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ARGUS NORTH AMERICAN FERTILIZER

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The most up-to-date Argus North American Fertilizer methodology is available on www.argusmedia.com

Methodology overview

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 and are free from distortion. As a result, the specific currencies, volume units, locations and other particulars of an assessment are determined by industry conventions.

In the North American fertilizers markets, Argus publishes prices as laid out in the specifications and methodology guide. Argus uses the trading period deemed by Argus to be most appropriate, in consultation with industry, to capture market liquidity.

In order to be included in the assessment process, deals must meet the minimum volume, delivery, timing and specification requirements in our methodology. In illiquid markets, Argus assesses the range within which product could have traded by applying a strict process outlined later in this methodology.

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 fall 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.

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.

For certain price assessments identified by local management, if more than 50pc of the market data involved in arriving at a price assessment is sourced from a single party 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.

Market data usage

In each market, Argus uses the methodological approach deemed to be the most reliable and representative for that market. Argus will utilise 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, 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 applies, 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 analyse all data submitted to the price assessment process. These data include transactions, bids, offers, volumes, counterparties, specifications and any other information that contributes materially to the determination of price. This high level of care described 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. In some transactional average methodologies, full details of the transactions verified are published electronically and are accessible to subscribers. The deals are also published in the daily report.

Several tests are applied by reporters in all markets to transactional data to determine if they should be subjected to further scrutiny. If a transaction has been identified as failing such a test, it will receive further scrutiny. For assessments used to settle derivatives and for many other assessments, 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 and perceived by Argus to be as such.
- 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 behaviour. 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. 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 Argus concludes that 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

Transactions may 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 judgment.

- 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.

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 centre.
- Comparison to a more actively traded but slightly different specification commodity in the same market centre.
- 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).

Volume minimums and transaction data thresholds

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 price assessments used to settle derivatives, 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.

Minimum transaction thresholds

Assessment	Minimum trade volume for inclusion in assessment
UAN E coast cfr t	5,000t
DAP Nola barge fob	1,500st
Granular urea Nola barge fob	1,500st
UAN Nola barge fob	3,000st

Transparency

Argus values transparency in 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.

Publications and price data

Argus North American fertilizer prices are published in the Argus North American Fertilizer report. Subsets of these prices appear in other Argus market reports and newsletters in various forms. The price data are 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 period assessed.

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 commodities or 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 arms length transactions (please see the [Argus Global Compliance Policy](#) for a detailed definition of arms length).

Consistency in the assessment process

Argus recognises 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 programme of training and oversight of reporters. This programme 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 and are free from distortion. 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 assess-

ments 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
- For prices used in derivatives, 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 analyse 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, which will be published in the relevant Argus report and include a date for implementation. For prices used in derivatives, publication of stakeholders' formal comments that are not subject to confidentiality and Argus' response to those comments will also take place.

Publication frequency

Argus North American Fertilizer publishes 51 weeks a year on a Thursday evening. A report is not published the week of 25 December-1 January, depending on how the Christmas and New Year holidays fall.

In the event of a federally-recognized US holiday falling on a Thursday, Argus North American Fertilizer will assess all prices on the Wednesday and publish on the Wednesday. When this happens, previous-week data will be used for constructed assessments which are based on international prices.

A full publication schedule is available at www.argusmedia.com.

General methodology

Argus surveys a wide variety of market participants during the course of the week including producers, trader, buyers, sellers and other market analysts. This survey seeks to confirm what trade has been done, by whom, as well as firm bids and offers. The goal is to cross check market transactions from all participants wherever possible. The survey also seeks to ascertain fundamentals data, tender news and supply and demand information. Argus will contact and accept market data from all credible market sources including front and back office of market participants and brokers.

The report determines ranges in which actual transactions are taking place or in which transactions could have taken place between a willing buyer and seller.

Assessing price ranges

Price assessments for standard grades of fertilizer will represent a range in which a deal between a willing buyer and seller could have been done from Friday at 6am Houston time until the following Thursday at 11am Houston time.

Deals done, bids and offers and other relevant information over the course of the entire trading week prior to publication may be considered when setting prices. In periods of high volatility, assessments are weighed towards trading activity later in the week or at the end of the Thursday of the assessment.

Unless otherwise noted, prices are for trades concluded within the specified time period following the assessment.

When there is sufficient liquidity and deals data are deemed reliable and representative, the price range will be defined on the low and the high end of confirmed deals concluded throughout the trading week. These deals must meet the minimum volumes and strict delivery timing, as well as specifications as laid down in this methodology.

Information on transactions, bids and offers that lie outside the specifications of timing, size, location and quality may be used in assessing price ranges, but deals that lie within these specifications are given most weight.

In markets that periodically lack liquidity, Argus may assess price ranges based on a range of other market information including netbacks to more liquid markets and market fundamentals.

Lot and cargo sizes

For international trade, the minimum lot size used for consideration and inclusion in the relevant price range is 5,000t of a particular product (this includes part cargoes on larger vessels including other fertilizers). US domestic price assessments are of one barge, assumed to be carrying a minimum of 1,500st, with no set maximum number of barges. The exception is the UAN Nola barge fob assessment — trade must be for at least 3,000st to be considered for inclusion in the assessment.

