

Cobalt



Methodology and price
specifications – September 2021

Mission statement

Fastmarkets Metals and Mining is the leading global provider of pricing intelligence for the non-ferrous metal, steel, steelmaking raw materials, industrial minerals, ferrous and non-ferrous scrap markets, producing price assessments with Fastmarkets MB and Fastmarkets AMM since 1913 and 1882 respectively. Fastmarkets Forest Products meanwhile is the leading global provider of pricing intelligence for the global forest products industry, incorporating Fastmarkets RISI, Fastmarkets FOEX and Random Lengths.

Our mission is to meet the market's data requirements honestly and independently, acting with integrity and care to ensure that the trust and confidence placed in the reliability of our pricing methodologies is maintained. We do not have a vested interest in the markets on which we report.

Introduction

Fastmarkets' reporters are required to abide by a **code of conduct** and clear pricing procedures during their market reporting and pricing activities. Fastmarkets is completely independent and has no vested commercial interest in any of the markets it prices.

We are the world's largest dedicated price reporting teams for both metals and forest products. We have offices in London, New York, Boston, San Francisco, Eugene, Charlottesville, Atlanta, Pittsburgh, Beijing, Shanghai, Hong Kong, Singapore, Melbourne, Sao Paolo, Mumbai, Brussels, Helsinki, Dnipro and Istanbul. The aim of this document is to provide a clear overview of Fastmarkets' methodology and specifications for the prices it assesses. If you have any questions, please contact Fastmarkets Editorial Director Alex Harrison at aharrison@fastmarkets.com for metals, or Fastmarkets Forest Products' Senior VP of Indices, Matt Graves, at mgraves@fastmarkets.com for forest products.

Price discovery and methodology

Methodology rationale

Fastmarkets produces independent, fair and representative price assessments and indices of metals and forest products prices on a daily, bi-weekly, weekly, monthly or quarterly basis. Fastmarkets' rationale for adopting the price-discovery process described in this methodology document is to produce consistent and representative indicators of value for the cobalt markets over defined trading periods.

Assessment objective

The assessor's intended aim is to reflect Fastmarkets' assessment price definition:

'The prevailing level at which a commodity of stated specification has or could be expected to have transacted over a defined period of time.'

We summarize this for effective use as the prevailing 'tradeable level' of the market.

Time window

The time windows for cobalt - daily for standard and alloy-grade metal in Rotterdam, and twice weekly for cobalt hydroxide, sulfate, tetroxide and metal in China - were determined after considering the number of data points that Fastmarkets can reasonably expect to collect on a consistent basis over the selected period to support the price assessment process, ensuring that the assessments produced are reliable indicators for the physical markets they relate to.

Fastmarkets' cobalt standard grade and cobalt alloy grade price assessments are published daily at 3pm London time. Other assessments for metal in China, sulfate, tetroxide and hydroxide will also be published between 2pm and 3pm London time. The deadline for data submission is 2pm London time. Data received after this time will not be included in the price assessment.

The data collection window runs from the time of publication of the last price assessment to 2pm on the day of the next assessment. Only data points communicated to Fastmarkets MB within the data collection window will be included in the price discovery process. The published prices are reflective of the levels seen during this stated collection period.

Data contribution

Fastmarkets reporters aim to collect data from a

broad sample of market participants actively involved in the physical cobalt spot markets, with a good representation of both sides of the market, including producers and consumers, as well as traders and intermediaries.

Data is collected from industry participants directly involved in the market primarily by telephone but also by email, digital messaging, face-to-face interaction or by direct submission. All data supplied to Fastmarkets is kept confidential and stored in our secure online pricing database system MInD (Market Information Database). Fastmarkets may sign a Data Submitter Agreement (DSA) with any data provider, if requested to do so, to maximize the number of data points collected for inclusion in the assessment process. Any data received subject to a DSA will be used in the pricing assessment but will not be commented on.

