



North America Light Olefins Daily: Pricing and Methodology

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Overview

This statement of methodology reflects fundamental principles that form the foundation of IHS Markit **Daily North America Olefins/Polyolefins Report**. It includes detailed information on process, data collection, terms and conditions of price acceptance and product specifications.

The overarching goal of IHS Markit daily chemical price assessment is to provide market participants with a **trusted and independent benchmark**. IHS Markit has no stake in any commodity transactions, is not funded by oil and chemical industry initiatives, and strictly adheres to antitrust guidelines determined by independent legal counsel.

As part of the price assessment process, IHS Markit chemical market analysts are required to exercise best judgment and **adherence to the methodology** so as to ensure the reliability of the data and marker compilation process.

The methodology is continually evolving to reflect changing market realities and IHS Markit takes full responsibility for keeping this statement current.

The IHS Markit North America Olefins/Polyolefins Daily service lists North America daily spot market price assessments for the following light olefin markets:

- **USGC Ethylene (Delivered): (99.90% Purity)**
- **MtB-Nova Ethylene (Delivered): (99.90% Purity)**
- **Choctaw Ethylene (Delivered): (99.90% Purity)**
- **Polymer Grade Propylene (Delivered): (99.5% to over 99.95% Purity)**
- **Refinery Grade Propylene (Delivered): (55%–75% Purity)**

All price assessments are subject to compliance with standard trading conditions with regard to **quality, parcel size, loading/delivery ports, laycans and credit terms** as determined by standard market conventions. For IHS Markit's standard trading conditions and criteria please refer to the *Methodology Product table*.

Product	Daily	Currency	Type Contract/Spot	Basis	Location	Delivery Period	Standard Load Size	Minimum Load Size	Unit	Quality	Calculation / Assessment
USGC Ethylene M1/Current	x	USD	Spot	Delivered	USG	Current month	First to last working days of the month	1 million	lbs	99.90%	Daily methodology doc
USGC Ethylene M2/Next	x	USD	Spot	Delivered	USG	Next month	First to last working days of the month	1 million	lbs	99.90%	Daily methodology doc
USGC Ethylene 45-day Weighted Average M1	x	USD	Spot	Delivered	USG	Current month	16th of prior month to last working day of current month			99.90%	Daily methodology doc
USGC Ethylene 30-day Weighted Average M1	x	USD	Spot	Delivered	USG	Current month	First to last working days of the month			99.90%	Daily methodology doc
USGC Ethylene Full Month Simple Average	x	USD	Spot	Delivered	USG	Current month	16th of prior month to last working day of current month			99.90%	Daily methodology doc
MtB-Nova Ethylene M1/Current	x	USD	Spot	Delivered	MtB	Current month	First to last working days of the month	1 million	lbs	99.90%	Daily methodology doc
MtB-Nova Ethylene M2/Current	x	USD	Spot	Delivered	MtB	Next month	First to last working days of the month	1 million	lbs	99.90%	Daily methodology doc
MtB-Nova Ethylene 45-day Weighted Average	x	USD	Spot	Delivered	MtB	Current month	16th of prior month to last working day of current month			99.90%	Daily methodology doc
MtB-Nova Ethylene 30-day Weighted Average	x	USD	Spot	Delivered	MtB	Current month	First to last working days of the month			99.90%	Daily methodology doc
MtB-Nova Ethylene Full Month Simple Average	x	USD	Spot	Delivered	MtB	Current month	16th of prior month to last working day of current month			99.90%	Daily methodology doc
Choctaw Ethylene	x	USD	Spot	Delivered	Choctaw	Current month	First to last working days of the month	1 million	lbs	99.90%	Daily methodology doc
Choctaw Ethylene	x	USD	Spot	Delivered	Choctaw	Next month	First to last working days of the month	1 million	lbs	99.90%	Daily methodology doc