Average truck load size out of terminals is 20t. Two truckloads is the minimum transaction volume for relevant assessments.

Unit trains can vary in size, but generally consist of 85 to 110 cars, all carrying the same commodity. The minimum transaction volume for relevant assessments is 70 cars.

Markets snapshot

Please see the individual product methodology for each fertilizer and freight rate quoted in the markets snapshot.

Crop Fundamentals — This is a calculated five-day average (Friday through Thursday) for corn, wheat and soybean contracts based on Chicago Mercantile Exchange (CME)/Chicago Board of Trade (CBOT) settlement prices.

Argus publishes prompt month and new crop settlement prices. Prompt month refers to the monthly contract nearest to the publication date. New crop refers to the nearest year-end monthly contract following the prompt month. The year-end monthly contract is December for the corn and wheat contracts and November for the soybean contract.

Related market prices include WTI crude, Henry Hub natural gas, ethanol, ethanol crush spread and copper.

WTI — This price is the five-day average (Friday through Thursday) of the New York Mercantile Exchange's Light Sweet Crude contract (Nymex WTI). More information can be found in the [Argus Crude methodology](#).

Henry Hub — This price is a calculated five-day average (Friday through Thursday) of the spot natural gas price as assessed by Argus. See the [Argus Natural Gas Americas methodology](#).

Ethanol — This price is a calculated five-day average (Friday through Thursday) of the Chicago (Argo) prompt price as assessed daily for the Argus Americas Biofuels report. See the [Argus Americas Biofuels methodology](#).

Crush spread — This price is a five-day average (Friday through Thursday) of the Chicago ethanol crush spread, which measures the profitability of producing ethanol corn and provides a hedging tool. See the [Argus Americas Biofuels methodology](#).

Copper — This price is a calculated five-day average (Friday through Thursday) of the COMEX HG Copper front month price based on settlement prices reported by CME.

Freight

The freight rates table for dry bulk fertilizer barges shows the week's spot rates for northbound barges originating from miles 90-184, or what is commonly referred to as New Orleans (Nola). This will include northbound rates for covered barges from New Orleans to various points listed in the table along the Mississippi, Arkansas, Ohio and Illinois rivers. All references to Nola in this document refer to New Orleans.

The price is indicative for a minimum of one barge, assumed to be carrying a minimum 1,500st, with no set maximum number of barges.

The freight rates are established by surveying barge freight providers and buyers of spot freight, maintaining a balance between both parties. The assessment will be for barges that will load and move within the next 30 days. Argus makes an assessment of the range between the low and high prices provided. Market information will be collected through 11am Houston time on a Thursday.

Northbound barge rates are assessed from Nola to points along the Mississippi river including Old River, Arkansas, through Cairo, Illinois; St Louis, Missouri; Louisiana, Missouri, through Clinton, Iowa; Dubuque, Iowa; Winona, Minnesota; and St Paul, Minnesota.

Northbound barge rates are assessed from Nola to points along the Arkansas river including Pine Bluff through Little Rock, Arkansas; and Inola through Catoosa, Oklahoma.

Northbound barge rates are assessed from Nola to points along the Ohio river including Paducah, Kentucky; Mt Vernon, Indiana, through Owensboro, Kentucky; Jeffersonville, Indiana, through Louisville, Kentucky; Cincinnati, Ohio; East Liverpool, Ohio.

Northbound barge rates are assessed from Nola to points along the Illinois river including Naples through Peoria, Illinois; Hennepin through LaSalle, Illinois; Ottawa, Illinois; and Joliet, Illinois.

Demurrage is also assessed, using a range of high-low demurrage rates charged by operators.

In all references:

- t = metric tonne
- st = short ton
- lt = long ton
- eq = equivalent
- cfr = cost and freight
- del = delivered
- fob = free on board
- fot = free on truck
- Nola = New Orleans, the river area at Baton Rouge, Louisiana, and south

Seasonal freight rates

Winter weather prompts lock closures along the upper Mississippi river system as determined by the US Army Corps of Engineers. Argus suspends seasonally affected assessments in the autumn when operators stop loading barges ahead of the closures to prevent equipment from being left north of the closed locks during the winter and reactivates the assessments in the spring when operators resume loadings ahead of the locks officially reopening.

Seasonal rates

- Dry urea New Orleans-Louisiana to Clinton barge
- Dry urea New Orleans-Dubuque barge
- Dry urea New Orleans-Winona barge
- Dry urea New Orleans-St Paul barge

North American fertilizers

Nitrogen

Urea (granular)

Granular urea is a dry bulk fertilizer containing 46pc nitrogen by weight, with typical granulation size of 2-4mm and a standard white coloring. Urea is produced using liquid ammonia and carbon dioxide and requires a hydrocarbon energy source. The granular urea assessed in Argus North American Fertilizer will be for agricultural purposes only.

Delivery periods are specified for several assessments below. For market information to be considered for inclusion in those assessments, it must refer to trade for which at least half of the delivery period falls within the delivery period specified for the assessment.

Nola barge

Argus publishes two low-high ranges and two volume-weighted averages for trade in barges loaded at Nola.

