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## ***ARGUS METALS INTERNATIONAL***

### **Contents:**

Methodology overview	2
Market overview	6
Aluminium	7
Copper and brass	7
Copper TC/RC Index	7
Nickel lead and zinc	7
Nickel and zinc specifications	8
Minor metals	9
Electronic metals specifications	10
Battery metals specifications	12
Light metals specifications	14
Mineral sands specifications	18
High-temperature metals specifications	18
Minor metals scrap	22
Minor metals scrap specifications	23
Minor metals indexes	24
Platinum group metals	25
Ferro-alloys and feedstocks	26
Bulk alloy and feedstock specifications	27
Noble-alloy and feedstock specifications	31
Nickel and stainless steel scrap specifications	34
Ferro-alloys and feedstocks indexes	35
Rare earths	36
Rare earths specifications	37
Rare earths indexes	42

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The most up-to-date Argus Metals International methodology is available on [www.argusmedia.com](http://www.argusmedia.com)

## Methodology overview

### Methodology rationale

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

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

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

### Corrections to assessments

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

### Ethics and compliance

Argus operates according to the best practices in the publishing field, and maintains thorough compliance procedures throughout the firm. We want to be seen as a preferred provider by our 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](http://www.argusmedia.com). Included in this policy are restrictions against staff trading in any energy commodity or energy related stocks, and guidelines for accepting gifts. Argus also has strict policies regarding central archiving of email and instant messenger communication, maintenance and archiving of notes, and archiving of spreadsheets and deal lists used in the price assessment process. Argus publishes prices that report and reflect prevailing levels

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

### Consistency in the assessment process

Argus recognises the need to have judgment consistently applied by reporters covering separate markets, and by reporters replacing existing reporters in the assessment process. In order to ensure this consistency, Argus has developed a programme of training and oversight of reporters. This programme includes:

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

### Review of methodology

The overriding objective of any methodology is to produce price assessments which are reliable and representative indicators of commodity market values and are free from distortion. As a result, Argus editors and reporters are regularly examining our methodologies and are in regular dialogue with the industry in order to ensure that the methodologies are representative of the market being assessed. This process is integral with reporting on a given market. In addition to this ongoing review of methodology, Argus conducts reviews of all of its methodologies and methodology documents on at least an annual basis.

Argus market report editors and management will periodically and as merited initiate reviews of market coverage based on a qualitative analysis that includes measurements of liquidity, visibility of market data, consistency of market data, quality of market data and industry usage of the assessments. Report editors will review:

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

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

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

Should changes, terminations, or initiations be merited, the report editor will submit an internal proposal to management for review and approval. Should changes or terminations of existing 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 Metals International

Argus Metals International 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 Metals International 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

Chinese daily and twice weekly prices are not assessed on public holidays in China, and are uploaded to the Argus database as unchanged. Weekly Chinese price assessments are made the working day before 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 after US public holidays.

Argus Metals International is not published on UK public holidays. A publication schedule is available at [www.argusmedia.com](http://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

Argus Metals International includes weekly aluminium prices republished from Argus Metal Prices.

See the [Argus Metal Prices methodology](#).

### Premiums

- P1020 US midwest premium
- P1020 US midwest spot monthly average
- P1020 US midwest transaction
- 6061 billet US premium
- 6063 billet US premium
- 6063 billet del US transaction
- 6063 extrusion premium delivered Italy
- 6063 extrusion premium delivered Germany
- 6063 extrusion duty paid premium in-warehouse Rotterdam
- P1020 duty paid 3-month premium in-warehouse Rotterdam
- P1020 duty paid forward quarter premium cif Japan
- P1020 duty paid spot premium in-warehouse Rotterdam
- P1020 duty unpaid 3-month premium in-warehouse Rotterdam
- P1020 duty unpaid spot premium in-warehouse Rotterdam
- Aluminium-alloy die castings 12 ADC12 fob China
- Aluminium-alloy die castings 12 ADC12 cif Japan

## Copper and brass

Argus Metals International includes weekly copper and brass prices republished from Argus Metal Prices.

See the [Argus Metal Prices methodology](#).

