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## ***ARGUS SULPHUR***

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The most up-to-date Argus Sulphur methodology is available on [www.argusmedia.com](http://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 and representative 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 sulphur markets, Argus publishes physical market prices in the open market 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, and in other cases where deemed appropriate, 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, Argus Open Markets™ (AOM™) and directly from the back offices of market participants. Argus will accept market data by telephone, instant messenger, email, AOM 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.

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 by 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 it 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 arm's 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

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 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 in most cases 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.
- Comparison to the same commodity traded for a different delivery timing.
- 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

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 and because of the varying transportation infrastructure found in all commodity markets. 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.

### Transparency

Argus values transparency in energy markets. As a result, where available, we publish lists of deals in our reports that include price, basis, counterparty 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.

### Swaps and forwards markets

Argus publishes forward assessments for numerous markets. These include forward market contracts that can allow physical delivery and swaps contracts that swap a fixed price for the average of a floating published price. Argus looks at forward swaps to inform physical assessments but places primary emphasis on the physical markets.

### Publications and price data

Argus sulphur prices are published in the Argus Sulphur 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.

A publication schedule is available at [www.argusmedia.com](http://www.argusmedia.com)

### 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.

### 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 sub-scribers, 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](http://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 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 and representative 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 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.

### Introduction

Argus publishes the Argus Sulphur report once a week on a Thursday evening in the UK. The report contains a variety of prices and market commentary on international bulk markets of formed, crushed bulk and molten sulphur.

### Publication frequency

The weekly report is published 51 weeks of the year on a Thursday evening UK time. The weekly Argus Sulphur report is not published for one week during the Christmas/New Year holidays in the UK, although the precise date depends on when national holidays fall within the week.

Argus also provides market updates which provide real-time deals and pricing information and other market news stories affecting fertilizer supply, demand and pricing. These are produced on an ad hoc basis.

There is no minimum number of daily updates and frequency reflects market liquidity and the timing of other market news events.

### General methodology

The Argus editorial fertilizer team consists of specialised and highly experienced editors and analysts based in the UK who work closely with our global network of correspondents in Singapore, Beijing, Houston, Moscow, Delhi and other parts of the world.

The team surveys a wide variety of market participants during the course of the week, from traders to producers to buyers as well as other analysts, mostly via telephone, skype, email, instant messenger and during conferences via face-to-face meetings. As regards pricing, this survey seeks to confirm what business 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. Argus will contact and accept market data from all credible market sources including front and back office of market participants and brokers. The survey also seeks to ascertain fundamentals data, tender news and supply and demand information.

### Assessing price ranges

Sulphur prices are assessed in various regions, countries and within countries on a free on board (fob) basis in the main export regions and on a cost and freight (cfr) basis in the main destination markets. Deals, bids and offers must be considered repeatable to be reflected in the assessments. There is also one assessment on a "carriage paid to" basis (cpt) covering roadtanker trade in Europe.

The report seeks to determine price ranges in which actual transactions are taking place or in which transactions could have taken place between a willing buyer and seller. In markets that periodically lack liquidity, Argus may assess price ranges based on judgement, in view of market discussions with buyers and sellers, and what we consider to be achievable given prices paid in end user markets and appropriate netbacks from these deals (using actual fixtures or indicative freight rates), balanced against a seller's order book and propensity to sell. Where there has been no discoverable business in a week for a specific pricing point, prices are usually held at the previous week's range. However, in the absence of verified high or low deals, Argus also reserves the right to make an assessment of the range based on what deals could have been achieved within that time frame based on market fundamentals.

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 data on deals that lie within these specifications is given most weight.

The price guide reflects the last seven days of business Friday through to Thursday. However, while all information and trades are taken into account, in periods of high volatility, assessments are

weighed towards trading activity (5:00pm UK time) later in the week or at the end of the Thursday of the assessment.

When there is sufficient liquidity and deals data is 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. Wherever possible, Argus seeks to validate all deals from buyers, traders and sellers – all parties in the deal chain.