If a particular origin of product is treated by the market differently because of specification or quality concerns, trades of this urea may be excluded from any assessed ranges or volume-weighted averages. For instance, if product from a non-traditional source is trading at a \$10/st discount to other product, it would be excluded. Alternatively, if a speciality buyer requirement prompts a premium price outside of the range of other trades collected during the assessment period, such a trade may also be excluded.

Low-high price assessments

Nola barge fob

The range of prices for barges released or to be released to the buyer at Nola within 40 days.

Nola barge prompt fob

The range of prices for barges released or to be released to the buyer at Nola within 7 days. In the absence of relevant prompt market information, the Nola barge prompt fob assessment may be assessed equal to the Nola barge fob assessment described above.

Volume-weighted averages

For the purpose of constructing volume-weighted averages, all barges are assumed to carry an industry-standard 1,500st. Trades reported during the week but excluded from either or both volume-weighted average are also published.

Nola barge volume-weighted average (VWA)

A volume-weighted average of the price of trade done for barges released or to be released to the buyer at Nola within 30 days.

If fewer than three index-relevant barges are reported to have traded in a given week, the price will be calculated as the midpoint value derived using a combined high-low range between the upriver/prompt price and the Argus Nola barge price.

Nola urea delivery month barge-weighted average

A volume-weighted average of the price of trade done for barges released or to be released to the buyer at Nola during the named calendar month. Prices are published for the prompt month — the calendar month of the Friday before the date of assessment — and one month forward. If the Friday before the assessment day is a holiday, the prompt month is the month of the next business day.

If fewer than three index-relevant barges are reported to have traded in a given week, an assessment of the price for the named month based on trade, bids, offers and other market information will be published.

Nola cfr t import eq

Calculated by deducting from the Nola barge fob assessment a fixed amount for the cost of discharge into a barge, shrinkage and other costs and dividing the result by 0.90719 (or multiplying by 1.1023) to convert from short tons to metric tonnes.

Inola/Catoosa fot

The price of granular urea sold out of non-production point warehouses in Inola/Catoosa, Oklahoma and all terminals falling within a 50-mile radius, including those in Tulsa.

Terminal assessments are the price for prompt sales, or sales with intended loading within 30 days.

St Louis fot

The price of granular urea sold out of non-production point warehouses within a 50-mile radius of St Louis, Missouri.

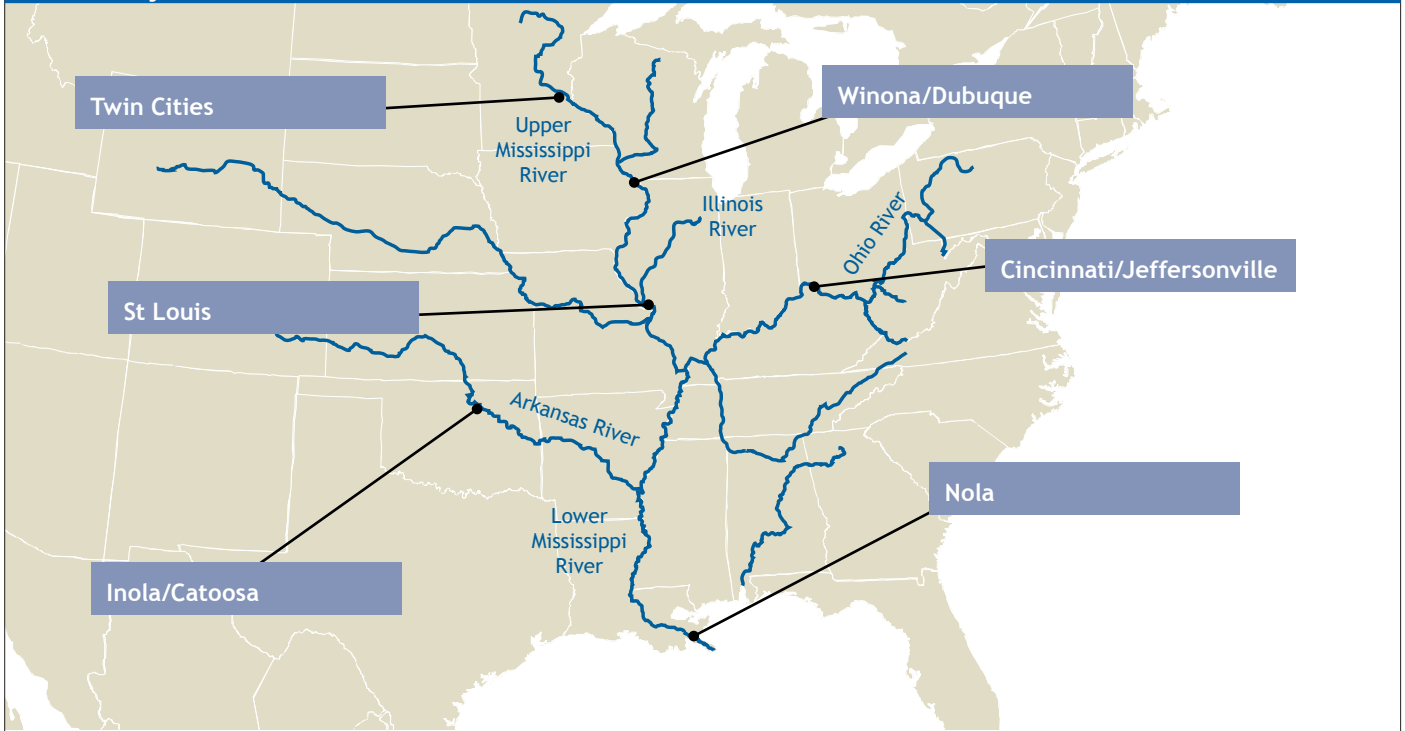
Cincinnati/Jeffersonville fot

The price of granular urea sold out of non-production point warehouses in Jeffersonville, Indiana, and Cincinnati, Ohio. Prices from warehouses within the 100-mile diameter between the two cities will be included.