Product	Daily	Currency	Type Contract/Spot	Basis	Location	Delivery Period	Standard Load Size	Minimum Load Size	Unit	Quality	Calculation / Assessment
Polymer Grade Propylene	x	USD	Spot	Delivered	USG	Current month	First to last working days of the month	1 million	lbs	99.5 to over 99.95%	Daily methodology doc
Polymer Grade Propylene	x	USD	Spot	Delivered	USG	Next month	First to last working days of the month	1 million	lbs	99.5 to over 99.95%	Daily methodology doc
Polymer Grade Propylene 45-day Weighted Average	x	USD	Spot	Delivered	USG	Current month	16th of prior month to last working day of current month			99.5 to over 99.95%	Daily methodology doc
Polymer Grade Propylene 30-day Weighted Average	x	USD	Spot	Delivered	USG	Current month	First to last working days of the month			99.5 to over 99.95%	Daily methodology doc
Polymer Grade Propylene Full Month Simple Average	x	USD	Spot	Delivered	USG	Current month	16th of prior month to last working day of current month			99.5 to over 99.95%	Daily methodology doc
Refinery Grade Propylene	x	USD	Spot	Delivered	USG	Current month	First to last working days of the month	25,000	bbls	55-75%	Daily methodology doc
Refinery Grade Propylene	x	USD	Spot	Delivered	USG	Next month	First to last working days of the month	25,000	bbls	55-75%	Daily methodology doc
Refinery Grade Propylene 45-day Weighted Average	x	USD	Spot	Delivered	USG	Current month	16th of prior month to last working day of current month			55-75%	Daily methodology doc
Refinery Grade Propylene 30-day Weighted Average	x	USD	Spot	Delivered	USG	Current month	First to last working days of the month			55-75%	Daily methodology doc
Refinery Grade Propylene Full Month Simple Average	x	USD	Spot	Delivered	USG	Current month	16th of prior month to last working day of current month			55-75%	Daily methodology doc

The IHS Markit North America Olefins/Polyolefins Daily service also provides specific calculations for the following price references:

45-day weighted average US Gulf Coast (USGC) Ethylene

30-day weighted average USGC Ethylene

45-day weighted average Mont Belvieu-Nova (MtB-N) Ethylene

30-day weighted average MtB-N Ethylene

45-day simple average USGC Ethylene

45-day simple average MtB-N Ethylene

45-day weighted average USGC Polymer-grade Propylene

30-day weighted average USGC Polymer-grade Propylene

45-day simple average USGC Polymer-grade Propylene

45-day weighted average Texas Refinery-grade Propylene

30-day weighted average Texas Refinery-grade Propylene

45-day simple average Texas Refinery-grade Propylene

Daily Price Discovery Process

The North American light olefin price assessment methodology seeks to capture full day transactions, bids and offers for spot market **ethylene, polymer grade propylene and refinery grade propylene**. IHS Markit chemical market analysts will proactively poll market participants via electronic instant messaging (such as ICE Chat, Eikon, Yahoo), email, telephone or face-to-face conversation for price data throughout the North American trading day (9am-4pm Central Standard time).

Analysts will always attempt to collect data from a broad cross section of the North American light olefins sector, including producers, consumers, traders and brokers, so that IHS Markit is not reliant on one source for data.

In order to meet publication deadline, IHS Markit reserves the right not to include transactions received **after 4pm** Central Standard time for consideration in the day's final price assessment process or the revision process. Information received beyond this time will be used at the analyst's discretion only.

Market participants are encouraged to report transactions, **real-time** bids and offers and live market bid-offer ranges directly to IHS Markit. The expressions of bids and offers are regarded as open and executable to the **market at large**. IHS Markit will attempt to gather as much price information from the marketplace as possible and from as many sources as it can, so that data is not being provided from any one source. IHS Markit reserves the right to **re-publish** the market information collected, and closely track the evolution of indicative values throughout the business day. All data collected is **time-stamped** and **archived** for review.

Price Assessment Laycans

IHS Markit tracks market activity throughout the US business day to derive an assessment of spot barge prices levels for specified delivery/loading laycans. Based on 'normal' regional market activity, the following laycans will be assessed:

USGC Ethylene: Month 1 (M1), Month 2 (M2)

MtB-Nova Ethylene: Month 1 (M1), Month 2 (M2)

Choctaw Ethylene: Month 1 (M1), Month 2 (M2)

Polymer Grade Propylene: Month 1 (M1), Month 2 (M2)

Refinery Grade Propylene: Month 1 (M1), Month 2 (M2)

On any given day Month 1 refers to the current month, and Month 2 = current month +1.

