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ARGUS NON-FERROUS MARKETS

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The most up-to-date Argus Non-Ferrous Markets 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 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 base metals, minor metals, ferro-alloys and rare earths 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 and directly from the back offices of market participants. Argus will accept market data by telephone, instant messenger, email or other means.

Argus encourages all sources of market data to submit all market data to which they are a party that falls within the Argus stated methodological criteria for the relevant assessment. Argus encourages all sources of market data to submit transaction data from back office functions.

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 base metals, minor metals, ferro-alloys and rare earths prices are published in the Argus Non-Ferrous Markets 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

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 subscribers, who are held to equally high standards, while at the same time maintaining our editorial integrity and independence. Argus has a strict ethics policy that applies to all staff. The policy can be found on our website at www.argusmedia.com. Included in this policy are restrictions against staff trading in any energy commodity or energy related stocks, and guidelines for accepting gifts. Argus also has strict policies regarding central archiving of email and instant messenger communication, maintenance and archiving of notes, and archiving of spreadsheets and deal lists used in the price assessment process. Argus publishes prices that report and reflect prevailing levels

for open-market 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 assessments be approved, then formal procedures for external consultation are begun.

Changes to methodology

Formal proposals to change methodologies typically emerge out of the ongoing process of internal and external review of the meth-

odologies. 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.

Market overview

Argus Non-Ferrous Markets

Argus Non-Ferrous Markets provides price assessments for the global markets in base metals, minor metals, ferro-alloys and rare earths.

Average price indexes

In addition to outright prices, the service provides month-to-date and final-month average indexes.

Indexes are calculated by summing the value of published assessments and dividing by the number of assessments published in a given month. The final index value for a given month is the average calculated on the final day of assessment of that month. The report shows the evolution of the current-month index, as well as the final index value for the previous month.

Timing and indexation

Argus Non-Ferrous Markets contains twice-weekly, weekly and monthly assessments. Those assessments are republished in the Argus Database and available electronically for each publication date. For example, a weekly price assessed on Wednesdays will be republished on Thursday and on each subsequent publication date until the next day of assessment, in this example, the following Wednesday.

Users are advised that the published month-to-date and final indexes may differ from those calculated using Argus or third-party tools, because of this daily republication of price assessments.

Publication schedule

Argus may not publish certain assessments on public holidays and may publish others on the business day before or after the holiday depending on frequency, market and location of the assessment. Argus does not publish non-ferrous coverage on Saturday or Sunday, even when those days are treated as working days in the market being reported.

Chinese daily and twice weekly prices are not assessed on public holidays in China. Weekly Chinese price assessments are made the working day before Chinese public holidays. Twice monthly Chinese price assessments are made the working day after Chinese public holidays.

Indian twice weekly prices are not assessed on public holidays in India and are uploaded to the Argus database as unchanged.

European twice weekly prices are not assessed on UK public holidays and no uploads are made.

Weekly US prices are assessed and uploaded on the working day before US public holidays.

Monthly prices typically published at the start of the calendar month are published on the first working day after a holiday. Monthly prices typically published at the end of the month are published on the last working day before a holiday.

Argus Non-Ferrous Markets is not published on UK public holidays. A publication schedule is available at www.argusmedia.com

Assessment process

Price assessments are based on data and information gathered by specialist market reporters by telephone, email and instant messaging. Reporters contact a wide cross-section of market participants, including producers, consumers, marketers, traders and other intermediaries. As many participants as possible are contacted. Where relevant, Argus may also take into account information from exchanges, government agencies and trade associations.

Argus welcomes transaction data and survey input from all market participants and strongly encourage full disclosure of all relevant details of all deals concluded. All information received is crosschecked and tested against other market information. Any anomalies are excluded.

When gathering data on transactions, reporters seek to obtain the price level, volume, specifications and delivery terms. Reported trades are tested against wider market conditions and must be deemed repeatable in order to be included in the assessment. Reporters apply a series of primary and where appropriate secondary tests when verifying trades. For example, transactions which are priced significantly above or below the prevailing market may be excluded from the assessment process.

Spot transactions can vary in size between markets, and the significance of a particular spot trade to the price assessment process must be gauged in light of trade patterns in the relevant market and prevailing market conditions.

Assessing illiquid markets

Where possible, assessments are based on verified and repeatable spot trades. In illiquid market conditions, with a lack of verified spot trades, reporters apply intelligent judgment to form assessments based on bids and offers and/or other relevant market information including a market survey of participants' view of where price levels would stand if trade were to take place.

Bids and offers must be considered repeatable for inclusion in the assessment process, and are tested against the wider market through contact with as many market participants as possible.

Additional information that may be taken into account when there are no verified spot trades during the assessment period includes:

- Bids and offers
- Market participants' view of prevailing price levels
- Verified trades in related and/or correlated markets
- Tenders
- Exchange prices
- Other relevant information including supply and demand fundamentals, and current market trends.

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.

Aluminium

Introduction

Argus Non-Ferrous Markets publishes weekly aluminium price assessments.

Basis of assessment

Assessments are for the named material delivered by truck, meeting the quantity and timing criteria listed in the table below. Assessments are of the range in which repeatable trade took place or in which it could have taken place in the absence of transactions since the last assessment.

Notes

- P1020 US midwest premium: assessed at a differential to LME official cash price for aluminium
- P1020 US midwest spot monthly average: the average of the midpoints of the low and high spot premium assessments published in the named calendar month
- Primary 6061 US billet premium: assessed at a differential to P1020 US midwest assessment
- Primary 6063 US billet premium: assessed at a differential to P1020 US midwest assessment
- International spot premiums: assessed at a differential to the LME official cash price for aluminium
- International forward/three-month premiums: assessed at a differential to the LME official cash price for aluminium on the day of shipment

Timing of assessment

Prices are assessed and published weekly on the day specified in the table below.

US markets

Market information received after 4pm Houston time on the day of assessment may not be included in the assessment process.

European markets

Market information received after 5pm London time on the day of assessment may not be included in the assessment process.

Asia-Pacific markets

Market information received after 4pm Houston time on the day of assessment may not be included in the assessment process.

Rounding

Assessments are published to up to four decimal places, ending in 0 or 5.

Currency and unit

Prices are assessed and published in the currencies and units specified below.

Copper and brass

Argus Non-Ferrous Markets publishes weekly copper price assessments.

Basis of assessment

Assessments are for the named material meeting the lot size, timing and delivery criteria listed in the table below. Assessments are of the range in which repeatable trade took place or in which it could have taken place in the absence of transactions since the last assessment.

Notes

- Cathode premiums and cash spreads, which are assessed as:
 - US: a differential to the Comex current month (spot) copper settlement
 - Europe and Asia: a differential to LME official cash settlement

Timing of assessment

Prices are assessed and published weekly on the day specified in the table below.

US markets

Market information received after 4pm Houston time on the day of assessment may not be included in the assessment process.

European markets

Market information received after 5pm London time on the day of assessment may not be included in the assessment process.

Asia-Pacific markets

Market information received after 5pm Beijing time on the day of assessment may not be included in the assessment process.

Rounding

Assessments are published to up to four decimal places, ending in 0 or 5.

Brass/bronze alloys del US

- C89833
- C89836

See the [Argus Scrap Markets methodology](#).

Copper TC/RC Indexes

Treatment charges and refining charges (TC/RCs) for clean copper concentrate are published as outright prices of spot treatment and refining for clean copper concentrate meeting the specification below.

Charges assume delivery of the concentrate within three months of the date of agreement and a refined copper price equal to the LME settlement price for the third-forward calendar month (a "quotation period" or "QP" of M+3). TC/RCs priced in reference to another QP will be standardised to M+3 using the spread between relevant futures closing prices.

Treatment charges are calculated weekly as a volume-weighted average of agreed charges meeting or normalized to the specification below and a survey of active market participants.

If five or fewer index-relevant deals are reported, the volume-weighted average of deals will account for 50pc of the final index. The volume-weighted average of deals will account for a larger share of the final index when more deals are reported, rising by 10 percentage points for each additional deal. When 10 or more index-relevant deals are reported, the volume-weighted average will make up the entirety of the index.

Refining charges are calculated as 10pc of the assessed treatment charge.

Calendar month and month-to-date averages are also published.

TC currency/unit: \$/t

RC currency/unit: ¢/lb

Payment terms: on sight L/C

Minimum tonnage: 5,000t

Delivery: within three months

QP: M+3

Cut off time: 5.30pm Beijing time on Friday

Two sets of TC/RC indexes are published, one for treatment and refining charges paid by smelters within China and one for treatment and refining charges paid by intermediary traders.

Copper concentrate smelter purchase TC/RCs

Treatment and refining charges paid by smelters within China.

Copper concentrate trader purchase TC/RCs

Treatment and refining charges paid by traders within China.

| Aluminium specifications | | | | | | | |
|--|---|-----------------------------|----------------------|--------------|------------------|-------------------|---|
| Assessment | Quality | Transacted/ transactable | Day of assessment | Min lot size | Timing | Currency/ unit | Delivery |
| Aluminium premiums | | | | | | | |
| P1020 duty paid cif Japan forward quarter | LME P1020A, 99.7% purity | on day of assessment | * | 250t | 3 months forward | \$/t | cif Osaka, Tokyo, Norita |
| Note: prices are assessed and published on or before the 15th calendar day of the quarter based on market activity | | | | | | | |
| P1020 duty paid 3-month in-warehouse Rotterdam | LME P1020A, 99.7% purity | on day of assessment | Wednesday | 25t | 3 months forward | \$/t | in-warehouse |
| P1020 duty paid spot in-warehouse Rotterdam | LME P1020A, 99.7% purity | on day of assessment | Wednesday | 25t | 30 days | \$/t | in-warehouse |
| P1020 duty unpaid 3-month in-warehouse Rotterdam | LME P1020A, 99.7% purity | on day of assessment | Wednesday | 25t | 3 months forward | \$/t | in-warehouse |
| P1020 duty unpaid spot in-warehouse Rotterdam | LME P1020A, 99.7% purity | on day of assessment | Wednesday | 25t | 30 days | \$/t | in-warehouse |
| P1020 US midwest spot | LME P1020A, 99.7% purity | on day of assessment | Wednesday | truckload | 30 days | \$/lb | by truck to Indiana, Missouri, Wisconsin, Kentucky or Tennessee |
| P1020 US midwest spot monthly average | Calculated as the average of the midpoints of the low and high spot premium assessments published in the named calendar month. Published on the last Wednesday of the month. | | | | | | |
| P1020 US midwest transaction | calculated as the LME cash price settlement + the Argus P1020 US midwest premium assessment | | | | | | |
| 6061 billet US spot | Aluminum Association 6061 | on day of assessment | Wednesday | truckload | 30 days | \$/lb | by truck to Indiana, Missouri, Wisconsin, Kentucky or Tennessee |
| 6061 billet del US transaction | calculated as the Argus P1020 US midwest spot transaction price + the Argus 6061 billet price assessment | | | | | | |
| 6063 billet del US spot | Aluminum Association 6063 | on day of assessment | Wednesday | truckload | 30 days | \$/lb | by truck to Indiana, Missouri, Wisconsin, Kentucky or Tennessee |
| 6063 billet del US transaction | calculated as the Argus P1020 US midwest transaction price + the Argus 6063 billet price assessment | | | | | | |
| 6063 billet del Italy | Aluminum Association 6063 primary billet premium | on day of assessment | Wednesday | 25t | 60 days | \$/t | northern Italy |
| 6063 billet del Germany | Aluminum Association 6063 primary billet premium | on day of assessment | Wednesday | 25t | 30 days | \$/t | Ruhr region |
| 6063 extrusion duty paid spot in-warehouse Rotterdam | calculated as the higher of the Argus 6063 billet del Italy price assessment plus the assessed cost of freight to Rotterdam and the Argus 6063 billet del Germany price assessment plus the assessed cost of freight to Rotterdam | | | | | | |

| Copper specifications | | | | | | | |
|------------------------------------|--|-----------------------------|----------------------|--------------|---------|-------------------|--------------------------|
| Assessment | Quality | Transacted/ transactable | Day of assessment | Min lot size | Timing | Currency/ unit | Delivery |
| Copper cathode premiums | | | | | | | |
| Grade A del US midwest | ASTM B115-00 | since last assessment | Wednesday | truckload | 30 days | \$/lb | del Iowa, Illinois, Ohio |
| Grade A del US midwest transaction | calculated as the Comex copper spot settlement + the Argus grade A del US midwest price assessment | | | | | | \$/lb |
| Grade A del southern Europe | LME copper grade A | day of assessment | Tuesday | 25t | prompt | \$/t | del Spain, Italy, Greece |
| Grade A cif Rotterdam | LME copper grade A | day of assessment | Tuesday | 25t | prompt | \$/t | cif Rotterdam |
| Grade A del Germany | LME copper grade A | day of assessment | Tuesday | 25t | prompt | \$/t | del Germany |
| Grade A cif Shanghai | Grade A cathode 99.9935% min copper conforming to LME specifications BS EN 1978:1998 – Cu CATH-1 | day of assessment | Tuesday/ Thursday | 25t | 6 weeks | \$/t | cif Shanghai |

Nickel

Introduction

Argus Non-Ferrous Markets publishes price assessments and market commentary on the international nickel markets.

Basis of assessment

Assessments are for the named material meeting the lot size, timing and delivery criteria listed in the table below. Assessments are published as a low-high range of prices that traded, or could have traded, on the day or during the period shown.

Unless stated, price assessments are for physical material for prompt delivery, defined as delivery within four weeks.

Note

- Nickel cathode premiums are assessed as a differential to the LME official cash price

Timing of assessment

Weekly prices are assessed and published on Thursday, except where noted below. Monthly prices are assessed and published on the last publication day of the month.

US markets

Market information received after 4pm Houston time on the day of assessment may not be included in the assessment process.

European markets

Market information received after 5pm London time on the day of assessment may not be included in the assessment process.

China markets

Market information received after 4pm Beijing time on the day of assessment may not be included in the assessment process.

Currency/unit conversions

Argus converts several price assessments to \$/t, Yn/t and Yn/mtu and removes VAT where appropriate.

Converted prices are calculated for:

- Nickel sulphate min 22% ex-works China (excluding VAT)
- Nickel pig iron 10-14% cif China
- Nickel matte 70% cif China
- Mixed hydroxide precipitate (MHP) 37%min cif China

Rounding

Prices assessed in US dollars are rounded to two decimal places, with the exception of nickel pig iron cif China, mixed hydroxide precipitate cif China and nickel mate cif China which are rounded to the nearest 10¢/mtu. Prices assessed in Chinese yuan are rounded to whole numbers.

Lead and zinc

Introduction

Argus Non-Ferrous Markets publishes price assessments and market commentary on the international lead and zinc markets.

Basis of assessment

Assessments are for the named material meeting the lot size, timing and delivery criteria listed in the table below. Assessments are published as a low-high range of prices that traded, or could have traded, on the day or during the period shown.

Unless stated, price assessments are for physical material for prompt delivery, defined as delivery within four weeks.

Note

- Special high grade zinc premiums are assessed as a differential to the LME official cash price
- Lead ingot premiums are assessed as a differential to the LME official cash price

Timing of assessment

Zinc prices are assessed and published weekly on Monday. Lead prices are assessed and published weekly on Tuesday.

Market information received after 4pm Houston time on the day of assessment may not be included in the assessment process.

| Nickel specifications | | | | | | | |
|--|--|------------------------------|----------------------|---------------------------------|-------------------------|---------|------------------------|
| Assessment | Quality | Minimum quantity | Currency/unit | Assessment frequency | Transacted/transactable | Timing | Basis |
| Nickel | | | | | | | |
| Ore 1.8% Ni fca China, Yn/wmt | Nickel 1.8%, moisture 35% maximum, mud, bulk, includes VAT | 10,000t | Yn/wet metric tonne | twice weekly (Tuesday/Thursday) | on day of assessment | prompt | fca China |
| Philippine ore min 1.3pc Ni cif China \$/wmt | Nickel 1.3%, moisture 30% maximum, mud, duty unpaid, of Philippine origin, | 50,000t | \$/wet metric tonne | weekly | on day of assessment | 45 days | cif China |
| Pig iron 10% Ni ex-works China, Yn/mtu | Nickel 10% minimum, iron 10-15%, phosphorous 0.8%, sulphur 0.6% maximum, lump, big bags, includes VAT | 100t | Yn/metric tonne unit | twice weekly (Tuesday/Thursday) | on day of assessment | prompt | ex-works China |
| Pig iron 10-14% Ni cif China | Nickel 10-14%, carbon 4% maximum, sulphur 0.5% maximum, silicon 4% maximum, phosphorus 0.05% maximum, containers or bulk, duty unpaid | 1,000t | \$/metric tonne unit | weekly (Friday) | since last assessment | 60 days | cif China |
| Nickel sulphate | | | | | | | |
| min 22% ex-works China | nickel 22% minimum, iron 0.005% maximum, zinc 0.008% maximum, chromium, 0.008% maximum | 1t (+/- 2%) | Yn/t | twice weekly (Tuesday/Thursday) | on day of assessment | prompt | ex-works China |
| min 22% ex-works China (USD/t, ex-VAT) | nickel 22% minimum, iron 0.005% maximum, zinc 0.008% maximum, chromium, 0.008% maximum | 1t (+/- 2%) | \$/t | twice weekly (Tuesday/Thursday) | on day of assessment | prompt | ex-works China |
| min 22% cif China† | nickel 22% minimum, cobalt 0.4% maximum, natrium 0.01% maximum, calcium 0.005% maximum, magnesium 0.005% maximum, manganese 0.001% maximum, copper 0.0005% maximum, iron 0.0005% maximum, zinc 0.005% maximum, cadmium 0.0002% maximum | 10t | \$/t | twice weekly (Tuesday/Thursday) | on day of assessment | prompt | cif China, duty unpaid |
| Nickel intermediates | | | | | | | |
| Mixed hydroxide precipitate (MHP) payable indicator 30-40% Ni cif China* | nickel 30-40%, cobalt 3-5% | 100t nickel metal equivalent | % | weekly | on day of assessment | 45 days | cif China, duty unpaid |
| Matte payable indicator 70% min Ni cif China* | nickel 70% minimum | 100t nickel metal equivalent | % | weekly | on day of assessment | 45 days | cif China, duty unpaid |
| Mixed hydroxide precipitate (MHP) 37% Ni, cif China | Nickel 37% minimum, cobalt 3-5%, duty unpaid | 1,000t | \$/metric tonne unit | weekly (Friday) | since last assessment | 60 days | cif China |
| Matte 70% Ni, cif China | Nickel 70%, cobalt 0.5% max, duty unpaid | 1,000t | \$/metric tonne unit | weekly (Friday) | since last assessment | 60 days | cif China |
| *Assessed and published as a percent of the London Metal Exchange nickel official cash price | | | | | | | |
| Nickel premiums | | | | | | | |
| 1x1 inch (small lots) del US | nickel 99.8% minimum, 1x1inch cut cathodes, plating grade | 5,000lbs | \$/lb | monthly | since last assessment | 30 days | del US |
| 1x1 inch (truckloads) del US | nickel 99.8% minimum, 1x1inch cut cathodes, plating grade | truckload | \$/lb | monthly | since last assessment | 30 days | del US |
| 4x4 inch (small lots) del US | nickel 99.8% minimum, 4x4inch cut cathodes, melting grade | 5,000lbs | \$/lb | weekly | since last assessment | 30 days | del US |
| 4x4 inch (truckloads) del US | nickel 99.8% minimum, 4x4inch cut cathodes, melting grade | truckload | \$/lb | weekly | since last assessment | 30 days | del US |
| Briquettes del US | nickel 99.8% minimum, briquette | truckload | \$/lb | weekly | since last assessment | 30 days | del US |
| Nickel 200 scrap | UNS N02200 solid scrap, unprocessed | 2,000lbs | \$/lb | weekly | since last assessment | 30 days | del US |
| 4x4 inch in-warehouse Rotterdam (Russian origin) | nickel 99.8% minimum, 4x4inch cut cathodes | truckload | \$/t | weekly | on day of assessment | prompt | in-warehouse Rotterdam |
| 4x4 inch in-warehouse Rotterdam (non-Russian origin) | nickel 99.8% minimum, 4x4inch cut cathodes | truckload | \$/t | weekly | on day of assessment | prompt | in-warehouse Rotterdam |
| Full plate in-warehouse Rotterdam (Russian origin) | nickel 99.8% minimum, full plate uncut cathode | truckload | \$/t | weekly | on day of assessment | prompt | in-warehouse Rotterdam |
| Full plate in-warehouse Rotterdam (non-Russian origin) | nickel 99.8% minimum, full plate uncut cathode | truckload | \$/t | weekly | on day of assessment | prompt | in-warehouse Rotterdam |
| Briquettes in-warehouse Rotterdam | nickel 99.8% minimum, briquette | truckload | \$/t | weekly | on day of assessment | prompt | in-warehouse Rotterdam |

