

Ethanol Methodology

There are two main types of ethanol – fermentation and synthetic.

The major outlets for industrial ethanol are as a solvent and in chemical synthesis. Some 60% of US industrial demand goes to solvent applications in pharmaceuticals, toiletries and cosmetics, detergents and household cleaners, coatings and inks and processing solvents.

Ethanol is also used as a chemical intermediate for the manufacture of ethyl acetate, ethyl acrylate, acetic acid, glycol ethers and ethylamines, as well as other products. It is also used as an additive to food and beverages.

However, a much larger and growing outlet for ethanol is as a fuel, oxygenate additive to gasoline and a gasoline extender. Globally, fuel ethanol accounts for 73% of production, with beverage ethanol at 17% and industrial ethanol at 10%.

Corn and sugarcane are common feedstocks for fermentation ethanol, along with grain, and sugar beet, while synthetic ethanol's primary feedstock is ethylene. Fuel grade or bio-ethanol is produced from fermentation ethanol sources. Synthetic ethanol cannot be used for fuel ethanol purposes.

The major outlet of fuel ethanol in Europe is in ethyl tertiary butyl ether (ETBE), and also blending, whereby ethanol is used as a fuel oxygenate additive to gasoline and a gasoline extender.

Another use is direct blending, in which ethanol is directly blended into gasoline. Both uses are set to grow following the introduction of the European Union's Renewable Energy Directive (RED) which stipulates that renewable energy should have a minimum 10% share in transport by 2020.

In the US, 92% of fermentation ethanol is used in fuel applications, with 4% going into food and beverages, and 4% as industrial solvents and chemicals.

In Asia, most ethanol produced and traded is fermentation ethanol. The feedstock varies from sugarcane in India, Thailand and Pakistan to corn and tapioca in China. The biggest downstream application in Asia is industrial chemicals – for production of acetic acid and ethyl acetate and also as a solvent in pharmaceuticals and personal care products. The other use is for beverage industries. Hydrous or industrial ethanol is also known as 'B-grade' ethanol, which refers to a second-tier specification grade of Brazilian cane-based hydrous ethanol traded in northeast Asia.

Fuel blending use is increasing in countries like Thailand, China and India. Thailand is the leader in terms of conversion on a large scale to 10% ethanol blended gasoline.

Fuel blending applications are the most important sector driving the ethanol production in Asia. Exports from Asia to Europe and the US have also spurred the fuel demand in these regions.

Ethanol was first produced thousands of years ago by fermentation of carbohydrates and in some countries large volumes are still produced by this method. Synthetic ethanol was first produced industrially in the 1930s by indirect catalytic hydration of ethylene.

Ethanol vapour irritates the eyes and respiratory tract. It may cause effects on the central nervous and on the upper respiratory tract, resulting in irritation, headache, fatigue and lack of concentration. Chronic ingestion of ethanol may cause liver cirrhosis. Vapours can travel to a source of ignition and flash back.

ICIS quotes ethanol in Europe, USA, Asia and Latin America

Frequency:

Ethanol is published weekly on Wednesdays in Europe, Asia and the US. Ethanol Fuel is published weekly on Wednesdays in Europe and on Tuesdays in Latin America.

Ethanol Fuel (EUROPE)

Weekly Price Assessments

Fuel Ethanol Grades 99.3%-99.9%

- FOB RDAM German RED Certified T2 (spot) (EUR/CBM with conversion to EUR/MT)
- FOB RDAM T2 (spot) (EUR/CBM with conversion to EUR/MT)
- FOB RDAM T1 (spot) (USD/CBM with conversion to USD/MT)

Ethanol (EUROPE)

Weekly Price Assessments

Ethanol Domestic Prices 96% Beverage Fermented

- FD UK (GBP/HLT)
- FD FRANCE (EUR/HLT)
- FD GERMANY (EUR/HLT)
- FD ITALY (EUR/HLT)

Ethanol Domestic Prices 99% Industrial Fermented & Synthetic

- FD UK (GBP/MT)
- FD FRANCE (EUR/HLT)
- FD GERMANY (EUR/HLT)
- FD ITALY (EUR/HLT)

Ethanol (Asia)

Fuel Grade – Anhydrous Ethanol Min. 99.5%

- FOB Southeast Asia (USD/CBM converted to USD/tonne)
- CFR SE Asia (Philippines) (USD/CBM converted to USD/tonne)

Hydrous Ethanol – Min. 95%

- CFR NE Asia (USD/CBM converted to USD/tonne)
- FOB SE Asia (USD/CBM converted to USD/tonne)


Ethanol (USA)

Weekly Price Assessments

Industrial Ethanol Contract Prices

- DEL 200 PROOF (USD/GAL)
- DEL 190 PROOF (USD/GAL)

Fuel Ethanol Spot Prices

- ANHYDROUS FOB US MIDWEST (PLANT) (USD/GAL)
 - ANHYDROUS FOB CHICAGO (USD/GAL)
 - ANHYDROUS DEL SOUTHERN CAL (USD/GAL)
 - ANHYDROUS FOB NY HARBOR (USD/GAL)
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Ethanol (Latin America)