Price Assessment Criteria

IHS Markit prices are assessed based on the range of confirmed physical deals transacted and reported during the North American working day (8am-4pm Central Standard time) for the relevant month of assessment. Where only one deal has been confirmed, then that will form the price assessment for the day. Where there is a range of deals for the same month, the lowest and highest traded values will form the range. *On occasions where there is extreme price volatility or severe illiquidity in petrochemical markets, IHS Markit will assess prices at the analysts' discretion as opposed to traded value or last heard notional ranges.*

Highest priority will be given to transactions that are **transparent** and open to any **reputable counterparty** with proper financial and logistical resources. For a deal to be used in the price assessment, it must be confirmed by a source that has been vetted and deemed an approved market source for the product in question by IHS Markit. A good faith attempt will always be made to "confirm" both sides of any transaction (meaning that the buyer and seller in the transaction have been identified and corroborate

the price and terms of the sale). Deals of all types that are confirmed to IHS Markit with the stipulation that they are not for wider publication will not be used within the price assessment.

All transactions are to be "physical" product; the sale of "paper" product (meaning a financial arrangement where no physical volume is expected or required to be exchanged) will not be included in the price range.

Any transaction that has logistic restrictions, quality or specification issues, different currency, load size or shipping terms to those specified in the *methodology product table* or any other special considerations will not be used to determine the posted range. Bids and offers that are restrictive to select buyer or seller will be ranked lower as compared to bids and offers that are transparent and open to the market at large.

All buy/sell transactions; time and/or location swaps; any transactions having options which could meaningfully impact the commercial value; will be ignored if discovered, regardless of the price assigned.

If a transaction appears to be "out of market" (meaning significantly different in price than would be expected based on other recently confirmed price points), IHS Markit may elect to ignore the transaction following review of the data. IHS Markit will also review prior expressions of buying and selling interests to examine the circumstances leading to the trade in order to determine the **integrity** of the transaction.

Transactions must be conducted **at arm's length** whereby the buyer and seller are not related in any way by means of share ownership or affiliation in each other's company.

All **bona fide** transactions can be considered for index compilation, regardless of whether it is concluded by a natural buyer (end-user), seller (producer) or trader. If a transaction is identified by IHS Markit or market participants as **anomalous or suspicious**, it will be excluded from the assessment process until the situation can be clarified. This can include **repetitive transactions** between two parties within a single trading session, whereby the parties alternately buy and sell from each other. If it is verified that the transaction is above board by the **next business day**, IHS Markit will retroactively revise its marker assessment to include the deal.

On days when there have been no confirmed transactions a "notional" price will be posted. A notional price reflects the consultant's best estimate of price or price range where a transaction could have occurred between an interested buyer and interested seller. The consultant will take into account market direction, momentum, demand and supply as well as the most recent transaction price information and the prevailing range of bids and offers, if any. Highest priority will be given to bids and offers that are **transparent** and open to any **reputable counterparty** with proper financial and logistical resources.

Both **repetitive and incremental** bids and offers that conform to standard market conventions, as well as **retracted** bids and offers, are included for consideration in the IHS Markit price assessment process.

Notional postings are indicated by the letter "n" located in the right hand column of the price range in question.

Illiquid Markets

IHS Markit recognizes that petrochemical markets can suffer from periods of illiquidity. In the absence of firm bids, offers and transactions, IHS Markit will still poll market participants for expressions of interest to trade and notional price indications. Due to **tight correlation** between certain markets, IHS Markit also tracks **spread values** in upstream feedstock, downstream products, co-products and alternative products. Other factors that can influence prices, such as supply/demand data, macroeconomic issues and geopolitics will also be filtered for market clarity. Accordingly, in certain assessments where **insufficient market data** exists, IHS Markit analysts will exercise best judgment to **quantify** these **relative values** in the process of compiling the price index.

In the event that certain markets are shut because of public holidays, IHS Markit analysts may elect to **retain** the marker values published on the previous trading day.

Price Assessment Revisions

Daily price postings are open to revision if additional information becomes available after the close of the business day or outside standard working hours, provided the new information meets the deal assessment/confirmation criteria.

For a revision to be made based on new information being provided after initial assessment, a deal must be confirmed by the buyer or seller involved and IHS Markit must be satisfied that the deal was fully representative of market conditions at the time of transaction. Data used for price revisions must be reported no later than the close of business the next business day.