Twin Cities fot

The price of granular urea sold out of non-production point warehouses in Minneapolis and St Paul, Minnesota, and other warehouses within a 50-mile radius, including Pine Bend.

US River System Terminal Hubs



Southern Plains producer fot

The price of granular urea sold by truck from production points in Texas and Oklahoma. Assessments include activity for intended loading within 30 days.

Corn Belt producer fot

The price of granular urea sold by truck from production points in Iowa, Illinois and Ohio. Assessments include activity for intended loading within 30 days.

Northern Plains rail delivered

The price of granular urea sold on a delivered basis via unit train to wholesale and retail locations in North Dakota, South Dakota and western Minnesota. Assessments include activity for intended loading within 30 days.

Northern Plains truck delivered

The price of granular urea sold on a delivered basis via truck to wholesale and retail locations in North Dakota, South Dakota and western Minnesota. Assessments include activity for intended loading within 30 days.

Urea (prilled)

Prilled urea is a dry bulk fertilizer containing 46pc nitrogen by weight. It has a typical granule size of 1-2mm and a standard white coloring.

Nola barge fob, dry

The price of imported prilled urea sold on barges loading at New Orleans for delivery to either industrial or agricultural consumers. Typical sales are to producers of dry feedstuff, material used as feed for animals. Assessments include activity for intended loading within 30 days.

UAN

UAN, or urea ammonium nitrate, is an aqueous solution of urea and ammonium nitrate and is a 28-32pc nitrogen-containing fertilizer, by weight. Most UAN assessments are for UAN 32pc, as this is the primary and preferred nitrogen concentration of most international trades to the US and domestic US production.

At colder temperatures, the liquid fertilizer forms crystals which is problematic for mechanized applicators, hence lower nitrogen-content UAN, or 28pc, will often be applied as an alternative with a lower melting point. Northern regions of the US and Canada require UAN with lower nitrogen concentration. To accommodate the variation in product specifications, Argus North American Fertilizer assesses prices from tanks further upriver on the basis of \$/unit of nitrogen (N) as well as on a UAN 32pc basis.

UAN trades are highly seasonal, whereby prompt loading is required during the spring application season. During this window, prices assessed will be for business concluded with intended loading within 30 days.

Delivery periods are specified for several assessments below. For market information to be considered for inclusion in those assessments, it must refer to trade for which at least half of the delivery period falls within the delivery period specified for the assessment.

As spring application demand concludes, Argus assesses prices for "fill" or "prepay" transactions. "Fill" is defined as a transaction in which the buyer purchases product though the supplier will load the product at a later date, provided it is before the application season. As the fill seasons can vary because they are heavily weather and demand dependent, the decision to switch to fill pricing is at Argus's

discretion, after broad consultation with the industry on when the market shifts its focus to fill pricing.

To accommodate this seasonal fluctuation, during the fill period, Argus includes in its assessment trades for loading during the fill period (roughly July-December) as well as the first quarter. This allows “spring prepay” transactions to be assessed during the July through December months, with “spring prepay” defined as a transaction with intended loading in the first quarter. In the event that both prepay and fill transactions are occurring, weight will be given to the type of prices backed by the largest volume of transactions.

Nola barge fob

The price for barges of UAN on a 32pc basis at Nola, with a loading period corresponding to the season, as outlined above. The assessment includes sales of domestically produced and imported UAN.

Nola cfr t import eq (32pc)

This is a calculated assessment whereby the barge price is converted to a cfr metric tonne equivalent price and put-through costs are subtracted. The costs accounted for are an average of shrink, cost of money and stevedoring. It does not factor in additional margins as these can vary considerably.

St Louis fot¹

The price of UAN sold out of tanks and onto trucks, with a loading period corresponding to the season, as previously outlined. These prices are assessed on the basis of \$/unit of nitrogen (N) as well as on a UAN 32pc basis.

Cincinnati/Jeffersonville fot

The price of UAN sold out of tanks and onto trucks, with a loading period corresponding to the season, as previously outlined. These prices are assessed on the basis of \$/unit of nitrogen (N) as well as on a UAN 32pc basis.

Dubuque/Winona fot

The price of UAN sold out of tanks and onto trucks, with a loading period corresponding to the season, as previously outlined. These prices are assessed on the basis of \$/unit of nitrogen (N) as well as on a UAN 32pc basis. Trade captured from any location between these terminal hubs in Dubuque, Iowa, and Winona, Minnesota, representing a 155-mile stretch, will be included in the assessment.

