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ARGUS NGL AMERICAS

Contents:

The report	2
Methodology rationale	2
NGL product quality	5
Spot NGL assessments	5
Calculated NGL assessments	6
Ice daily weighted averages	7
NGL forward curve assessments	7
Non-NGL refined product assessments	7
Freight	7
Daily calculated USGC propylene alkylation	7
Olefins	8
Appendix 1: quality parameters	9

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The most up-to-date Argus NGL Americas methodology is available on www.argusmedia.com

The report

Argus NGL Americas is a daily report on the Americas market for natural gas liquids (NGLs) and olefins. The report includes spot price assessments, forward curves, deals data, fractionation spreads, ethylene margins, news, and market commentary.

Methodology rationale

Argus strives to construct methodologies that reflect the way the market trades. Argus aims to produce price assessments which are reliable indicators of commodity market values, free from distortion and representative of spot market values. As a result, the specific currencies, volume units, locations and other particulars of an assessment are determined by industry consensus to facilitate seamless bilateral trade and Argus mirrors these industry conventions.

In Americas natural gas liquids (NGL) and olefins spot markets, Argus typically reflects physical market prices across the entire trading day as a low and high of deals done and in some cases a volume-weighted average of deals done. In illiquid markets and time periods, Argus assesses the range within which product could have traded by applying a strict process outlined later in this methodology. An entire day price is a reliable indicator of physical market values as it incorporates the broadest possible pool of spot market liquidity and has acceptance from industry.

In order to qualify to set the low or high of the day, deals must meet the minimum volume, delivery, timing, and specification requirements in our methodology, and the deals must be bona fide. With the exception of volume, the same requirements apply to volume-weighted averages.

Survey process

Argus price assessments are informed by information received from a wide cross section of market participants, including producers, consumers and intermediaries. Argus reporters engage with the industry by proactively polling participants for market data. Argus will contact and accept market data from all credible market sources including front and back office of market participants and brokers. Argus will also receive market data from electronic trading platforms and directly from the back offices of market participants. Argus will accept market data by telephone, instant messenger, email or other means. Argus encourages all sources of market data to submit all market data to which they are a party that falls within the Argus stated methodological criteria for the relevant assessment. Argus encourages all sources of market data to submit transaction data from back office functions when and where possible.

Throughout all markets, Argus is constantly seeking to increase the number of companies willing to provide market data. Reporters are mentored and held accountable for expanding their pool of contacts. The number of entities providing market data can vary significantly from day to day based on market conditions. Should the number of

entities providing market data repeatedly fall to a level that assessment quality may be affected, supervising editors will review the viability of the assessment. For certain price assessments identified by local management, should more than 50pc of the market data upon which the assessment is based come from a single entity during any assessment period (defined as the minimum period covered, such as a day for a daily assessment), then the supervising editor will engage in an analysis of the market data with the primary reporter to ensure that the quality and integrity of the assessment has not been affected.

Argus has committed to deliver many of our final published prices to clients by a particular deadline each day. Because compiling and confirming transactions and other market data in advance of this deadline is a lengthy process, price assessment procedures must be concluded well before that deadline. As a result, for Americas NGL markets, Argus has instituted a cut-off time of 1700 Central for the submission of data by market participants. Argus will review all data received after the cut-off time and will make best efforts to include in the assessment process all verifiable transactions and market data received after the cut-off time but reserves the right to exclude any market data from the process if received after the cut-off time.

Market data usage

In each market, Argus uses the methodological approach deemed to be the most reliable and representative for that market. Argus will utilize various types of market data in its methodologies, to include:

- Transactions
- Bids and offers
- Other market information, to include spread values between grades, locations, timings, posted prices, and many other data.

In many markets, the relevant methodology will assign a relatively higher importance to transactions over bids and offers, and a relatively higher importance to bids and offers over other market information. Certain markets however will exist for which such a hierarchy would produce unreliable and non-representative price assessments, and so the methodology must assign a different relative importance in order to ensure the quality and integrity of the price assessment. And even in markets for which the hierarchy normally obtains, certain market situations will at times emerge for which the strict hierarchy would produce non-representative prices, requiring Argus to adapt in order to publish representative prices.