### Copper cathode premiums

- Cathode grade A del US midwest
- Cathode grade A US midwest transaction
- Cathode grade A in-warehouse Rotterdam
- Cathode grade A premium del southern Europe

### Brass/bronze alloys del US

- C89833
- C89836

## Copper TC/RC Index

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 paid between overseas miners and smelters within China.

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.

The involvement of intermediary traders can affect agreed treatment and refining charges. Information about agreements between miners and intermediary traders may be considered for inclusion in the assessment only after adjustment of the price to a miner-smelter basis based on discussion with the market.

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

## Nickel lead and zinc

### Introduction

Argus Metals International publishes price assessments and market commentary on the international nickel, 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.

Price assessments are for physical material for prompt delivery, defined as delivery within four weeks.

*Note: Zinc premiums are assessed as a differential to the LME official cash price*

### Timing of assessment

Nickel prices are assessed and published weekly, on Thursday, or twice weekly on Tuesday and Thursday.

For European price assessments market information received after 5pm London time on the day of assessment may not be included in the assessment process. For Chinese price assessments, market

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

### 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 \$/t price.

Converted prices are calculated for:

- Nickel sulphate min 22% ex-works China

### Rounding

Price assessments are published to two decimal places. Price changes are shown to three decimal places

Argus Metals International also includes weekly nickel, lead and zinc prices republished from Argus Metal Prices.

See the [Argus Metal Prices methodology](#).

## Nickel

### Europe premiums

- 4x4 inch cathode in-warehouse Rotterdam
- Full plate cathode in-warehouse Rotterdam

### Cathode premiums del US

- 4x4inch (small lots)
- 4x4inch (truckloads)
- 4x4inch (truckloads) transaction
- 1x1inch (small lots)
- 1x1inch (truckloads)

## Zinc

- Special high grade premium in-warehouse Rotterdam
- Special high grade premium del US
- Special high grade del US transaction

## Lead

- Ingot primary 99.97% premium del US
- Ingot primary 99.97% del US transaction

### Nickel and zinc specifications

Assessment	Quality	Minimum lot size	Currency/unit	Assessment frequency	Transacted/transactable	Timing	Delivery
<b>Nickel premiums</b>							
Briquettes in-warehouse Rotterdam	nickel 99.8% minimum, briquette	truckload	\$/t	weekly (Thursday)	on day of assessment	prompt	in-warehouse Rotterdam
<b>Nickel sulphate</b>							
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, sodium 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
<b>Nickel metal</b>							
Metal 99% Ni ex-warehouse, China*	nickel 99.9%, iron 0.5%, carbon 0.1%, sulphur 0.02%, phosphorous 0.02% maximum	1t	Yn/t	twice weekly (Tuesday/Thursday)	on day of assessment	prompt	ex-warehouse, free market

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

\*Subject to VAT – assessed as plates packaged in bundles

## Minor metals

### Introduction

Argus Metals International 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 5pm local time on the day of assessment may not be included in the assessment process. The exception is the cobalt hydroxide min 30% cif China assessment, which has a 5pm London time cut off for market information.

### Rounding

Price assessments are published to two decimal places. Price changes are shown to three decimal places.

Electronic metals specifications									
Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
<b>Arsenic</b>									
min 99% du Rotterdam	arsenic 99% minimum	in-warehouse	Rotterdam	duty unpaid	1t (+/-2%)	lumps	\$/lb	prompt	monthly
min 99% fob US warehouse	arsenic 99% minimum	fob	US	duty paid	1t	lumps	\$/lb	within 30 days	weekly (Tuesday)
<b>Bismuth</b>									
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)
<b>Gallium</b>									
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)
<b>Germanium</b>									
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)
<b>Indium</b>									
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)

\*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
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)
<b>Selenium</b>									
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)
<b>Tantalum</b>									
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% Ta2O5 cif main port (per lb of Ta2O5)	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)
<b>Tellurium</b>									
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)
<b>Zirconium</b>									
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)O2 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 SiO4 0.005% maximum	ex-works	China	no	50t	crystalline powder	Yn/t	prompt	weekly (Tuesday)
Oxychloride 36% Zr(Hf)O2 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 SiO4 0.005% maximum.	fob	China	export duty paid	50t	crystalline powder	\$/t	prompt	weekly (Tuesday)