There will be occasions when a specific deal may fall well outside of the channel of trade or raise other concerns, in which case the editor shall subject the deal to further scrutiny, which will involve consultation with industry sources and review by other senior Argus management. This process is critical to ensuring that the Argus range of trade remains representative. Argus reserves the right to exclude deals from the range of trade if these are considered unrepresentative or unrepeatable.

There are occasions where trade is disrupted from a specific pricing point because of prolonged production outages, export bans etc it is omitted from regional price points, or assessed in relation to prices in similar regions.

### Spot, contract and formula pricing

**Spot pricing** refers to specific cargoes sold that are scheduled to load within 40 days of the sale being agreed.

**Contract pricing** is split out from normal spot pricing and refers to significant sales volume contracted over a minimum three-month shipping period. On quarterly contract pricing, the Price Guide is adjusted when prices for that relevant quarter have been agreed, not necessarily or automatically at the beginning of that quarter. If a new quarterly price is known before the start of the relevant quarter it is not included in the price guide until the start of that quarter.

Contract prices are assessed based on settlements reached and reported during the negotiation process by the buy and sell sides. This will result in a change in the assessment once the new quarter begins as first settlements are reported. To allow time for settlements to be reached, the contract prices are subject to ongoing amendment until up to six weeks after the start of the quarter. After that time, the quarterly prices will remain fixed and final and will not be modified until the beginning of the next quarter.

**Formula pricing** is an arrangement where a buyer and seller agree in advance on the price to be paid for a product delivered in the future, based upon a pre-determined calculation, sometimes utilising published prices from Argus and/or other publications. Given that the exact nature of the calculation or the agreement between the parties is often private and confidential, and if the deal is considered a one-off (i.e not repeatable) then calculated netbacks are not used in formulation of a spot price range. However, if a buyer and seller use this method of pricing for multiple transactions on a specific

trade route, then the editor may use the deal in formulating a spot price range using current known cfr levels, domestic prices in destination country and indicative freight rates.

### Terms

Most transactions are conducted on a sight/cash basis, but where credit terms apply for example, up to 180 days, these are taken into account and subtracted from the price so that the published price is net of credit or other terms.

All prices are assessed in US dollars per tonne (\$/t), apart from US domestic references, which are priced in US dollars per long ton (\$/lt), and China domestic references, which are priced in yuan/t.

### Lot and cargo sizes

For international trade, the minimum lot size used for consideration and inclusion in the relevant price range is 10,000t of a particular product, with the exception of the fob Black Sea assessment, which includes all trade of at least 1,000t. There is a wide variety of shipment sizes employed in the solid sulphur trade with much of it being handled in 30-50,000t vessels. Prices in the Mediterranean are specified in the Guide as under 10,000t.

Molten prices quoted in Tampa in the US, and Europe cover tonnages moved by molten barge (typically 5,000-10,000t) as well as by pipeline and roadtanker.

### Products and specifications

#### Granular sulphur (formed)

Purity on a dry basis min 99.5pc by weight  
Ash content max 0.05pc by weight  
Moisture max 0.50pc by weight

#### Crushed lump sulphur

Purity on a dry basis min 99.5pc by weight  
Ash content max 0.05pc by weight  
Moisture max 0.50pc by weight

#### Molten sulphur

Purity 99.9pc as elemental sulphur by weight  
Moisture max 0.5pc by weight  
Reduced carbon max 0.1pc by weight  
Ash content max 0.01pc by weight  
Arsenic, selenium and tellurium content — each less than 0.1 part per million



## Price Guide – how prices are defined

To accommodate all netbacks, some fob prices for Vancouver, Black Sea and the Middle East are assessed on the basis of cfr business with appropriate freight cost deducted.

### Fob solid sulphur trade

#### fob Vancouver

Fixed-volume contracts exist but within this structure the vast majority of prices are agreed on a cargo by cargo basis and so are assessed as spot prices. Consequently each week we publish contract and spot prices as identical ranges. These prices all relate to granular product shipped out of the two Vancouver sulphur terminals.

#### fob Middle East (excluding Iran)

Prices are assessed on the basis of fob quarterly contracts and fob spot transactions and all relate to granular sulphur. The prices relate to sales made ex-Saudi Arabia, Abu Dhabi, Qatar and Kuwait. They do not include Iran – these prices are published separately.