| | | | | | | | |
|---|--|-----|------|---------------------------------|----------------------|------------------|-----------------------|
| Full plate cif Shanghai | nickel 99.8% minimum, primary nickel conforming to LME specification: ASTM B39-79 (2013) or GB/T 6516- 2010 - Ni9990 grade | 50t | \$/t | weekly | on day of assessment | within six weeks | cif Shanghai |
| Full plate ex-warehouse Shanghai, Jinchuan-produced** | nickel 99.8% minimum, primary nickel conforming to LME specification: ASTM B39-79 (2013) or GB/T 6516- 2010 - Ni9990 grade | 1t | Yn/t | twice weekly (Tuesday/Thursday) | on day of assessment | prompt | ex-warehouse Shanghai |
| Full plate ex-warehouse Shanghai, imported** | nickel 99.8% minimum, primary nickel conforming to LME specification: ASTM B39-79 (2013) or GB/T 6516- 2010 - Ni9990 grade | 1t | Yn/t | twice weekly (Tuesday/Thursday) | on day of assessment | prompt | ex-warehouse Shanghai |

**Assessed as differentials to the most liquid Shanghai Futures Exchange monthly nickel contract

Nickel transaction prices

| | |
|--|--|
| 4x4 inch (truckloads) del US transaction | calculated as the LME nickel cash settlement + the Argus 4x4 inch (truckloads) del US price assessment |
| 4x4 inch in-warehouse Rotterdam transaction (Russian origin) | calculated as the LME nickel cash settlement + the Argus 4x4 inch in-warehouse Rotterdam (Russian origin) price assessment |
| 4x4 inch in-warehouse Rotterdam transaction (non-Russian origin) | calculated as the LME nickel cash settlement + the Argus 4x4 inch in-warehouse Rotterdam (non-Russian origin) price assessment |
| Full plate in-warehouse Rotterdam transaction (Russian origin) | calculated as the LME nickel cash settlement + the Argus full plate in-warehouse Rotterdam (Russian origin) price assessment |
| Full plate in-warehouse Rotterdam transaction (non-Russian origin) | calculated as the LME nickel cash settlement + the Argus full plate in-warehouse Rotterdam (non-Russian origin) price assessment |
| Briquettes in-warehouse Rotterdam transaction | calculated as the LME nickel cash settlement + the Argus briquettes in-warehouse Rotterdam price assessment |

† Duty unpaid – assessed as crystalline powder packaged in big bags

Lead and zinc specifications

| Assessment | Quality | Minimum quantity | Currency/ unit | Assessment frequency | Transacted/ transactable | Timing | Basis |
|---|---|------------------|----------------|----------------------|--------------------------|---------|------------------------|
| Lead | | | | | | | |
| Lead ingot primary 99.97% premium del US | LME Lead | truckload | \$/lb | weekly | since last assessment | 30 days | del US |
| Lead ingot primary 99.97% del US transaction | calculated as the LME lead cash settlement + the Argus del US premium price assessment | | | | | | |
| Zinc | | | | | | | |
| Special high grade del US premium 99.995% | LME Zinc | truckload | \$/lb | weekly | since last assessment | 30 days | del US |
| Special high grade del US transaction | calculated as the LME zinc cash settlement + the Argus special high grade del US premium price assessment | | | | | | |
| Special high grade in-warehouse Rotterdam premium | LME Zinc | truckload | \$/lb | weekly | since last assessment | 30 days | in-warehouse Rotterdam |

Minor metals

Introduction

Argus Non-Ferrous Markets publishes price assessments and market commentary on the international minor metals markets.

Basis of assessment

Minor metals price assessments are for spot physical material for prompt delivery, defined as delivery within four weeks. Product specifications for each assessment, such as currency, unit of trade and quality, follow recognised industry standards such as norms published by the Minor Metals Trade Association and other widely used specifications.

Price assessments are published as low-high ranges.

Assessments are for material certified as conflict free using recognised traceability systems in compliance with relevant legislation, and delivered to the market through legal routes, with relevant export taxes paid.

Fob China assessments are basis export duty paid, including any export taxes levied by China, and VAT. Fob China prices are not inclusive of any import duty charged by the importing country. China domestic prices are basis ex-works, VAT paid, unless otherwise stated. European prices are basis in-warehouse Rotterdam, duty unpaid, unless otherwise stated. Fob US prices in-warehouse are inclusive of duties.

Note: titanium oxide concentrate is discussed and priced on a “fob China warehouse” basis involves the transfer of the product from the seller to the buyer at a port warehouse in China.

In most cases, information relating to material that falls outside of the stated specifications will not be used in the assessment process. Exceptions may be made if an acceptable and appropriate normalisation process can be applied.

In markets where liquidity is split across several locations, verified spot trades may be normalised to a single reference hub, for example by making adjustments for transportation costs, where appropriate and in line with market practice. See below for a full list of product specifications.

Ex-works US dollar conversions

Argus converts several ex-works price assessments to US dollar, VAT excluded prices by removing value-added tax from the relevant ex-works assessment and applying an exchange rate to create a \$/kg or \$/lb price.

Converted prices are calculated for:

- Lithium carbonate min 99.5pc (\$/kg)
- Lithium hydroxide min 56.5pc (\$/kg)
- Cobalt sulphate min 20.5pc (\$/lb)

Timing of assessment

The frequency and timing of each assessment are specified in the tables below. Monthly European price assessments are made and published on the first publication date of the month. Monthly US price assessments are made and published on the last publication date of the month.

In each market, information received after 4pm local time on the day of assessment may not be included in the assessment process.

Rounding

Prices assessed in US dollars and Chinese yuan per kilogram are rounded to two decimal places. Prices assessed in Chinese yuan per tonne are rounded to whole numbers.

Electronic metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|--|------------------|-----------|------------------|------------------|--|----------------|----------------|---------------------------------|
| Arsenic | | | | | | | | | |
| min 99% fob US warehouse | arsenic 99% minimum | fob | US | duty paid | 1t | lumps | \$/lb | within 30 days | monthly |
| Bismuth | | | | | | | | | |
| min 99.99% du Rotterdam | bismuth 99.99% minimum | in-warehouse | Rotterdam | duty unpaid | 1t (+/-2%) | ingots | \$/lb | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% ex-works China | bismuth 99.99% minimum | ex-works | China | no | 1t (+/-2%) | ingots | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% fob China | bismuth 99.99% minimum | fob | China | export duty paid | 1t (+/-2%) | ingots | \$/lb | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% fob US warehouse* | bismuth 99.99% minimum | fob | US | duty paid | 1t | ingots | \$/lb | within 30 days | weekly (Tuesday) |
| Gallium | | | | | | | | | |
| min 99.9999% ex-works China | gallium 99.9999% minimum | ex-works | China | no | 50kg (+/-2%) | ingots | Yn/kg | prompt | weekly (Tuesday) |
| min 99.9999% fob China | gallium 99.9999% minimum | fob | China | no | 50kg (+/-2%) | ingots | \$/kg | prompt | weekly (Tuesday) |
| min 99.99% ex-works China | gallium 99.99% minimum | ex-works | China | no | 50kg (+/-2%) | ingots | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% fob China | gallium 99.99% minimum | fob | China | export duty paid | 50kg (+/-2%) | ingots | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% cif main airport | gallium 99.99% minimum | cif main airport | Europe | duty paid | 100kg (+/-2%) | ingots | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Germanium | | | | | | | | | |
| Dioxide min 99.999% ex-works China | germanium dioxide 99.999% minimum; germanium 69% approximately | ex-works | China | no | 50kg (+/-2%) | white powder | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |
| Dioxide min 99.999% fob China | germanium dioxide 99.999% minimum; germanium 69% approximately | fob | China | export duty paid | 50kg (+/-2%) | white powder | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Dioxide min 99.999% cif main airport Europe | germanium dioxide 99.999% minimum; germanium 69% approximately | cif main airport | Europe | duty unpaid | 100kg (+/-2%) | white powder | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Metal (zone refined ingot) min 99.999% ex-works China | germanium 99.999% minimum | ex-works | China | no | 50kg (+/-2%) | ingots | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |
| Metal min 99.999% cif main airport Europe | germanium 99.999% minimum | cif main airport | Europe | duty unpaid | 100kg (+/-2%) | ingots, typically 1-5kg each | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Metal min 99.999% fob China | germanium 99.999% minimum | fob | China | export duty paid | 50kg (+/-2%) | ingots | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Indium | | | | | | | | | |
| min 99.99% du Rotterdam | indium 99.99% minimum | in-warehouse | Rotterdam | duty unpaid | 100kg (+/-2%) | ingots, usually 0.5-3.5kg, occasionally 10kg | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% ex-works China | indium 99.99% minimum | ex-works | China | no | 50kg (+/-2%) | ingots, usually 0.5-3.5kg, occasionally 10kg | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% fob China | indium 99.99% minimum | fob | China | export duty paid | 50kg (+/-2%) | ingots, usually 0.5-3.5kg, occasionally 10kg | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Ingot min 99.99% fob US warehouse | indium 99.99% minimum | fob | US | duty paid | 100kg | ingots | \$/kg | within 30 days | weekly (Tuesday) |
| min 99% ex-works China | indium 99% minimum | ex-works | China | no | 50kg (+/-2%) | ingots, usually 0.5-3.5kg, occasionally 10kg | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |

*Does not include information about market activity involving galvanizers

Electronic metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|--|---|--------------------|-----------|------------------|------------------|--|----------------|----------------|---------------------------------|
| Selenium | | | | | | | | | |
| Dioxide min 98% delivered consumer China | selenium 98% minimum | delivered consumer | China | no | 250kg (+/-2%) | powder | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.5% du Rotterdam | selenium 99.5% minimum | in-warehouse | Rotterdam | duty unpaid | 500kg (+/-2%) | powder of -200 mesh or granules sizing 1-5mm | \$/lb | prompt | twice weekly (Tuesday/Thursday) |
| min 99.5% fob US warehouse | selenium 99.5% minimum | fob | US | duty paid | 500kg min | powder, shot or granule | \$/lb | within 30 days | weekly (Tuesday) |
| Powder min 99.9% delivered consumer China | selenium 99.9% minimum | delivered consumer | China | no | 250kg (+/-2%) | powder of -200 mesh or granules sizing 1-5mm | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |
| Tantalum | | | | | | | | | |
| Pentoxide min 99.5% ex-works China | tantalum pentoxide 99.5% minimum | ex-works | China | inc VAT | 1t | powder | Yn/kg | prompt | weekly (Tuesday) |
| Tantalite basis 25% Ta ₂ O ₅ cif main port (per lb of Ta ₂ O ₅) | 25% tantalum pentoxide, thorium dioxide + triuranium octoxide 0.5% maximum | cif | main port | duty unpaid | 10t | lump concentrate | \$/lb | prompt | twice weekly (Tuesday/Thursday) |
| min 99.8% du Rotterdam | tantalum 99.8% minimum; carbon/nickel/iron/titanium 0.01%, manganese/silicon/phosphorus/sulphur 0.005%, molybdenum 0.02%, niobium 0.1%, tungsten 0.05%, oxygen 0.03%, cadmium 0.003%, magnesium/antimony 0.002%, arsenic 0.001%, and silver 0.0005% maximum | in-warehouse | Rotterdam | duty unpaid | 500kg (+/-2%) | uniform bars/rods/ingot of 4" (10cm) | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Tellurium | | | | | | | | | |
| min 99.99% ex-works China | tellurium 99.99% minimum | ex-works | China | no | 500kg (+/-2%) | ingots, sticks or powder | Yn/kg | prompt | weekly (Tuesday) |
| min 99.99% du Rotterdam | tellurium 99.99% maximum | in-warehouse | Rotterdam | duty unpaid | 500kg (+/-2%) | ingots, sticks or powder | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.95% fob US | tellurium 99.95% minimum | fob | US | duty paid | 500kg | ingots | \$/kg | within 30 days | weekly (Tuesday) |
| Zirconium | | | | | | | | | |
| Fused zirconia 98.5% ZrO ex-works China | zirconium (hafnium) dioxide 98.5% minimum, aluminium (II) oxide 0.40%, silicon dioxide 0.40%, ferrous oxide 0.08%, and titanium dioxide 0.20% maximum | ex-works | China | no | 10t | clean shot | Yn/t | prompt | weekly (Tuesday) |
| Oxychloride 36% Zr(Hf)O ₂ ex-works China | zirconium (hafnium) dioxide 36% minimum; silicon dioxide 0.01%, titanium dioxide 0.001%, ferric oxide 0.002%, sodium oxide 0.005%, calcium oxide 0.01%, and SiO ₄ 0.005% maximum | ex-works | China | no | 50t | crystalline powder | Yn/t | prompt | weekly (Tuesday) |
| Oxychloride 36% Zr(Hf)O ₂ fob China | zirconium (hafnium) dioxide 36% minimum; silicon dioxide 0.01%, titanium dioxide 0.001%, ferric oxide 0.002%, sodium oxide 0.005%, calcium oxide 0.01%, and SiO ₄ 0.005% maximum. | fob | China | export duty paid | 50t | crystalline powder | \$/t | prompt | weekly (Tuesday) |
| Silicate 65% Zr(Hf)O ₂ ex-works China | zirconium (hafnium) dioxide ≥ 64.5%, Iron(II) oxide 0.15%, and titanium oxide 0.20% maximum | ex-works | China | no | 50t | powder | Yn/t | prompt | weekly (Tuesday) |

Electronic metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|--|---|----------|----------|----------------|------------------|--|----------------|--------|----------------------|
| Sponge 99.4% Zr+Hf ex-works China | zirconium + hafnium 99.4% minimum; hafnium 0.01%, carbon 0.025%, oxygen 0.14%, nitrogen 0.005%, chlorine 0.13%, aluminium 0.0075%, boron 0.00005%, cadmium 0.00005%, cobalt 0.002%, copper 0.003%, chromium 0.02%, iron 0.15%, manganese 0.005%, molybdenum 0.005%, nickel 0.0007%, silicon 0.012%, titanium 0.005%, tungsten 0.005%, and uranium 0.0003% maximum | ex-works | China | | 2-3t (+/-2%) | grains of 5-35mm, 90% minimum, free from fines | Yn/kg | prompt | weekly (Tuesday) |
| Carbonate 40% Zr (Hf)O ₂ 0.2% Cl ex-works China | Zr (Hf)O ₂ 40%min, Na ₂ O 0.1% max, chlorine 0.2% max | ex-works | China | VAT paid | 30t | crystal | Yn | prompt | weekly (Tuesday) |
| Carbonate 40% Zr (Hf)O ₂ 0.2% Cl fob China | Zr (Hf)O ₂ 40%min, Na ₂ O 0.1% max, chlorine 0.2% max | fob | China | VAT paid | 18t | crystal | \$/t | prompt | weekly (Tuesday) |
| Carbonate 40% Zr (Hf)O ₂ 0.005% Cl ex-works China | Zr (Hf)O ₂ 40%min, Na ₂ O 0.01% max, chlorine 0.005% max | ex-works | China | VAT paid | 30t | crystal | Yn | prompt | weekly (Tuesday) |
| Carbonate 40% Zr (Hf)O ₂ 0.005% Cl fob China | Zr (Hf)O ₂ 40%min, Na ₂ O 0.01% max, chlorine 0.005% max | fob | China | VAT paid | 18t | crystal | \$/t | prompt | weekly (Tuesday) |

Battery metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|--|------------------------|-----------|------------------|------------------|------------------|----------------|----------------|---------------------------------|
| Antimony | | | | | | | | | |
| min 99.65% ex-works China | antimony 99.65% minimum | ex-works | China | no | 10t (+/-2%) | ingots | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| min 99.65% fob China | antimony 99.65% minimum | fob | China | export duty paid | 10t (+/-2%) | ingots | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| min 99.65% cif US | antimony 99.65% minimum | cif | US | duty paid | 10-30t | ingots | \$/lb | within 30 days | weekly (Tuesday) |
| Regulus Grade II min 99.65% Sb du Rotterdam | antimony 99.65% minimum; arsenic 0.15%, selenium 0.005%, and sulphur 0.06% maximum | in-warehouse | Rotterdam | duty unpaid | 10t (+/-2%) | ingots (regulus) | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Regulus Trioxide grade min 99.65% Sb du Rotterdam | antimony 99.65% minimum; arsenic 0.15%, selenium 0.005%, bismuth 0.01%, iron 0.02%, copper 0.02%, lead 0.2%, and sulphur 0.06% maximum | in-warehouse | Rotterdam | duty unpaid | 10t (+/-2%) | ingots (regulus) | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Trioxide min 99.8% ex-works China | antimony 99.8% minimum | ex-works | China | VAT included | 5t | powder | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Trioxide min 99.5% ex-works China | antimony 99.5% minimum | ex-works | China | no | 10t (+/-2%) | ingots | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Trioxide min 99.8% fob China | antimony 99.8% minimum | fob | China | export duty paid | 5t | powder | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Trioxide min 99.5% fob China | antimony 99.5% minimum | fob | China | export duty paid | 25t (+/-2%) | ingots | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Metal min 99.85% ex-works China | antimony 99.85% minimum (permissible range 99.85-99.9%) | ex-works | China | VAT included | 5t | lump | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Concentrate 50% del China consumer | antimony 50% minimum | delivered to consumers | China | inc VAT | 10t | powder | Yn/t | prompt | twice weekly (Tuesday/Thursday) |