Changes or corrections will not be made if a transaction was made under conditions of being Private & Confidential (P&C) – and initially reported as such - but the sale was later disclosed following the publication date of the report. IHS Markit always attempts to be fully diligent in their price discovery and confirmation process and will make every reasonable effort to survey the market. However, prices that cannot be confirmed per the above standards before publication will not necessitate a correction.

For all weighted average calculations, information regarding historical deals will form part of the calculation as long as the information is provided at any point within the scope of each 30 or 45-day pricing period.

Corrections or changes to prices may also be initiated if the price range was reported incorrectly due to clerical error or if the price and/or terms were misrepresented or misunderstood. In some circumstances the daily report will be re-issued.

Revised postings are indicated by a red letter "r" located in the right hand column of the price range in question.

Forward Curves/Spot Price

The IHS Markit end-of-day light olefins forward curves/spot prices provides a snapshot glimpse of monthly and quarterly forward assessments. The forward curves show assessed values for Mont Belvieu-Nova ethylene, Choctaw ethylene and Polymer-grade propylene with values incorporating completed deals and current markets and market projections.

It is important to note that a forward curve is NOT the same as a price forecast.

A forward curve represents the assessed price at which forward futures or spreads can be bought and sold, at a fixed price or spread that is agreed upon each day/on any given day. Financial deals, paper deals, forward deals and broker markets are used to develop the curve and represent what market participants may be seeing for product at certain points along the curve.

At times, liquidity is low in light olefins forward markets and price reporting can be subjective. Therefore, editors talk to a cross-section of market participants, and any information editors receive pertaining to forward transactions is kept strictly confidential.

IHS Markit analysts have the discretion to exclude values that represent extraordinary circumstances or are far outside the range of other values reported on a given day. Ethylene and polymer-grade propylene spot deals must have a minimum volume of 1,000,000 pounds (lbs) to be included in IHS Markit calculations. Forward market deals, swaps or strips may have smaller volumes. Editors have the ability to reflect transactions reached on electronic platforms, but will not include a price in daily ranges simply because it appeared on an electronic platform. Ranges are only changed in the case of clerical mistakes and typographical errors.

Time Range:

Monthly Options – Current month to Current month+5

Quarterly Options – 4 quarter strips will be assessed. Quarters are closed following the completion of the first full month of the current quarter. Quarterly assessments are based on the average value of the months making up the quarter.

Calendar Options – Calendar (Cal) options will roll to the following year after the completion of January, at which point the current year Cal strip will no longer be available. Calendar assessments are based on the average value of the months making up the calendar year.

Month-To-Date Weighted Average Prices

Month-to-date Weighted Average Prices are shown for USGC Ethylene, MtB-Nova Ethylene, Polymer Grade Propylene, and Refinery Grade Propylene. Month-to-date weighted average prices are shown for 45-day prior month, 45-day current month, 30-day current month, and 45-day current month +1.

For all 45-day weighted averages, the price includes all confirmed spot transactions from the 16th day of the prior month to the last day of the current month.

For the 30-day weighted average, the price includes all confirmed spot transactions from the 1st of the month to the last day of the month, for delivery within that month reflecting the volume of each transaction.

The weighted average is calculated as follows:

Multiplying the price of each deal by the volume of the deal, then adding the sum and dividing by the total volume traded over the specified date range.

The weighted averages include all confirmed spot transactions with no future volume contract commitment within the 45-day range or the 30-day range for delivery in a given month reflecting the volume of each transaction.

When a volume is not identified for a specific transaction, a nominal volume of 3 million pounds is assigned to the transaction in order to include all relevant price data in the monthly calculation. Only single month, cash basis transactions are included.