#### Posted prices

Three fob monthly published posted prices are also listed separately — the United Arab Emirates (UAE) OSP (Official Selling Price), the Qatar QSP (Qatar Sulphur Price) and the Kuwait KSP (Kuwait Sulphur Price).

#### fob Middle East netback

Expressed as a high-low range of the Argus cfr India high price assessment less the Middle East–EC India (30,000-35,000t) freight rate and the Argus cfr China high price assessment less an average of the Middle East–N/River China (30,000-35,000t) freight rate and the Middle East–South China (30,000-35,000t) freight rate.

#### fob Iran (lump-granular)

Prices are assessed on the basis of spot transactions only. The price range includes crushed lump and granular material.

#### fob Black Sea (lump-granular)

Prices are assessed on the basis of quarterly fob contracts and fob spot prices. The price range includes crushed lump and granular product loading from any Black Sea port.

#### fob Baltic Sea

Prices are assessed on the basis of sales of bulk formed product to load at Baltic Sea ports.

#### fob US Gulf

Prices are assessed as fob quarterly and spot through the ports of Texas and Louisiana.

#### fob Mediterranean (under 10,000t)

Prices are assessed on the basis of sales of formed product made from Mediterranean refineries.

### Cfr solid sulphur trade

#### cfr Brazil

Prices are assessed as both cfr quarterly and spot transactions delivered mainly from the US Gulf, Middle East and former Soviet Union (FSU).

#### cfr Mediterranean (under 10,000t)

Prices are assessed solely on a spot basis.

#### cfr north Africa (lump-granular)

Prices in north African markets are assessed for cargoes of all sizes on the basis of cfr quarterly contracts and cfr spot transactions. The price range covers granular and crushed lump tonnage sold primarily into Morocco, Tunisia and Egypt.

#### cfr India

Prices are assessed from spot transactions from transactions virtually sourced entirely from the Middle East .

#### cfr China (molten-lump-granular)

Fixed volume contracts exist in China but prices are agreed on a cargo by cargo basis and so are assessed as spot prices. Consequently, each week contract and spot prices are published as identical ranges.

#### cfr China (granular)

Prices are assessed on the basis of spot transactions. The high end of the granular price will be identical to the high end of the published China cfr molten-lump-granular price, typically the highest price in the north/river area of China. The low end is typically the lowest price in the south of China. Even if no trade is concluded in both or either of these locations, the published price range will include the geographical price difference. Sulphur exported from Iranian ports is not included in the assessment.

#### ex-works China (yuan/t)

A spot price range on tonnage sold from the domestic stockpiles at Chinese ports. Assessed in Chinese yuan on an ex-works basis.

### Cfr molten sulphur trade

#### cfr Tampa/C Fla (lt)

Prices for molten sulphur are assessed on the basis of quarterly prices cfr Tampa. These are priced in long tons.

#### cfr Benelux (loc refs) (molten)

Molten prices are assessed on the basis of quarterly prices cfr Benelux (ex-local refineries).

#### cpt NW Europe

Molten prices are assessed on the basis of roadtanker deliveries in northwest Europe. These are agreed on a quarterly cpt (carriage paid to) basis.

## Freight rates

Argus Sulphur includes freight rate assessments. Rates are assessed as a range, and include information collected over the course of the trading week.

Freight rate assessments are established by surveying freight providers and buyers of spot freight, maintaining a balance between both parties. Assessments are for cargoes that will load and move within the next 30 days.

### Routes assessed

- Vancouver – China 50,000-60,000t
- Middle East – EC India 30,000-35,000t
- Middle East – N/River China 30,000-35,000t
- Middle East – South China 30,000-35,000t
- Middle East – Brazil 30,000-35,000t
- Middle East – North Africa 30,000-35,000t
- Middle East – South Africa 35,000-40,000t
- Black Sea – North Africa 30,000-35,000t
- Black Sea – Brazil 30,000-35,000t
- Baltic – Brazil 30,000-35,000t
- Baltic – North Africa 30,000-35,000t
- US Gulf – Brazil 35,000-40,000t