Weekly Price Assessments

Fuel Ethanol Plant Prices

- ANHYDROUS EX-WORKS SAO PAULO (BRL/CBM converted to US CTS/GAL)
- HYDROUS EX-WORKS SAO PAULO (BRL/CBM converted to US CTS/GAL)

General Information:

Assessment window: Price assessments are based on information supplied by market participants through the week up to close of business on Wednesdays at 1700 hours in London for Ethanol and Ethanol Fuel, and Tuesdays at 1700 hours in Houston for Ethanol Latin America. Price assessments for Asian ethanol are based on information received from market participants through the week up to the close of business on Wednesday at 1800 hours in Singapore.

Specifications: In Europe, ICIS quotes 99.3%-99.9% anhydrous fuel grade ethanol.

In traditional ethanol markets, European domestic assessments include quarterly and monthly contract prices for 96% grade (fermentation/potable) and 99% grade (industrial “denatured” synthetic and fermentation). In the US, quotes are given for both 200- and 190-proof specifications. The spot fuel assessment reflects 200-proof undenatured alcohol, for blending as a gasoline oxygenate.

Timing: In Europe quotes refer to cargoes loading (FOB) four weeks forward from the date of publication. In the US, industrial ethanol contract quotes refer to cargoes loading (DEL) four weeks forward from the date of publication and fuel ethanol spot quotes refer to cargoes loading 14 days forward from the date of publication. In Asia, quotes for anhydrous grade refer to cargoes usually loading zero to three months forward from the publication date for supplies from southeast Asia and the US. For the hydrous grade, ICIS assesses prices for cargoes originating from Southeast Asia, Pakistan and Brazil for a forward delivery period of three to five months.

Terms: Credit terms are typically 20-30 days from invoicing, depending on source, otherwise 30-60 days after bill of lading date.

Standard cargo size: Standard ethanol cargo sizes are 1,000 tonnes. European prices are also quoted per hectolitre (HLT), hundred litres. Standard fuel ethanol cargo sizes are typically 1,000-3,000 cbm (cubic metres) but 500-600 cbm cargoes may be included. Typical cargo sizes in Asia range from 3,000-15,000 cbm for anhydrous material and 1,000-15,000 cbm for hydrous ethanol.



Assessment basis: European fuel ethanol price quotes are published on a free on board (FOB) Rotterdam basis for the T1, German RED certified T2 and T2 markets. Prices incorporate discussions and confirmed deals across the region. Prices may represent a bid/sell range in the absence of confirmed deals.

European traditional ethanol price assessments are published on a free delivered (FD) basis, incorporating discussions and confirmed deals across the region. European domestic assessments are gross prices typically defining key ethanol accounts settled on a quarterly or monthly basis. Most contracts are priced on a quarterly basis. Accounts with annual volume requirements of 6,000-100,000 hectolitres are included in the assessments. Annual offtake of 10,000 hectolitres represents a medium-sized consumer.

In the US, industrial ethanol list prices, based on distiller list values, are noted as a reference for the market. Price adjustments in the industrial alcohol sector are typically made quarterly, and sellers nominating a price movement will specify whether such initiatives apply to list or contract (off-list) numbers, or both. Values range based on location and regional factors such as freight cost and gasoline blending requirements in the area.

US industrial contract prices address 190- and 200-proof for small-to-medium direct domestic buyers purchasing 50,000-375,000 gal/year.

The fuel ethanol and ethanol reports offer market commentary and analysis including details of traced spot transactions, supply/demand issues, export/import information news, spot prices, contract price negotiations and general sentiment for price direction. Where applicable there is product information, comments on upstream and downstream market developments and general market intelligence including comments on European Union and individual state legislation relating to fuel ethanol and biofuels.

Asian fuel ethanol prices are published on a FOB Southeast Asia and CFR Philippines basis.

The Southeast Asia assessments for anhydrous and hydrous ethanol incorporate discussions and confirmed deals across the region. Prices may include bid-offer range in case no confirmed deals exist.

The zero- to three-month assessment window for the CFR SE Asia (Philippines) assessment for anhydrous ethanol is divided into three monthly blocks. The midpoint of each month's price range reflects deals or the average of the best bid-offer levels for each month in the absence of trade. In situations where there are only deals or bids-offers for one particular month, the inter-month price spread between the current month and other months will be used to form the mid-point value for the months without firm discussions. The highest and lowest mid-point values for the



three months will form the high and low end of the CFR SE Asia (Philippines) published range.

Overall, commentary also includes news on legislations regarding fuel blending, sentiment, production and seasonal factors affecting supply and demand of ethanol. When pertinent, regional comment from the US and European markets is also included in the commentary.

Brazilian prices are for delivery at the plant (EXW). The reference state for delivery plant prices is Sao Paulo. The assessment includes all applicable taxes.

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