Verification of transaction data

Reporters carefully analyze all data submitted to the price assessment process. This data includes transactions, bids, offers, volumes, counterparties, specifications and any other information that contributes materially to the determination of price. This high level of care applies regardless of the methodology employed. Specific to transactions, bids, and offers, reporters seek to verify the price, the volume, the specifications, location basis, and counterparty. In some transactional average methodologies, reporters also examine the full array of transactions to match counterparties and arrive at a list of unique transactions. Several tests are applied by reporters in all markets to

transactional data to determine if it should be subjected to further scrutiny. If a transaction has been identified as failing such a test, it will receive further scrutiny. For certain price assessments identified by local management, Argus has established internal procedures that involve escalation of inquiry within the source's company and escalating review within Argus management. Should this process determine that a transaction should be excluded from the price assessment process, the supervising editor will initiate approval and, if necessary, documentation procedures.

Primary tests applied by reporters

- Transactions not transacted at arms length, including deals between related parties or affiliates.
- Transaction prices that deviate significantly from the mean of all transactions submitted for that day.
- Transaction prices that fall outside of the generally observed lows and highs that operated throughout the trading day.
- Transactions that are suspected to be a leg of another transaction or in some way contingent on an unknown transaction.
- Single deal volumes that significantly exceed the typical transaction volume for that market.
- Transaction details that are identified by other market participants as being for any reason potentially anomalous.
- Transaction details that are reported by one counterparty differently than the other counterparty.
- Any transaction details that appear to the reporter to be illogical or to stray from the norms of trading behavior. This could include but is not limited to divergent specifications, unusual delivery location and counterparties not typically seen.
- Transactions that involve the same counterparties, the same price and delivery dates are checked to see that they are separate deals and not one deal duplicated in Argus records.

Secondary tests applied by editors for transactions identified for further scrutiny

Transaction tests

- The impact of linkage of the deal to possible other transactions such as contingent legs, exchanges, options, swaps, or other derivative instruments. This will include a review of transactions in markets that the reporter may not be covering.
- The nature of disagreement between counterparties on transactional details.
- The possibility that a deal is directly linked to an offsetting transaction that is not publicly known, for example a "wash trade" which has the purpose of influencing the published price.
- The impact of non-market factors on price or volume, including distressed delivery, credit issues, scheduling issues, demurrage, or containment.

Source tests

- The credibility of the explanation provided for the outlying nature of the transaction.
- The track record of the source submitting the data. Sources will be deemed more credible if they:

- Regularly provide transaction data with few errors.
- Provide data by Argus' established deadline.
- Quickly respond to queries from Argus reporters.
- Have staff designated to respond to such queries.
- How close the information receipt is to the deadline for information, and the impact of that proximity on the validation process.

Assessment guidelines

When insufficient, inadequate, or no transaction information exists, or when a transaction based methodology will not produce representative prices, Argus reporters will make an assessment of market value by applying intelligent judgment based on a broad array of factual market information. Reporters must use a high degree of care in gathering and validating all market data used in determining price assessments, a degree of care equal to that applying to gathering and validating transactions. The information used to form an assessment could include deals done, bids, offers, tenders, spread trades, exchange trades, fundamental supply and demand information and other inputs.

The assessment process employing judgment is rigorous, replicable, and uses widely accepted valuation metrics. These valuation metrics mirror the process used by physical commodity traders to internally assess value prior to entering the market with a bid or offer. Applying these valuation metrics along with sound judgment significantly narrows the band within which a commodity can be assessed, and greatly increases the accuracy and consistency of the price series. The application of judgment is conducted jointly with the supervising editor, in order to be sure that guidelines below are being followed. Valuation metrics include the following:

Relative value transactions

Frequently transactions occur which instead of being an outright purchase or sale of a single commodity, are instead exchanges of commodities. Such transactions allow reporters to value less liquid markets against more liquid ones and establish a strong basis for the exercise of judgement.

- Exchange one commodity for a different commodity in the same market at a negotiated value.
- Exchange delivery dates for the same commodity at a negotiated value.
- Exchange a commodity in one location for the same commodity at another location at a negotiated value.

Bids and offers

If a sufficient number of bids and offers populate the market, then the highest bid and the lowest offer can be assumed to define the boundaries between which a deal could be transacted.

Posted prices

Posted prices are the prices that a company advertises to all potential buyers of its product. Companies frequently sell at a discount to their posted prices. In Americas NGLs markets, posted prices are assumed to form a ceiling for the traded market at that location and modality.

Comparative metrics

The relative values between compared commodities are readily discussed in the market and can be discovered through dialogue with market participants. These discussions are the precursor to negotiation and conclusion of transactions.