Market participants may contribute data following a review by Fastmarkets of their activities. The aim is to ensure that submitters have sufficient visibility and understanding of the market in question to be able to provide reliable price data. We expect that data submitters taking part in the pricing process are authorized to report market data on behalf of their organizations. Fastmarkets encourages organizations to submit all their pricing data, especially all the concluded transactions. Price reporters generally speak to, and collect data from, front office staff directly involved in the commercial activity of buying and selling. Fastmarkets also welcomes organizations to submit transaction data from authorized back-office functions. Fastmarkets' Data Submitter Policy provides guidelines to ensure the high level of data quality and integrity we expect from contributing organizations providing pricing data. The policy can be found on Fastmarkets' website, or is available on request.

Depending on market liquidity, Fastmarkets reserves the right to also base its prices on bids, offers, deals heard and market participant indications of prevailing tradeable values or other indications such as trigger prices that might prompt a sale or purchase.

Price specifications and reference units

Fastmarkets has clear specifications for all the price points that it covers. All the reference units, such as currency and volume, are in line with the trading conventions used in the recognized metals and forest products markets.

Fastmarkets has defined clear specifications for its cobalt assessments, as outlined below, to match the industry standard. These specifications have been determined in consultation with market participants and are regularly reviewed. All the reference units, such as currencies and volumes used in the assessments, are in line with recognized cobalt market conventions and trading practices. The specifications also have a published minimum volume size accepted.

Fastmarkets aims to collect full details of each transaction, bid and offer, including brand, commercial terms and any other details relevant to value and pricing. Reporters ensure that the information they receive meet the specifications or can be normalized to them. Any data that does not fall within the stated quality ranges of the specification will not be eligible for consideration in the assessment.

Data analysis and producing the price assessment

Establishing a data hierarchy

Once data collection is complete, Fastmarkets reviews the data points applying its methodology and its expert judgement to set the price range to reflect the representative spread of prices at which business has been transacted, offered or bid, or indicated in the absence of business.

To produce the price assessment, a consideration hierarchy is established based on an evaluation of first, the reporter's confidence in the data's reliability, and second, the significance of the data.

The confidence level, or trustworthiness, of a data point is generally based on the transparency of the activity, whether it was reported by a party directly involved or was 'heard' activity, corroboration by other market participants and the level of detail provided

by the data submitter, although there may be other contributory factors.

For indications of tradeable levels or other indication of willingness to sell or purchase, confidence may be determined based on the justification provided by the submitter, their visibility and activity level in the market, and their prior reliability.

The significance of a data point is determined based on its effectiveness in identifying the tradeable level of the market under assessment. Transactions are considered highest in the significance hierarchy, 'tight' bids/offers are of secondary importance, followed by data sources' own indications of a tradeable level when they have no business to report. Tight bids/offers are typically defined as those being within the range of transaction and/or indication data points, thereby helping narrow our assessment of the tradeable range. More speculative bids/offers, outside of the range of other data, would typically be of lowest significance. In some circumstances, firm bids higher than transactions or offers lower than transactions may be considered of high significance if deemed to demonstrate a clear directional change in market floor or ceiling levels.

The published assessment will typically be reflective of the highest-confidence and highest-significance data collected in that pricing session.

In pricing sessions with little or no data of sufficient quality, extra caution will be applied, and reporters may exercise their judgment to keep a price assessment unchanged as a fallback until activity can be confirmed with greater certainty.

All Fastmarkets price specifications define the minimum lot size accepted. When volume information is available, this is also taken into consideration in the assessment process. As a general rule, larger deals may typically be considered more significant, but Fastmarkets also tries to ascertain what sort of price differential different lot sizes might carry.

Fastmarkets will also compare the information received from a single source with the information provided by the same source in the previous pricing cycle. This way, if a source consistently gives lower or higher indications than the consensus, Fastmarkets can still use the data for directional context without it unduly influencing the assessment.

Normalization

Where necessary in certain assessments, data that falls

within the stated specification ranges for consideration may be normalized to determine the equivalent price for the respective base specification if one exists. This may include, for instance, variances in material type or quality, delivery terms of location, payment terms or cargo size.