Battery metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|------------------------|--------------|-----------|----------------|------------------|-------------------------|-----------------|----------------|---------------------------------|
| Cadmium | | | | | | | | | |
| min 99.99% du Rotterdam | cadmium 99.99% minimum | in-warehouse | Rotterdam | duty unpaid | 20t (+/-2%) | sticks, ingots or balls | \$/lb | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% ex-works China | cadmium 99.99% minimum | ex-works | China | no | 5t (+/-2%) | sticks, ingots or balls | Yn/t | prompt | weekly (Tuesday) |
| min 99.99% cif India | cadmium 99.99% minimum | cif | India | duty paid | 5t (+/-2%) | sticks, ingots or balls | Indian rupee/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.99% fob US warehouse | cadmium 99.99% minimum | fob | US | duty paid | 10t | sticks, ingots or balls | \$/lb | within 30 days | weekly (Tuesday) |
| min 99.95% du Rotterdam | cadmium 99.95% minimum | in-warehouse | Rotterdam | duty unpaid | 20t (+/-2%) | sticks, ingots or balls | \$/lb | prompt | twice weekly (Tuesday/Thursday) |
| min 99.95% fob US warehouse | cadmium 99.95% minimum | fob | US | duty paid | 10t | sticks, ingots or balls | \$/lb | within 30 days | weekly (Tuesday) |
| min 99.95% cif India | cadmium 99.95% minimum | cif | India | duty paid | 5t (+/-2%) | sticks, ingots or balls | Indian rupee/kg | prompt | twice weekly (Tuesday/Thursday) |
| oxide min 99.5% ex-works China | cadmium 99.5% minimum | ex-works | China | no | 5t (+/-2%) | sticks, ingots or balls | Yn/t | prompt | weekly (Tuesday) |
| Cobalt - prices are republished from Argus Battery Materials - see the Argus Battery Materials methodology | | | | | | | | | |
| (Electrolytic metal) min 99.8% ex-works China | | | | | | | | | |
| Chloride min 24% ex-works China | | | | | | | | | |
| min 99.8% alloy grade du Rotterdam | | | | | | | | | |
| min 99.8% fob US warehouse | | | | | | | | | |
| min 99.8% chemical grade du Rotterdam | | | | | | | | | |
| Hydroxide min 30% cif China | | | | | | | | | |
| Hydroxide payable indicator min 30% cif China (pc Argus cobalt metal) | | | | | | | | | |
| Oxide 72% ex-works China | | | | | | | | | |
| Powder min 99.8% ex-works China | | | | | | | | | |
| Sulphate min 20.5% ex-works China | | | | | | | | | |
| Sulphate min 20.5% ex-works China (USD/lb, ex-VAT) | | | | | | | | | |
| Tetroxide min 73% ex-works China | | | | | | | | | |
| Lithium - prices are republished from Argus Battery Materials - see the Argus Battery Materials methodology | | | | | | | | | |
| Carbonate 99.5% ex-works China | | | | | | | | | |
| Carbonate 99.5% ex-works China (USD/kg, ex-VAT) | | | | | | | | | |
| Carbonate 99.5% cif China | | | | | | | | | |
| Cobalt oxide min 60% Co ex-works China | | | | | | | | | |
| Concentrate (spodumene) 6% Li ₂ O cif China | | | | | | | | | |
| Hydroxide 56.5% ex-works China | | | | | | | | | |
| Hydroxide 56.5% ex-works China (USD/kg, ex-VAT) | | | | | | | | | |
| Hydroxide 56.5% fob China | | | | | | | | | |
| Graphite - prices are republished from Argus Battery Materials - see the Argus Battery Materials methodology | | | | | | | | | |
| Graphite flake 94% fob China | | | | | | | | | |
| Graphite flake 94% ex-works China | | | | | | | | | |
| Graphite flake 94% ex-works China (USD/t, ex-VAT) | | | | | | | | | |

Light metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|--|--------------|-----------|------------------|------------------|--|----------------|----------------|---------------------------------|
| Magnesium | | | | | | | | | |
| Alloy min 90% Mg AZ91 ex-works China | magnesium 90% minimum | ex-works | China | no | 20t (+/-2%) | ingot | Yn/t | prompt | daily |
| Alloy min 90% Mg AZ91 fob China | magnesium 90% minimum | fob | China | export duty paid | 20t (+/-2%) | ingot | \$/t | prompt | daily |
| min 99.9% fob US warehouse | magnesium 99.9% minimum | fob | US | duty paid | 20-40t | ingots, free from oxidation - surface condition to be specified - each 8kg (+/- 1kg), (Chinese 7kg (+/- 0.5kg)) of uniform size and weight | \$/t | within 30 days | weekly (Tuesday) |
| min 99.9% du Rotterdam | magnesium 99.9% minimum For reference purposes only - iron 0.04%, sodium 0.04%, chlorine 0.04%, molybdenum 0.03%, silicon 0.02%, aluminium 0.02%, and copper 0.01% maximum | in-warehouse | Rotterdam | duty unpaid | 20t (+/-2%) | ingots, free from oxidation - surface condition to be specified - each 8kg (+/- 1kg), (Chinese 7kg (+/- 0.5kg)) of uniform size and weight | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| min 99.9% ex-works China | magnesium 99.9% minimum; iron 0.04%, sodium 0.04%, chlorine 0.04%, molybdenum 0.03%, silicon 0.02%, aluminium 0.02%, and copper 0.01% maximum | ex-works | China | no | 20t (+/-2%) | ingots, free from oxidation - surface condition to be specified - each 8kg (+/- 1kg), (Chinese 7kg (+/- 0.5kg)) of uniform size and weight | Yn/t | prompt | daily |
| min 99.9% fob China | magnesium 99.9% minimum; iron 0.04%, sodium 0.04%, chlorine 0.04%, molybdenum 0.03%, silicon 0.02%, aluminium 0.02%, and copper 0.01% maximum | fob | China | export duty paid | 20t (+/-2%) | ingots, free from oxidation - surface condition to be specified - each 8kg (+/- 1kg), (Chinese 7kg (+/- 0.5kg)) of uniform size and weight | \$/t | prompt | daily |
| Powder 99.9% Mg 20-80 mesh ex-works China | magnesium 99.9% minimum | ex-works | China | no | 20t (+/-2%) | powder | Yn/t | prompt | daily |
| Powder 99.9% Mg 20-80 mesh fob China | magnesium 99.9% minimum | fob | China | export duty paid | 20t (+/-2%) | powder | \$/t | prompt | daily |
| Manganese | | | | | | | | | |
| Briquette min 97% Mn ex-works China | manganese 97pc minimum | ex-works | China | inc VAT | 10t | briquette | Yn/t | prompt | daily |
| Briquette 97% Mn fob China | manganese 97% minimum | fob | China | export duty paid | 25t (+/-2%) | briquette | \$/t | prompt | daily |
| Electrolytic metal min 99.7% fob US warehouse | manganese 99.7% minimum | fob | US | duty paid | one truckload | flakes, briquette | \$/lb | within 30 days | weekly (Thursday) |
| Flake 99.7% Mn ex-works China | manganese 99.7% minimum; carbon 0.04%, phosphorus 0.005%, sulphur 0.05%, and iron + selenium + silicon 0.205% maximum | ex-works | China | no | 25t (+/-2%) | flakes | Yn/t | prompt | daily |

Light metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|---|-----------------------|---------------|------------------|------------------|---------------------------------------|----------------|----------------|---------------------------------|
| Flake min 99.7% fob China | manganese 99.7% minimum; carbon 0.04%, phosphorus 0.005%, sulphur 0.05%, and iron + selenium + silicon 0.205% maximum | fob | China | export duty paid | 25t (+/-2%) | flakes | Yn/t | prompt | daily |
| Flake min 99.7% du Rotterdam | manganese 99.7% minimum; carbon 0.04%, phosphorus 0.005%, sulphur 0.05%, and iron + selenium + silicon 0.205% maximum | in-warehouse | Rotterdam | duty unpaid | 25t (+/-2%) | flakes | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Lump min 95% Mn ex works China | manganese 95% minimum | ex-works | China | inc VAT | 10t | lump | Yn/t | prompt | daily |
| Lump 95% Mn fob China | manganese 95% minimum | fob | China | export duty paid | 25t (+/-2%) | lump | \$/t | prompt | daily |
| Sulphate min 32% Mn battery grade ex works China | manganese 32% minimum | ex-works | China | inc VAT | 1t | crystalline powder | Yn/t | prompt | weekly (Tuesday) |
| Dioxide min 91% carbon battery grade ex works China | manganese dioxide 91% minimum | ex-works | China | inc VAT | 1t | powder | Yn/t | prompt | weekly (Tuesday) |
| Dioxide min 91% carbon battery grade ex works China (USD/t, ex-VAT) | manganese dioxide 91% minimum | ex-works | China | less VAT | 1t | powder | \$/t | prompt | weekly (Tuesday) |
| Dioxide min 91% alkaline battery grade ex works China | manganese dioxide 91% minimum | ex-works | China | inc VAT | 1t | powder | Yn/t | prompt | weekly (Tuesday) |
| Dioxide min 91% alkaline battery grade ex works China (USD/t, ex-VAT) | manganese dioxide 91% minimum | ex-works | China | less VAT | 1t | powder | Yn/t | prompt | weekly (Tuesday) |
| Silicon | | | | | | | | | |
| 5-5-3 min 98.5% Si dat Chinese ports | silicon 98.5% minimum; iron 0.5%, aluminium 0.5%, and calcium 0.3% maximum | delivered at terminal | Chinese ports | | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| 5-5-3 min 98.5% Si fob China | silicon 98.5% minimum; iron 0.5%, aluminium 0.5%, and calcium 0.3% maximum | fob | China | export duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| 5-5-3 min 98.5% Si ddp Europe works | silicon 98.5% minimum; iron 0.5%, aluminium 0.5%, and calcium 0.3% maximum | ddp | Europe | duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | €/t | prompt | twice weekly (Tuesday/Thursday) |
| 5-5-3 min 98.5% Si fca duty paid Rotterdam | silicon 98.5% min; iron 0.5% max, aluminium 0.5% max, and calcium 0.3% max | fca | Rotterdam | duty paid | 100t (+/-2%) | lumps, in range 10-100mm, 90% minimum | €/t | 90 days | weekly (Thursday) |
| 5-5-3 min 98.5% Si fob US warehouse | silicon 98.5% minimum; iron 0.5%, aluminium 0.5%, and calcium 0.3% maximum | fob | US | duty paid | 20-100t | lumps, in range 10-100mm, 90% minimum | \$/lb | within 30 days | weekly (Tuesday) |
| 5-5-3 min 98.5% Si fob US warehouse 90 days | silicon 98.5% minimum; iron 0.5%, aluminium 0.5%, and calcium 0.3% maximum | fob | US | duty paid | 100t | lumps, in range 10-100mm, 90% minimum | \$/lb | 90 days | weekly (Tuesday) |
| 4-4-1 min 99% Si dat Chinese ports | silicon 99% minimum; iron 0.4%, aluminium 0.4%, and calcium 0.1% maximum | delivered at terminal | Chinese ports | | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| 4-4-1 min 99% Si fob China | silicon 99% minimum; iron 0.4%, aluminium 0.4%, and calcium 0.1% maximum | fob | China | export duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| 4-4-1 min 99% Si ddp Europe works | silicon 99% minimum; iron 0.4%, aluminium 0.4%, and calcium 0.1% maximum | ddp | Europe | duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | €/t | prompt | twice weekly (Tuesday/Thursday) |
| 3-3-0-3 min 99% Si dat Chinese ports | silicon 99% minimum; iron 0.3%, aluminium 0.3%, calcium 0.03% maximum | delivered at terminal | Chinese ports | no | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| 3-3-0-3 min 99% Si fob China | silicon 99% minimum; iron 0.3%, aluminium 0.3%, calcium 0.03% maximum | fob | China | export duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| 3-3-0-3 min 99% Si fca Europe | silicon 99% minimum; iron 0.3%, aluminium 0.3%, calcium 0.03% maximum | fca | Europe | duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | €/t | prompt | twice weekly (Tuesday/Thursday) |
| 2-2-0-2 min 99.5% Si dat Chinese ports | silicon 99.5% minimum; iron 0.2%, aluminium 0.2%, calcium 0.02% maximum | delivered at terminal | Chinese ports | no | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | Yn/t | prompt | weekly (Thursday) |
| 2-2-0-2 min 99.5% Si fob Chinese ports | silicon 99.5% minimum; iron 0.2%, aluminium 0.2%, calcium 0.02% maximum | fob | China | export duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | \$/t | prompt | weekly (Thursday) |

Light metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|---|---------------|-----------|------------------|------------------|---------------------------------------|----------------|----------------|---------------------------------|
| 2-2-0-2 min 99.5% Si fca Europe | silicon 99.5% minimum; iron 0.2%, aluminium 0.2%, calcium 0.02% maximum | fca | Europe | duty paid | 25t (+/-2%) | lumps, in range 10-100mm, 90% minimum | €/t | prompt | twice weekly (Tuesday/Thursday) |
| Titanium | | | | | | | | | |
| Concentrate 50% TiO2 ex-works China (VAT unpaid) | titanium oxide 50% minimum | ex-works | China | VAT unpaid | 50t | lump | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Concentrate 46% TiO2 ex-works China (VAT unpaid) | titanium oxide 46% minimum, lead 0.30% maximum, sulphur 0.05% maximum | ex-works | China | VAT unpaid | 50t | lump | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Concentrate Vietnamese A grade min 50% TiO2 fob China warehouse | TiO2 50% minimum, Fe 25% minimum, Fe2O3 13% maximum | fob warehouse | China | duty unpaid | 1,500t | powder | \$/t | prompt | weekly (Thursday) |
| Concentrate Vietnamese B grade min 54% TiO2 fob China warehouse | TiO2 54% minimum, Fe 25% minimum, Fe2O3 20% maximum | fob warehouse | China | duty unpaid | 1,500t | powder | \$/t | prompt | weekly (Thursday) |
| Concentrate Mozambique origin min 50% TiO2 cif China | TiO2 50% minimum, Fe 20% minimum, Fe2O3 25% maximum | cif | China | duty unpaid | 5,000t | powder | \$/t | prompt | weekly (Thursday) |
| Concentrate Australia origin min 50% TiO2 cif China | TiO2 50-52% minimum, Fe 27% minimum, Fe2O3 15% maximum | cif | China | duty unpaid | 5,000t | powder | \$/t | prompt | weekly (Thursday) |
| Titanium dioxide min 93% rutile grade ex-works China | titanium oxide 93% minimum, loss at 105°C ≤ 0.5%, water soluble ≤0.5%, residue in 45 micrometre sieve ≤0.1% | ex-works | China | VAT paid | 30t | powder | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Titanium dioxide min 93% min rutile grade fob China | titanium oxide 93% minimum, loss at 105°C ≤ 0.5%, water soluble ≤0.5%, residue in 45 micrometre sieve ≤0.1% | fob | China | export duty paid | 30t | powder | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Titanium dioxide min 98% anatase grade ex-works China | titanium oxide 98% minimum, loss at 105°C ≤ 0.5%, water soluble ≤0.6%, residue in 45 micrometre sieve ≤0.1% | ex-works | China | VAT paid | 30t | powder | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Ingot min 99% Ti pure TA1 ex-works China | titanium 99% minimum, iron 0.25%, carbon 0.10%, nitrogen 0.03%, oxygen 0.20%, and hydrogen 0.015% | ex-works | China | no | 2t | ingots | Yn/t | prompt | weekly (Tuesday) |
| Ingot min 99% Ti pure TA2 ex-works China | titanium 99% minimum, iron 0.30%, carbon 0.10%, nitrogen 0.05%, oxygen 0.25%, and hydrogen 0.015% | ex-works | China | no | 2t | ingots | Yn/t | prompt | weekly (Tuesday) |
| Ingot min 99% Ti pure TA3 ex-works China | titanium 99% minimum, iron 0.40%, carbon 0.10%, nitrogen 0.05%, oxygen 0.30%, and hydrogen 0.015% | ex-works | China | no | 2t | ingots | Yn/t | prompt | weekly (Tuesday) |
| Ingot CP Grade 1 Ingot | CP Grade 1: maximum iron 0.20%, carbon 0.08%, oxygen 0.18%, nitrogen 0.03%, hydrogen 0.015% , titanium - balance | fob | Rotterdam | duty unpaid | 5t | ingots | \$/kg | prompt | monthly |
| Ingot CP Grade 2 Ingot | CP grade 2: maximum iron 0.30%, carbon 0.10%, oxygen 0.25%, nitrogen 0.03%, hydrogen 0.015%, titanium - balance | fob | Rotterdam | duty unpaid | 5t | ingots | \$/kg | prompt | monthly |
| Ingot CP Grade 1 Slab | CP Grade 1: maximum iron 0.20%, carbon 0.08%, oxygen 0.18%, nitrogen 0.03%, hydrogen 0.015% Ti - b titanium - balance | fob | Rotterdam | duty unpaid | 10t | As cast, thickness max 250mm | \$/kg | prompt | monthly |
| Ingot CP Grade 2 Slab | CP grade 2: maximum iron 0.30%, carbon 0.10%, oxygen 0.25%, nitrogen 0.03%, hydrogen 0.015%, Ti - titanium - balance | fob | Rotterdam | duty unpaid | 10t | As cast, thickness max 250mm | \$/kg | prompt | monthly |
| Ingot 6Al 4V ingot fob US producer | titanium 90% aluminium 6%, vanadium 4% | fob | US | duty paid | 11,000-18,500lbs | ingots | \$/lb | within 30 days | monthly |