- Comparison to the same commodity in another market center.
- Comparison to a more actively traded but slightly different specification commodity in the same market center.
- Analysis of prices in forward markets for physically deliverable commodity that allow extrapolation of value into the prompt timing for the commodity assessed.
- Comparison to the commodity's primary feedstock or primary derived product(s).
- Comparison to trade in the same commodity but in a different modality (as in barge versus oceangoing vessel) or in a different total volume (as in full cargo load versus partial cargo load).

Throughout this methodology, Argus will explain, in more detail and on a market by market basis, the criteria and procedures that are used to make an assessment of market value by applying intelligent judgment.

Volume minimums and transaction data thresholds

In establishing each methodology, Argus will list specific minimum volume for each assessment. Because of the varying transportation infrastructure found in all commodity markets, Argus typically does not establish thresholds strictly on the basis of a count of transactions, as this could lead to unreliable and non-representative assessments. Instead, minimum volumes are typically established which may apply to each transaction accepted, to the aggregate of transactions, to transactions which set a low or high assessment or to other volumetrically relevant parameters.

For certain price assessments identified by local management, Argus will seek to establish minimum transaction data thresholds and when no such threshold can be established Argus will explain the reasons. These thresholds will often reflect the minimum volumes necessary to produce a transaction-based methodology, but may also establish minimum deal parameters for use by a methodology that is based primarily on judgment. Should no transaction threshold exist, or should submitted data fall below this methodology's stated transaction data threshold for any reason, Argus will follow the procedures outlined elsewhere in this document regarding the exercise of judgment in the price assessment process.

Transparency and confidentiality

Argus values transparency in energy markets. As a result, we publish lists of deals in our reports that include price, basis, and volume information. The deal tables allow subscribers to cross check and verify the deals against the prices. Argus feels transparency and openness is vital to developing confidence in the price assessment process. Argus asks for transaction counterparty names from contacts in order to confirm deals and to avoid double-counting in volume-weighted averages. But Argus does not publish counterparty names in the Americas NGL and olefins markets. Many companies in the Americas

have existing confidentiality agreements with counterparties and can only reveal deals to the press if confidentiality is maintained. Maintaining confidentiality allows Argus to gather more information and create more robust assessments.

Publications and price data

Argus NGL and olefins prices for the Americas are published in the Argus NGL Americas report. Subsets of these prices appear in other Argus market reports and newsletters in various forms, such as Argus International LPG. The price data is available independent of the text-based report in electronic files that can feed into various databases. These price data are also supplied through various third-party data integrators. The Argus website also provides access to prices, reports and news with various web-based tools. All Argus prices are kept in a historical database and available for purchase. Contact your local Argus office for information.

Corrections to assessments

Argus will on occasion publish corrections to price assessments after the publication date. We will correct errors that arise from clerical mistakes, calculation errors, or a misapplication of our stated methodology. Argus will not retroactively assess markets based on new information learned after the assessments are published. We make our best effort to assess markets based on the information we gather during the trading day assessed.

If transaction information is submitted in error, and the company submitting informs Argus of the error within 24 hours of the original submission, Argus will make best efforts to correct the price data. After 24 hours, Argus will review both the material effect that the correction will have on the price data and the amount of time that has elapsed from the date of the published price data before deciding whether to issue a correction. After 30 days, data submitters are not expected to file corrections to submitted data.

Ethics and compliance

Argus operates according to the best practices in the publishing field, and maintains thorough compliance procedures throughout the firm. We want to be seen as a preferred provider by our subscribers, who are held to equally high standards, while at the same time maintaining our editorial integrity and independence. Argus has a strict ethics policy that applies to all staff. The policy can be found on our website at www.argusmedia.com. Included in this policy are restrictions against staff trading in any energy commodity or energy related stocks, and guidelines for accepting gifts. Argus also has strict policies regarding central archiving of email and instant messenger communication, maintenance and archiving of notes, and archiving of spreadsheets and deal lists used in the price assessment process. Argus publishes prices that report and reflect prevailing levels for open-market arm's length transactions (please see the Argus Global Compliance Policy for a detailed definition of arms length).

