the buyer nominates a 12,500 mt vessel, the seller will incur demurrage cost for 3,000 mt, while the buyer will face the demurrage cost of the remaining 9,500 mt. In this instance leading to a consequential demurrage cost, the seller must show good endeavor and not wilfully obstruct the timely loading process in order to disadvantage the buyer.

2) Effective October 1, 2012, Platts assesses T2 FOB Rotterdam ethanol quote fully at par with the T2 FOB Rotterdam German-spec assessment.

3) Platts European ethanol assessments reflect products that are lawfully sourced within the marketplace. Platts considers in its assessment process ethanol based on its chemical structure

and is not currently distinguishing between feedstocks used in its manufacture.

T2 Ethanol futures

T2 ethanol futures trade in lots of 100 cu m and settle on the arithmetic average of the mid-point of the high and low quotations for physical T2 undenatured ethanol assessments published by Platts during the determined contract month.

Platts T2 ethanol futures values are assessed for the next six calendar months from the date of publication and are denoted in Eur/cu m. The assessments roll forward on the first business day of each month and reflect the close of European markets time stamped at 16:30 London time, subject to the typical guidelines of the Platts Market On Close assessment process.

T1 Ethanol Northwest Europe

Basis and Locations: Prices for T1 (European Union duties unpaid) ethanol barges and cargoes are assessed daily on a FOB Rotterdam and CIF NWE basis, respectively, in \$/cu m.

Sustainability Criteria: Platts ethanol assessments reflect fuel ethanol that holds proof of sustainability obtained in the framework of voluntary schemes approved by the EU Commission.

Minimum greenhouse gas saving: Platts FOB Rotterdam T2 and T1 ethanol assessments reflect material with sustainability documentation showing a minimum greenhouse gas saving of 50% when compared to the fossil fuel comparator, as per the European Union's Fuel Quality Directive calculation. This operates in addition to the prevailing Renewable Energy Directive (RED) requirement, with the highest requirement for GHG savings taking precedence.

Timing: Platts ethanol assessments for T1 FOB Rotterdam barges reflect loading 3-15 days forward (Monday-Tuesday) and 5-15 days forward (Wednesday-Friday) from the date of

publication. Platts European ethanol assessments for T1 CIF Northwest European T1 cargoes reflect delivery 10-25 days forward from date of publication.

Volume: Typical 1,000 mt or their equivalent in cu m for FOB Rotterdam barges and minimum 3,000 mt or their equivalent in cu m for T1 CIF NWE cargoes.

Product Purity and Specification: Assessments are for anhydrous, undenatured ethanol conforming to the latest edition of the European standard EN 15376 specifications for automotive fuels — ethanol as a blending component for gasoline. The ethanol must also conform to the Netherlands' customs TARIC code of CN 2207 1000, under the European Commission's latest definition of "Undenatured ethyl alcohol of an alcoholic strength by volume of 80% vol. or higher.

Temperature: The European automotive fuel ethanol assessment reflects product at a temperature of 20 degrees Celsius with a reference conversion mt to cu m: 0.7887.

T1 ethanol assessment method: The Platts T1 ethanol CIF NWE cargoes and T1 ethanol FOB Rotterdam barge assessments represent the lowest calculated net-forward value from a basket of daily established values, basis 16:30 London time, for FOB Santos anhydrous and FOB Chicago Argo Terminal ethanol, as provided by Platts' regional teams.

For the Platts European T1 CIF NWE assessment, a premium is applied to convert ASTM to EN spec in the case of the Chicago Argo Terminal value. Premiums are applied to convert ANP to EN spec and for Bonsucro Proof of Sustainability in the case of the FOB Santos anhydrous value. All premiums are based on market feedback. The net-forward calculation uses an assessment of freight rates based on freight reports and market feedback. The assessment uses a density value of 0.7887 g/cu m for converting metric tons into cu m.

T1 FOB Rotterdam barges are assessed at a fixed premium of

\$12/cu m versus the T1 CIF NWE assessment, which represents logistics costs.

Platts European ethanol assessments reflect products that are lawfully sourced within the marketplace. Platts considers in its assessment process ethanol based on its chemical structure and is not currently distinguishing between feedstocks used in its manufacture.

Biodiesel FOB ARA

Basis and Locations: Prices are assessed daily on a FOB Amsterdam-Rotterdam-Antwerp basis. The assessments are for T2 product ;duty paid for European-qualified material and free from origin restrictions.

Unit: Assessment is published in \$/mt

Sustainability Criteria: Platts biodiesel assessments reflect product that holds proof of sustainability obtained in the framework of voluntary schemes approved by the EU Commission. Proof of Sustainability documentation should be provided to the buyer within a maximum of 20 working days from the date of Bill of Lading. All biodiesel barge assessments reflect material of 100% virgin vegetable oil (VVO) origin. This applies to both physical material and sustainability certification delivered to the buyer. Platts will continue to publish bids, offers and trades for non-VVO product and the associated data points will be normalized to reflect 100% VVO as part of the assessment process. All Platts FOB ARA biodiesel assessments except for SME reflect material with sustainability documentation showing a minimum greenhouse gas saving of 50% when compared to the fossil fuel comparator, as per the European Union's Fuel Quality Directive calculation.

Platts will only consider bids, offers and transactions where, upon buyer's request, the seller shall exercise reasonable efforts to provide documentation describing:

- 1) the biodiesel feedstock type and percentage of each feedstock in case of blendstocks;
- 2) the country of origin of the feedstock;
- 3) a declaration of land use on which feedstock was grown on or after January 1, 2008.
- 4) The buyer holds a right to audit the sustainability documentation for the sole purpose of determining the validity and veracity of these documents.

Timing: The assessments reflect barges loading 3-15 days forward (Monday-Tuesday) and 5-15 days forward (Wednesday-Friday) from the date of publication.

Volume: a standard size of 1,000-3,000 mt, normalised to 1,000 mt. The operational tolerance reflected for European biodiesel barge assessments is plus or minus 2%.