Example of a Weighted Average:

USGC ethylene deals completed within 45-day window: Price_A @ Volume_A, Price_B @ Volume_B, Price_C @ Volume_C, Price_D @ Volume_D

Weighted average price = (Price_A * Volume_A + Price_B * Volume_B + Price_C * Volume_C + Price_D * Volume_D) / (Volume_A + Volume_B + Volume_C + Volume_D)

For example: 25.0 cpp @ 3MM lbs; 26.0 cpp @ 2MM lbs; 30.0 cpp @ 4MM lbs; 27.0 cpp @ 3MM lbs

Weighted average price = (25.0 cpp * 3MM lbs + 26.0 cpp * 2MM lbs + 32.0 cpp * 4MM lbs + 27.0 cpp * 3MM lbs) / (3MM lbs + 2MM lbs + 4MM lbs + 3MM lbs)

Weighted average price = (75 + 52 + 128 + 81) / (12) = 28.0 cpp

Month-To-Date Simple Average Prices

Month-to-date Simple Average Prices are shown for USGC Ethylene, MtB-Nova Ethylene, Polymer Grade Propylene, and Refinery Grade Propylene. The month-to-date Simple Average prices are for the prior month, the current month, and one month out.

Simple average prices are negotiated between buyers with no future volume contract commitments based on the delivery (by any means) of the product to a Texas Gulf Coast consumer's plant or storage facility. The minimum reportable volume of consideration for such a transaction is 1,000,000 lbs for ethylene and polymer-grade propylene and 5,000 barrels for refinery-grade propylene. The final monthly spot number is the average of the first half of the month and second half of the month spot ranges. Only single month, cash basis transactions are included. The first half range is a 30-day range from the 16th of the prior month to the 15th of the current month, for current month delivery. The second half range is a 15-day range from the 16th of the current month to the last day of the current month, for current month delivery.

The monthly listings for all average prices will change over to the next month on the 16th of current month.

Price Assessment Disputes

Every spot price editor at IHS Markit understands that his or her top priority is calling market assessments fairly. Our methodologies are crafted after careful consultation with our customers and applied by our editors to ensure maximum transparency and accuracy.

Still, we understand there may be times when spot price customers wish to question, dispute or comment on a price assessment and/or our methodologies. As a valued IHS Markit spot price customer, you have the right to:

- a prompt reply to any inquiry regarding price assessments and/or methodology within two trading days
- a full consideration by senior IHS Markit spot market personnel of any request for a correction or adjustment of a price assessment as well as any suggested changes to spot price methodology and complete confidentiality.

In the event of an **assessment dispute**, the disputing party should inform IHS Markit of their complaint by the following business day via telephone call, email or instant messaging platforms and all complaints will be acknowledged in writing within one business day. The party should, within one business day, supply IHS Markit with **evidence** of mishandling and/or misinformation of material data that had directly resulted in the distortion of the marker assessment.

The appropriate IHS Markit personnel will reply to complaints with two (2) spot trading days via email. This reply may or may not be a resolution of the complaint but it will acknowledge receipt of the complaint and assure the complainant that he or she can expect an answer in a timely manner.

Upon review and verification of the data, and IHS Markit may then publish a price revision. IHS Markit guarantees complete **confidentiality** of the data provider in the price dispute.

Methodology Review

IHS Markit price assessment methodology is constantly scrutinized internally for clarity, relevance and comprehensiveness by market analysts and senior analysts across the IHS chemical group. Methodology changes involve a robust polling of the marketplace to ensure all points of view are considered prior to any changes being considered or made.

Internally, all methodologies are reviewed on a quarterly basis, within the Market Daily Service group and records of any proposed methodology change are stated in a central electronic file.

IHS Markit also encourages industry participants to propose improvements or revisions to daily price assessment methodology via e-mail, telephone and instant messaging. Based on the input received, IHS Markit senior leadership within the chemical group will decide whether to accept or reject suggestions made by stakeholders for methodology changes.

Once a spot methodology change is contemplated, IHS Markit will reach out to stakeholders in the form of a formal note delivered via email soliciting feedback on the change.

Feedback may be given via post, email or telephone and the opportunity to comment on any contemplated spot methodology change is open for no less than four (4) weeks and generally not more than six (6) weeks.

In the case of methodology additions, a draft notice is sent out to customers with a deadline for comments set at a maximum of two (2) weeks.

IHS Markit will publish stakeholder comments received with our responses regarding proposed methodology changes on our website and will respect commenter confidentiality when requested.

About IHS Markit

IHS Markit (Nasdaq: INFO) is a world leader in critical information, analytics and solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 key business and government customers, including 85 percent of the Fortune Global 500 and the world's leading financial institutions. Headquartered in London, IHS Markit is committed to sustainable, profitable growth.

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