Consistency in the assessment process

Argus recognizes the need to have judgment consistently applied by reporters covering separate markets, and by reporters replacing

existing reporters in the assessment process. In order to ensure this consistency, Argus has developed a program of training and oversight of reporters. This program includes:

- A global price reporting manual describing among other things the guidelines for the exercise of judgment.
- Cross-training of staff between markets to ensure proper holiday and sick leave backup. Editors that float between markets to monitor staff application of best practices.
- Experienced editors overseeing reporting teams are involved in daily mentoring and assisting in the application of judgment for illiquid markets.
- Editors are required to sign-off on all price assessments each day, thus ensuring the consistent application of judgment.

Review of methodology

The overriding objective of any methodology is to produce price assessments which are reliable indicators of commodity market values, free from distortion and representative of spot market values. As a result, Argus editors and reporters are regularly examining our methodologies and are in regular dialogue with the industry in order to ensure that the methodologies are representative of the physical market being assessed. This process is integral with reporting on a given market. In addition to this ongoing review of methodology, Argus conducts reviews of all of its methodologies and methodology documents on at least an annual basis. Argus market report editors and management will periodically and as merited initiate reviews of market coverage based on a qualitative analysis that includes measurements of liquidity, visibility of market data, consistency of market data, quality of market data and industry usage of the assessments. Report editors will review:

- Appropriateness of the methodology of existing assessments
- Termination of existing assessments
- Initiation of new assessments

The report editor will initiate an informal process to examine viability. This process includes:

- Informal discussions with market participants
- Informal discussions with other stakeholders
- Internal review of market data

Should changes, terminations, or initiations be merited, the report editor will submit an internal proposal to management for review and approval. Should changes or terminations of existing assessments be approved, then formal procedures for external consultation are begun.

Changes to methodology

Formal proposals to change methodologies typically emerge out of the ongoing process of internal and external review of the methodologies. Formal procedures for external consultation regarding material changes to existing methodologies will be initiated with an announcement of the proposed change published in the relevant Argus report. This announcement will include:

- Details on the proposed change and the rationale
- Method for submitting comments with a deadline for submissions
- Notice that all formal comments will be published after the given consultation period unless submitter requests confidentiality

Argus will provide sufficient opportunity for stakeholders to analyze and comment on changes, but will not allow the time needed to follow these procedures to create a situation wherein unrepresentative or false prices are published, markets are disrupted, or market participants are put at unnecessary risk. Argus will engage with industry throughout this process in order to gain acceptance of proposed changes to methodology. Argus cannot however guarantee universal acceptance and will act for the good order of the market and ensure the continued integrity of its price assessments as an overriding objective.

Following the consultation period, Argus management will commence an internal review and decide on the methodology change. This will be followed by an announcement of the decision in the relevant Argus report and include a date for implementation. In addition, publication of stakeholders' formal comments that are not subject to confidentiality and Argus' response to those comments will also take place. These formal comments should be published in a manner described by management but must be available to all market participants and stakeholders.

Updates to methodology

The NGL Americas methodology is constantly updated and revised. The latest available methodology (which may supersede the one you are reading) is available at www.argusmedia.com.

NGL product quality

Argus' assessments reflect trade in products that meet specific quality parameters (see appendix 1: quality parameters).

Spot NGL assessments

Argus assesses physical, spot NGL trade at various locations around North America. Spot assessments reflect the range of trade that was transacted, or could have been transacted, over the entire trading day.

Price types

Argus publishes the following price types:

Low: The lowest price that was transacted, or could have been transacted, for product meeting that market's timing, volume, and quality parameters (see tables below) over the whole trading day.

High: The highest price that was transacted, or could have been transacted, for product meeting that market's timing, volume, and quality parameters (see tables below) over the whole trading day.

Mean: The mean of the low and high assessments for that market

VWA: Where Argus has validated a minimum aggregate volume of deals that meet that market’s timing and quality parameters (see tables below), the VWA is a volume-weighted average of those deals. Where Argus has not validated a minimum aggregate volume of deals, the VWA is assessed as a mean (see above).

Mean MTD: the average of mean assessments published for that market during the month of publication, including the present day

VWA MTD: the average of VWA assessments published for that market during the month of publication, including the present day

Spot market trade ranges

These assessments reflect trade where delivery takes place inside a storage tank, a storage cavern, or a pipeline at the named location. Argus assesses material delivering over the following periods:

NGL delivery and contract timing		
Assessment	Delivery	Earliest contract assessed
Wet	Within 24 hours, or by close of next business day.	na
Month	Any time during the named month at seller’s option.	Current month, or front-month for Canadian condensate
Quarter	Rateable across the three calendar months of the quarter	Quarter following the current calendar quarter.