Light metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|--|---|--------------|-----------|----------------|------------------|----------------------------------|----------------|--------|---------------------------------|
| Ingot 6Al-4V ingot in-warehouse Rotterdam | Titanium - balance, aluminium 5.5-6.75%, vanadium 3.5-4.5%, iron 0.40% maximum, oxygen 0.08% maximum, carbon 0.08% maximum, nitrogen 0.05% maximum, hydrogen 0.015% maximum | in-warehouse | Rotterdam | no | 5t | ingots | \$/kg | prompt | monthly |
| Slag min 92% TiO2 ex-works China | titanium dioxide 92% minimum | ex-works | China | no | 50t | sand | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Sponge 99.7% Ti ex-works China | titanium 99.7% minimum | ex-works | China | no | 10t | sponge | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Sponge 99.6% Ti ex-works China | 99.6% titanium minimum MHT- 110; iron 0.10%, silicon 0.03%, chlorine 0.08%, carbon 0.03%, nitrogen 0.02%, oxygen 0.08%, manganese 0.01%, magnesium 0.07%, and hydrogen 0.005% maximum | ex-works | China | no | 5t | sponge 0.83mm-12.7mm 90% minimum | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Sponge TG-TV 10x30mm du Rotterdam | titanium 97.75% minimum; iron 1.9% and nitrogen 0.10% maximum - origin in seller's option | in-warehouse | Rotterdam | duty unpaid | 10mt (+/-2%) | sponge lumps in range 10-30mm | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| Sponge TG100 12x25mm long-term contract du Rotterdam | titanium 99.5%, iron 0.07%, nitrogen 0.02%, silicon 0.02%, carbon 0.05%, chlorine 0.08%, oxygen 0.04% | in-warehouse | Rotterdam | duty unpaid | 10mt (+/-2%) | sponge 12-70mm, in steel drums | \$/kg | agreed | twice weekly (Tuesday/Thursday) |
| Tetrachloride min 99.9% TiCl4 ex-works China | Titanium tetrachloride 99.96% minimum, silicon tetrachloride 0.01% maximum, vanadium oxytrichloride%, 0.0012% maximum, FeCl3 0.001 maximum | ex-works | China | no | 1t | liquid, in steel drum | Yn/t | prompt | twice weekly (Tuesday/Thursday) |

Mineral sands specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|--|----------|-------------|----------------|------------------|------|----------------|--------|----------------------|
| Rutile | | | | | | | | | |
| Hainan rutile min 90% TiO ₂ ex-works China | titanium dioxide minimum 90%, phosphorus maximum 0.03%, sulphur maximum 0.03% | ex-works | China | inc VAT | 100t | sand | Yn/t | prompt | weekly (Tuesday) |
| Australian rutile min 95% TiO ₂ ex-works China | titanium dioxide minimum 95%, phosphorus maximum 0.03%, sulphur maximum 0.03% | ex-works | China | inc VAT | 100t | sand | Yn/t | prompt | weekly (Tuesday) |
| Zircon sand | | | | | | | | | |
| Hainan zircon sand min 65% (Zr.Hf)O ₂ ex works China | zirconium hafnium oxide minimum 65%, titanium dioxide maximum 0.15%, Iron (III) oxide maximum 0.1% | ex-works | China | excluding VAT | 100t | sand | Yn/t | prompt | weekly (Tuesday) |
| Australian zircon sand min 66% (Zr.Hf)O ₂ cif China | zirconium hafnium oxide minimum 66%, titanium dioxide maximum 0.1%, iron (III) oxide maximum 0.1%, Murray Basin of Iluka | cif | China ports | inc VAT | 100t | sand | \$/t | prompt | weekly (Tuesday) |
| Monazite | | | | | | | | | |
| Monazite REO+ThO min 60% ex-works China | REO+ThO minimum 60%, containing PrO+NdO minimum 22.50%, TbO minimum 0.16%, DyO minimum 0.70% | ex-works | China | inc VAT | 30t | sand | Yn/t | prompt | weekly (Tuesday) |

High-temperature metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|---|--------------|-----------|----------------|------------------|--|----------------|----------------|---------------------------------|
| Chromium (alumino-thermic) | | | | | | | | | |
| min 99% du Rotterdam | chromium 99% minimum | in-warehouse | Rotterdam | duty paid | 10t (+/-2%) | lumps | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| min 99% fob US warehouse | chromium 99% minimum | fob | US | duty paid | 10t | lumps | \$/lb | within 30 days | monthly |
| min 99% Cr ex-works China | chromium 99% minimum | ex-works | China | no | 10t (+/-2%) | lumps | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| min 99% Cr fob China | chromium 99% minimum | fob | China | no | 20t | lumps | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Hafnium | | | | | | | | | |
| min 99pc Hf, max 0.5pc Zr du Rotterdam | hafnium 99% minimum (hafnium + zirconium 99.8% minimum), zirconium 0.5% maximum, aluminium 0.01% maximum, iron 0.05% maximum, nitrogen 0.01% maximum, oxygen 0.05% maximum, trace elements each 0.01% maximum | in-warehouse | Rotterdam | duty unpaid | 100kg | uniform pieces of max 3kg (excluding sponge) in drums or cases | \$/kg | prompt | weekly (Tuesday) |
| Crystal bar Hf+Zr min 99.95% ex-works China | hafnium + zirconium 99.95% minimum, zirconium 0.2% maximum, aluminium 0.001% maximum, iron 0.008% maximum, nitrogen 0.005% maximum, oxygen 0.01% maximum | ex-works | China | duty paid | 20kg | crystal bar | Yn/kg | within 30 days | weekly (Thursday) |
| Crystal bar Hf+Zr min 99.95% fob China | hafnium + zirconium 99.95% minimum, zirconium 0.2% maximum, aluminium 0.001% maximum, iron 0.008% maximum, nitrogen 0.005% maximum, oxygen 0.01% maximum | fob | China | duty paid | 20kg | crystal bar | \$/kg | within 90 days | weekly (Thursday) |

High-temperature metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---------------------------------------|--|----------|----------|----------------|------------------|-------|----------------|----------------|----------------------|
| Ingot Hf+Zr min 99.95% ex-works China | hafnium + zirconium 99.95% minimum, zirconium 0.5% maximum, aluminium 0.001% maximum, iron 0.008% maximum, nitrogen 0.005% maximum, oxygen 0.01% maximum | ex-works | China | duty paid | 100kg | ingot | Yn/kg | within 30 days | weekly (Thursday) |
| Ingot Hf+Zr min 99.95% fob China | hafnium + zirconium 99.95% minimum, zirconium 0.5% maximum, aluminium 0.001% maximum, iron 0.008% maximum, nitrogen 0.005% maximum, oxygen 0.01% maximum | fob | China | duty paid | 100kg | ingot | \$/kg | within 90 days | weekly (Thursday) |

Molybdenum

| | | | | | | | | | |
|---|---|--------------|--------------------|-------------|-----------|---|----------------------|--------|---------------------------------|
| min 99.8% in-warehouse Rotterdam | molybdenum 99.8% minimum; tungsten 0.05%, iron 0.05%, oxygen 0.05%, carbon 0.015%, aluminium 0.01%, copper 0.01%, magnesium 0.01%, silicon 0.01%, phosphorus 0.01%, nitrogen 0.01%, lead 0.001%, tin 0.001%, bismuth 0.001%, cadmium 0.001% maximum | in-warehouse | Rotterdam | no | 5t | bar/rod (incl. uniformly sintered vacuum prepared scrap solids) | \$/kg | prompt | weekly (Tuesday) |
| Oxide min 57% Mo du Rotterdam (per lb of Mo) | molybdenum 57% minimum; carbon 0.1%, phosphorus 0.05%, sulphur 0.1%, copper 0.5%, and lead 0.05% maximum | in-warehouse | Rotterdam | duty unpaid | 20t | powder 0-4mm, packaged in drums 250/400kg each | \$/lb | prompt | twice weekly (Tuesday/Thursday) |
| Oxide min 57% fob US warehouse | Molybdenum 57% minimum, carbon 0.1%, phosphorus 0.05%, S 0.1%, copper 0.5%, lead 0.05% maximum | fob | US warehouse | duty unpaid | truckload | powder, packaged in drums, super sacks | \$/lb | prompt | weekly (Thursday) |
| Concentrates Mo 45% ex-works China | Molybdenum 45%, SiO ₂ 9%, arsenic 0.1%, tin 0.05%, phosphorous 0.05%, carbon 0.1%, copper 0.05%, lead 0.05%, sulphur 0.1% maximum | ex-works | China | no | 20t | powder | Yn/metric tonne unit | prompt | daily |
| Roasted concentrates (oxide) min 57% ex-works China | Molybdenum 57% minimum, carbon 0.1%, phosphorus 0.05%, S 0.1%, copper 0.5%, lead 0.05% maximum | ex-works | China | no | 20t | powder | Yn/metric tonne unit | prompt | daily |
| Trioxide min 99.9% ex-works China | Molybdenum 66.6% minimum, 40 mesh (0-425um) | ex-works | China | inc VAT | 5t | powder | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Oxide min 57% Mo in-warehouse Busan | Molybdenum 57% minimum, carbon 0.1%, phosphorus 0.05%, sulphur 0.1%, copper 0.5%, lead 0.05% maximum | in-warehouse | Busan, South Korea | duty unpaid | 20t | powder 0-4mm, packaged in drums | \$/lb | prompt | daily |
| Oxide min 57% Mo dp India (per kg Mo) | Molybdenum 57% minimum, carbon 0.1%, phosphorus 0.05%, sulphur 0.1%, copper 0.5%, lead 0.05% maximum | in-warehouse | India | duty paid | | powder | Rs/kg | prompt | twice weekly (Tuesday/Thursday) |

High-temperature metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|--|--------------|--------------|----------------|-------------------------|---|-----------------------|----------------|---------------------------------|
| Niobium | | | | | | | | | |
| Ingot 99.8% in-warehouse Rotterdam | niobium 99.8% minimum; tantalum 0.1%, tungsten 0.05%, zirconium 0.05%, oxygen 0.02%, hydrogen 0.015%, carbon 0.01%, nitrogen 0.01% maximum | in-warehouse | Rotterdam | no | 1t | ingot/bar/rod (incl. fully sintered vacuum prepared scrap solids) | \$/kg | prompt | monthly |
| Pentoxide min 99.5% ex works China | niobium pentoxide 99.5% minimum | ex-works | China | inc VAT | 1t | powder | Yn/kg | prompt | weekly (Tuesday) |
| Niobium (columbite) concentrate min 50% Ta2O5 (per lb Nb2O5) | niobium pentoxide 50pc minimum, tantalum 5% minimum, triuranium octoxide and thorium dioxide 0.5% maximum | cif | main port | duty unpaid | 10t | lump concentrate | \$/lb Nb2O5 contained | prompt | twice weekly (Tuesday/Thursday) |
| Rhenium | | | | | | | | | |
| Ammonium perrhenate (APR) min 69.2% Re (basic grade) du Rotterdam (per kg of Re) | rhenium 69.2% minimum; potassium 0.05%, sodium 0.05%, phosphorus 0.05%, aluminium 0.05%, magnesium 0.05%, iron 0.05%, calcium 0.05%, silicon 0.05%, manganese 0.05%, copper 0.05%, molybdenum 0.05%, nickel 0.05%, sulphur 0.05%, and water 0.1% maximum | in-warehouse | Rotterdam | duty unpaid | 100kg material (+/-2%) | white free flowing powder/crystals | \$/kg | prompt | weekly (Tuesday) |
| Ammonium perrhenate (APR) min 69.4% Re (catalyst grade) dp Rotterdam (per kg of Re) | rhenium 69.4% minimum; potassium 0.02%, chlorine 0.01%, sodium 0.005%, and phosphorus 0.02% maximum; molybdenum 100 parts per million (ppm) maximum; Other impurities as per customer specification; Minimum specification: total 200ppm arsenic, calcium, iron, potassium, magnesium, sodium, lead, and tin maximum in total, not exceeding 50ppm each; 200ppm arsenic, cobalt, chromium, copper, manganese, nickel, antimony, silicon and tin maximum, not exceeding 50ppm each. Heavy metals (lead, antimony, cadmium) 30ppm maximum each | in-warehouse | Rotterdam | duty paid | 20kg material (+/- 2%) | white free flowing powder/crystals | \$/kg | prompt | weekly (Tuesday) |
| Ammonium perrhenate (APR) min 69.4% Re ex-works China | rhenium 69.4% minimum | ex-works | China | no | 100kg material (+/- 2%) | white free flowing powder/crystals | Yn/kg | prompt | weekly (Tuesday) |
| Ammonium perrhenate (APR) min 69.4% Re (catalyst grade) fob US warehouse | rhenium contained 69.4% minimum | fob | US warehouse | duty paid | 100lbs | white free flowing powder/crystals | \$/lb | within 30 days | monthly |
| Pellets min 99.9% Re dp Rotterdam | rhenium 99.9% minimum | in-warehouse | Rotterdam | duty paid | 50kg (+/-2%) | pellets | \$/lb | prompt | weekly (Tuesday) |
| min 99.9% fob US warehouse | rhenium 99.9% minimum | fob | US warehouse | duty paid | 100lbs | pellets | \$/lb | within 30 days | monthly |

High-temperature metals specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|---|---|--------------|-----------|------------------|------------------|---|----------------|----------------|---------------------------------|
| Tungsten | | | | | | | | | |
| Ammonium paratungstate (APT) du Rotterdam (per mtu of WO ₃) | tungsten trioxide 88.5% minimum; aluminium 10 parts per million (ppm), arsenic 5ppm, bismuth 5ppm, calcium 5ppm, cadmium 5ppm, cobalt 5ppm, chromium 5ppm, copper 5ppm, iron 10 ppm, phosphorus 10ppm, manganese 10 ppm, magnesium 10 ppm, molybdenum 20ppm, sodium 10ppm, antimony 5ppm, silicon 10ppm, tin 5ppm, titanium 5ppm, and vanadium 5ppm maximum | in-warehouse | Rotterdam | duty unpaid | 18t (+/-2%) | white finely divided free-flowing crystals | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Ammonium paratungstate (APT) fob China | tungsten trioxide 88.5% minimum; aluminium 10 parts per million (ppm) , arsenic 5ppm, bismuth 5ppm, calcium 5ppm, cadmium 5ppm, cobalt 5ppm, chromium 5ppm, copper 5ppm, iron 10ppm, phosphorus 10ppm, manganese 10ppm, magnesium 10ppm, molybdenum 20ppm, sodium 10ppm, antimony 5ppm, silicon 10ppm, tin 5ppm, titanium 5ppm, and vanadium 5ppm maximum | fob | China | export duty paid | 18t (+/-2%) | white finely divided free-flowing crystals | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Ammonium paratungstate (APT) min 88.5% ex-works China | tungsten trioxide 88.5% minimum; aluminium 10 parts per million (ppm), arsenic 5ppm, bismuth 5ppm, calcium 5ppm, cadmium 5ppm, cobalt 5ppm, chromium 5ppm, copper 5ppm, iron 10ppm, phosphorus 10ppm, manganese 10ppm, magnesium 10ppm, molybdenum 20ppm, sodium 10ppm, antimony 5ppm, silicon 10ppm, tin 5ppm, titanium 5ppm, and vanadium 5ppm maximum | ex-works | China | no | 10t (+/-2%) | white finely divided free-flowing crystals | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Carbide min 99.7% ex-works China | tungsten 99.7% minimum | ex-works | China | no | 5t | powder – fraction size 1-10 microns | Yn/kg | prompt | twice weekly (Tuesday/Thursday) |
| Carbide powder (3-4micron) fob China | tungsten 99.7% minimum | fob | China | export duty paid | 1t | powder 3-4 microns | \$/kg | prompt | twice weekly (Tuesday/Thursday) |
| min 99.9% in-warehouse Rotterdam | tungsten 99.9% minimum; molybdenum 0.05%, iron 0.05%, zinc 0.05%, oxygen 0.05%, carbon 0.05%, silver 0.001%, lead 0.001%, tin 0.001%, bismuth 0.001%, thorium 0.001% maximum | in-warehouse | Rotterdam | no | 5t | bar (incl. fully sintered vacuum prepared scrap solids) | \$/kg | prompt | weekly (Tuesday) |
| min 99.9% min Chinese bar del US consumer | tungsten 99.9% minimum | delivered | US | duty paid | 2,000-10,000lbs | bar | \$/lb | within 30 days | monthly |
| Oxide (Yellow/Blue oxide) fob China | tungsten trioxide purity 99.95% minimum | fob | China | export duty paid | 10t | powder, in drums | \$/t | prompt | twice weekly (Tuesday/Thursday) |
| Oxide min 99.95% ex-works China | tungsten trioxide purity 99.95% minimum | ex-works | China | no | 1t | powder, in drums | Yn/t | prompt | twice weekly (Tuesday/Thursday) |

| High-temperature metals specifications | | | | | | | | | |
|---|---|--------------|-----------|----------------|------------------|------------------------|----------------|-----------|---------------------------------|
| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
| Concentrates min 65% ex-works China | tungsten 65% minimum | ex-works | China | no | 5t | lump concentrate | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Concentrates min 55% ex-works China | wolframite WO ₃ 55% minimum (permissible range 55-60%) | ex-works | China | VAT included | 15t | lump | Yn/t | prompt | twice weekly (Tuesday/Thursday) |
| Concentrates 65% grade, range 50-70% du Rotterdam | tungsten 50% minimum, 70% maximum; silicon 1.5%, tin 5%, molybdenum 0.3%, antimony 0.01%, arsenic 0.2%, lead 1%, and phosphorus 0.05% maximum; uranium/thorium complying with international transport regulations | in-warehouse | Rotterdam | duty unpaid | 10t | bags | \$/dmu | six weeks | weekly (Tuesday) |
| Vanadium | | | | | | | | | |
| Pentoxide fused flake min 98% du Rotterdam (per lb of V ₂ O ₅) | vanadium pentoxide 98% minimum; silicon 0.25%, iron 0.3%, sulphur 0.03%, phosphorus 0.05%, arsenic 0.02%, and Na ₂ +K ₂ O 1.5% maximum | in-warehouse | Rotterdam | duty unpaid | 10t (+/-2%) | brown flakes 55x55x5mm | \$/lb | prompt | weekly (Tuesday) |
| Pentoxide 98% V ₂ O ₅ ex-works China | vanadium pentoxide 98% minimum | ex-works | China | no | 10t (+/-5%) | flakes | Yn/t | prompt | daily |
| Pentoxide 98% V ₂ O ₅ fob China | vanadium pentoxide 98% minimum; silicon 0.25%, iron 0.30%, phosphorus 0.05%, sulphur 0.03%, arsenic 0.02%, sodium oxide and potassium oxide 1.5% maximum | fob | China | VAT paid | 20t | flakes | \$/lb | prompt | daily |

Super alloys and super alloy scrap

Argus Non-Ferrous Markets publishes daily calculated prices for super alloys and super alloy scrap.

Prices are calculated by weighting the price of component and feedstock metals according to formulas developed in collaboration with the industry. Formulas are revised at least quarterly or as market conditions change. Super alloy prices are published as single values in US dollars per pound (lb) calculated using a single set of weightings common across producers. Super alloy scrap prices are expressed as a low-high range in US dollars per pound to account for various discounts assumed by the industry. Month-to-date averages are also published.