Product Purity Specification:

Platts assesses five grades of biodiesel - Fatty Acid Methyl Ester minus 10 (FAME -10), FAME 0, Soy Methyl Ester (SME), Rapeseed Methyl Ester (RME) and Palm oil Methyl Ester (PME).

- FAME -10 assessments reflect product that conforms to EN 14214 specifications with a maximum cold filter plugging point (CFPP) of minus 10 degrees Celsius and a maximum water content of 350 ppm.
- FAME 0 assessments reflect product that conforms to EN

14214 specifications with a maximum CFPP of 0 degrees Celsius and a maximum water content of 350 ppm.

- SME assessments reflect product that conforms to EN 14214 specifications with maximum Iodine of 135g/100g, minimum Cetane of 47, a maximum CFPP of minus 3 degrees Celsius and a maximum water content of 400 ppm.
- RME assessments reflect product that conforms to EN 14214 specifications with a maximum CFPP of minus 12 degrees Celsius and a maximum water content of 300 ppm.
- PME assessments will reflect product that conforms to EN 14214 specifications with a maximum CFPP of plus 13 degrees Celsius and a maximum water content of 350 ppm.

Biodiesel blended with any non-bio additives will not be included in the assessment, with the exception of the BHT anti-oxidant. The assessment excludes tax refunds or other rebates.

Calculation for FAME -10 assessments: Platts assessed RED FAME -10 biodiesel using a fixed calculation based on FAME 0, RME, PME and SME assessments. Platts determines the RED FAME -10 assessment as the most competitive method of replacement, using the ratios of blendstocks in the following table, plus a \$5/mt logistic cost. Should the assessment for RED RME be lower than the corresponding RED FAME -10 replacement calculation, logistical costs will be ignored.

Blendstock ratios:

- 1) 10% FAME 0 and 90% RME

- 2) 15% SME and 85% RME
- 3) 8% PME and 92% RME

The logistical costs reflect recirculation and retesting costs. In the event that price indications for FAME -10 are received, then Platts may also reflect those in the assessments.

Biodiesel premium assessments: The majority of spot physical and paper biodiesel trades in Europe are transacted as premiums over the ICE 10ppm low Sulfur Gasoil futures contract. Platts publishes the outright price of all biodiesel qualities and grades and the corresponding premiums for a select number. The premium for each assessment is determined by subtracting from the full outright price assessment the weighted average value of the front month(s) ICE low sulfur gasoil future(s) across the date range reflected in the price assessment.

The weighted average ICE low sulfur gasoil value for the biodiesel assessment laycan is calculated per the following:

Front-month ICE low sulfurgasoil future value x (number of days front-month contract not expired during assessment laycan / total number of days in assessment laycan)

plus

Second-month ICE low sulfur gasoil future value x (number of days front-month contract is expired during assessment laycan / total number of days in assessment laycan)

AMERICAS

Assessment	CURRENCY	CODE	Mavg	Wavg	CONTRACT TYPE	CONTRACT BASIS	LOCATION	DELIVERY PERIOD	MIN SIZE	MAX SIZE	UOM
Methyl Tertiary Butyl Ether (MTBE)											
Assessed by the Petchems team (and covered in their methodology)											
Brazil Ethanol Hydrous and Anhydrous Ethanol (Fuel Grade)											
Ethanol FOB Santos Cargo c/gal	¢/gal	AATAE00			Spot	FOB	Santos, Brazil	10-30 days from date of publication	10,000 cu m		gallon
Ethanol FOB Santos Cargo \$/cu m	\$/cu m	AAWFO00			Spot	FOB	Santos, Brazil	10-30 days from date of publication	10,000 cu m		cubic meter
Ethanol FOB Santos Cargo Real/cu m	Real/cu m	AAWFP00			Spot	FOB	Santos, Brazil	10-30 days from date of publication	10,000 cu m		cubic meter
Hydrous ANP Domestic Ex-mill Ribeirao with taxes	Real/cu m	AAXNQ00			Spot	EXW	ex-mill Ribeirao Preto	1-7 days from date of publication	500 cu m	1,500 cu m	cubic meter
Hydrous FOB Santos/Paranagua \$/cu m	\$/cu m	AAXNR00			Spot	FOB	Santos, Brazil	20-30 days from date of publication	5,000 cu m		cubic meter
Anhydrous ANP Domestic Ex-mill Ribeirao with taxes	Real/cu m	AAXNN00			Spot	EXW	ex-mill Ribeirao Preto	1-7 days from date of publication	500 cu m	1,500 cu m	cubic meter
Grade B FOB Santos/Paranagua	\$/cu m	AAXNS00			Spot	FOB	Santos/Paranagua	20-30 days from date of publication	5,000 cu m		cubic meter
NNE Brazil delivered Suape anhydrous weekly	Real/cu m	AAXFW04			Spot	DAP	Suape, Pernambuco	1-15 days from date of publication	250 cu m	1000 cu m	cubic meter
Raw Sugar Equivalent	c/lb	AAXOA00			Spot	FOB	Santos, Brazil				pound
Biodiesel											
Biodiesel B100 SME Chicago	¢/gal	AAURR00			Spot	FOB	Chicago	3-10 days forward	150	3,000	barrels
Biodiesel B100 SME Houston	¢/gal	AAURS00			Spot	FOB	Houston	3-10 days forward	150	3,000	barrels
Renewable Identification Number (RIN) Assessments											
Ethanol (D6) RIN Rolling Year 1	¢/RIN	RINCY01			Spot				500,000		RIN
Ethanol (D6) RIN Rolling Year 2	¢/RIN	RINCY02			Spot				500,000		RIN
Ethanol (D6) RIN Rolling Year 3	¢/RIN	RINCY03			Spot				500,000		RIN
Biodiesel (D4) RIN Rolling Year 1	¢/RIN	BDRCY01			Spot				250,000		RIN
Biodiesel (D4) RIN Rolling Year 2	¢/RIN	BDRCY02			Spot				250,000		RIN
Biodiesel (D4) RIN Rolling Year 3	¢/RIN	BDRCY03			Spot				250,000		RIN
Advanced biofuel (D5) RIN Rolling Year 1	¢/RIN	ABRCY01			Spot				100,000		RIN
Advanced biofuel (D5) RIN Rolling Year 2	¢/RIN	ABRCY02			Spot				100,000		RIN
Advanced biofuel (D5) RIN Rolling Year 3	¢/RIN	ABRCY03			Spot				100,000		RIN
Cellulosic biofuel (D3) RIN Rolling Year 1	¢/RIN	CBRCY01			Spot				100,000		RIN
Cellulosic biofuel (D3) RIN Rolling Year 2	¢/RIN	CBRCY02			Spot				100,000		RIN
Cellulosic biofuel (D3) RIN Rolling Year 3	¢/RIN	CBRCY03			Spot				100,000		RIN
Ethanol (fuel grade)											
Ethanol Chicago (terminal)	¢/gal	AALRI00			Spot	ITT	ITT Kinder Morgan Argo Terminal, Chicago	5-15 days forward	5,000		barrels
Ethanol Chicago (Rule 11)	¢/gal	AAVWD00			Spot	FOB	Chicago	This week (Monday through Wednesday) Next 145,000 Week (Thursday, Friday)			gallons
Ethanol NYH Barge (M1)	¢/gal	AAMPF00			Spot	FOB	New York Harbor	front-monhth	25,000		barrels
Ethanol NYH Barge (M2)	¢/gal	AAUEG00			Spot	FOB	New York Harbor	second-month	25,000		barrels
Ethanol Houston 5-15 Tank	¢/gal	AATGJ00			Spot	FOB	Houston	5-15 days forward	10,000		barrels
North California Rail Car Ethanol prompt	¢/gal	AAMFT00			Spot	DLvd rail	California; Richmond, Selby terminals	This week (Monday through Wednesday) Next 800 Week (Thursday, Friday)			barrels