**Electronic metals specifications**

Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
Silicate 65% Zr(Hf)O <sub>2</sub> 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)
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)

**Battery metals specifications**

Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
<b>Antimony</b>									
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)
<b>Cadmium</b>									
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)

Battery metals specifications									
Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
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)
<b>Cobalt</b>									
(Electrolytic metal) min 99.8% ex-works China	cobalt 99.8% minimum	ex-works	China	no	1t (+/-2%)	cut cathode	Yn/kg	prompt	twice weekly (Tuesday/Thursday)
Chloride min 24% ex-works China	cobalt 24% minimum	ex-works	China	no	1t (+/-2%)	powder	Yn/t	prompt	twice weekly (Tuesday/Thursday)
min 99.8% alloy grade du Rotterdam	cobalt 99.8% minimum	in-warehouse	Rotterdam	duty unpaid	1t (+/-2%)	cut cathode, rounds	\$/lb	prompt	twice weekly (Tuesday/Thursday)
min 99.8% fob US warehouse	cobalt 99.8% minimum	warehouse	US	duty paid	1t min, 20t max	cut or broken cathode, briquette	\$/lb	within 30 days	weekly (Tuesday)
min 99.8% chemical grade du Rotterdam	cobalt 99.8% minimum	in-warehouse	Rotterdam	duty unpaid	1t (+/-2%)	broken cathode, briquettes	\$/lb	prompt	twice weekly (Tuesday/Thursday)
Hydroxide min 30% cif China	cobalt 30-35% minimum	cif	China	duty paid	5t	powder, wet bulk	\$/lb	prompt	weekly (Tuesday)
Oxide 72% ex-works China	cobalt 72% minimum	ex-works	China	no	1t (+/-2%)	powder	Yn/kg	prompt	twice weekly (Tuesday/Thursday)
Powder min 99.8% ex-works China	cobalt 99.8% minimum	ex-works	China	no	1t (+/-2%)	powder	Yn/kg	prompt	twice weekly (Tuesday/Thursday)
Sulphate min 20.5% ex-works China	cobalt 20.5% minimum	ex-works	China	no	1t (+/-2%)	powder	Yn/t	prompt	twice weekly (Tuesday/Thursday)
Sulphate min 20.5% ex-works China (USD/lb, ex-VAT)	cobalt 20.5% minimum	ex-works	China	no	1t (+/-2%)	powder	\$/lb	prompt	twice weekly (Tuesday/Thursday)
Tetroxide min 73% ex-works China	cobalt 73% minimum	ex-works	China	no	1t (+/-2%)	powder	Yn/kg	prompt	twice weekly (Tuesday/Thursday)
<b>Lithium</b>									
Carbonate 99.5% ex-works China	lithium carbonate 99.5% minimum	ex-works	China	inc VAT	1t	powder, packaged in barrel/bag	Yn/t	prompt	twice weekly (Tuesday/Thursday)
Carbonate 99.5% ex-works China (USD/kg, ex-VAT)	lithium carbonate 99.5% minimum	ex-works	China	less VAT	1t	powder, packaged in barrel/bag	\$/kg	prompt	twice weekly (Tuesday/Thursday)
Carbonate 99.5% cif China	lithium carbonate 99.5% minimum	cif	China	duty paid	1t	powder, packaged in barrel/bag	\$/kg	prompt	weekly (Tuesday)
Cobalt oxide min 60% Co ex-works China	cobalt 60% minimum	ex-works	China	no	100kg	powder	Yn/kg	prompt	twice weekly (Tuesday/Thursday)
Hydroxide 56.5% ex-works China	lithium hydroxide monohydrate 56.5% minimum	ex-works	China	inc VAT	1t	powder, packaged in barrel/bag	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
Hydroxide 56.5% ex-works China (USD/kg, ex-VAT)	lithium hydroxide monohydrate 56.5% minimum	ex-works	China	less VAT	1t	powder, packaged in barrel/bag	\$/kg	prompt	twice weekly (Tuesday/Thursday)
Hydroxide 56.5% fob China	lithium hydroxide monohydrate 56.5% minimum	fob	China	duty paid	1t	powder, packaged in barrel/bag	\$/kg	prompt	weekly (Tuesday)
<b>Graphite</b>									
Graphite flake 94% min fob China	carbon 94% minimum (permissible range 94-97%), mesh size -100	fob	China	duty paid	40t	powder	\$/t	prompt	weekly (Tuesday)
Graphite flake 94% min ex-works China	carbon 94% minimum (permissible range 94-97%), mesh size -100	ex-works	China	inc VAT	40t	powder	Yn/t	prompt	weekly (Tuesday)
Graphite flake 94% min ex-works China (USD/t, ex-VAT)	carbon 94% minimum (permissible range 94-97%), mesh size -100	ex-works	China	less VAT	40t	powder	\$/t	prompt	weekly (Tuesday)