In order to qualify to set the low or the high of the day, deals must meet the volume minimums set out under “low/high (individual deal)” below. Argus will only calculate VWAs when it has validated a minimum volume as set out under “VWA (aggregate volume)” in the minimum volumes table below.

Canada

Argus publishes low-high daily NGL prices in Edmonton and Sarnia based on discussions with market participants for in-well barrels.

Edmonton

Argus publishes differentials and outright prices for propane and butane in the market in and around Edmonton and Fort Saskatchewan, Alberta. Differentials for propane are published relative to product available in Conway, Kansas. Differentials for butane are published relative to product available in the LST cavern at Mont Belvieu, Texas.

Sarnia

Argus publishes differentials and outright prices for propane, butane, and isobutane in the market in and around Sarnia and Corunna, Ontario. Differentials for butane are published relative to similar product available in the LST cavern at Mont Belvieu, Texas. Sarnia propane assessments account for posted prices in addition to other market information.

Canadian condensate: see the [Argus Americas Crude methodology](#)

Rail

Rail assessments reflect trade where delivery takes place at a rail terminal at the named location. Rail assessments are intended to reflect trade that meets the following delivery, timing, and volume parameters.

NYH refinery grade butane reflects the price of at least 150,000 USG of butane in at least five pressurized containers, meeting the quality specifications listed in appendix 1: quality parameters, and delivering 15-30 days forward at New York Harbor. The assessment is published seasonally, from the start of November until the end of February.

Waterborne

USGC propane fob: Reflects the price of at least 44,000t of propane, loading 30-45 days ahead, fob Gulf coast terminals. Assessed as a differential to Mont Belvieu propane. Expressed as both a differential low-high and as an outright price, where the outright price is calculated by adding the differential low-high midpoint to a differential basis. The differential basis is an average of mean month 1, month 2, and month 3 Enterprise propane assessments, weighted according to the number of days of the 30-45 day window that fall within that month.

Definition of trading day

Argus defines the trading day by determining at what times the market can be said to contain a fair number of willing buyers and sellers. Outside of these time boundaries, markets are typically too illiquid to produce representative price indications and deals. These boundaries can vary in different markets, and will be under continuous review to maintain the accuracy of the assessments. The trading day for Americas NGLs is defined as 8am-4pm Houston time.

Argus will announce its publishing schedule in a calendar located at www.argusmedia.com. Argus may not assess prices on certain public holidays even when the exchanges are open, due to anticipated illiquidity in the physical markets.

Calculated NGL assessments

US propane del Japan (AUSJ): Prices are in US dollars/tonne. Calculated by adding the USGC propane fob assessment to the Propane USGC to Japan freight assessment (see below).

US propane del ARA (AUSE): Prices are in US dollars/tonne. Calculated by adding the USGC propane fob assessment to the Propane USGC to Europe freight assessment (see below).

US propane del Argentina: Prices are in US dollars/tonne. Calculated by adding the USGC propane fob price assessment to the derived Houston-Bahia Blanca VLGC equivalent freight rate (see the [Argus Freight methodology](#)).

Conway rail natural gasoline: Argus calculates its Conway natural gasoline rail assessment by adding a rail loading cost to its Conway

Minimum volumes		
Assessment	Minimum volume requirement b/	
	Low/high (individual deal)	VWA (aggregate volume)
Outright trade ranges		
Mont Belvieu, Texas		
Enterprise		
E/P mix	10,000	20,000
Ethane	10,000	30,000
Propane	10,000	30,000
Normal butane	10,000	20,000
Natural gasoline	10,000	30,000
Isobutane	10,000	20,000
Targa		
Ethane	10,000	20,000
Propane	10,000	20,000
Natural gasoline	10,000	20,000
LST		
Propane	10,000	30,000
Refinery-grade butane	10,000	20,000
Isobutane	10,000	20,000
Natural gasoline	10,000	20,000
Conway, Kansas		
E/P mix	5,000	10,000
Propane	5,000	15,000
Normal butane	5,000	10,000
Isobutane	2,500	10,000
Natural gasoline	2,500	10,000
Hattiesburg, Mississippi		
Propane	5,000	
Bushton, Kansas		
Propane	5,000	
Napoleonville, Louisiana		
E/P mix	5,000	
Purity ethane	5,000	
Propane	5,000	
Normal butane	5,000	
Isobutane	5,000	
Natural gasoline	5,000	
Quality spreads		
Enterprise		
EP Mix/Purity ethane		20,000
Isobutane/Butane		20,000
Locational spreads		
Propane		
LST/Enterprise		20,000
Targa/LST		20,000
Targa/Enterprise		20,000
Conway/LST		10,000
Conway/Enterprise		10,000
Natural gasoline		
LST/Enterprise		20,000
Targa/Enterprise		20,000

in-tank natural gasoline assessment for the same month. The value for rail loading costs is arrived at by a market survey.