AMERICAS

Assessment	CURRENCY	CODE	Mavg	Wavg	CONTRACT TYPE	CONTRACT BASIS	LOCATION	DELIVERY PERIOD	MIN SIZE	MAX SIZE	UOM
South California Rail Car Ethanol prompt	¢/gal	AAMNK00			Spot	Dlvd rail	California; Gardena, Wilmington and Carson terminals	This week (Monday through Wednesday) Next 800 Week (Thursday, Friday)			barrels
Ethanol NoCal Rail Premium to Ethanol Chicago IL Swap Mo01	¢/gal	AAVXD00			Spot	Dlvd rail	California; Richmond, Selby terminals	This week (Monday through Wednesday) Next 800 Week (Thursday, Friday)			barrels
Ethanol SoCal Rail Premium to Ethanol Chicago IL Swap Mo01	¢/gal	AAVYD00			Spot	Dlvd rail	California; Gardena, Wilmington and Carson terminals	This week (Monday through Wednesday) Next 800 Week (Thursday, Friday)			barrels
Low Carbon Fuel Standard credits (LCFS)											
Low Carbon Fuel Standard Carbon Credits Front Quarter	\$/mt of CO2e	AAXYA00			Spot			Quarterly			metric tonnes
		AAXYA03									
Low Carbon Fuel Standard Carbon Credits Second Quarter	\$/mt of CO2e	AAXYZ00			Spot			Quarterly			metric tonnes
		AAXYZ03									
Dried Distiller Grains (DDG)											
Dried Distiller Grains CIF New Orleans barge	\$/st	AADDG00			Spot	CIF	New Orleans	Delivery on a barge that has loaded in the front-month; rolls on 25th of month	1,500		short ton
Dried Distiller Grains FOB Chicago truck	\$/st	ACDDG00			Spot	FOB	Channahon, Illinois	Delivered to railhead during calendar month; 25 rolls on 21st day of the month			short ton

Americas

Brazil ethanol

The daily Brazil ethanol assessments are assessed to a 13:30 US Central Time close in line with the US ethanol assessments.

Ethanol FOB Brazil Cargo (Anhydrous)

Quality: Standard ANP anhydrous quality ethanol.

Timing: Loading 10-30 days forward from date of publication.

Volume: Minimum 10,000 cu m, other volumes may be considered but will be normalized to 10,000 cu m.

Location: Assessment reflects cargoes loaded basis FOB Santos.

Units: \$/cu m.

Notes: If no FOB pricing data is received to determine this

assessment it will be calculated from the anhydrous ex-mill Ribeirao price assessment adjusted for freight, terminal costs and taxes. This assessment is also published daily in \$/gallon and Real/cu m using a 13:30 US Central Time published value for the Real/USD exchange rate .

Hydrous ANP FOB Santos

Quality: Standard ANP hydrous quality ethanol.

Timing: Loading 20-30 days forward from date of publication.

Volume: Minimum 5,000 cu m, other volumes may be considered but will be normalized to 5,000 cu m.

Location: Assessment reflects cargoes loaded basis FOB Santos.

Units: \$/cu m.

Notes: If no input data is received to determine this assessment it will be calculated from the hydrous ex-mill

Ribeirao price assessment adjusted for freight, terminal costs and taxes.

Hydrous ANP domestic ex-mill Ribeirao with taxes

Quality: Standard ANP hydrous quality ethanol.

Timing: Loading 1-7 days forward from date of publication.

Volume: Minimum volume of 500 cu m and maximum of 1,500 cu m. Other volumes may be considered but would be normalized back to the reference range.

Payment: payment on the day of the product transfer to 10 days after the transfer.

Location: Ex-mill Ribeirao Preto, Sao Paulo, other locations may be considered but will be normalized back to the basis location.

Units: Real/cu m.

Taxes: 12% ICMS tax, according to Sao Paulo State law 11.593, published on December 4 2003 by the State Government Legislative Assembly. According to Federal law 12.859 on September 10 2013 PIS/Cofins tax was stated at R\$120/cu m. However it was zero until Dec 31 2016. Effective July 21 2017, the PIS/Cofins tax increased to R\$ 130.90/cu m.