**Light metals specifications**

Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
<b>Magnesium</b>									
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

Light metals specifications									
Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
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
<b>Manganese</b>									
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	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
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% alkaline battery grade ex works China	manganese dioxide 91% minimum	ex-works	China	inc VAT	1t	powder	Yn/t	prompt	weekly (Tuesday)
<b>Silicon</b>									
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)

**Light metals specifications**

Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
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 (Thursday)
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 (Thursday)
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 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 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 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 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)
<b>Titanium</b>									
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)

Light metals specifications									
Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
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
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									
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
<b>Rutile</b>									
Hainan rutile min 90% TiO <sub>2</sub> 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 <sub>2</sub> 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)
<b>Zircon sand</b>									
Hainan zircon sand min 65% (Zr.Hf)O <sub>2</sub> 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 <sub>2</sub> 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)
<b>High-temperature metals specifications</b>									
Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
<b>Chromium (alumino-thermic)</b>									
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)
<b>Hafnium</b>									
min 99pc Hf, max 1pc Zr du Rotterdam	hafnium 99% minimum (hafnium + zirconium 99.8% minimum), zirconium 1% 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)
<b>Molybdenum</b>									
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)

**High-temperature metals specifications**

Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
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%, SiO2 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
Molybdenum oxide min 57% Mo dp India (per kg Mo)	Molybdenum 57% minimum, carbon 0.1%, phosphorus 0.05%, S 0.1%, copper 0.5%, lead 0.05% maximum	in-warehouse	India	duty paid		powder	Rs/kg	prompt	twice weekly (Tuesday/Thursday)
<b>Niobium</b>									
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)
<b>Rhenium</b>									
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)

**High-temperature metals specifications**

Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
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
<b>Tungsten</b>									
Ammonium paratungstate (APT) du Rotterdam (per mtu of WO3)	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)

**High-temperature metals specifications**

Assessment	Grade	Basis	Location	Duties/Tariffs	Minimum lot size	Form	Currency /unit	Timing	Assessment frequency
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)
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 WO3 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	\$/dmtu	six weeks	weekly (Tuesday)
<b>Vanadium</b>									
Pentoxide fused flake min 98% du Rotterdam (per lb of V2O5)	vanadium pentoxide 98% minimum; silicon 0.25%, iron 0.3%, sulphur 0.03%, phosphorus 0.05%, arsenic 0.02%, and Na2+K2O 1.5% maximum	in-warehouse	Rotterdam	duty unpaid	10t (+/-2%)	brown flakes 55x55x5mm	\$/lb	prompt	twice weekly
Pentoxide 98% V2O5 ex-works China	vanadium pentoxide 98% minimum	ex-works	China	no	10t (+/-5%)	flakes	Yn/t	prompt	daily
Pentoxide 98% V2O5 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