A typical example is a data point that is adjusted due to Incoterms (International Commercial Terms) being different from Fastmarkets' specifications. For example, a data contributor will report a transaction done with a cobalt consumer on a delivered basis, as opposed to the in-warehouse incoterm specified in Fastmarkets' methodology for cobalt standard grade or alloy grade. In which case Fastmarkets will normalize the transaction's value by subtracting the cost of moving material from inside a warehouse to the consumer. To calculate that cost, Fastmarkets will ask the data contributor to net back the transaction to an in-warehouse basis as well as using its own cost estimate, which is regularly assessed and reviewed by its dedicated price reporters. Fastmarkets reserves the right to exercise editorial judgment to net transactions back to typical commercial terms.

Another example is a price that is either net-back or net-forward due to payment terms different from Fastmarkets' specifications. Payment terms are based on typical commercial practice in the cobalt spot market. Transactions that are conducted on different payment or credit terms can be normalized, taking into account discounts, interest rates and standard commercial terms.

Fastmarkets will apply editorial judgment to determine whether payment terms reported for specific deals match typical commercial terms and adjust the normalization accordingly.

Full details of data inputs prior and post normalization are stored in Fastmarkets' electronic database MInD and may be accessed at any time for internal review and auditing purposes.

Where prices cannot be normalized with sufficient confidence or precision, such data may be discarded from the assessment. Fastmarkets' aim is to balance the requirement to keep assessments reflective of their base specifications with the need to source a sufficiently robust data set for consideration.

Minimum data threshold

In order to provide a representative price for the market, the price reporter aims to collect as many representative

data points as possible within the defined window. Since commodity markets differ in liquidity levels at different periods, the methodology does not set any minimum number, or threshold, of transactions to be gathered on which to base the assessment. A pricing session typically includes concluded transactions, bids and offers, contributors' market indications or deals heard.

In each pricing session, reporters aim to source data from a suitably diverse set of participants from a cross section of the market (producers, consumers, traders). In the unlikely situation that more than half of the pricing data collected in a session is provided by a single source, the assessor may refer to data collected in the previous pricing session to avoid a dependency on a single entity providing an unacceptably significant (50% or more) proportion of data.

Criteria for discarding pricing data and the removal of outliers

Fastmarkets price assessments are intended to reflect the 'open and competitive' market level. Reporters therefore may apply expert judgment to exclude data deemed unrepresentative, questionable or unreliable prior to consideration in the final assessment. Data that falls outside of the respective assessment specifications, or which cannot be normalized to a base specification with sufficient confidence, is also discarded. Decisions to discard data points are recorded in the form of a written rationale in our internal pricing database, where they are reviewed and approved under the two-tier peer review process.

Data may be discarded as outliers based on the identification of external factors that may be distorting the price. Price-affecting side terms, inconsistencies in information reported, or suspected motivation to unfairly influence the price discovery process would typically be grounds for removal of data, as would activity not considered to have taken place at 'arm's length'. Outliers will be investigated; more detail may be requested to determine possible reasons behind an anomalous price, and efforts will be made to identify the counterparty to cross-verify information. Suspected attempts to influence the assessment unfairly may result in the data provider being warned or excluded. Fastmarkets reserves the right to see contracts and signed paperwork before inclusion of the data in the assessment. If this is refused, the data supplied may be excluded from the assessment process.

Data publication

Peer review process

All Fastmarkets' price assessments are set by a first reporter who covers that specific market, peer reviewed by a second reporter, and always signed-off by a senior reporter or editor prior to publication. This peer review process, which takes place in Fastmarkets' MInD system and is fully auditable, is in place to make sure that pricing procedures and methodologies are correctly and consistently applied and to ensure integrity and quality of the published prices. Relevant information, including all price inputs and editorial judgements, are securely retained in MInD for at least five years to maintain a full audit trail. Price reporters are formally trained in the price discovery process and must abide by a written Code of Conduct and Pricing Procedures.

For certain prices Fastmarkets also publishes pricing rationales to explain the assessment, describing why a particular price or range was determined based on the market information collected. These notes explain for instance whether any data has been excluded and why, information on the data collected and whether fallback procedures have been applied.

Publication

At the end of the peer review process, Fastmarkets MB and AMM publish their price assessments via MInD and on the Fastmarkets Dashboard and on product-specific websites and in the Price Book. Fastmarkets RISI, FOEX and Random Lengths publish their price assessments on the Intelligence Center, mobile app and in dedicated newsletters.