Illinois River fot

The price of UAN sold out of tanks and onto trucks, with a loading period corresponding to the season, as previously outlined. These prices are assessed on the basis of a \$/unit of nitrogen (N) as well as on a UAN 32pc basis. Trade captured from any terminals located between Kingston Mines, Illinois, and Seneca, Illinois, will be included in the assessment.

East coast terminal fot

The price of UAN sold out of tanks and onto trucks, with a loading period corresponding to the season, as previously outlined. These

prices are assessed on a UAN 32pc basis. Trade captured from the following locations will be considered: Wilmington, North Carolina; Norfolk, Virginia; Baltimore, Maryland; Philadelphia/Fairless Hills, Pennsylvania; Brunswick, Georgia; and Savannah, Georgia.

E coast cfr t

The price of UAN imports and domestic cfr sales to the east coast US. The east coast is defined as any port from the eastern side of Florida through Maine. This includes but is not limited to Wilmington, North Carolina; Norfolk, Virginia; Baltimore, Maryland; and Brunswick, Georgia.

Ammonium nitrate (prilled)

High-density prilled ammonium nitrate (AN) is a dry bulk fertilizer created by mixing ammonia with nitric acid. It has a typical nitrogen content of 33-34pc by weight. The product can be used as a nitrogen fertilizer or an oxidizer in blasting agents, often for the mining industry. In its initial form, AN is produced as a solution and can be used in the manufacture of UAN if it is not prilled or granulated to produce a solid product.

In North America, the sale and distribution of AN is heavily regulated because of its explosive properties. Argus North American Fertilizer will assess only trade for agricultural purposes. Low-density prilled ammonium nitrate is not included in the assessments.

Nola barge fob

The price for AN barge trades. Transaction specifications include a minimum quantity of one barge, or 1,500st. This includes barges that are loaded or loading at Nola within 30 days. Netbacks of trades for barges placed further upriver may be included in the absence of deals at Nola.

Nola cfr t import eq

This is a calculated assessment whereby the barge price is converted to a cfr metric tonne equivalent price and additional costs are added in for the higher insurance and handling fees associated with AN.

Term	Definition
Winter/spring fill	Buyers purchase ammonia which will be shipped by suppliers and stored by buyers during the off-season, in advance of the spring application season
Spring prepay	Buyers purchase ammonia in advance of the application season, which will be shipped by suppliers during the spring application season.
Spring prompt	Buyers purchase ammonia on a prompt basis to ship immediately from tanks and pipelines for the the spring application season.
Summer fill of fall fill	Buyers purchase ammonia which will be shipped by suppliers during the summer/fall, in advance of the fall application season. Buyers must store the ammonia until fall applications begin.
Fall prepay	Buyers purchase ammonia which the suppliers will ship only during the fall application season.
Fall prompt	Buyers purchase the ammonia on a prompt basis to ship immediately from tanks and pipelines for the fall application season.

¹ See the granular urea section for clarification on terminal locations assessed.

Mid-South fot

The price of AN truck sales out of terminals in the Mid-South for shipment within 30 days. Mid-South is defined as terminals on the Mississippi River between Cairo, Illinois, and Rosedale, Mississippi, along the Arkansas River and in Yazoo City, Mississippi.

Ammonium sulfate (granular)

Ammonium sulfate (amsul) is a byproduct of caprolactam production for which there are a variety of production methods. Amsul can also be created by reacting ammonia with sulfuric acid. Granular amsul is a colorless or white crystal containing at least 20-21pc nitrogen by weight. Unless stated, assessments include activity for shipment within 30 days.

Nola barge fob

The range of prices for barges released or to be released to the buyer at Nola within 60 days.

Houston/Pasadena fot

The price for ammonium sulfate truck sales out of terminals in the Houston/Pasadena area of Texas, including Freeport. This price will generally reflect prices for product from two local producers APF and PCI Nitrogen.

Corn Belt fot

The price for ammonium sulfate sold from warehouses in the Corn Belt. Corn Belt is defined as Iowa, Missouri, Illinois, Indiana and Ohio, in line with US Department of Agriculture guidelines.

Twin Cities fot

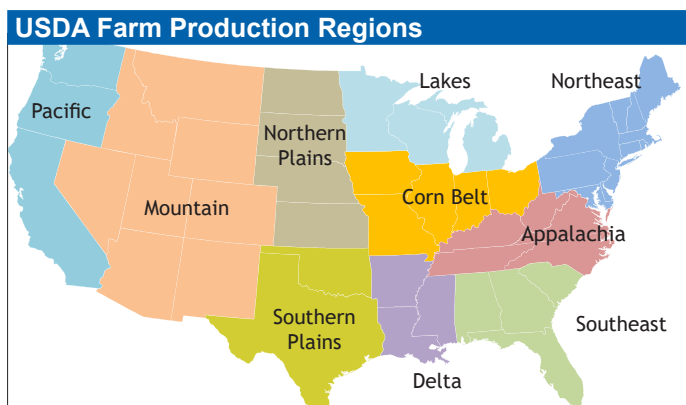
The price of granular ammonium sulfate sold via truck out of warehouses within a 50-mile radius of the Minneapolis and St Paul, Minnesota, area for shipment within 30 days.