## Minor metals scrap

### Introduction

Argus Metals International 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 5pm 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
<b>Molybdenum</b>									
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
<b>Niobium</b>									
(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
<b>Tantalum</b>									
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)
<b>Titanium</b>									
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 (Tuesday)
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 (Tuesday)
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 (Tuesday)
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 (Tuesday)
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 (Tuesday)
6Al 4V turnings aero quality del US dealer/processor	titanium 90%, aluminium 6%, vanadium 4%; turnings, unprocessed, 3% allowed oil/moisture/magnetics	delivered	US	duty paid	3,000lb	turnings	\$/lb	within 30 days	weekly (Tuesday)
<b>Tungsten</b>									
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 Metals International 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% Ta<sub>2</sub>O<sub>5</sub> du Rotterdam
- Min 99.8% du Rotterdam

#### Tellurium

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

#### Zirconium

- Oxychloride 36% Zr(Hf)O<sub>2</sub> 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

#### 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

### 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 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 ddp Europe works
- 3-3-0-3 min 99% Si fob China
- 3-3-0-3 min 99% Si dat Chinese ports
- 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 dealer/processor

## High-temperature metals

### Chromium

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

### Hafnium

- Min 99% max 1% Zr du Rotterdam

### 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 Metals International 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
99.9% fob US warehouse	ruthenium 99.9% minimum	fob warehouse	US	duty paid	250 ozt (troy ounces)	sponge or powder	\$/ozt	delivered within 30 days	weekly (Tuesday)

## Ferro-alloys and feedstocks

### Introduction

Argus Metals International 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 5pm 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.

### Rounding

Price assessments are published to two decimal places. Price changes are shown to three decimal places

Bulk alloy and feedstock specifications									
Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
<b>Ferro-chrome</b>									
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% Cr 6-8% C ddp NWE, \$/lb Cr	Chromium 60% minimum, carbon 6-8%, silicon 1.5%, phosphorous 0.05% max, and sulphur 0.06% maximum	ddp NWE	duty paid	100t (+/- 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%, phosphorous 0.03%, 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%, phosphorous 0.03%, 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	weekly (Thursday)
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
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)

Bulk alloy and feedstock specifications									
Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
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)
<b>Chrome ore</b>									
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
<b>Ferro-manganese</b>									
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)
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	twice weekly (Tuesday/Thursday)
HC min 80% Mn 6-8% C fob North America warehouse	Manganese 80% minimum, carbon 6-8% maximum	fob North America	duty paid	20-100t	\$/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	weekly (Thursday)

Bulk alloy and feedstock specifications									
Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
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)
<b>Manganese</b>									
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	\$/dmtu (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	\$/dmtu (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	\$/dmtu (dry metric tonne unit)	5-75mm	bulk	within six weeks	weekly (Thursday)
<b>Silico-manganese</b>									
65% Mn ddp Europe works, €/t	Manganese 65%, silicon 17% minimum, carbon 2%, phosphorous 0.25%, sulphur 0.03% maximum	ddp Europe	duty paid	100t	€/t	lump	big bags of 1t, bulk	prompt	twice weekly (Tuesday/Thursday)
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)

Bulk alloy and feedstock specifications									
Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
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	20-24t / 25t	€/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,	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)
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)

**Bulk alloy and feedstock specifications**

Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
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
<b>Ferro-boron</b>									
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	weekly (Thursday)
<b>Ferro-molybdenum</b>									
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)
<b>Ferro-niobium</b>									
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)

Noble-alloy and feedstock specifications									
Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
<b>Ferro-tungsten</b>									
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	truckload	\$/lb	lump	drums, bulk	within 30 days	weekly (Thursday)
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)
<b>Ferro-titanium</b>									
Russian min 70% Ti du Rotterdam, \$/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	du Rotterdam	duty unpaid	24t (+/- 2%)	\$/kg	lump	big bags, drums	prompt	twice weekly (Tuesday/Thursday)
70% Ti dp/duty-free Rotterdam, \$/kg Ti	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	dp/df Rotterdam	duty-free/duty-paid	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)

Noble-alloy and feedstock specifications									
Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
<b>Titanium</b>									
Turnings 90/6/4 max 0.5% Sn ddp UK	Titanium 90/6/4 alloy (Titanium minimum 90%, aluminium 6%, vanadium 4%) tin 0.5% maximum, degreased	ddp UK	duty paid	20t	\$/lb	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)
<b>Ferro-vanadium</b>									
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
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