The cobalt assessments are reported as a range, which reflects where the bulk of the business has been or is likely to have been concluded over the quotation period.

To enhance market transparency and to provide evidence of data inputs that support the price discovery process, Fastmarkets may publish trade logs for its Cobalt price assessments (while maintaining full counterparty confidentiality) detailing pricing data and volumes received from data contributors.

Fastmarkets' cobalt standard grade and cobalt alloy grade price assessments are published daily at 3pm London time. Other assessments for metal in China, sulfate, tetroxide and hydroxide will be published between 2pm and 3pm London time.

Price assessments that are due to be published on UK or China public holidays will be rolled over. In addition,

price assessments that are due to be published between December 25 and January 1, inclusive, in the UK, will be rolled over due to office closures.

Please refer to the [pricing holiday schedule](#) for this year's public holidays.

Corrections and delays

If an assessment is published incorrectly, it will be rectified and republished as soon as possible. A pricing notice explaining the reasons for the correction will also be published promptly.

Fastmarkets uses several procedures and measures to avoid delays in the publication of its assessments. In the event of a delay, however, Fastmarkets will inform subscribers as soon as possible.

In the event of late publication, only data that has been received within the correct standard timeframe will be included in the assessment. No assessment will be amended due to the emergence of new data or market activity after the initial publication. Retrospective changes to the published values will only be made in cases of technical, administrative or interpretation error in line with Fastmarkets' Correction Policy.

Methodology and price specification review process

Methodology review and pricing notices

Fastmarkets aims to continually develop and periodically review its methodologies in consultation with industry participants, with the objective to adopt product specifications, trading terms and conditions that reflect and are representative of typical working practices in the industries it serves.

Fastmarkets carries out a formal review and approval of its methodology and price specifications on an annual basis. The process is initiated by Fastmarkets publishing on its website an open consultation at least one month (or around 20 working days) before the annual methodology review is due, inviting market feedback over the duration of that period. The timeframe for the consultation and method of submission are both clearly stated.

Following a review of market participants' feedback,

comments and suggestions, Fastmarkets concludes the consultation by publishing a notice stating whether or not any methodology changes are proposed. If suggested, changes are classified either as 'material' or 'immaterial'. Material changes are those that, once implemented, may result in fundamental changes to the published price. These include specification changes or structural changes to assessments. Immaterial changes are those that will not result in a different price level once they are implemented.

If a material change to the methodology is required, Fastmarkets includes in its pricing notice: the outline of the proposed change; the rationale or motivation for proposing such a change; and a proposed timetable for the date on which, if the change goes ahead, it would be implemented. If received feedback is considered insufficient to support a material change, Fastmarkets publishes a new notice extending the consultation and inviting comments on the new proposal.

A record of the methodology review is sent to the Risk & Compliance team. All comments received from the market are assumed to be confidential and are treated as such unless stated otherwise.

When Fastmarkets proposes a change to the methodology, it should be understood that no decision has yet been made and that the proposal to make a change should not automatically be understood as confirmation that the change will happen.

For prices subject to EU Benchmark Regulation (BMR), any change to the methodology requires approval from the Managing Director of our benchmark administrator, Fastmarkets Benchmark Administration Oy.

Outside of the formal methodology review process, editors may from time to time suggest changes or additions to reflect market developments. As with the formal review, changes to the existing methodology will either be classed as 'material' or 'immaterial'. The process for implementing the change will be the same as outlined above for formal reviews. The minimum duration of one month (or around 20 working days) for the consultation process normally provides market participants sufficient opportunity to analyze and comment on the impact of the proposed change.

For more details on the formal review of the methodology and the consultation process to propose changes to the methodology, refer to Fastmarkets' [Methodology Review and Change Consultation Process](#) available on the Fastmarkets website.

Queries and complaints

Fastmarkets encourages engagement from the market on its pricing principles and methodology. The company promotes understanding of its pricing procedures and is committed to responding to requests for further information and clarification on a timely basis.

There are multiple channels for interaction with the pricing team including email, telephone and instant messenger services.

If a subscriber has an issue with the published prices, then they may contact the pricing team. In the event that the response is not satisfactory the issue may be escalated to the internal compliance department. For more details refer to Fastmarkets' [Complaint Handling Policy](#) available on Fastmarkets' website.