Ammonium Thiosulfate (ATS)

Ammonium Thiosulfate is a biproduct of oil refining or is produced by reacting ammonia with sulfuric acid. ATS is a clear solution that contains 12pc nitrogen and 26pc sulphur by weight. Assessments are published every two weeks for each location and included activity for shipment within 30 days.

Corn Belt fot

The price of ammonium thiosulfate sold from tanks and loaded onto trucks in the Corn Belt. Corn Belt is defined as Iowa, Missouri, Illinois, Indiana and Ohio, in line with US Department of Agriculture guidelines.



Southern Plains fot

The price of ammonium thiosulfate sold from tanks and loaded onto trucks in Texas, Oklahoma and Kansas.

Ammonia

Anhydrous ammonia is a gas but is transported and sold in a refrigerated state, or minus 28 degrees Fahrenheit. It is injected as a liquid into the soil as a fertilizer and is also used globally as a feedstock for the industrial sector. Ammonia is produced using steam (water), air and energy feedstock, which is typically natural gas in the US.

Ammonia trades are highly seasonal, whereby faster shipment is required during spring and fall application seasons but product movement and refill programs occur throughout the year. There are various tiers of pricing as the market shifts from fill to prepay to prompt.

Tampa cfr t contract

See the [Argus Ammonia methodology](#).

Nola barge fob

The price for ammonia barges loaded or to load in Nola. The assessment will include netbacks from delivered barge business concluded further upriver but will exclude netbacks from other transport methods.

In periods of illiquidity, weak demand and minimal market price signals, an equivalent price based on the Tampa cfr contract price (the price agreed for imported cargoes) will be used. An equivalent price is calculated by taking the Tampa cfr price, adding additional freight for a theoretical import cargo to Nola, converting to short tons and adding throughput costs to transfer product from vessel to barge.

Ammonia cost of production

A cost of production calculation based on a formula using the calculated average for the Henry Hub gas price and factoring in additional processing and operations costs. This calculation is reviewed annually.

US Gulf cfr t

This US Gulf price is assessed on a \$/t cfr basis for imports to any port within the US Gulf from Texas to Florida. This price is linked to the Tampa contract settlement, allowing for a freight differential between the ports of an additional \$5/t.

Oklahoma ex-works

The price of ammonia sold from production facilities in Oklahoma. This includes information gathered regarding plants in Verdigris, Woodward (CF Industries), Pryor (LSB Industries) and Enid (Koch).

E Corn Belt fot

The price of ammonia sold from tanks in the east Corn Belt, defined as Illinois, Indiana and Ohio, in line with US Department of Agriculture (USDA) guidelines. Sales ex-pipeline will also be considered in the assessment.

W Corn Belt fot

The price of ammonia sold from tanks in the west Corn Belt, defined as Missouri and Iowa, in line with USDA guidelines. Sales from

Beatrice, Nebraska and other Nebraska terminals east of Beatrice will also be included. Ex-pipeline sales will also be considered in the assessment.

Price ranges for both east and west Corn Belt typically present a wide high-low spread because of the large geographic expanse covered and the limited number of suppliers operating in small localized regions.

Phosphate

DAP

Diammonium phosphate (DAP) is a dry bulk fertilizer containing 18pc nitrogen and 46pc P₂O₅ (nutrient phosphate), by weight. It is produced by combining ammonia with phosphoric acid. For all phosphate fertilizer assessments, Argus will only consider trades for use by the agricultural sector.

Delivery periods are specified for several assessments below. For market information to be considered for inclusion in those assessments, it must refer to trade for which at least half of the delivery period falls within the delivery period specified for the assessment.

Nola barge fob

The price for DAP barges loaded at or to load in Nola within 30 days. Trades of domestically-produced and import product business are included.

Nola fob t export eq

This is a calculated assessment of the producer export equivalent price out of New Orleans or Tampa based on current barge prices. This calculation factors in processing costs. This provides a reference for producer profitability in the domestic versus offshore markets.

Tampa fob t (exports)

See DAP/MAP Tampa in the [Argus Phosphates methodology](#).

Nola barge import eq (ex-Mor)

This is a calculated assessment using the Moroccan fob price published in the Argus Phosphates weekly report on a Thursday (see the [Argus Phosphates methodology](#)) and adding freight and throughput costs then converting to short tons to reach a New Orleans barge fob equivalent price.

Central Florida rail

Prices for DAP sold on 100st railcars in Central Florida. In the absence of railcar business, prices for truck (fot) sales will be considered.

Inola/Catoosa fot

The price of DAP sold out of non-production point warehouses in Inola/Catoosa, Oklahoma and all terminals falling within a 50-mile radius, including those in Tulsa.

Terminal assessments are the price for prompt sales, or sales with intended loading within 30 days.

St Louis fot

The price of DAP sold out of non-production point warehouses within a 50-mile radius of St Louis, Missouri.

Cincinnati/Jeffersonville fot

The price of DAP sold out of non-production point warehouses in Jeffersonville, Indiana, and Cincinnati, Ohio. Prices from warehouses within the 100-mile diameter between the two cities will be included.

Twin Cities fot

The price of DAP sold out of non-production point warehouses in Minneapolis and St Paul, Minnesota, and other warehouses within a 50-mile radius, including Pine Bend.