Nickel and stainless steel scrap specifications									
Alloy	Grade	Basis	Duties/Tariffs	Minimum lot size	Currency/unit	Form	Packaging	Timing	Assessment
<b>Nickel</b>									
Ore 1.8pc Ni fca China, Yn/wmt	Nickel 1.8%, moisture 35% maximum	fca China	VAT	10,000t	Yn/wet metric tonne	mud	bulk	prompt	twice weekly (Tuesday/Thursday)
Pig iron 10pc Ni ex-works China, Yn/mtu	Nickel 10% minimum, iron 10-15%, phosphorous 0.8% <sub>m</sub> , sulphur 0.6% maximum	ex-works China	VAT	100t	Yn/metric tonne unit	lump	big bags	prompt	twice weekly (Tuesday/Thursday)
<b>Secondary</b>									
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
<b>Stainless steel scrap</b>									
Scrap 304 (18-8) scrap solids cif Rotterdam (\$/lb)	See the <a href="#">Argus Metal Prices methodology</a>								
Scrap 304 (18-8) scrap solids cif Rotterdam (€/t)	See the <a href="#">Argus Metal Prices methodology</a>								
Stainless steel 304 (18-8) scrap solids cif Japan	See the <a href="#">Argus Metal Prices methodology</a>								
Stainless steel 304 (18-8) scrap solids cit South Korea	See the <a href="#">Argus Metal Prices methodology</a>								
Stainless steel 304 (18-8) scrap solids cif Taiwan	See the <a href="#">Argus Metal Prices methodology</a>								
Stainless steel 409/410 scrap solids del US processor	See the <a href="#">Argus Metal Prices methodology</a>								
Stainless steel 430 scrap solids del US processor	See the <a href="#">Argus Metal Prices methodology</a>								

## 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 Metals International 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 du Rotterdam
- 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 Metals International 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.

Price assessments are compiled by 6pm UK time and typically published by 8pm UK time.

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 are assessed to two decimal places in either yuan/t (Yn/t), yuan/kg (Yn/kg) or in US dollars/kg (\$/kg).

Rare earths specifications						
China export and delivered Europe						
Element	Grade	Currency/ unit	Minimum lot size	Form	Packaging	Frequency
<b>Cerium</b>						
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
<b>Dysprosium</b>						
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
<b>Europium</b>						
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	Twice 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	Twice monthly
<b>Erbium</b>						
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
<b>Ferro-dysprosium</b>						
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
<b>Gadolinium</b>						
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	Weekly
<b>Holmium</b>						
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

<b>Lanthanum</b>							
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%, cuprum 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	
<b>Lutetium</b>							
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	
<b>Mischmetal</b>							
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	Twice 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	
<b>Neodymium</b>							
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	
<b>Praseodymium</b>							
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	
<b>Praseodymium-neodymium</b>							
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	
<b>Samarium</b>							
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 monthly	
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 monthly	
<b>Terbium</b>							
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
<b>Ytterbium</b>						
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
<b>Yttrium</b>						
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
<b>China domestic ex-works</b>						
<b>Element</b>	<b>Grade</b>	<b>Currency/ unit</b>	<b>Minimum lot size</b>	<b>Form</b>	<b>Packaging</b>	<b>Frequency</b>
<b>Cerium</b>						
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
<b>Dysprosium</b>						
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
<b>Erbium</b>						
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
<b>Europium</b>						
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	Twice monthly
<b>Ferro-dysprosium</b>						
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
<b>Ferro-gadolinium</b>						
Gd 75% min ex-works China	Gadolinium 75%, iron 24% minimum; carbon 0.04% maximum	Yn/t	1t (+/-2%)	ingots	250kg drums	Daily
<b>Gadolinium</b>						
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
<b>Holmium</b>						
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
<b>Lanthanum</b>						
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
<b>Lutetium</b>						
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
<b>Mischmetal</b>						
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	Twice 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
<b>Neodymium</b>						
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
<b>Praseodymium</b>						
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
<b>Praseodymium-neodymium</b>						
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
<b>Samarium</b>						
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 monthly
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 monthly

**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
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**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

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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