Super alloys

- Inconel 718 vacuum melted del US processor
- Inconel 718 vacuum melted ex-works Europe
- Inconel 625 vacuum melted del US processor
- Inconel 625 vacuum melted ex-works Europe
- 7075 aluminium del US processor
- 7075 aluminium ex-works Europe

Super alloy scrap prices are republished from Argus Scrap Markets. See the [Argus Scrap Markets methodology](#).

Super alloy scrap

- Hastelloy C air melted del US processor
- Hastelloy X air melted del US processor
- Inconel 600 vacuum melted del US processor
- Inconel 601 vacuum melted del US processor
- Inconel 617 vacuum melted del US processor
- Inconel 625 vacuum melted del US processor
- Inconel 718 vacuum melted del US processor
- Waspaloy vacuum melted del US processor

Minor metals scrap

Introduction

Argus Non-Ferrous Markets publishes price assessments and market commentary on the minor metals scrap markets.

Basis of assessment

Minor metals scrap price assessments are for spot physical material for prompt delivery. Product specifications for each assessment, such as currency, unit of trade and quality, follow recognised industry standards, such as norms published by the Minor Metals Trade Association and other widely used specifications.

Assessments are of the range in which repeatable trade took place or in which it could have taken place in the absence of transactions since the last assessment.

Assessments are for material certified as conflict free using recognised traceability systems in compliance with relevant legislation, and delivered to the market through legal routes, with relevant export taxes paid.

Argus assesses scrap collection prices typically paid by scrap dealers and processors to direct generators of the scrap such as manufacturers, known as industrial generators. These assessments include the cost of delivering product to the dealer or processor.

Timing of assessment

Weekly prices are assessed and published weekly on Tuesday. Monthly prices are assessed and published on the last publication day of each month. Market information received after 4pm Houston time on the day of assessment may not be included in the assessment process.

For Chinese price assessments, market information received after 4pm Beijing time on the day of assessment may not be included in the assessment process.

Rounding

Minor metals scrap price assessments are published to up to two decimal places.

Minor metals scrap specifications

| Assessment | Grade | Basis | Location | Duties/Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|--|---|-----------|----------|----------------|------------------|---------------------------|----------------|----------------|----------------------|
| Molybdenum | | | | | | | | | |
| Scrap 99.7% airmelt del US consumer | molybdenum 99.7% | delivered | US | duty paid | 2,000lbs | solids | \$/lb | within 30 days | monthly |
| Vacuum grade 99.7% del US vacuum consumer | molybdenum 99.7% | delivered | US | duty paid | 2,000lbs | sintered bar, solids | \$/lb | within 30 days | monthly |
| Scrap 99.9% del US vacuum processor | molybdenum 99.9% | delivered | US | duty paid | 2,000lbs | solids | \$/lb | within 30 days | monthly |
| Contained in 316 solids del US consumer | Molybdenum oxide in 316 scrap clips/solids | delivered | US | duty paid | one truckload | solids | \$/lb | within 30 days | monthly |
| Niobium | | | | | | | | | |
| (Columbium) scrap vacuum del US consumer | niobium 99.9% minimum | delivered | US | duty paid | 2,000lbs | solids | \$/lb | within 30 days | monthly |
| (Columbium) scrap vacuum del US processor | niobium 99.9% minimum | delivered | US | duty paid | 2,000lbs | solids | \$/lb | within 30 days | monthly |
| Tantalum | | | | | | | | | |
| Scrap 99.9% vacuum melted del US consumer | tantalum 99.9% minimum; processed scrap | delivered | US | duty paid | 2,000lbs | solids | \$/lb | within 30 days | weekly (Tuesday) |
| Titanium | | | | | | | | | |
| Scrap 6Al 4V bulk weldable del US dealer/processor | titanium 90%, aluminium 6%, vanadium 4%; bulk weldable scrap, unprocessed | delivered | US | duty paid | 1,000lb | solids | \$/lb | within 30 days | weekly (Thursday) |
| Scrap 6Al 4V clips del US dealer/processor | titanium 90%, aluminium 6%, vanadium 4%; scrap clips, unprocessed | delivered | US | duty paid | 3,000lb | clips | \$/lb | within 30 days | weekly (Thursday) |
| Scrap grade CP1 solids del US dealer/processor | titanium grade CP1 scrap solids, unprocessed | delivered | US | duty paid | 3,000lb | solids | \$/lb | within 30 days | weekly (Thursday) |
| Scrap grade CP2 solids del US dealer/processor | titanium grade CP2 scrap solids, unprocessed | delivered | US | duty paid | 3,000lb | solids | \$/lb | within 30 days | weekly (Thursday) |
| Scrap grade CP3/4 solids del US dealer/processor | titanium grade CP3/4 scrap solids, unprocessed | delivered | US | duty paid | 3,000lb | solids | \$/lb | within 30 days | weekly (Thursday) |
| 6Al 4V turnings aero quality del US processor | titanium 90%, aluminium 6%, vanadium 4%; turnings, unprocessed, 3% allowed oil/moisture/magnetics | delivered | US | duty paid | 6,000lb | turnings | \$/lb | within 30 days | weekly (Thursday) |
| Tungsten | | | | | | | | | |
| Carbide scrap inserts fob US processor | tungsten 88%, cobalt 6%, carbon 6% | fob | US | duty paid | 2,000lb | inserts | \$/lb | within 30 days | monthly |
| Carbide scrap rounds fob US processor | tungsten 86-88%, cobalt 6-8%, carbon 6% | fob | US | duty paid | 2,000lb | reamers, drills or rounds | \$/lb | within 30 days | monthly |
| 99.9% scrap solids consumer price fob US producer | tungsten 99.9% minimum; processed scrap solids | fob | US | duty paid | 1,000-3,000lbs | solids | \$/lb | within 30 days | monthly |
| 99.9% scrap del US processor | tungsten 99.9% minimum; unprocessed scrap solids | delivered | US | duty paid | 1,000-3,000lbs | solids | \$/lb | within 30 days | monthly |

Minor metals indexes

Average price indexes

In addition to outright prices, the service provides month-to-date and final-month average indexes.

Indexes are calculated by summing the value of published assessments and dividing by the number of assessments published in a given month. The final index value for a given month is the average calculated on the final day of assessment of that month. The report shows the evolution of the current-month index, as well as the final index value for the previous month.

Timing and indexation

Argus Non-Ferrous Markets contains twice-weekly, weekly and monthly assessments. Those assessments are republished in the Argus Database and available electronically for each publication date. For example, a weekly price assessed on Wednesdays will be republished on Thursday and on each subsequent publication date until the next day of assessment, in this example, the following Wednesday.

Users are advised that the published month-to-date and final indexes may differ from those calculated using Argus or third-party tools, because of this daily republication of price assessments.

Indexes are published for:

Electronic metals

Arsenic

- Min 99% fob US warehouse

Bismuth

- Min 99.99% du Rotterdam
- Min 99.99% fob China
- Ingot min 99.99% fob US warehouse

Gallium

- Min 99.99% ex-works China
- Min 99.99% fob China
- Min 99.99% cif Main Airport
- Min 99.9999% fob China

Germanium

- Dioxide min 99.999% fob China
- Dioxide min 99.999% cif main airport Europe
- Metal min 99.999% fob China
- Metal min 99.999% cif main airport Europe

Indium

- Min 99.99% du Rotterdam
- Min 99.99% fob China
- Ingot min 99.99% fob US warehouse

Selenium

- Min 99.5% du Rotterdam
- Min 99.5% fob US warehouse

Tantalum

- Tantalite basis 30% Ta₂O₅ du Rotterdam
- Min 99.8% du Rotterdam

Tellurium

- Min 99.99% du Rotterdam
- Min 99.95% fob US warehouse

Zirconium

- Oxychloride 36% Zr(Hf)O₂ fob China

Battery metals

Antimony

- Ingot min 99.65% fob China
- Min 99.65% cif US
- Regulus grade II min 99.65% Sb du Rotterdam
- Regulus Trioxide grade min 99.65% Sb du Rotterdam
- Trioxide min 99.5% fob China
- Concentrate 50% del China consumer

Cadmium

- Min 99.95% du Rotterdam
- Min 99.95% cif India
- Min 99.99% fob US warehouse
- Min 99.99% du Rotterdam
- Min 99.95% fob US warehouse
- Min 99.99% cif India

Cobalt

- Min 99.8% alloy grade du Rotterdam
- Min 99.8% fob US warehouse
- Min 99.8% chemical grade du Rotterdam
- Oxide 72% ex-works China
- Hydroxide payable indicator min 30% cif China

Lithium

- Lithium concentrate (spodumene) 6% Li₂O cif China

Nickel

- Philippine nickel ore min 1.3% Ni cif China
- Pig iron 10-14% Ni cif China
- Sulphate min 22% cif China
- Mixed hydroxide precipitate (MHP) payable indicator 30-40% Ni cif China
- Matte payable indicator 70% min Ni cif China
- Mixed hydroxide precipitate 37% Ni cif China
- Matte 70% Ni cif China
- Full plate premium ex-warehouse Shanghai, Jinchuan-produced
- Full plate premium ex-warehouse Shanghai, imported

Light metals

Magnesium

- Alloy min 90% Mg AZ91 fob China
- Min 99.9% fob US warehouse

- Min 99.9% du Rotterdam
- Min 99.9% fob China
- Powder 99.9% Mg 20-80 mesh fob China

Manganese

- Briquette 97% Mn fob China
- Electrolytic metal min 99.7% fob US warehouse
- Flake min 99.7% fob China
- Flake min 99.7% du Rotterdam
- Lump 95% Mn fob China

Silicon

- 5-5-3 min 98.5% Si fob China
- 5-5-3 min 98.5% Si dat China
- 5-5-3 min 98.5% Si ddp Europe works
- 5-5-3 min 98.5% Si fob US warehouse
- 4-4-1 min 99% Si fob China
- 4-4-1 min 99% Si dat China
- 4-4-1 min 99% Si ddp Europe works
- 3-3-0-3 min 99% Si fob China
- 3-3-0-3 min 99% Si fca Europe works
- 2-2-0-2 min 99.5% Si fca Europe works

Titanium

- Sponge TG-Tv 10x30mm du Rotterdam
- Scrap 6Al 4V bulk weldable del US dealer/processor
- Scrap 6Al 4V clips del US dealer/processor
- Scrap grade CP1 solids del US dealer/processor
- Scrap grade CP2 solids del US dealer/processor
- Scrap grade CP3/4 solids del US dealer/processor
- Scrap 6Al 4V turnings aero quality del US processor

Mineral sands

- Monazite REO+ThO min 60% ex-works China

High-temperature metals

Chromium

- (aluminothermic) min 99% fob China
- (aluminothermic) min 99% du Rotterdam

Hafnium

- Min 99% max 0.5% Zr du Rotterdam
- Crystal bar Hf+Zr min 99.95% ex-works China
- Crystal bar Hf+Zr min 99.95% fob China
- Ingot Hf+Zr min 99.95% ex-works China
- Ingot Hf+Zr min 99.95% fob China

Molybdenum

- Oxide min 57% Mo du Rotterdam
- Oxide min 57% fob US warehouse

Rhenium

- APR min 69.2% Re (basic grade) du Rotterdam
- APR min 69.4% Re (catalyst grade) dp Rotterdam
- Pellets min 99.9% Re dp Rotterdam

Tungsten

- APT du Rotterdam
- APT fob China
- Carbide powder (3-4micron) fob China
- Oxide (Yellow/Blue oxide) fob China

Vanadium

- Pentoxide fused flake min 98% du Rotterdam
- Pentoxide 98% V2O5 fob China

Platinum group metals

Introduction

Argus Non-Ferrous Markets publishes a price assessment and market commentary for the US ruthenium market. Third party PGM prices are available via the Argus Metals Platform.

Basis of assessment

The US ruthenium price assessment is for spot physical material for prompt delivery. Assessments are of the range in which repeatable trade took place or in which it could have taken place in the absence of transactions since the last assessment.

Timing of assessment

The frequency and timing of the assessment is specified in the tables below. Information received after 5pm Houston time on the day of the assessment may not be included in the process.

Rounding

Price assessments are published to three decimal places.

Platinum group metals specifications

| Assessment | Grade | Basis | Location | Duties/ Tariffs | Minimum lot size | Form | Currency /unit | Timing | Assessment frequency |
|------------------------|-------------------------|--------------------|----------|--------------------|-----------------------------|---------------------|-------------------|--------------------------------|-------------------------|
| Ruthenium | | | | | | | | | |
| 99.9% fob US warehouse | ruthenium 99.9% minimum | fob ware- house | US | duty paid | 250 toz (troy ounces) | sponge or powder | \$/toz | delivered within 30 days | weekly (Tuesday) |

Ferro-alloys and feedstocks

Introduction

Argus Non-Ferrous Markets publishes price assessments and market commentary on the international bulk and noble ferro-alloys and feedstocks markets.

Basis of assessment

Price assessments are for spot physical material for prompt delivery, defined as delivery within four weeks, with cash payment and in lump form unless otherwise stated. Packaging norms are in bags, loose in bulk, in containers or in drums, in line with market convention.

For US in-warehouse prices, the main delivery locations are Baltimore, Pittsburgh, Chicago, Houston and Decatur (Alabama); Portland (Oregon) and Los Angeles, with other warehouse locations also taken into account where appropriate. (See below for further details of ferro-alloy and ore specifications)

Fob China assessments are basis export duty paid, including any export taxes levied by China, and VAT. Fob China prices are not inclusive of any import duty charged by the importing country. China domestic prices are basis ex-works, VAT paid, unless otherwise stated. European prices are basis in-warehouse Rotterdam, duty unpaid unless otherwise stated. Fob US prices in-warehouse are inclusive of duties.

Nickel premiums are spreads to the last LME three-month official price.

Product specifications for each assessment such as currency, unit of trade and quality follow recognised industry standards such as norms published by the Minor Metals Trade Association and other widely used specifications.

Price assessments are published as low-high ranges.

In most cases, information relating to material that falls outside of the stated specifications will not be used in the assessment process. Exceptions may be made if an acceptable and appropriate normalisation process can be applied.

In markets where liquidity is split across several locations, verified spot trades may be normalised to a single reference hub, for example by making adjustments for transportation costs, where appropriate and in line with market practice. (See below for a full list of product specifications.)

Timing of assessment

The frequency and timing of each assessment are specified in the tables below.

In each market, information received after 4pm local time on the day of assessment may not be included in the assessment process.

Quarterly benchmark prices are posted by the main producer, usually around the first of each quarter.

OMC chrome ore prices are published monthly by the producer, typically early in the month.

Monthly US price assessments are made and published on the last publication date of the month.

Rounding

Prices assessed in US dollars and fca China prices assessed in Chinese yuan are rounded to two decimal places. Other Chinese yuan-denominated prices are rounded to whole numbers.

| Bulk alloy and feedstock specifications | | | | | | | | | |
|--|--|------------------|---------------------|------------------|---------------|------|----------------------------------|----------------------------|---------------------------------|
| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
| Ferro-chrome | | | | | | | | | |
| Charge Chrome 52% Cr ddp Europe, \$/lb Cr | Chromium 52% | ddp Europe | duty-free/duty-paid | 100t (+/- 2%) | \$/lb | lump | as per customer specification | Supplier / customer agreed | quarterly benchmark |
| HC basis 60-64.99% Cr 6-8% C ddp NWE, \$/lb Cr | Chromium 60-64.99%, carbon 6-8%, silicon 3% maximum, phosphorous 0.05% max, and sulphur 0.06% maximum | ddp NWE | duty paid | 25t (+/- 2%) | \$/lb | lump | big bag of 1t, bulk, steel drums | Prompt | twice weekly (Tuesday/Thursday) |
| HC basis min 65% Cr 6-8% C ddp NWE, \$/lb Cr | Chromium 65% minimum, carbon 6-8%, silicon 3% maximum, phosphorous 0.05% maximum, and sulphur 0.05% maximum | ddp NWE | duty paid | 25t (+/- 2%) | \$/lb | lump | big bag of 1t, bulk, steel drums | Prompt | twice weekly (Tuesday/Thursday) |
| LC min 65% Cr 0.10% C ddp Europe works, \$/lb Cr | Chromium 65% minimum, carbon 0.10%, silicon 1.5% maximum, phosphorous 0.03% maximum, and sulphur 0.03% maximum | ddp Europe works | duty paid | 25t (+/- 2%) | \$/lb | lump | big bag of 1t, bulk, steel drums | Prompt | twice weekly (Tuesday/Thursday) |
| LC 60-64.99% Cr, 0.10% C ddp Europe works, \$/lb Cr | Chromium 60-64.99%, carbon 0.10%, silicon 1.5% maximum, phosphorous 0.03% maximum, and sulphur 0.03% maximum | ddp Europe works | duty paid | 25t (+/- 2%) | \$/lb | lump | big bag of 1t, bulk, steel drums | Prompt | twice weekly (Tuesday/Thursday) |
| Charge chrome fob US warehouse | size 75mm x 25mm (3x1inch) max, Cr 47% min, C 6% - 8%, Si 6% max, P 0.05% max, S 0.06% max | fob US warehouse | duty paid | 20-100t | \$/lb | lump | as per customer specification | within 30 days | monthly |
| HC min 62% Cr 6-8% C fob US warehouse (per lb Cr) | Chromium 62%, carbon 6-8% | fob US warehouse | duty paid | 20-100t | \$/lb | lump | bulk | within 30 days | weekly (Thursday) |
| LC min 65% Cr 0.05% C max 1.5% Si fob US warehouse (per lb Cr) | Chromium 65% minimum, carbon 0.05%, silicon 1.5% maximum | fob US warehouse | duty paid | 25t max | \$/lb | lump | bulk | within 30 days | weekly (Thursday) |
| LC min 65% Cr 0.10% C max 1.5% Si fob US warehouse (per lb Cr) | Chromium 65% minimum, carbon 0.10%, silicon 1.5% maximum | fob US warehouse | duty paid | 25t max | \$/lb | lump | bulk | within 30 days | weekly (Thursday) |
| LC 60% Cr 0.15% C fob US warehouse | Chromium 60-65%, carbon 0.15% maximum | fob US warehouse | duty paid | 25t max | \$/lb | lump | bulk | within 30 days | weekly (Thursday) |
| HC 50% Cr ex-works China | Chromium 50% min, carbon 6-8%, silicon 5%, phosphorous 0.04%, and sulphur 0.04% maximum | ex-works China | no | 500t | Yn/t | lump | big bag of 1t, bulk | Prompt | Daily |
| HC 50% Cr ex-works China | Chromium 50% min, carbon 6-8%, silicon 5%, phosphorous 0.04%, and sulphur 0.04% maximum | ex-works China | no | 500t | \$/lb | lump | big bag of 1t, bulk | Prompt | Daily |