Anhydrous ANP domestic ex-mill Ribeirao with taxes

Quality: Standard ANP anhydrous quality ethanol

Timing: 1-7 days forward from date of publication

Volume: Minimum volume of 500 cu m and maximum of 1,500 cu m. Other volumes may be considered but would be normalized back to the reference range.

Payment: payment on the day of the product transfer to 10 days after the transfer.

Location: ex-mill Ribeirao Preto, Sao Paulo, other locations may be considered but will be normalised back to the basis location

Units: Real/cu m.

Taxes: No ICMS tax. According to Federal law 12.859 on September 10 2013, PIS/Cofins tax was stated at R\$120/cu m. However, since then it was zero until December 31 2016. Effective July 21 2017, the PIS/Cofins tax increased to R\$130.90/cu m.

Ex-mill Hydrous Raw Sugar equivalent

Platts publishes a value of ex-mill Ribeirao hydrous ethanol expressed as a raw sugar equivalent basis Santos in cents/lb. The base for the calculation is the Hydrous ANP domestic ex-mill Ribeirao with taxes assessment. The calculation takes into account the ICMS and PIS tax as well as freight and elevation costs to Santos. Platts also converts the ethanol price to ATR (Total Recoverable sugar) value then to sugar equivalent. To allow an accurate comparison between the

Platts raw sugar equivalent value and the ICE New York Sugar No. 11 futures contract Platts normalizes the polarization quality to 96 degrees from an assumed polarization of between 99.2 to 99.3 pol.

Grade B FOB Santos/Paranagua

Quality: Standard Grade B industrial ethanol.

Timing: Loading 20-30 days forward from date of publication.

Volume: Minimum 5,000 cu m, other volumes may be considered but will be normalized to 5,000 cu m.

Location: Assessment reflects cargoes basis FOB Santos/Paranagua.

Units: \$/cu m.

NNE Brazil delivered Suape anhydrous weekly

Assessment reflects anhydrous ethanol in Suape, the assessment is time-stamped to a 16:30 Sao Paulo time Friday as a weekly assessment.

Quality: Standard ANP anhydrous quality ethanol

Timing: 1-15 days forward from date of publication

Volume: Minimum volume 250,000 liters, or 250 cu m, maximum volume 1,000,000 liters, or 1,000 cu m. Other volumes may also be considered but in relation to the assessed volume range.

Location: DAP (Delivered At Place) basis Suape, Pernambuco. Other locations and Incoterms such as FOB/CIF may be considered but will be normalized back to the basis location. Platts also takes into consideration product produced regionally, transfers from the Center-South region as well as volumes delivered from international locations.

Units: Real/cu m.

Notes: Platts considers standard payment terms, such as payment within 10 days of "delivery."

US Ethanol

Platts US ethanol assessments are daily fuel grade assessments, assessed to a market close of 13:30 Central Time.

US Atlantic Coast ethanol

Basis and Location: FOB New York Harbor

Volume: Minimum of 25,000 barrels.

Quality: Domestic, denatured, refinery grade ethanol; Octane of min 115 (R+M)/2, RVP of min 18 psi.

Units: cents/gallon

Timing: Assessments reflect material loading on an any-month basis, i.e. loading at any point over the two corresponding front-months from date of publication. The front-month assessment will roll to the next month seven calendar days before the end of the month. If the seventh calendar day prior to the end of the prompt month should fall on a public holiday or weekend, the roll to second month will take place on the business day immediately preceding the seventh calendar day.

Platts altered the roll timing to seven calendar days from eight calendar days effective August 10, 2015.

Note: Platts considers LEAP terms standard in the New York Harbor market.

US Gulf Coast ethanol

Basis and Location: FOB Houston

Volume: Minimum of 10,000 barrels.

Quality: Domestic, denatured, refinery grade ethanol; octane of min 115 (R+M)/2, RVP of min 18 psi.

Units: cents/gallon

Timing: Loading 5-15 days forward from date of publication.

RIN Transfer: It is the seller's option to transfer current or prior-year RINs with trades in the FOB Houston Market if ownership of the physical ethanol transfers on or between January 1 and January 31. Transfers after January 31 to December 31 must carry current-year RINs.

Chicago Terminal ethanol

Basis and Location: The assessment reflects Intertank Transfer (ITT) in the Kinder Morgan Argo and Chicago fungible system, which includes the Argo and Chicago (Stony Island) terminals

Timing: Assessments reflect material loading 5-15 days forward from date of publication.

Loading Options: Buyer has the option to take delivery of the product in a method other than by ITT at the Kinder Morgan terminals such as by barge, rail and truck. All incremental costs associated with the chosen offtake option would be borne by the buyer. A seller should not unreasonably withhold any offtake option, and any associated costs for non-ITT offtake options must be demonstrably reasonable and typical.

Platts expects incremental costs, which would include throughput fees for physical offtake, to be around 2.5 cents/gal for barge loading, and 1.5 cents/gal for rail loading and offtake via truck at the Kinder Morgan fungible ethanol system. These costs may be subject to change due to market conditions; any such change in costs for transactions published during the Platts MOC process may be subject to review by Platts, and must be demonstrably reasonable and typical.

Nomination guidelines:

- In the ITT market, the buyer retains the option to nominate the transfer date within a 5 to 15 day forward range; this nomination should take place at least one calendar day in advance of the transfer date.
- For offtake via barge, a buyer should nominate a three-day loading period within the 5-15 day assessment laycan as well as a performing vessel, at least five calendar days prior to the first day of the three-day loading period, subject to terminal acceptance. The seller should nominate a loading terminal at least 48 hours prior to the first day of the three-day loading period.
- If a buyer chooses to take delivery of product via truck, the buyer should nominate a specific lifting date at least one calendar day prior. This is in line with current stated nomination guidelines for ITT.
- For offtake via rail, a buyer should nominate a lifting date at least five calendar days prior.

For all nominations, there will be an end-of-day time cutoff of 15:00 CT (16:00 ET). Any nomination provided after this time would be considered as being for the next day.