MAP

Monoammonium phosphate (MAP), also known as ammonium dihydrogen phosphate, is a dry bulk fertilizer containing typical 10-11pc nitrogen by weight and 50-52pc P₂O₅ by weight. It is produced by adding phosphoric acid to ammonia solution until the solution becomes highly acidic and crystallizes. Assessments reflect material containing a minimum 52pc P₂O₅ by weight.

Loading periods are specified for several assessments below. For market information to be considered for inclusion in those assessments, it must refer to trade for which at least half of the loading period falls within the loading period specified for the assessment.

Nola barge fob

The price of MAP barge trades for loading within 30 days. Transaction specifications include a minimum quantity of one barge, or 1,500st. This will only include barges that are loaded or to be loaded at Nola. Netbacks of trades for barges placed further upriver will be excluded.

Nola fob t export eq

This is a calculated assessment which gives the producer export equivalent price out of New Orleans or Tampa based on current barge prices. This calculation factors in processing costs. This provides a reference for producer profitability in the domestic versus offshore markets.

Nola barge import eq (ex-Russ)

This is a calculated assessment using the Russian fob price published in the Argus Phosphates weekly report on a Thursday (see the [Argus Phosphates methodology](#)) and adding freight and throughput costs then converting to short tons to reach a New Orleans barge fob price equivalent.

Inola/Catoosa fot

The price of MAP sold out of non-production point warehouses in Inola/Catoosa, Oklahoma and all terminals falling within a 50-mile radius, including those in Tulsa.

Terminal assessments are the price for prompt sales, or sales with intended loading within 30 days.

St Louis fot

The price of MAP sold out of non-production point warehouses within a 50-mile radius of St Louis, Missouri.

Cincinnati/Jeffersonville fot

The price of MAP sold out of non-production point warehouses in Jeffersonville, Indiana, and Cincinnati, Ohio. Prices from warehouses within the 100-mile diameter between the two cities will be included.

Twin Cities fot

The price of MAP sold out of non-production point warehouses in Minneapolis and St Paul, Minnesota, and other warehouses within a 50-mile radius, including Pine Bend.

Potash

MOP

Granular muriate of potash (MOP) is a dry bulk fertilizer containing 60-62pc K₂O by weight. It is initially extracted from underground potash ore deposits, either via solution mining or traditional mining, and then further processed to achieve typical product specifications and granulation of 2-5mm. Assessments include activity for delivery to buyer within 30 days.

For market information to be considered for inclusion in the assessments, it must refer to trade for which at least half of the loading period falls within the loading period specified for the assessment.

Nola barge fob

The price of potash sold from offshore imports onto barges for loading in 30 days. Normalized Nola netbacks from barge trades of domestic product (that previously loaded upriver) will also be included, but netbacks from other transport modes will be excluded.

Corn Belt fot

The price of potash sold from warehouses in the Corn Belt. Corn Belt is defined as Iowa, Missouri, Illinois, Indiana and Ohio, in line with US Department of Agriculture guidelines.

Vancouver fob t std (exports)

See the [Argus Potash methodology](#).

Sulfur

SOP

Granular sulfate of potash (SOP) is a dry bulk fertilizer containing 50pc potassium and 17pc sulfur by weight. Argus only assesses agricultural granular grades of SOP.

Delivery periods are specified for several assessments below. For market information to be considered for inclusion in those assessments, it must refer to trade for which at least half of the delivery period falls within the delivery period specified for the assessment. Assessments include activity for delivery to the buyer within 30 days.

West coast fca

The price of SOP sold via truck or rail out of warehouses in Stockton, California, and Ogden, Utah for loading within 30 days.

Pacific Northwest del

The price of SOP delivered via truck or rail into the Pacific Northwest — defined as Washington, Oregon and Idaho.

Sulfur (formed)

Formed sulfur (granular) specifications include purity on a dry basis min 99.5pc by weight, ash content max 0.05pc by weight, and moisture max 0.5pc by weight.

US Gulf fob

The price of granular sulfur exported through ports in Louisiana and Texas. Spot and quarterly contract prices are published. Quarterly contract prices are for January-March, April-June, July-September and October-December. Assessments may involve information about netbacks from delivered markets. See the Argus Sulphur methodology for more information about the spot price assessment.

Vancouver fob

See the [Argus Sulphur methodology](#)

US west coast fob

See the [Argus Sulphur methodology](#)

Sulfur (molten)

Molten sulfur specifications include purity 99.9pc as elemental sulfur by weight, moisture max 0.5pc by weight, reduced carbon max 0.1pc by weight, and As (Arsenic), Se (Selenium) and Te (Tellurium) content — each less than 0.1ppm.

Tampa del quarterly contract

See the [Argus Sulphur methodology](#)

Gulf coast ex-refinery quarterly contract

Assessed in US dollars per long ton. Prices are for sulfur produced at refineries in Louisiana and Texas and sold directly from the point of production. Prices are assessed and published the week after the publication of the cfr Tampa quarterly contract price. Market information received after 1pm Houston time on the day of assessment may not be considered for inclusion in the assessment.