Fractionation spreads: see [Argus Natural Gas Americas methodology](#).

Ethylene cash margins: Ethylene cash margins represent the profitability of producing ethylene from a variety of feedstocks. Argus calculates its ethylene cash margins using a proprietary model that takes into account an array of feedstock, energy, NGL, and petrochemical prices. For further information, contact houstonlpg@argusmedia.com

WTI comparison: Argus calculates its WTI comparisons (pc) by dividing the NGL market in question by the front-month WTI contract, converted into ¢/USG.

Ice daily weighted averages

See www.theice.com

NGL forward curve assessments

Northwest Europe: see the [Argus International LPG methodology](#).

Non-NGL refined product assessments

For non-NGL refined products methodology, see the [Argus US Products methodology](#).

Freight

Propane VLGC Houston-Chiba

Prices are in US dollars/tonne. Reflects the cost of shipping propane from Houston to Chiba on a refrigerated Very Large Gas Carrier (VLGC).

Propane VLGC Houston-Flushing

Prices are in US dollars/tonne. Reflects the cost of shipping propane from Houston to Flushing on a refrigerated Very Large Gas Carrier (VLGC).

Handysize Houston-east coast Mexico

Prices are in US dollars/tonne. Reflects the cost of shipping at least 12,000t of propane or butane from Houston to either Tuxpan or Pajaritos on a semi-refrigerated gas carrier.

Daily calculated USGC propylene alkylation

The value of propylene converted to alkylate based on a proprietary formula involving other chemicals and fuels prices reported by Argus the day before publication. The formula is subject to annual review.

Olefins

Price assessments and volume-weighted averages

Argus assesses the price of ethylene, polymer-grade propylene and refinery-grade propylene.

Argus publishes the low and the high price of physical deals done throughout the entire trading day for the current "any month," and the next "any month" markets for

- Mont Belvieu ethylene
- Choctaw ethylene
- US Gulf coast polymer-grade propylene (PGP)
- US Gulf coast refinery-grade propylene (RGP)

Argus also publishes volume-weighted averages of ethylene and polymer-grade propylene deals transacted during the trading day. Volume weighted averages are published for

- Mont Belvieu ethylene
- US Gulf coast polymer-grade propylene (PGP)

In order to set the low or high of the day, deals must meet the minimum volumes and strict delivery, timing, and specification requirements set out in this methodology, and must be confirmed.

In illiquid markets, Argus makes an intelligent assessment of the range within which product could have traded, based on bids and offers through the entire day, price movements in similar grades, and extensive polling of market participants. In addition to the low and high, Argus publishes the arithmetic mean of the low and high prices.

To avoid distortion in illiquid markets, a minimum aggregate volume of trade must occur during the trading day for a volume-weighted average to be calculated. Should this aggregate volume not be met, the weighted average will represent an assessment of market value based on bids, offers, and trades in the market.

Forward assessments

Argus also publishes forward month and quarter assessments for ethylene at Mont Belvieu based on market discussion. These prices are intelligent assessments of the best bid and best offer at 3:00pm Houston time. Prices are for physical material delivering during the named month or quarter.

Prices are published for three forward months and three forward calendar quarters.

Definition of trading day

Argus defines the day by determining at what times the market can be said to contain a fair number of willing buyers and sellers. Outside of these time boundaries, markets are typically too illiquid to produce representative price indications and deals. These boundaries can vary in different markets, and will be under continuous review to maintain the accuracy of the assessments. The trading day for olefins is defined as 8am-5pm Houston time. Physical spot olefin assessments

and volume-weighted averages (VWAs) are informed by transactions entered into during these hours.

Olefins physical spot prices

Physical spot prices are the price of material delivering any time during the named month.