Sellers for transactions published during the MOC process should ensure that they make best efforts to seek terminal dates that meet the reported transaction laycan. Platts is aware that physical conditions regarding logistics which are beyond the control of the seller or buyer may result in issues such as late loading. If it becomes clear that it is not possible to secure offtake of product within the 5-15 day assessment laycan via the means nominated by the buyer, the buyer should seek resolution to perform on the transaction via other means, including alternative offtake mechanisms and bookouts.

In addition, since offtake via rail at the Kinder Morgan ethanol

fungible system is available only at the Chicago (Stony Island) terminal, if there is insufficient product at that terminal, a seller may reasonably reject an offtake nomination via rail.

Demurrage: Platts understands that ethanol trades that involve barge loading at the Kinder Morgan fungible system typically include a public dock clause. For transactions published in the MOC process, sellers should ensure that they seek terminal dates that meet the reported transaction laycan and have product available for said laycan. In the event that terminal dates do not meet the reported transaction laycan, the availability of which neither the buyer or seller have control over, the public dock clause would apply. Platts understands the under the commonly used public dock clause for barges loading ethanol at the Kinder Morgan fungible system, laytime commences when the vessel is at the dock.

Volume: Minimum of 5,000 barrels.

Quality: Refinery grade ethanol, Octane of min 115 (R+M)/2, RVP of min 18 psi.

Unit: Cents/gallon

RIN transfer: Chicago Terminal ethanol trades must carry current-year RINs if the transfer date of the physical ethanol is after January 31 to 31 December. For ethanol transfers on or between January 1 and January 31 it is the seller's option to transfer prior-year RINs or current year RINs. The physical ethanol transfer date determines what RIN vintage may be attached, not the trade date.

Chicago (Rule 11)

Basis and Location: Platts daily "Rule 11" Chicago assessment, reflects rail basis Chicago. Rule 11 is a railroad accounting term that refers to a customer shipping their freight "pre-paid" to an intermediate point and "collecting" beyond that intermediate point.

Volume: Minimum five rail car lots or 145,000 gallons.

Timing: Platts has aligned its R11 assessment timing to a This-Week-Shipment (TWS) and Next-Week-Shipment (NWS) system of delivery. Platts assessment Monday through Wednesday will reflect This-Week-Shipment (TWS). On Thursday and Friday, the timing of the assessment will reflect Next-Week-Shipment (NWS).

RIN transfer: For Rule 11 ethanol trades the bill of lading date is used to determine what RIN vintage may be attached. Bills of lading after January 31 to December 31 must carry current-year RINs. For bills of lading on or between January 1 to January 31 it is the seller's option to transfer prior-year RINs or current year RINs.

California Rail Car Ethanol

Platts assesses ethanol basis California that has a carbon intensity (CI) equal to the annual gasoline CI standard as set by CARB. This update was made July 12, 2017 following a move by CARB to review ethanol pathway applications of both new and legacy pathways. The review gave new CI scores to the fuel pathways, where the fuel pathway CI consists of the sum of the greenhouse gases emitted throughout each stage of the ethanol's production and use. CI is expressed in grams of carbon dioxide equivalent per mega-joule (gCO₂e/MJ). As the annual gasoline standard set by CARB, when changes are set forth by CARB, Platts will inform the market of the changes in the basis CI through subscriber notes.

In a non-obligated ethanol trade the seller will retain any obligation for credits or deficits generated by the actual CI of the ethanol sold.

For the basis California ethanol price assessment Platts takes into consideration transactable market information such as bids, offers and trades that do not have a CI at the annual reference level and normalizes them to the current assessment reference CI level. This normalization may reflect a calculated valuation of the differences in carbon intensities between the values received from market participants and the assessed reference ethanol CI, taking into account the value of the carbon credits under the LCFS as defined by CARB and as assessed by Platts.

Here is an example of normalization of a market indication received by Platts to the Platts assessed "non-obligated" ethanol value.

To find the value in cents/gallon of the difference between a heard indication CI and the basis assessment CI you need to take the annual gasoline standard CI in gCO₂e/MJ as set by CARB minus the CI of the ethanol indication reported. Then take the LCFS carbon credits as published daily by Platts, under the code AAXYA00 divide by 1 million, and multiply by 81.51 MJ/gallon (energy density of ethanol). Take the result of this calculation and multiply by the CI difference previously calculated to get the \$/gal value.

For example:

Platts heard a 79.9 CI ethanol trade basis North Terminal California at 162.00 cents/gal, the 2017 annual gasoline standard CI is 95.02.

- 95.02 minus 79.9 equal 15.12
- The value of LCFS carbon credits for Q1 published by Platts on the corresponding day was \$80/mt.
- \$80/mt divided by 1,000,000 then multiplied by 81.51 (energy density of ethanol) equals \$0.006521/CI
- 15.12 (the difference in the CI values) multiplied by 0.006521 equals \$ 0.098594 /gal or 9.86 cents/gal 'actual CI'

The 79.9 CI ethanol trade heard at 162.00 cents/gal can be normalized by 9.86 cents/gal to give 152.14 cents/gal; an equivalent value for a 95.02 CI ethanol trade.

North California Rail Car Ethanol

Basis and Location: California Delivered rail cars basis the Richmond and Selby terminals.

Timing: This-Week-Shipment (TWS) and Next-Week-Shipment (NWS). Platts timing will reflect on Monday through Wednesday

This-Week-Shipment (TWS) and on Thursday and Friday, the timing of the assessment will reflect Next-Week-Shipment (NWS). For example, on July 10, 2019, the loading timing reflects July 8 through July 14. On July 11 2019, the loading timing will roll to July 15 through to July 21.

Volume: 800 barrels, or 33,600 gallons, representing one single rail car.

Units: c/gal.

Notes: Platts assesses ethanol basis California that has a carbon intensity (CI) equal to the annual gasoline CI standard as set by CARB, referred to as "non-obligated" ethanol. Platts publishes North California ethanol assessments as both flat price indications in cents/gallon and as a premium to the Platts Ethanol Chicago front-month swap.

South California Rail Car Ethanol

Basis and Location: California delivered rail cars basis Gardena, Wilmington and Carson terminals.