| Bulk alloy and feedstock specifications | | | | | | | | | |
|---|---|----------------|----------------|------------------|----------------------|-------------|---|--------|---------------------------------|
| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
| HC min 60% Cr ex-works India | Chromium 60% minimum, carbon 6-8%, silicon 5, phosphorous 0.05%, sulphur 0.06% maximum | ex-works India | no | 100t | Rs/t | lump | big bag of 1t, bulk | Prompt | twice weekly (Tuesday/Thursday) |
| Charge Chrome SA 50-55% Cr 6-10% C cif China | Chromium 50-55%, carbon 6-10%, silicon 5%, phosphorous 0.05%, sulphur 0.05% maximum | cif China | unpaid | >1,000t | \$/lb | lump | big bag of 1t, bulk | Prompt | twice weekly (Tuesday/Thursday) |
| HC Indian 60-62% Cr 6-10% C cif China | Chromium 60-62%, carbon 6-10%, silicon 3-4%, phosphorous 0.05% sulphur 0.06% maximum | cif China | unpaid | >1,000t | \$/lb | lump | big bag of 1t, bulk, producers' steel drums | Prompt | twice weekly (Tuesday/Thursday) |
| HC Kazakh 65-70% Cr 6-9% C cif China | Chromium 65-70%, carbon 6-9%, silicon 1%, phosphorous 0.03%, sulphur 0.05% maximum | cif China | unpaid | >1,000t | \$/lb | lump | big bag of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| Chrome ore | | | | | | | | | |
| South African concentrate 44% grade cif China | Chromium2O3 42%-44%, phosphorous 0.01%, sulphur 0.01%, MgO + Al2O3 30% maximum | cif China | unpaid | 5,000t | \$/t | concentrate | container | prompt | twice weekly (Tuesday/Thursday) |
| South African concentrate 44% grade fca China | Chromium2O3 42%-44%, phosphorous 0.01%, sulphur 0.01%, MgO + Al2O3 30% maximum | fca China | unpaid | 5,000t | Yn/metric tonne unit | concentrate | container | prompt | Daily |
| Turkish 42% lump cif China | Chromium2O3 40%-42%, phosphorous 0.01%, sulphur 0.01%, MgO + Al2O3 30% maximum | cif China | unpaid | 1,000t | \$/t | lump | container | prompt | twice weekly (Tuesday/Thursday) |
| Turkish 42% lump fca China | Chromium2O3 40%-42%, phosphorous 0.01%, sulphur 0.01%, MgO + Al2O3 30% maximum | fca China | unpaid | 1,000t | Yn/metric tonne unit | lump | container | prompt | Daily |
| South African UG2 concentrate 40-42% Cr2O3 cif China main ports | Chromium2O3 40%-42%, phosphorous 0.01%, sulphur 0.01%, MgO + Al2O3 30% maximum | cif China | unpaid | 5,000t | \$/t | concentrate | container | prompt | twice weekly (Tuesday/Thursday) |
| South African UG2 concentrate 40-42% Cr2O3 fca China main ports | Chromium2O3 40%-42%, phosphorous 0.01%, sulphur 0.01%, MgO + Al2O3 30% maximum | fca China | unpaid | 5,000t | Yn/metric tonne unit | concentrate | container | prompt | Daily |
| Cr2O3 48%-49.99% (South Kaliapani mines) OMC price ex-works India | Chromium2O3 48%-49.99% | ex-works India | no | 500t | Rs/t | lump | container | prompt | monthly benchmark |
| Cr2O3 50%-52% (Sukrangi mines) OMC price ex-works India | Chromium2O3 50%-52% | ex-works India | no | 500t | Rs/t | lump | container | prompt | monthly benchmark |
| Ferro-manganese | | | | | | | | | |
| HC 78% Mn ddp Europe works | Manganese 78% minimum, carbon 6-8.5%, silicon 1.5%, phosphorous 0.25%, sulphur 0.03-0.05% maximum | ddp Europe | duty paid | 25t (+/- 2%) | €/t | lump | big bag of 1t, bulk, producers' steel drums | prompt | twice weekly (Tuesday/Thursday) |

| Bulk alloy and feedstock specifications | | | | | | | | | |
|--|--|--------------------------------|------------------|------------------|---------------------------------|---------------|---|------------------|---------------------------------|
| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
| MC 78% Mn 1.5-2% C ddp Europe works | Manganese 78-85% minimum, carbon 1.5-2%, silicon 2%, phosphorous 0.15-0.2%, and sulphur 0.03-0.05% maximum | ddp Europe | duty paid | 25t (+/- 2%) | €/t | lump | big bag of 1t, bulk, producers' steel drums | prompt | weekly (Tuesday) |
| HC min 80% Mn 6-8% C fob North America warehouse | Manganese 80% minimum, carbon 6-8% maximum | fob North America | duty paid | 200t | \$/long ton | lump | big bags of 1t, steel drums, bulk | within 30 days | weekly (Thursday) |
| MC 80% Mn 1-2% C fob North America warehouse | Manganese 80%, carbon 1-2% | fob North America | duty paid | 20-40t | \$/lb | lump | super sacks, bulk | within 30 days | monthly |
| HC 65% Mn ex-works China | Manganese 65% min, carbon 7%, silicon 2.5-4.5%, phosphorous 0.25-0.4%, sulphur 0.03% max | ex-works China | no | > 100t | Yn/t | lump | big bag of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| HC 75% Mn fob China | Manganese 75% min, carbon 6-8.5%, silicon 1.5%, phosphorous 0.25%, sulphur 0.03-0.05% maximum | fob China | export duty paid | >25t | \$/t | lump | big bag of 1t, steel drums | prompt | weekly (Tuesday) |
| HC 75% Mn ex-works China | Manganese 75% minimum, carbon 6-8.5%, silicon 1.5%, phosphorous 0.25%, sulphur 0.03-0.05% maximum | ex-works China | no | >100t | Yn/t | lump | big bag of 1t, steel drums | prompt | twice weekly (Tuesday/Thursday) |
| HC min 65% Mn ex-works India | Manganese 65% minimum, carbon 8%, silicon 1.5-2%, phosphorous 0.3%, sulphur 0.03% maximum | ex-works India | no | 25t (+/- 2%) | Rs/t | lump | big bag of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| HC min 70% Mn ex-works India | Manganese 70% min, carbon 6-8.5%, silicon 1.5%, phosphorous 0.25%, sulphur 0.03-0.05% maximum | ex-works India | no | 25t (+/- 2%) | Rs/t | lump | big bag of 1t, producers' steel drums | prompt | twice weekly (Tuesday/Thursday) |
| Manganese | | | | | | | | | |
| Ore 44-46% lumpy ore fca China | Manganese 44-46% | fca China | duty unpaid | 1,000t | Yn/metric tonne unit | lump | bulk | prompt | twice weekly (Tuesday/Thursday) |
| Ore grade 37% range 36-38% grade cif China | Origin: South Africa, Mn base 37%, range 36-38%, Fe 2-7%, SiO2 7-13%, P 0.02-0.05% | cif main China port, cash paid | duty unpaid | 10,000t | \$/dmty (dry metric tonne unit) | lump 5-75mm | bulk | within six weeks | weekly (Thursday) |
| Ore 48-50% grade cif China | Origin: Australia, Mn base 49%, range 48-50%, Fe 2-12%, SiO2 4-10%, P 0.05-0.14% | cif main China port, cash paid | duty unpaid | 5,000t | \$/dmty (dry metric tonne unit) | chip 0.5-15mm | bulk | within six weeks | weekly (Thursday) |
| Ore range 44-46% grade cif China | Origin: Australia, Mn base 45%, range 44-46%, Fe 2-12%, SiO2 3-14%, P 0.03-0.13% | cif main China port, cash paid | duty unpaid | 10,000t | \$/dmty (dry metric tonne unit) | 5-75mm | bulk | within six weeks | weekly (Thursday) |
| Silico-manganese | | | | | | | | | |
| 65% Mn ddp Europe works, €/t | Manganese 65%, silicon 17% minimum, carbon 2%, phosphorous 0.25%, sulphur 0.03% maximum | ddp Europe | duty paid | 25t (+/- 2%) | €/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |

| Bulk alloy and feedstock specifications | | | | | | | | | |
|---|--|-----------------------------|------------------|------------------|---------------|------|----------------------|----------------|---------------------------------|
| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
| min 65% Mn 16% Si fob North America warehouse | Manganese 65%, silicon 16% minimum, carbon 2% maximum | fob North America warehouse | duty paid | 20t | \$/lb | lump | big bags of 1t, bulk | within 30 days | weekly (Thursday) |
| 65% Mn 17% Si fob China | Manganese 65-72%, silicon 17-20%, carbon 1.8%, phosphorous 0.1-0.25%, sulphur 0.04% maximum | fob China | export duty paid | >25t | \$/t | lump | big bags of 1t, bulk | prompt | weekly (Tuesday) |
| 65% Mn 17% Si ex-works China | Manganese 65-72%, silicon 17-20%, carbon 1.8%, phosphorous 0.1-0.25%, sulphur 0.04% maximum | ex-works China | no | >100t | Yn/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| 60% Mn 14% Si ex-works India | Manganese 60-65%, silicon 14-17%, carbon 2.5%, phosphorous 0.3%, sulphur 0.04% maximum | ex-works India | no | 100t | Rs/t | lump | bulk | prompt | twice weekly (Tuesday/Thursday) |
| Silico-manganese 65% Mn 15% Si fob India east coast | Manganese 65-70%, silicon 15-17%, carbon 2.5% phosphorous 0.3%, sulphur 0.03% maximum | fob India east coast | duty unpaid | 100t | \$/t | lump | bulk | prompt | twice weekly (Tuesday/Thursday) |
| Silico-manganese 60% Mn 14% Si fob India east coast | Manganese 60-65%, silicon 14-17%, carbon 2.5% phosphorous 0.3% sulphur 0.04% max | fob India east coast | duty unpaid | 100t | \$/t | lump | bulk | prompt | twice weekly (Tuesday/Thursday) |
| Ferro-silicon | | | | | | | | | |
| 75% Si ddp NWE | Silicon 75% maximum, aluminium 1.5% minimum | ddp NWE | duty paid | 25t (+/- 2%) | €/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| min 75% Si max 0.1% C fob US warehouse (per lb Si) | Silicon 75% minimum, aluminium 1.5%, carbon 0.10% maximum | fob US warehouse | duty paid | truckload | \$/lb | lump | big bags of 1t, bulk | within 30 days | weekly (Thursday) |
| 72% Si fob China | Silicon 72-80%, manganese 0.5%, chromium 0.5%, phosphorous 0.04%, sulphur 0.02%, carbon 0.2% maximum | fob China | export duty paid | 100t | \$/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| 72% Si ex-works China | Silicon 72-80%, manganese 0.5%, chromium 0.5%, phosphorous 0.04%, sulphur 0.02%, carbon 0.2% maximum | ex-works China | no | >100t | Yn/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| 75% Si fob China | Silicon 75% maximum, aluminium 1.5% minimum | fob China | export duty paid | 100t | \$/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| 75% Si ex-works China | Silicon 75% maximum, aluminium 1.5% minimum | ex-works China | no | >100t | Yn/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| Low aluminium 75% Si 0.1% Al fob China | Silicon 75%, aluminium 0.1% | fob China | export duty paid | >20t | \$/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| Low aluminium 75% Si 0.5% Al fob China | Silicon 75%, aluminium 0.5% | fob China | export duty paid | >20t | \$/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |

| Bulk alloy and feedstock specifications | | | | | | | | | |
|--|--|------------------------------|------------------|------------------|---------------|------------|----------------------|----------------|---------------------------------|
| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
| 75% Si ex-works India | Silicon 75% maximum, Al 1.5% minimum | ex-works India | no | 20-24t / 25t | Rs/t | lump | big bags of 1t, bulk | prompt | twice weekly (Tuesday/Thursday) |
| Calcium-silicon | | | | | | | | | |
| min 28% Ca 55-60% Si fob China | Calcium 28%, silicon 55-60%, carbon 1.2%, aluminium 2.4%, phosphorous 0.04%, sulphur 0.06% maximum | fob China | export duty paid | 20t | \$/t | lump | big bags of 1t, bulk | prompt | weekly (Thursday) |
| min 28% Ca 55-60% Si ex-works China | Calcium 28%, silicon 55-60%, carbon 1.2%, aluminium 2.4%, phosphorous 0.04%, sulphur 0.06% maximum | ex-works China | no | 100t | Yn/t | lump | big bags of 1t, bulk | prompt | weekly (Thursday) |
| min 30% Ca 55-60% Si fob China | Calcium 30% minimum, silicon 55-60%, carbon 1.2%, aluminium 2.4%, phosphorous 0.04%, sulphur 0.06% maximum | fob China | export duty paid | 20t | \$/t | lump | big bags of 1t, bulk | prompt | weekly (Thursday) |
| min 30% Ca 55-60% Si ex-works China | Calcium 30% minimum, silicon 55-60%, carbon 1.2%, aluminium 2.4%, phosphorous 0.04%, sulphur 0.06% maximum | ex-works China | no | 100t | Yn/t | lump | big bags of 1t, bulk | Prompt | weekly (Thursday) |
| Noble-alloy and feedstock specifications | | | | | | | | | |
| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
| Ferro-boron | | | | | | | | | |
| 17% B fob US warehouse | Boron 17% minimum, silicon 1.5%, carbon 0.4%, aluminium 0.3%, phosphorous 0.035%, sulphur 0.01% maximum | fob US warehouse | duty paid | <1000kg | \$/lb | 50mm x10mm | drums, super sacks | within 30 days | monthly |
| Ferro-molybdenum | | | | | | | | | |
| 65-70% Mo dp Rotterdam, \$/kg Mo | Molybdenum 65-70%, carbon 0.1%, silicon 1.5%, phosphorous 0.05%, S 0.1%, copper 0.5%, lead 0.05% | dp Europe | duty paid | 10t | \$/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |
| min 65% Mo max 1.5% Si fob North America warehouse (per lb Mo) | Molybdenum 65% minimum, silicon 1.5%, copper 0.5% maximum | fob North American warehouse | duty paid | 5t | \$/lb | lump | big bags, drums | within 30 days | weekly (Thursday) |
| 60% Mo fob China | Molybdenum 60%, carbon 0.1%, silicon 1.5%, phosphorous 0.05%, S 0.1%, copper 0.5% | fob China | export duty paid | 20-24t (+/- 2%) | \$/kg | lump | big bags, drums | prompt | daily |
| 60% Mo ex-works China | Molybdenum 60%, carbon 0.1%, silicon 1.5%, phosphorous 0.05%, S 0.1%, copper 0.5% | ex-works China | no | 10t (+/- 2%) | Yn/t | lump | big bags, drums | prompt | daily |
| 60% Mo ex-works India | Molybdenum 60%, carbon 0.1%, silicon 1.5%, phosphorous 0.05%, S 0.1%, copper 0.5% | ex-works India | no | 20-24t (+/- 2%) | Rs/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |

Noble-alloy and feedstock specifications

| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
|--|--|-------------------|---------------------|------------------|---------------|------|-------------------|----------------|---------------------------------|
| Ferro-niobium | | | | | | | | | |
| min 65% Nb du Rotterdam, \$/kg Nb | Niobium 65%, aluminium 1-2%, carbon 0.2%, phosphorous 0.15%, sulphur 0.15%, silicon 3%, tantalum 0.5% maximum | du Rotterdam | duty unpaid | 1t | \$/kg | lump | bags of 1t, drums | prompt | twice weekly (Tuesday/Thursday) |
| 65% Nb fob US warehouse | Niobium 65% minimum | fob US warehouse | duty paid | <10,000lb | \$/lb | lump | bags of 1t, drums | within 30 days | monthly |
| min 66% Nb Brazilian Imports fca China port | Niobium 66%, aluminium 1-2%, carbon 0.2%, phosphorous 0.15%, sulphur 0.15%, silicon 3%, tantalum 0.5% maximum | fca China | no | 5t (+/- 2%) | Yn/t | lump | big bags, drums | prompt | weekly (Tuesday) |
| Ferro-tungsten | | | | | | | | | |
| min 75% W du Rotterdam, \$/kg W | Tungsten 75-85% minimum, carbon 1%, silicon 0.6%, phosphorous 0.05%, sulphur 0.05%, manganese 0.6%, arsenic 0.1%, tin 0.1%, copper 0.2%, antimony 0.08%, As+Sb+Sn 0.2% maximum | du Rotterdam | duty unpaid | 5t | \$/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |
| 75% W fob North America warehouse | Tungsten 75% minimum | fob North America | duty paid | 5t | \$/lb | lump | drums, bulk | within 30 days | monthly |
| 75% W ex-works China | Tungsten 75% minimum, carbon 0.4%, sulphur 0.8%, manganese 0.5%, arsenic 0.1%, tin 0.08%, phosphorous 0.05%, silicon 0.7%, copper 0.15%, antimony 0.05% maximum | ex-works China | no | 10t (+/- 2%) | Yn/t | lump | drums | prompt | weekly (Tuesday) |
| min 75% W fob China | Tungsten 75% minimum, carbon 0.4%, sulphur 0.8%, manganese 0.5%, arsenic 0.1%, tin 0.08%, phosphorous 0.05%, silicon 0.7%, copper 0.15%, antimony 0.05% maximum | fob China | export duty paid | 10t (+/- 2%) | \$/kg | lump | drums | prompt | weekly (Tuesday) |
| Ferro-titanium | | | | | | | | | |
| Russian min 70% Ti dap Europe, \$/kg Ti | Titanium 70-74% minimum, aluminium 4.5%, vanadium 3%, phosphorous 0.02%, sulphur 0.02%, copper 0.2%, lead 0.05%, carbon 0.2%, silicon 0.25%, nitrogen 0.4%, tin 0.2%, bismuth 0.025%, boron 0.005% maximum | dap Europe | duty unpaid | 10t (+/- 2%) | \$/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |
| European min 70% Ti dp/duty-free Rotterdam, \$/kg Ti | Titanium 70-74% minimum, aluminium 5%, vanadium 3%, oxygen 2%, carbon 0.15%, sulphur 0.02%, phosphorous 0.02%, nitrogen 0.5%, tin 0.5%, nickel 0.5%, chromium 0.5%, lead 0.01%, bismuth 0.01% maximum | dp/df Rotterdam | duty-free/duty-paid | 10t (+/- 2%) | \$/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |

Noble-alloy and feedstock specifications

| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
|---|---|----------------------|----------------|------------------|---------------|----------------------|--|----------------|---------------------------------|
| min 70% Ti ex-works UK | Titanium 70-72% minimum, aluminium 5%, vanadium 3%, oxygen 2%, carbon 0.15%, sulphur 0.02%, phosphorous 0.02%, nitrogen 0.5%, tin 0.5%, nickel 0.5%, chromium 0.5%, lead 0.01%, bismuth 0.01% maximum | ex-works UK | no | 10t (+/- 2%) | \$/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |
| Ferro-titanium 70% Ti fob North America warehouse | Titanium 70% minimum | fob North America | duty paid | truckload | \$/lb | 2" x 1/4" and powder | super sack | within 30 days | weekly (Thursday) |
| 30% Ti ex-works China | Titanium 25-35%, aluminium 8%, silicon 4.5%, arsenic 0.1%, phosphorous 0.05%, sulphur 0.03%, copper 0.2%, manganese 2.5% maximum | ex-works China | no | > 10t | Yn/t | lump | big bags, drums | prompt | weekly (Tuesday) |
| 70% scrap grade ex-works China | Titanium 75% maximum (permissible range 65-75%), silicon 0.5% maximum, manganese 0.1% maximum, carbon 0.2% maximum, phosphorus 0.2% maximum, sulphur 0.03% maximum, vanadium 0.5% maximum (permissible range 0.03-0.5%) | ex-works China | VAT | 10t | Yn/t | powder | big bags, drums | prompt | weekly (Tuesday) |
| Titanium | | | | | | | | | |
| Turnings 90/6/4 max 0.5% Sn ddp northwest Europe | Titanium 90/6/4 alloy (Titanium minimum 90%, aluminium 6%, vanadium 4%) tin 0.5% maximum, degreased | ddp northwest Europe | duty paid | 20t | \$/kg | turnings | bulk | prompt | twice weekly (Tuesday/Thursday) |
| Scrap min 85% min Ti tin-bearing mixed turnings del US dealer/processor | Titanium 85% minimum; tin bearing turnings, unprocessed, maximum 2% tin, 3% allowed oil/moisture/magnetics | del US | duty paid | 3,000lb | \$/lb | turnings | bulk (packaging bulk or gaylord boxes) | within 30 days | weekly (Thursday) |
| Scrap min 85% Ti non-tin-bearing mixed turnings del US dealer/processor | Mixed turnings del US processor titanium 85% minimum; non-tin bearing turnings, unprocessed, maximum 0.5% tin, 3% allowed oil/moisture/magnetics | del US | duty paid | 3,000lb | \$/lb | turnings | bulk (packaging bulk or gaylord boxes) | within 30 days | weekly (Thursday) |
| Ferro-vanadium | | | | | | | | | |
| 78-82% V dp Rotterdam, \$/kg V | Vanadium 78-82% minimum, aluminium 1.5%, silicon 1.5%, manganese 0.5%, carbon 0.3%, sulphur 0.05%, phosphorous 0.06% maximum | dp Rotterdam | duty paid | 5t | \$/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |
| 78-82% V max 1.5% Si fob North America warehouse (per lb V) | Vanadium 78-82% minimum, aluminium 1.5%, silicon 1.5%, carbon 0.25%, phosphorous 0.06%, sulphur 0.05% maximum | fob North America | duty paid | 5t | \$/lb | lump | big bags, drums | within 30 days | weekly (Thursday) |
| 50% V ex-works China | Vanadium 50% minimum, aluminium 0.5%, silicon 2%, manganese 0.5%, carbon 0.4%, sulphur 0.04%, phosphorous 0.07% maximum | ex-works | no | 10t (+/- 2%) | Yn/t | lump | drums | prompt | daily |

Noble-alloy and feedstock specifications

| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
|--|---|----------------|------------------|------------------|---------------|--------|-----------------|--------|---------------------------------|
| 80% V fob China | Vanadium 78-82% minimum, aluminium 1.5%, silicon 1.5%, manganese 0.5%, carbon 0.3%, sulphur 0.05%, phosphorous 0.06% maximum | fob China | export duty paid | 20-24t (+/- 2%) | \$/kg | lump | big bags, drums | prompt | daily |
| min 50% V ex-works India, Rs/kg | Vanadium 50% minimum, aluminium 1.5%, silicon 1.5%, carbon 0.1%, sulphur 0.05%, phosphorous 0.1% maximum | ex-works India | no | 10t (+/- 2%) | Rs/kg | lump | big bags, drums | prompt | twice weekly (Tuesday/Thursday) |
| Vanadium-nitrogen alloy ex works China | Vanadium 77% minimum (permissible range 77-81%), nitrogen 18% maximum (permissible range 14-18%), carbon 6% maximum, phosphorous 0.06% maximum, silicon 0.10% maximum | ex-works China | VAT | 10t | Yn/t | powder | big bags, drums | prompt | daily |

Stainless steel and stainless steel scrap specifications

| Alloy | Grade | Basis | Duties/Tariffs | Minimum lot size | Currency/unit | Form | Packaging | Timing | Assessment |
|--|---|---|----------------|------------------|---------------|--------|-----------|----------------|-------------------------------|
| Secondary | | | | | | | | | |
| Nickel-Cobalt refinery scrap nickel contained del US processor | price basis percentage of cobalt (min 99.3%) in scrap generated by a nickel-cobalt refinery | del US | duty paid | 2,500lbs min | \$/lb | solids | | within 30 days | monthly, on day of assessment |
| Stainless steel scrap | | | | | | | | | |
| Scrap 304 (18-8) scrap solids cif Rotterdam (\$/lb) | | See the Argus Scrap Markets methodology | | | | | | | |
| Scrap 304 (18-8) scrap solids cif Rotterdam (€/t) | | See the Argus Scrap Markets methodology | | | | | | | |
| Stainless steel 304 (18-8) scrap solids cif Japan | | See the Argus Scrap Markets methodology | | | | | | | |
| Stainless steel 304 (18-8) scrap solids cit South Korea | | See the Argus Scrap Markets methodology | | | | | | | |
| Stainless steel 304 (18-8) scrap solids cif Taiwan | | See the Argus Scrap Markets methodology | | | | | | | |
| Stainless steel 409/410 scrap solids del US processor | | See the Argus Scrap Markets methodology | | | | | | | |
| Stainless steel 430 scrap solids del US processor | | See the Argus Scrap Markets methodology | | | | | | | |
| Stainless steel | | | | | | | | | |
| Stainless steel 304/2B cold rolled coil 2.0mm ex-warehouse China | | See the Argus Scrap Markets methodology | | | | | | | |

Ferro-alloys and feedstocks indexes

Average price indexes

In addition to outright prices, the service provides month-to-date and final-month average indexes.

Indexes are calculated by summing the value of published assessments and dividing by the number of assessments published in a given month. The final index value for a given month is the average calculated on the final day of assessment of that month. The report shows the evolution of the current-month index, as well as the final index value for the previous month.

Timing and indexation

Argus Non-Ferrous Markets contains twice-weekly, weekly and monthly assessments. Those assessments are republished in the Argus Database and available electronically for each publication date. For example, a weekly price assessed on Wednesdays will be republished on Thursday and on each subsequent publication date until the next day of assessment, in this example, the following Wednesday.

Users are advised that the published month-to-date and final indexes may differ from those calculated using Argus or third-party tools, because of this daily republication of price assessments.

Indexes are published for:

Ferro-chrome

- HC basis 60% Cr 6-8% C ddp NWE
- LC Cr min 65% 0.10% C ddp Europe works
- Charge chrome fob US warehouse
- HC min 62% Cr 6-8% C fob US warehouse
- LC min 65% Cr 0.05% C max 1.5% Si fob US warehouse
- LC min 65% Cr 0.10% C max 1.5% Si fob US warehouse
- LC 60% Cr 0.15% C fob US warehouse

Ferro-manganese

- HC Mn 78% ddp Europe works
- MC 78% Mn 1.5-2% C 0.15-0.20 P ddp Europe works
- HC min 80% Mn 6-8% C fob North America warehouse
- MC 80% Mn 1-2% C fob North America warehouse

Manganese ore

- 44-46% lumpy ore fca China

Silico-manganese

- 65% Mn ddp Europe works
- Min 65% Mn 16% Si fob North America warehouse
- 65% Mn 17% Si fob China
- 65% Mn 15% Si fob India East Coast
- 60% Mn 14% Si fob India East Coast

Ferro-silicon

- 75% Si ddp NWE
- Min 75% Si max 0.1% C fob US warehouse
- Low aluminium 75% Si 0.1% Al fob China
- Low aluminium 75% Si 0.5% Al fob China
- 72% Si fob China
- 75% Si fob China

Calcium-silicon

- Min 28% Ca 55-60% Si fob China
- Min 30% Ca 55-60% Si fob China

Ferro-boron

- 17% B fob US warehouse

Ferro-molybdenum

- 65-70% Mo dp Rotterdam
- Min 65% Mo max 1.5% Si fob North America warehouse
- 60% Mo fob China

Ferro-niobium

- Min 65% Nb du Rotterdam
- Min 66% Nb Brazilian Imports fca China port

Ferro-tungsten

- Min 75% W du Rotterdam
- 75% W fob North America warehouse
- Min 75% W fob China

Ferro-titanium

- Russian min 70% Ti ex-works Russia
- European min 70% Ti dp/duty-free Rotterdam
- 70% Ti fob North America warehouse

Ferro-Vanadium

- Ferro-vanadium 78-82% V dp Rotterdam
- Ferro-vanadium 78-82% V max 1.5% Si fob North America warehouse
- Ferro-vanadium 80% V fob China

Rare earths

Introduction

Argus Non-Ferrous Markets publishes price assessments and market commentary on the international rare earths markets.

Basis of assessment

Rare earths price assessments are for physical material for spot delivery, with “spot” defined as delivery within four weeks. Assessments reflect the average value of spot material across the whole of the day of assessment.

Fob China assessments are basis export duty paid, including any export taxes levied by China. Fob China prices are not inclusive of any import duty charged by the importing country.

China domestic prices are basis ex-works, VAT paid, unless otherwise stated.

European prices are cif Rotterdam, duty paid, unless otherwise stated.

Specifications such as currency, unit of trade and quality follow recognised industry standards.

Price assessments are published as low-high ranges.

In most cases, information relating to material that falls outside of the stated specifications will not be used in the assessment process. Exceptions may be made if an acceptable and appropriate normalisation process can be applied.

Timing of assessment

Rare earths prices are assessed and published daily, twice weekly (on Tuesday and Thursday), weekly (on Tuesday) or monthly (on the first publication day of the month). See the table below for the frequency of each assessment.

For European price assessments, market information received after 4pm London time on the day of assessment may not be included in the assessment process.

For Chinese price assessments, market information received after 3pm Beijing time on the day of assessment may not be included in the assessment process.

Rounding

Prices assessed in US dollars are rounded to two decimal places. Prices assessed in Chinese yuan are rounded to whole numbers.

Rare earths specifications

China export and delivered Europe

| Element | Grade | Currency/ unit | Minimum lot size | Form | Packaging | Frequency |
|-----------------------------|--|-------------------|---------------------|------------------------|-----------------------|--------------|
| Cerium | | | | | | |
| Carbonate 45% REO fob China | Total Rare Earth Oxide (TREO) 45% minimum; chlorine 1,000ppm maximum | \$/kg | 5t (+/- 2%) | white powder | 1t bags or 25kg drums | monthly |
| Metal 99% min fob China | Cerium 99% minimum; iron 0.25%, carbon 0.05%, silicon 0.03%, calcium 0.02%, total RE impurities 1% maximum | \$/kg | 5t (+/-2%) | 0.5kg (500g) ingots | UN drums | twice weekly |
| Metal 99.9% min fob China | Cerium 99.9% minimum; iron 0.1%, carbon 0.03%, silicon 0.02%, calcium 0.01%, total RE impurities 0.1% maximum | \$/kg | 5t (+/-2%) | 0.5kg (500g) ingots | UN drums | twice weekly |
| Oxide 99.5-99.9% fob China | Cerium oxide 99.5-99.9% minimum; iron 0.01%, silicon 0.03%, calcium 0.03%, chlorine 0.05%, sulphur 0.1%, RE impurities 0.1% maximum | \$/t | 5t (+/- 2%) | off-white/beige powder | 1t bags or 25kg drums | twice weekly |
| Oxide 99.5-99.9% cif Europe | Cerium oxide 99.5-99.9% minimum; iron 0.01%, silicon 0.03%, calcium 0.03%, chlorine 0.05%, sulphur 0.1%, RE impurities 0.1% maximum | \$/kg | 5t (+/- 2%) | off-white/beige powder | 1t bags or 25kg drums | monthly |
| Dysprosium | | | | | | |
| Metal 99% min fob China | Dysprosium 99% minimum; iron 0.01% maximum, magnesium 0.01%, silicon 0.01%, calcium 0.075%, carbon 0.01%, aluminium 0.01%, oxygen 0.18%, total RE impurities 1% maximum | \$/kg | 20kg (+/-2%) | ingots | 50kg drums | daily |
| Oxide 99.5% min fob China | Dysprosium oxide 99.5% minimum; iron 0.05%, silicon 0.02%, calcium 0.03%, aluminium 0.05%, total RE impurities 0.5% maximum | \$/kg | 500kg (+/- 2%) | white powder | 50kg drums | daily |
| Oxide 99.5% min cif Europe | Dysprosium oxide 99.5% minimum; iron 0.05%, silicon 0.02%, calcium 0.03%, aluminium 0.05%, total RE impurities 0.5% maximum | \$/kg | 500kg (+/- 2%) | white powder | 50kg drums | monthly |
| Europium | | | | | | |
| Metal 99.9% min fob China | Europium 99.9% minimum; iron 0.01%, silicon 0.01%, calcium 0.01%, aluminium 0.02%, manganese 0.01%, magnesium 0.001%, tungsten 0.03%, oxygen 0.03%, tantalum 0.01% | \$/kg | 10kg (+/-2%) | ingots | 50kg drums | monthly |
| Oxide 99.99% min fob China | Europium oxide 99.99% minimum; iron 0.005%, silicon 0.002%, calcium 0.002%, nickel 0.001%, zinc 0.001%, aluminium 0.01%, total RE impurities 0.01% maximum | \$/kg | 50kg (+/-2%) | pink powder | 50kg drums | monthly |
| Erbium | | | | | | |
| Oxide 99.5% cif Europe | Erbium oxide 99.5% minimum; iron 0.05%, silicon 0.01%, calcium 0.02%, total RE impurities 0.5% maximum | \$/kg | 1t (+/-2%) | pink powder | 50kg drums | monthly |
| Ferro-dysprosium | | | | | | |
| Dy 80% min fob China | Dysprosium 79.6% minimum; iron 20.07%, magnesium 0.01%, silicon 0.013%, calcium 0.01%, carbon 0.032%, aluminium 0.019%, oxygen 0.028%, nickel 0.01% maximum | \$/kg | 200kg (+/- 2%) | ingots | 50kg drums | daily |
| Gadolinium | | | | | | |
| Metal 99% min fob China | Gadolinium 99% minimum; iron 0.15%, silicon 0.01%, calcium 0.05%, aluminium 0.01%, magnesium 0.01%, oxygen 0.25%, carbon 0.03%, chlorine 0.02%, RE impurities 1% maximum | \$/kg | 100kg (+/-2%) | ingots | 50kg drums | daily |
| Oxide 99.99% min fob China | Gadolinium oxide 99.99% minimum; iron 0.0001%, silicon 0.002%, calcium 0.0005%, total RE impurities 0.01% maximum | \$/t | 5t | white powder | 50kg drums | daily |
| Oxide 99.999% min fob China | Gadolinium oxide 99.999% minimum; iron 0.0002%, silicon 0.002%, calcium 0.001%, total RE impurities 0.001% maximum | \$/t | 1t (+/- 2%) | white powder | 50kg drums | twice weekly |
| Holmium | | | | | | |
| Oxide 99.5% min fob China | Holmium oxide 99.5% minimum; iron 0.001%, silicon 0.0017%, calcium 0.0075%, total RE impurities 0.5% maximum | \$/t | 500kg | powder | 50kg drums | daily |

| | | | | | | | |
|--------------------------------|--|-------|---------------|--|------------------------|--------------|--|
| Lanthanum | | | | | | | |
| Metal 99% min fob China | Lanthanum 99% minimum; iron 0.3%, carbon 0.05%, silicon 0.05%, calcium 0.02%, RE impurities 1% maximum | \$/kg | 5t (+/- 2%) | 0.5kg (500g) ingots | 50kg drums | twice weekly | |
| Metal 99.9% min fob China | Lanthanum 99.9% minimum; iron 0.1%, carbon 0.03%, silicon 0.03%, calcium 0.01%, RE impurities 0.1% maximum | \$/kg | 5t (+/- 2%) | 0.5kg (500g) ingots | 50kg drums | twice weekly | |
| Oxide 99.5-99.9% fob China | Lanthanum oxide 99.5-99.9% minimum; iron 0.005%, silicon 0.05%, calcium 0.05%, sodium 0.10%, zinc 0.015%, chlorine 0.05%, RE impurities 0.5% maximum | \$/t | 5t (+/- 2%) | white powder | 1t bags or 250kg drums | twice weekly | |
| Oxide 99.999% min fob China | Lanthanum oxide 99.999% minimum; iron 0.0001%, silicon 0.003%, copper 0.0001%, calcium 0.0005%, nickel 0.0001%, other RE oxides 0.001% maximum | \$/kg | 5t (+/- 2%) | white powder | 1t bags or 250kg drums | twice weekly | |
| Lutetium | | | | | | | |
| Oxide 99.99% min fob China | Lutetium 99.99% minimum; iron 0.0001%, silicon 0.001%, calcium 0.0007%, RE impurities 0.01% maximum | \$/kg | 200kg | powder | 5kg drums | weekly | |
| Mischmetal | | | | | | | |
| La 35% Ce 65% fob China | Cerium 65%, lanthanum 35% ratio Total Rare Earth Oxide (TREO) 99% minimum; iron 0.2%, silicon 0.03%, carbon 0.03%, zinc 0.01%, magnesium 0.01%, RE impurities 1% maximum | \$/kg | 5t (+/- 2%) | 1-2kg ingots | 50kg drums | monthly | |
| Low Zn and Mg fob China | Total rare earth oxide (TREO) 99.7% minimum, lanthanum 25-35%, cerium 45-55%, praseodymium 4-10%, neodymium 14-18%, iron 0.2%, zinc 0.001%, magnesium 0.01%, silicon 0.001% maximum | \$/kg | 1t (+/- 2%) | ingots | 250kg drums | monthly | |
| Neodymium | | | | | | | |
| Metal 99% min fob China | Neodymium 99% minimum; iron 0.2%, silicon 0.03%, calcium 0.03%, magnesium 0.03%, carbon 0.03%, other RE metals 1% maximum | \$/kg | 5t (+/- 2%) | 1-2kg or 5-7kg ingots | 1t bags or 250kg drums | daily | |
| Oxide 99.5-99.9% fob China | Neodymium oxide 99.5-99.9% minimum; iron 0.01%, silicon 0.05%, calcium 0.03%, aluminium 0.03%, chlorine 0.03%, other RE oxides 0.5% maximum | \$/t | 5t (+/- 2%) | light blue powder | 1t bags | daily | |
| Metal 99% cif Europe | Neodymium 99% minimum; iron 0.02%, silicon 0.05%, calcium 0.05%, magnesium 0.05%, carbon 0.03%, other RE metals 1% maximum | \$/kg | 5t (+/- 2%) | small ingots or irregular pieces <50mm | 25 kg drums | monthly | |
| Nd Oxide 99.5-99.9% cif Europe | Neodymium oxide 99.5-99.9% minimum; iron 0.05%, silicon 0.05%, calcium 0.05%, aluminium 0.05%, chlorine 0.05%, other RE oxides 0.5% maximum | \$/kg | 5t (+/- 2%) | light blue powder | 1t bags | monthly | |
| Praseodymium | | | | | | | |
| Metal 99% min fob China | Praseodymium 99% minimum; iron 0.2%, silicon 0.05%, calcium 0.02%, aluminium 0.3%, magnesium 0.02%, oxygen 0.05%, carbon 0.05%, chlorine 0.03%, RE impurities 1% maximum | \$/kg | 1t (+/-2%) | irregular lumps of 50mm max | 25kg drums | daily | |
| Oxide 99.5-99.9% fob China | Praseodymium oxide 99.5-99.9% minimum; iron 0.01%, silicon 0.03%, calcium 0.04%, chlorine 0.03%, aluminium 0.05%, RE impurities 0.5% maximum | \$/t | 1t (+/- 2%) | black powder | 1t bags | daily | |
| Praseodymium-neodymium | | | | | | | |
| Metal 99% min fob China | Neodymium 75%, praseodymium 25% ratio Total Praseodymium-neodymium oxide 99% minimum; iron 0.3%, silicon 0.05%, calcium 0.03%, aluminium 0.1%, magnesium 0.05%, oxygen 0.05%, carbon 0.05%, chlorine 0.05%, oxygen 0.05%, RE impurities 1% maximum | \$/kg | 5t (+/- 2%) | 1-2kg or 5-7kg ingots | 1t bags or 250kg drums | daily | |
| Oxide 99% min fob China | Neodymium 75%, praseodymium 25% ratio Total Praseodymium-neodymium oxide 99% minimum; iron 0.05%, silicon 0.05%, calcium 0.05%, aluminium 0.05%, magnesium 0.05%, chlorine 0.05%, RE impurities 1% maximum | \$/t | 5t (+/- 2%) | brownish grey powder | 1t bags | daily | |
| Samarium | | | | | | | |
| Metal 99% min fob China | Samarium 99% minimum; iron 0.005%, silicon 0.005%, calcium 0.005%, aluminium 0.005%, carbon 0.0072%, magnesium 0.005%, oxygen 0.0066%, total RE impurities 1% maximum | \$/kg | 1t (+/-2%) | ingots | 50kg drums | twice weekly | |
| Oxide 99.5% min fob China | Samarium oxide 99% minimum; iron 0.001%, silicon 0.005%, calcium 0.01%, aluminium 0.02%, total RE impurities 1% maximum | \$/kg | 5t (+/- 2%) | faint yellow powder | 50kg drums | twice weekly | |
| Terbium | | | | | | | |
| Metal 99.9% min fob China | Terbium 99.9% minimum; iron 0.01%, silicon 0.01%, calcium 0.03%, aluminium 0.01%, magnesium 0.01%, oxygen 0.16%, carbon 0.01%, molybdenum 0.01%, total RE impurities 0.1% maximum | \$/kg | 100kg (+/-2%) | ingots | 50kg drums | daily | |