Low: the lowest trade of the day meeting minimum volume, location, and quality parameters (see below), or in the absence of trade, the lowest price at which material could have traded.

High: the highest trade of the day meeting minimum volume, location and quality parameters (see below), or in the absence of trade, the highest price at which material could have traded.

Midpoint: the arithmetic mean of the low and high

MTD average: the average mean published so far this month, including the price on the day of publication.

A month-to-date average is published for Mont Belvieu ethylene.

30- and 45-day averages: the average mean published in the 30- or 45- calendar days up to and including the date of publication.

30- and 45-day averages are published for Mont Belvieu ethylene and Gulf Coast polymer-grade propylene.

VWA: the volume-weighted average of validated deals meeting location and quality parameters (see below), unless the aggregate volume of those deals falls below the minimum volume threshold (see below). If the aggregate volume falls below this threshold, the midpoint sets the VWA.

Minimum volumes

Low/high

Ethylene and polymer-grade propylene: only deals of at least 1mn lbs will set the low/high.

Refinery grade propylene: only deals of at least 25,000 bl will set the low/high.

Volume-weighted averages

Ethylene and propylene: volume-weighted averages are only calculated if aggregate trade volumes are at least 3mn lbs. There is no minimum volume required for a trade to be considered for inclusion in a volume-weighted average.

Quality specifications

Ethylene: minimum of 99.9pc purity

Polymer grade propylene: minimum 99.5pc propylene

Refinery grade propylene: minimum 65pc propylene, up to 35pc propane. The assessment is of the price of the propylene only, not the propane

Location

Mont Belvieu: all storage facilities near Mont Belvieu, Texas

Choctaw: storage facilities in Choctaw, Louisiana.

Appendix 1: quality parameters

Table 1:																															
	Minimum %							Maximum %																							
	Ethane	Ethane/Ethylene	Isobutane	Normal butane	Pentanes	Pentanes and heavier	Propane	Butadiene	Butanes	Butanes and heavier	Butanes and lighter	Ethane	Ethylene	Hexanes and heavier	Isobutane and lighter	Isobutane	Isobutane and heavier	Methane	Methane and lighter	Natural gasoline	Normal butane	Normal butane and lighter	Olefins	Pentanes and heavier	Propane	Propane and heavier	Propane and lighter	Propylene	RVP	Sulfur (ppm wt)	
Mont Belvieu																															
Enterprise																															
E/P mix									0.8			75-82	4													25					30
Ethane		95											1					3									3.5				30
Propane							90				2.5																		5		123
Normal butane				94												6								0.35	1.5			0.35			140
Natural gasoline																							6							14	1000
Isobutane			96																			4				3					140
Targa																															
Ethane		95											1					3									3.5			30	
Propane							90				2.5																		5		123
Natural gasoline															3															14	1000
LST																															
Propane							90				2.5																		5		123
Normal butane				94				0.01								6								0.35	1.5			0.35			140
Isobutane			96																							3					140
Natural gasoline																							6							14	1000
Conway																															
E/P mix	80																														20
Propane							90			2.5																			5		
Normal butane				95												5									1.5	0.5					
Isobutane			95																				5			3					
Natural gasoline						42				8																					
Hattiesburg																															
Propane							90			2.5																			5		

	Minimum %							Maximum %																												
	Ethane	Ethane/Ethylene	Isobutane	Normal butane	Pentanes	Pentanes and heavier	Propane	Butadiene	Butanes	Butanes and heavier	Butanes and lighter	Ethane	Ethylene	Hexanes and heavier	Isobutane and lighter	Isobutane	Isobutane and heavier	Methane	Methane and lighter	Natural gasoline	Normal butane	Normal butane and lighter	Olefins	Pentanes and heavier	Propane	Propane and heavier	Propane and lighter	Propylene	RVP	Sulfur (ppm wt)						
Bushton																																				
Propane							90		2.5																										5	
Napoleonville																																				
E/P mix		70					15										3		5																25	
Purity ethane	90									0.25							5										5									
Propane							90			2.5																									5	
Normal butane				95																				0.5	2	2.5										
Isobutane			95																				4			3										
Natural gasoline																						2												13		
New York Harbor																																				
Refinery grade butane			30	60																	10															
Edmonton																																				
Propane							90		2.5																										5	
Field grade butane																																				
Sarnia																																				
Propane							90		2.5																										5	
Butane				93										7											2											
Isobutane			96																			4			3											