Timing: This-Week-Shipment (TWS) and Next-Week-Shipment (NWS). Platts timing will reflect on Monday through Wednesday This-Week-Shipment (TWS) and on Thursday and Friday, the timing of the assessment will reflect Next-Week-Shipment (NWS). For example, on July 10, 2019, the loading timing reflects July 8 through July 14. On July 11 2019, the loading timing will roll to July 15 through to July 21.

Volume: 800 barrels, or 33,600 gallons, representing one single rail car.

Units: c/gal.

Notes: Platts assesses ethanol basis California that has a carbon intensity (CI) equal to the annual gasoline CI standard as set by CARB, referred to as "non-obligated" ethanol. Platts publishes South California ethanol assessments as both flat price indications in cents/gallon and as a premium to the Platts

Ethanol Chicago front-month swap.

Low Carbon Fuel Standard credits (LCFS)

Platts assesses carbon credits under the Low Carbon Fuel Standard (LCFS) as defined by the California Air Resources Board (CARB).

Transfer dates: Platts assesses current quarter and next quarter carbon credits from the date of publication that are to be transferred before the end of the current quarter and next quarter.

Timing: Platts continues to publish the current quarter and next quarter values up until the 15th of the last month of that quarter. The assessment would roll on 15th, unless that day is not a business day, in which case the assessment rolls over on the preceding business day.

Units: US dollars per metric ton (MT) of carbon dioxide equivalent.

US Dried Distillers Grain with Solubles (DDGS)

DDGS FOB Chicago

Basis and Location: Basis FOB Chicago, assessment reflects truck delivered to the Channahon, Illinois, railhead.

Quality: Assessments will reflect export quality DDGS, protein content minimum of 25%, minimum color of 50 (according to the Hunter L test), fat minimum of 6%, and a moisture level in the range of 10% to 12%, standardized to 11.5%.

Volume: 25 short tons (22.6mt), other volumes may be considered but may be normalized to 25 short tons.

Timing: Assessment reflects delivered trucks on a calendar month basis. Platts assesses delivery in the current month until the 21st of that month, when the assessment rolls to delivery over the next calendar month. If the 21st day of the current month should fall on a public holiday or weekend, the roll to next month will take place on the business day immediately after the 21st day of the month.

Units: \$/short ton.

DDGS CIF New Orleans barge

Basis and Location: CIF basis New Orleans, assessment reflects barges delivered to New Orleans.

Quality: Assessments will reflect export quality DDGS, protein content minimum of 25%, minimum color of 50 (according to the Hunter L test), fat minimum of 6%, and a moisture level in the range of 10% to 12%, standardized to 11.5%.

Volume: 1,500 short tons (1,360 mt), other volumes may be considered but will be normalized to 1,500 short tons

Timing: Platts assesses delivery in New Orleans on a barge that has loaded over any period in the current month of the date of publication. Platts rolls to assess delivery from barges that have loaded over the next calendar month on the 25th of the current month. If the 25th day of the current month should fall on a public holiday or weekend, the roll to next month will take place on the business day immediately after the 25th day of the month.

Units: \$/short ton.

US Biodiesel

Platts US biodiesel assessments are timestamped to a 13:30 Central Time market close.

Biodiesel delivered Chicago

Basis and Locations: Chicago assessments reflect truck or rail volume delivered at Argo or other major storage facilities in the Chicago area.

Volume: Truck volume of 150 barrels, rail volume of 700 barrels. Volumes of 1,000 to 3,000 barrels sold FOB in-tank at terminals in Chicago may also be considered and normalized for assessment purposes.

Quality: ASTM specification for Biodiesel (B100): Cetane of min 47, Sulfur of max 15 ppm, Water and sediment of max 0.05% volume, Flash point of minimum 130 degrees Celsius.

Timing: 3-10 days forward from date of publication.

Units: cents/gal.

Biodiesel delivered Houston

Basis and Locations: Houston spot price assessments reflect truck or rail volume delivered in the Houston area.

Volume: Truck volume of 150 barrels, rail volume of 700 barrels. Volumes of 1,000 to 3,000 barrels sold FOB in-tank at terminals in the Houston Ship Channel may also be considered and normalized for assessment purposes.

Quality: ASTM specification for Biodiesel (B100): Cetane of min 47, Sulfur of max 15 ppm, Water and sediment of max 0.05% volume and Flash point of minimum of 130 degrees Celcius.

Timing: 3-10 days forward from date of publication.

Units: cents/gal.

Renewable Identification Number (RIN) assessments

A RIN is a credit issued by the US Environmental Protection Agency, for the purpose of tracking renewable fuel usage. Applicable refiners and importers, called "obligated parties," use RINs to demonstrate to the EPA they have fulfilled their mandated government use of renewable fuels. If the obligated party has not used enough physical product, such as ethanol, it can satisfy the quota by purchasing RINs.

Platts typically assesses RINs for conventional biofuels or "corn based ethanol" (D6), biomass-based diesel (D4), cellulosic biofuel (D3) and advanced biofuel (D5) for the previous year and the current year. When appropriate, Platts will also publish

assessments for the next year vintage RINs.

Platts RIN assessments reflect translatable market information including trade activity, bids and offers. For D3 cellulosic biofuels RIN assessments, Platts may look at the value of the Cellulosic Waiver Credit and D5 Advanced Biofuel RIN value in the absence of market activity. The US Environmental Protection Agency has historically published the value of the next year's CWC in or near December of the current year, however the underlying data for calculating the CWC is published in early September. Platts will publish next-year D3 RIN assessments using a value calculated from the same underlying data the EPA uses starting from the first working day of July, when Platts begins publishing next-year RIN assessments. Next year D3 RIN assessments over July and August will use projections of the next-year CWC based on available data while the assessments from early September will begin using a calculated CWC including all data the EPA will use to calculate the next-year CWC.

Volumes:

The assessments for conventional biofuel or corn based ethanol (D6) RINs reflect the price per RIN and typical volume of 500,000 RINs per trade.

The assessments for biodiesel (D4) RINs reflect the price per RIN and typical volume of 250,000 RINs per trade.