| Oxide 99.99% min fob China | Terbium oxide 99.99% minimum; iron 0.005%, silicon 0.02%, calcium 0.01%, total RE impurities 0.01% maximum | \$/kg | 100kg (+/-2%) | brown powder | 50kg drums | daily |
|--------------------------------|--|-------------------|---------------------|------------------------|-----------------------|--------------|
| Oxide 99.99% min cif Europe | Terbium oxide 99.99% minimum; iron 0.005%, silicon 0.02%, calcium 0.01%, total RE impurities 0.01% maximum | \$/kg | 100kg (+/-2%) | brown powder | 50kg drums | monthly |
| Ytterbium | | | | | | |
| oxide 99.99% min fob China | Ytterbium 99.99% minimum; iron 0.001%, silicon 0.003%, calcium 0.005%, total RE impurities 0.01% maximum | \$/t | 500kg | powder | 50kg drums | weekly |
| Yttrium | | | | | | |
| Metal 99.9% min fob China | Yttrium 99.9% minimum; iron 0.065%, calcium 0.051%, nickel 0.0016%, manganese 0.0011%, total RE impurities 0.1% maximum | \$/kg | 200kg (+/-2%) | ingots | 50kg drums | weekly |
| Oxide 99.999% min fob China | Yttrium oxide 99.999% minimum; iron oxide 0.0001%, silicon oxide 0.001%, calcium oxide 0.0005%, total RE impurities 0.0001% maximum | \$/t | 5t (+/- 2%) | white powder | 50kg drums | twice weekly |
| Oxide 99.999% cif Europe | Yttrium oxide 99.999% minimum; iron oxide 0.0001%, silicon oxide 0.001%, calcium oxide 0.0005%, total RE impurities 0.0001% maximum | \$/kg | 5t (+/- 2%) | white powder | 50kg drums | monthly |
| China domestic ex-works | | | | | | |
| Element | Grade | Currency/ unit | Minimum lot size | Form | Packaging | Frequency |
| Cerium | | | | | | |
| Carbonate 45% REO China | Total Rare Earth Oxide (TREO) 45% minimum; calcium 0.005%, chlorine 0.05% maximum | Yn/t | 5t (+/- 2%) | white powder | 1t bags or 25kg drums | monthly |
| Metal 99% min China | Cerium 99% minimum; iron 0.25%, carbon 0.05%, silicon 0.03%, calcium 0.02%, total RE impurities 1% maximum | Yn/t | 5t (+/-2%) | 0.5kg (500g) ingots | UN drums | twice weekly |
| Metal 99.9% min China | Cerium 99.9% minimum; iron 0.1%, carbon 0.03%, silicon 0.02%, calcium 0.01%, total RE impurities 0.1% maximum | Yn/t | 1t (+/-2%) | 0.5kg (500g) ingots | UN drums | twice weekly |
| Oxide 99.5-99.9% China | Cerium oxide 99.5-99.9% minimum; iron 0.01%, silicon 0.03%, calcium 0.03%, chlorine 0.05%, sulphur 0.1%, RE impurities 0.1% maximum | Yn/t | 5t (+/- 2%) | off-white/beige powder | 1t bags or 25kg drums | twice weekly |
| Dysprosium | | | | | | |
| Metal 99% min China | Dysprosium 99% minimum; iron 0.01%, magnesium 0.01%, silicon 0.01%, calcium 0.075%, carbon 0.01%, aluminium 0.01%, oxygen 0.18%, total RE impurities 1% maximum | Yn/kg | 20kg (+/-2%) | ingots | 50kg drums | daily |
| Oxide 99.5% min China | Dysprosium oxide 99.5% minimum; iron 0.005%, silicon 0.02%, calcium 0.03%, aluminium 0.05%, total RE impurities 0.5% maximum | Yn/kg | 500kg (+/- 2%) | white powder | 50kg drums | daily |
| Erbium | | | | | | |
| Oxide 99.5% min China | Erbium oxide 99.5% minimum; iron 0.05%, silicon 0.01%, calcium 0.02%, total RE impurities 0.5% maximum | Yn/t | 1t (+/-2%) | pink powder | 50kg drums | twice weekly |
| Europium | | | | | | |
| Oxide 99.99% min China | Europium oxide 99.99% minimum; iron 0.005%, silicon 0.002%, calcium 0.002%, nickel 0.001%, zinc 0.001%, aluminium 0.01%, total RE impurities 0.01% maximum | Yn/kg | 50kg (+/-2%) | pink powder | 50kg drums | monthly |
| Ferro-dysprosium | | | | | | |
| Dy 80% min | Dysprosium 79.6% minimum; iron 20.07%, magnesium 0.01%, silicon 0.013%, calcium 0.01%, carbon 0.032%, aluminium 0.019%, oxygen 0.028%, nickel 0.01% maximum | Yn/kg | 200kg (+/-2%) | ingots | 50kg drums | daily |
| Ferro-gadolinium | | | | | | |
| Gd 75% min ex-works China | Gadolinium 75%, iron 24% minimum; carbon 0.04% maximum | Yn/t | 1t (+/-2%) | ingots | 250kg drums | daily |
| Gadolinium | | | | | | |
| Metal 99% min China | Gadolinium 99% minimum; iron 0.15%, silicon 0.01%, calcium 0.05%, aluminium 0.01%, magnesium 0.01%, oxygen 0.25%, carbon 0.03%, chlorine 0.02%, RE impurities 1% maximum | Yn/t | 100kg (+/-2%) | ingots | 50kg drums | daily |
| Oxide 99.5-99.9% min China | Gadolinium oxide 99.5-99.9% minimum; iron 0.002%, silicon 0.008%, calcium 0.01%, aluminium 0.63% max, total RE impurities 0.5% maximum | Yn/t | 1t (+/- 2%) | white powder | 50kg drums | daily |

| | | | | | | |
|---------------------------------------|--|-------|-------------|-----------------------------|------------------------|--------------|
| Oxide 99.99% min China | Gadolinium oxide 99.99% minimum; iron 0.0001%, silicon 0.002%, calcium 0.0005%, total RE impurities 0.01% maximum | Yn/t | 1t | white powder | 50kg drums | daily |
| Holmium | | | | | | |
| Oxide 99.5% min China | Holmium oxide 99.5% minimum; iron 0.001%, silicon 0.0017%, calcium 0.0075%, total RE impurities 0.5% maximum | Yn/t | 500kg | powder | 50kg drums | daily |
| Lanthanum | | | | | | |
| Metal 99% min China | Lanthanum 99% minimum; iron 0.3%, carbon 0.05%, silicon 0.05%, calcium 0.02%, RE impurities 1% maximum | Yn/t | 5t (+/- 2%) | 0.5kg (500g) ingots | 50kg drums | twice weekly |
| Metal 99.9% min China | Lanthanum 99.9% minimum; iron 0.1%, carbon 0.03%, silicon 0.03%, calcium 0.01%, RE impurities 0.1% maximum | Yn/t | 1t (+/- 2%) | 0.5kg (500g) ingots | 50kg drums | twice weekly |
| Oxide 99.5-99.9% China | Lanthanum oxide 99.5-99.9% minimum; iron 0.005%, silicon 0.05%, calcium 0.05%, sodium 0.10%, zinc 0.015%, chlorine 0.05%, RE impurities 0.5% maximum | Yn/t | 5t (+/- 2%) | white powder | 1t bags | twice weekly |
| Oxide 99.999% min China | Lanthanum oxide 99.999% minimum; iron 0.0001%, silicon 0.003%, copper 0.0001%, calcium 0.0005%, nickel 0.0001%, other RE oxides 0.001% maximum | Yn/t | 5t (+/- 2%) | white powder | 1t bags | twice weekly |
| Lanthanum cerium chloride min 45% REO | Cerium 65%, lanthanum 35% ratio Total Rare Earth Oxide (TREO) 44% minimum | Yn/t | 5t (+/- 2%) | white particle or lump | 50kg drums | monthly |
| Lutetium | | | | | | |
| Oxide 99.99% min China | Lutetium 99.99% minimum; iron 0.0001%, silicon 0.001%, calcium 0.0007%, RE impurities 0.01% maximum | Yn/kg | 200kg | powder | 5kg drum | weekly |
| Mischmetal | | | | | | |
| La 35% Ce 65% China | Cerium 65%, lanthanum 35% ratio Total Rare Earth Oxide (TREO) minimum; iron 0.2%, silicon 0.03%, carbon 0.03%, zinc 0.01%, magnesium 0.01%, RE impurities 0.1% maximum | Yn/t | 5t (+/- 2%) | 1-2kg ingots | 50kg drums | monthly |
| Low Zn and Mg China | Lanthanum 25-35%, cerium 45-55%, praseodymium 4-10%, neodymium 14-18%, total rare earth oxide (TREO) 99.7% minimum; iron 0.2%, zinc 0.001%, magnesium 0.01%, silicon 0.001% maximum | Yn/t | 1t (+/- 2%) | ingots | 250kg drums | monthly |
| Neodymium | | | | | | |
| Metal 99% min China | Neodymium 99% minimum; iron 0.2%, silicon 0.03%, calcium 0.03%, magnesium 0.03%, carbon 0.03%, other RE metals 1% maximum | Yn/t | 5t (+/- 2%) | 1-2kg or 5-7kg ingots | 1t bags or 250kg drums | daily |
| Oxide 99.5-99.9% China | Neodymium oxide 99.5-99.9% minimum; iron 0.01%, silicon 0.05%, calcium 0.03%, aluminium 0.03%, chlorine 0.03%, other RE oxides 0.5% maximum | Yn/t | 5t (+/- 2%) | light blue powder | 1t bags | daily |
| Praseodymium | | | | | | |
| Metal 99% min China | Praseodymium 99% minimum; iron 0.2%, silicon 0.05%, calcium 0.02%, aluminium 0.3%, magnesium 0.02%, oxygen 0.05%, carbon 0.05%, chlorine 0.03%, RE impurities 1% maximum | Yn/t | 1t (+/- 2%) | irregular lumps of 50mm max | 25kg drums | daily |
| Oxide 99.5-99.9% China | Praseodymium oxide 99.5-99.9% minimum; iron 0.3%, silicon 0.05%, calcium 0.05%, aluminium 0.05%, magnesium 0.05%, chlorine 0.05%, RE impurities 0.5% maximum | Yn/t | 1t (+/- 2%) | black powder | 1t bags | daily |
| Praseodymium-neodymium | | | | | | |
| Metal 99% min China | Neodymium 75% praseodymium 25% ratio, total praseodymium-neodymium oxide 99% minimum; iron 0.3%, silicon 0.05%, calcium 0.03%, aluminium 0.1%, magnesium 0.05%, oxygen 0.05%, carbon 0.05%, chlorine 0.05%, oxygen 0.05%, RE impurities 1% maximum | Yn/t | 5t (+/- 2%) | 1-2kg or 5-7kg ingots | 1t bags or 250kg drums | daily |
| Oxide 99% min China | Neodymium 75% praseodymium 25% ratio, total praseodymium-neodymium oxide 99% minimum; iron 0.05%, silicon 0.05%, calcium 0.05%, aluminium 0.05%, magnesium 0.05%, chlorine 0.05%, RE impurities 1% maximum | Yn/t | 5t (+/- 2%) | brownish grey powder | 1t bags | daily |
| Samarium | | | | | | |
| Metal 99% min China | Samarium 99% minimum; iron 0.005%, silicon 0.005%, calcium 0.005%, aluminium 0.005%, carbon 0.0072%, magnesium 0.005%, oxygen 0.0066%, total RE impurities 1% maximum | Yn/t | 1t (+/- 2%) | ingots | 50kg drums | twice weekly |
| Oxide 99.5% min China | Samarium oxide 99% minimum; iron 0.001%, silicon 0.005%, calcium 0.01%, aluminium 0.02%, total RE impurities 1% maximum | Yn/t | 5t (+/- 2%) | faint yellow powder | 50kg drums | twice weekly |

Terbium

| | | | | | | |
|------------------------|---|-------|---------------|--------------|------------|-------|
| Metal 99.9% min China | Terbium 99.9% minimum; iron 0.01%, silicon 0.01%, calcium 0.03%, aluminium 0.01%, magnesium 0.01%, oxygen 0.16%, carbon 0.01%, molybdenum 0.01%, total RE impurities 0.1% maximum | Yn/kg | 100kg (+/-2%) | ingots | 50kg drums | daily |
| Oxide 99.99% min China | Terbium oxide 99.99% minimum; iron 0.005%, silicon 0.02%, calcium 0.01%, total RE impurities 0.01% maximum | Yn/kg | 100kg (+/-2%) | brown powder | 50kg drums | daily |

Ytterbium

| | | | | | | |
|------------------------|--|------|-------|--------|------------|--------|
| oxide 99.99% min China | Ytterbium 99.99% minimum; iron 0.001%, silicon 0.003%, calcium 0.005%, total RE impurities 0.01% maximum | Yn/t | 500kg | powder | 50kg drums | weekly |
|------------------------|--|------|-------|--------|------------|--------|

Yttrium

| | | | | | | |
|-------------------------|--|-------|---------------|--------------|------------|--------------|
| Metal 99.9% min China | Yttrium 99.9% minimum; iron 0.1%, calcium 0.15%, total RE impurities 0.1% maximum | Yn/kg | 200kg (+/-2%) | ingots | 50kg drums | weekly |
| Oxide 99.999% min China | Yttrium oxide 99.999% minimum; iron oxide 0.0001%, silicon oxide 0.001%, calcium oxide 0.0005%, total RE impurities 0.001% maximum | Yn/t | 5t (+/- 2%) | white powder | 50kg drums | twice weekly |

Rare earths indexes

Average price indexes

In addition to outright prices, the service provides month-to-date and final-month average indexes.

Indexes are calculated by summing the value of published assessments and dividing by the number of assessments published in a given month. The final index value for a given month is the average calculated on the final day of assessment of that month. The report shows the evolution of the current-month index, as well as the final index value for the previous month.

Timing and indexation

Argus Non-Ferrous Markets contains twice-weekly, weekly and monthly assessments. Those assessments are republished in the Argus Database and available electronically for each publication date. For example, a weekly price assessed on Wednesdays will be republished on Thursday and on each subsequent publication date until the next day of assessment, in this example, the following Wednesday.

Users are advised that the published month-to-date and final indexes may differ from those calculated using Argus or third-party tools, because of this daily republication of price assessments.

Indexes are published for:

Cerium

- metal min 99% fob China
- metal min 99.9% fob China
- oxide 99.5-99.9% fob China

Dysprosium

- metal min 99% fob China
- oxide min 99.5% fob China

Europium

- metal min 99.9% fob China
- oxide min 99.99% fob China

Ferro-dysprosium

- min 80% Dy fob China

Gadolinium

- metal min 99% fob China
- oxide min 99.99% fob China
- oxide min 99.999% fob China

Holmium

- oxide min 99.5% fob China

Lanthanum

- metal min 99% fob China
- metal min 99.9% fob China
- oxide 99.5-99.9% fob China
- oxide min 99.999% fob China

Lutetium

- oxide min 99.99% fob China

Mischmetal

- 35% La 65% Ce fob China

Neodymium

- metal min 99% fob China
- oxide 99.5-99.9% fob China

Praseodymium

- metal min 99% fob China
- oxide 99.5-99.9% fob China

Praseodymium-Neodymium

- metal min 99% fob China
- oxide min 99% fob China

Samarium

- metal min 99% fob China
- oxide min 99.5% fob China

Terbium

- metal min 99.9% fob China
- oxide min 99.99% fob China

Ytterbium

- oxide min 99.99% fob China

Yttrium

- metal min 99.9% fob China
- oxide min 99.999% fob China