Midwest ex-refinery quarterly contract

Assessed in US dollars per long ton. Prices are for sulfur produced at Midwest refineries including those in Illinois, Indiana, Kentucky, Michigan, Ohio and Oklahoma and sold directly from the point of production. Prices are assessed and published the week after the publication of the cfr Tampa quarterly contract price. Market information received after 1pm Houston time on the day of assessment may not be considered for inclusion in the assessment.

Lower Atlantic del quarterly contract

Assessed in US dollars per long ton, as a differential to the cfr Tampa quarterly contract price for product delivered to Georgia, North Carolina, South Carolina, Virginia or West Virginia by any transport mode: truck, rail, barge or vessel, from any domestic or foreign source. Prices are assessed and published the week after the publication of the cfr Tampa quarterly contract price.

Sulfuric acid

Sulfuric acid specifications include 93-98pc grade, Iron (Fe) <50 ppm concentration, Nitrate (NO₃⁺) <5 ppm concentration, Mercury (Hg) <1 ppm concentration, Arsenic (As) <1 ppm concentration.

US southeast cfr vessel import

See the [Argus Sulphuric Acid methodology](#)

Midwest del quarterly contract

Gulf coast del quarterly contract

Lower Atlantic del quarterly contract

Assessed in US dollars per short ton for sulfuric acid produced in North America and delivered by rail directly to the buyer in the named region. Information about contracts with a minimum annual purchase volume above 10,000st at one location may be considered for inclusion in the assessment. Information about volumes purchased from producers by resellers and distributors and their subsequent resales may be considered for inclusion in the assessment.

Information about prices for material delivered by truck or barge may not be considered for inclusion in the assessment.

Prices are assessed and published the week after the publication of the cfr Tampa quarterly contract price. Sulfur-based product typically establishes the high end of the published range and smelter-based product typically establishes the low end of the published range.

Midwest is defined as PADD 2

Gulf coast is defined as PADD 3

Lower Atlantic is defined as PADD 1C

PADD regions are defined by the US Energy Information Administration (EIA)

Barge price to nutrient values

The following prices are constructed assessments based on barge prices for the following products. The barge price is converted to find the \$/unit value of the primary nutrient (N/nitrogen, P₂O₅/phosphorous, K₂O/potassium) and then converts to find the ¢/lb nutrient value.

Urea, N — This divides the barge price by 46, the nitrogen content of the product, to determine \$/unit nitrogen then converts to find ¢/lb nutrient value.

UAN, N — This divides the barge price by 32, the nitrogen content of the product, to determine \$/unit nitrogen then converts to find ¢/lb nutrient value.

AN, N — This divides the barge price by 34, the nitrogen content of the product, to determine \$/unit nitrogen then converts to find ¢/lb nutrient value.

NH₃, N — This divides the ammonia (chemical symbol NH₃) barge price by 82.24, the nitrogen content of the product, to determine \$/unit nitrogen value then converts to find ¢/lb nutrient value.

DAP, P₂O₅ — This first subtracts the nitrogen value of 18-46 DAP, using the \$/unit nitrogen value for ammonia. It then divides the remaining price by 46, the P₂O₅ or phosphorous nutrient content of the product, to determine \$/unit P₂O₅ value which is also converted to ¢/lb nutrient value.

MAP, P₂O₅ — This first subtracts the nitrogen value of 11-52 MAP, using the \$/unit nitrogen value for ammonia. It then divides the remaining price by 52, the P₂O₅ or phosphorous nutrient content of the product, for a \$/unit P₂O₅ value which is also converted to ¢/lb nutrient value.

MOP, K₂O — This divides the barge price by 60, the K₂O or potassium nutrient content of the product, to determine \$/unit potassium value then converts to find ¢/lb nutrient value.

US affordability index

The cost of fertilizers relative to crop price compared with a 5 July 2018 baseline. The index is calculated by comparing the price of a basket of crops with the assumed mix of fertilizers used in their production.

Crop prices

The crop price component of the index is an average of CME front-month prices for wheat, corn and soybeans weighted by production using the most recent available crop data from the US Department of Agriculture (USDA). Argus updates production figures in July for the upcoming fertilizer year from the World Agricultural Supply and Demand Estimates report. The data are updated the following March using the annual Prospective Plantings report and again in the subsequent June using the initial Acreage reports.

If production figures for the next planting season are unavailable in July, Argus will continue to update production figures for the previous planting season using the updated Acreage reports in August and the Farm Service Agency's final acreage update in January, until figures are available for the next planting season.

USDA data are converted to metric tonnes using the USDA's Weights, Measures, and Conversion Factors for Agricultural Commodities and Their Products guide. Crop prices are weekly averages of the prompt-month CME futures converted to USD/t from USD/bushel using the CME's Agricultural Commodity Metric Conversion Guide.

Fertilizer prices

The fertilizer price component is weighted both by crop production as described above and by the Argus assumptions about the amount of each type of fertilizer used for that basket of crops. The index uses prices for nitrogen, phosphate, and potassium derived from Argus price assessments.

- Urea granular bulk fob US Gulf barge
- DAP bulk fob US Gulf barge
- Granular MOP bulk fob New Orleans barge.

The fertilizer content is assumed to be:

- Urea = 46pc N
- DAP = 46pc P₂O₅
- MOP = 61pc K₂O