The assessments for cellulosic biofuel (D3) RINs reflect the price per RIN and typical volume of 100,000 RINs per trade.

The assessments for advanced biofuels (D5) RINs reflect the price per RIN and typical volume of 100,000 RINs per trade.

Timing: Transfer of RIN documentation from seller to buyer 5-10 days forward from the date of publication.

Platts assesses year-ahead RINs on the first working day of July of the prior year. For example, 2019 RINs are assessed for the first time on July 2, 2018. The last day of publishing

for the calendar year RINs assessments is the last US working day of January two years after the year in question. For example, the last assessment for 2018 RINs shall be on Friday January 31, 2020.

Transfer dates: Platts reflects current year and previous year RIN where the seller has the obligation to transfer the RIN to the buyer during the first full calendar month forward from date of execution. For example, a seller of a RIN on June 7, 2019, has the obligation to transfer that RIN to the buyer no later than the last working day of July 2019. For year-ahead RIN assessments, the seller has the obligation to transfer the RIN to the buyer no later than the following January 31. For example, if an entity sells a 2019 RIN during July 2018, the seller must transfer that RIN to the buyer no later than January 31, 2019.

Lifetime RINS codes: Effective July 27, 2015, Platts introduced lifetime codes for its RIN assessments. These codes supplement the existing rolling codes, and accompany a RIN throughout its entire lifecycle, from forward year, to current year, to preceding year.

Renewable Volume Obligation

Platts publishes the US Renewable Volume Obligation calculated values in line with the release of the blending mandates under the Renewable Fuel Standard. RVO is the aggregate cost of the Renewable Identification Number percentages per gallon of transportation fuel as mandated by the US Environmental Protection Agency in the Renewable Fuel Standard Program.

To align with typical market practices, Platts calculates the RVO using the value of D4, D6, D5 and D3 biofuel RIN credits as assessed daily by Platts for the respective RVO year or vintage. Each year's RVO will follow the same calendar and publication timings as the corresponding RIN assessments.

Platts publishes the RVO values for three calendar years: The previous year, current year and next year. The previous year RVO cent/gallon value is based on the previous year percentage-per-

RIN breakdown, the current year is based on the current year percentage-per-RIN breakdown and the next year is based on the next year percentage-per-RIN breakdown.

The RVO is calculated by taking each category and vintage RIN value (i.e. 2018 D6, D4, D5 and D3 RINs), multiplying by its EPA mandated percentage and then adding the results together.

For example:

- D6 ethanol RINs daily assessment: 25 cents/RIN
- D5 advanced biofuel daily assessment: 45 cents/RIN
- D4 biodiesel daily assessment: 50 cents/RIN
- D3 cellulosic biofuel daily assessment: \$2.50/RIN

2018 RVO formula:

$$\text{RVO} = 8.3\% (\text{D6}) + 0.471\% (\text{D5}) + 1.74\% (\text{D4}) + 0.159\% (\text{D3})$$

$$\text{RVO} = 8.3\% (25) + 0.471\% (45) + 1.74\% (50) + 0.159\% (250)$$

$$\text{RVO} = 3.5545 \text{ (cents/gal)}$$

The 2018 and 2019 RVO percentages as stated by the RFS will be published as:

	Biodiesel	Ethanol	Adv. Biofuel	Cellulosic
2018 RVO	1.74%	8.30%	0.471%	0.159%
2019 RVO	1.73%	8.26%	0.750%	0.230%

As these renewable fuels are mandated by the EPA and hence subject to change without prior notice, Platts will update the Platts RVO formulas at any time. When such changes are set forth by the EPA, Platts will inform the market of the changes in the formulae through subscriber notes.

Global

Futures and Foreign Exchange assessments

Platts Biofuelscan publishes assessments reflecting the prevailing market value precisely at the MOC close for several futures on Bursa Malaysia (BMD), Intercontinental Exchange (ICE), Euronext and Chicago Board of Trade (CBOT) and foreign exchange values.

16:30 Singapore assessments

An assessment for the front-month crude palm oil futures contract listed on the BMD reflecting prevailing values at 16:30 Singapore is published daily in MYR/mt. The BMD contract rolls forward on the 15th of each calendar month, or if this falls on a holiday, on the preceding business day. From the start of the calendar month until rolling, the assessment reflects the traded value for BMD contract representing the balance of the current month. After the contract rolls until the end of the calendar month, the assessment reflects the traded value for the next month.

The assessed spread between the BMD crude palm oil front-month futures assessment and the ICE gasoil futures contract (PO-GO) for corresponding contractual months is also published

reflecting prevailing values at 16:30 Singapore time. Platts publishes this spread in US dollars per mt and uses the published and prevailing USD/MYR exchange rate at 16:30 Singapore time to convert the BMD palm oil assessment from MYR/mt to USD/mt.

16:30 London assessments

Assessments for the two front months of the gasoil futures contract listed on ICE Futures reflecting prevailing values at 16:30 London time are published in USD/mt. The assessments will roll over to the second and third month contracts on the 5th day of each calendar month until the official expiry of the front month futures contract.

Assessments reflecting the front month of the milling wheat, rapeseed and corn futures contracts listed on Euronext reflecting prevailing values at 16:30 London time are published in Eur/mt.

Assessments reflecting the front month of the soybean oil (USc/lb), corn (USC/bu) and soybean meal (USD/st) contracts listed on CBOT reflecting prevailing values at 16:30 London time are published. The front month assessment will roll to the second month on the 5th of each calendar month (until the official expiry of the existing front month contract).

Platts also reflects in USD/mt, the spread between the first- or second-month soybean oil futures contract as listed on CBOT and the corresponding calendar month's ICE gasoil futures contract (BO-GO). This assessment reflects the front month soybean oil contract until the 5th day of the calendar month of contract expiry. The assessment will roll over to reflect the second-month soybean oil futures contract listed on CBOT on the 5th day of the calendar month of futures contract expiry until the official expiry of the front-month contract. If the 5th day of the calendar month is not a business day in London the spread assessment will roll to reflect the second month futures contract on the next business day.

Platts also publishes an assessment of the prevailing USD/BRL and EUR/USD exchange rate at 16:30 London time.

13:30 CT Houston

Platts also publishes the settle values for the front month soybean oil, corn and soybean meal CBOT futures contracts, where the settle is defined by the exchange at 13:15 Central Time. The futures contract expiry is the business day prior to the 15th calendar day of the contract month as stated by CME.

Platts also publishes an assessment of the prevailing USD/BRL exchange rate at 13:30 Central Time

REVISION HISTORY

July 2019: Platts updated this guide to reflect the change in Ethanol Chicago (terminal) assessment methodology, with effect from June 3, 2019, including new offtake options and nomination guidelines. Platts completed an annual update to sections 1 to 6 of Platts Methodology and Specifications Guides in April 2019, and moved these sections into a standalone Methodology Guide.

April 2019: Platts updated CS Brazil domestic ethanol assessment credit terms, volume.

February 2019: Update RIN code labelling and RVO percentages.

January 2019: Platts reviewed the guide as part of its annual methodology review and made a number of minor edits.

October 2018: Platts clarified T2 ethanol sustainability criteria.

July 2018: Platts revamped sections I-VI.

June 2018: Platts clarified its Ethanol Grade B CFR Ulsan specifications reflecting sugarcane based industrial ethanol.

May 2018: Platts clarified RIN transfers with trades in US ethanol Market on Close assessment processes. Platts changed the basis of the T2 ethanol assessment to FOB ARA from FOB Rotterdam.

November 2017: Platts reviewed the guide as part of its annual methodology review. Updated Loading rate, dates, timing and locations, adding normalization. In addition, ICE Settlements, Open Interest and Volumes were also updated with correct contract references. Platts launched NNE Brazil delivered Suape weekly anhydrous ethanol assessment.

October 2017: Platts specified terms of POS in European T2 ethanol.

July 2017: Platts updates California ethanol Carbon Intensity

basis and timing reflected in the assessment.

June 2017: Platts updates the ex-mill Ribeirao Hydrourous expressed as Raw Sugar equivalent methodology

March 2017: Platts revised roll dates for CIF NOLA DDGS barge and FOB Chicago DDGS truck assessments

December 2016: Platts added a minimum 50% greenhouse gas saving requirement for T2 and T1 ethanol assessments.

November 2016: Platts made changes to the formatting and updated language for the Europe section.

October 2016: Annual review: Platts made a number of minor edits and updated language for the Asia, Europe and Americas sections. Platts discontinued its assessment of fuel-grade ethanol FOB Thailand.

July 2016: Platts changed Americas biofuels Market on Close assessment time to 14:30 Eastern Standard Time (13:30 CT) from 1515 EST (14:15 CT). Platts updated the guide to reflect a clarification regarding the delivery ports taken into consideration for the CIF Philippines ethanol assessments. Platts amended language for the Asian section of Futures and Foreign Exchange assessments to clarify the assessment month used on Bursa Malaysia (BMD) and the process in which the front month rolls over. Platts updated the guide to reflect changes made to the Biodiesel FOB Southeast Asia assessment. Beginning 1 July, 2016, Platts assesses RED compliant PME at the Malaysian loading ports of Port Klang, Pasir Gudang and Lahad Datu which adheres to EN14214 quality specifications with monoglyceride levels of 0.5% or less.

May 2016: Platts updated its methodology to reflect an alternate assessment methodology for D3 cellulosic RINs when market activity is not available.

April 2016: Platts updated the guide to reflect changes made to the FOB Rotterdam T2 ethanol assessments. As of April 1, 2016, Platts FOB Rotterdam T2 assessments reflect a FOB Rotterdam basis with loading options in Amsterdam and Antwerp. Platts updated Chicago terminal ethanol ITT methodology to include nomination time as originally stated in 2009.

January 2016: References to non-RED biodiesel FOB ARA assessments removed, following the discontinuation of those assessments effective January 1, 2016.

December 2015: The methodology guide was updated with further description and clarification of calculated values of the US Renewable Volume Obligation in accordance with the release of the blending mandates under the Renewable Fuel Standard. Platts also removed references to the FOB Singapore ethanol, following the discontinuation of its assessment effective Dec 21. References to non-RED biodiesel FOB ARA assessments removed, following the discontinuation of those assessments effective January 1, 2016.

October 2015: Platts updated the guide with the new assessment Ethanol Grade B CFR Ulsan, effective October 1. Platts updated guide with new assessments of US Dried Distillers Grain CIF basis New Orleans barge and FOB Chicago truck or rail launched October 1, 2015.

September 2015: Platts updated the guide with: new US 'lifetime' RINS codes; updated methodology around the roll dates for the Atlantic Coast ethanol assessments; a clarification on specifications for its FOB Southeast Asia biodiesel assessment; a clarification on methodology for T1 ethanol CIF NWE cargo and FOB Rotterdam barge assessments.

July 2015: Platts clarified and updated its RINS rolling dates and launch cycles, as well as improving the wording around each individual RIN name to align with industry standards on corn-based and biomass-based RINS.

June 2015: Platts removed references to non-RED SME biodiesel FOB ARA barges, following the discontinuation of its assessment effective June 1.

February 2015: This methodology guide was updated to include further description of Platts' processes and practices in survey assessment environments.

January 2015: Platts added a requirement for all FOB ARA

biodiesel assessments (except for non-RED and RED-compliant SME) to reflect material with sustainability documentation showing a minimum greenhouse gas saving of 50% when compared to the fossil fuel comparator, as per the European Union's Fuel Quality Directive calculation.

October 2014: Platts clarified for European biodiesel barges, operational tolerances and the maximum number of days for delivery of Proof of Sustainability documentation.

August 2014: Platts revamped all Agriculture and Biofuel Methodology And Specifications Guides, including its Global Biofuels guide, in August 2014. This revamp was completed to enhance the clarity and usefulness of all guides, and to introduce greater consistency of layout and structure across all published methodology guides. Methodologies for market coverage were not changed through this revamp, unless specifically noted in the methodology guide itself.