Fastmarkets takes all queries and complaints seriously and will seek to provide an explanation of the prices wherever possible. It is important to note, however, that input data remain confidential and cannot be provided to third parties.

Become a contributor to the price discovery process

Fastmarkets continually seeks to increase the number of market sources willing to take part in the price discovery process. The main condition Fastmarkets requires from contributors is for them to be active participants in the relevant market being priced.

Fastmarkets MB's [Data Submitter Policy](#) provides guidelines defining the high level of data quality and integrity that Fastmarkets expects from contributing organizations providing pricing data. Market participants that wish to provide pricing data and be part of the price discovery process should first read the Data Submitter Policy available on the Fastmarkets website. The Policy is communicated to all data submitters at least on an annual basis.

All data sources are subject to review before their data submitted is fully taken into account in the pricing process. Our Contributor Approval Policy (CAP) requires

this review or probation period to last no more than three months. The aim is to make sure that submitters are trustworthy and have sufficient visibility and understanding of the market to be able to provide viable price data.

Specifications

Cobalt metal

EUROPE

MB-CO-0004	Cobalt alloy grade, in-whs Rotterdam, \$/lb
Quality:	Min 99.8% cobalt metal; standard specifications of the following brands in original packaging: Nikkelverk cut cathodes, Vale cobalt rounds, SMM cut cathodes, Jinchuan cut cathodes, Jiangsu (KLK) broken cathodes, Sherritt briquettes
Quantity:	Minimum 1 tonne, maximum 100 tonnes
Location:	In-warehouse Rotterdam
Timing:	Within 30 days, other terms normalized
Unit:	US\$ per lb
Payment terms:	Cash; other terms normalized
Publication:	Daily, Monday to Friday, 3pm London time
MB-CO-0005	Cobalt standard grade, in-whs Rotterdam, \$/lb
Quality:	Min 99.8% cobalt metal; standard specifications of the following brands in original packaging: Katanga cathodes, Chambishi broken cathodes, CTT broken cathodes, Minara briquettes, Ambatovy briquettes, Norilsk grade 1 and grade 2 cut cathodes (production since January 2019)
Quantity:	Minimum 1 tonne, maximum 100 tonnes
Location:	In-warehouse Rotterdam
Timing:	Within 30 days, other terms normalized
Unit:	US\$ per lb
Payment terms:	Cash; other terms normalized
Publication:	Daily, Monday to Friday, 3pm London time

** Fastmarkets MB began daily publication of its standard and alloy grade cobalt price assessments in February 2020, following a formal consultation in October and November 2019. Prices were published twice a week, on Wednesdays and Fridays, until that time.*

Fastmarkets MB changed the names of its benchmark in-warehouse Rotterdam assessments in January 2019. From January 2019, the name 'standard-grade' replaced the name 'low-grade'. The name 'alloy-grade' replaced the name 'high-grade'.

CHINA
MB-CO-0001 Cobalt metal min 99.8% domestic China CNY/tonne

Quality: Cobalt metal, Co 99.8% min, cathode
 Quantity: Min 1 tonne
 Location: Ex-works China
 Unit: CNY/tonne
 Payment terms: Cash
 Publication: Twice weekly. Wednesday and Friday, between 2pm and 3pm London time

Cobalt sulfate

CHINA
MB-CO-0017 Cobalt sulfate 20.5% Co basis, exw China, yuan/tonne

Quality: Crystal; feed from cobalt ores & concentrates, cobalt intermediates, such as crude cobalt hydroxide (materials produced from cobalt scrap are excluded); chemical spec: Co: 20.5% min, Ni: 0.001% max, Cu: 0.001% max, Fe: 0.001% max, Zn: 0.001% max
 Quantity: Min 1 tonne
 Location: Ex-works China
 Timing: Within 30 days
 Unit: CNY/tonne
 Payment terms: On bank acceptance (other payments normalized)
 Publication: Twice weekly. Wednesday and Friday, between 2pm and 3pm London time

Cobalt tetroxide

CHINA
MB-CO-0012 Cobalt tetroxide 72.6% Co min, delivered China, yuan/tonne

Quality: min 72.6% Co
 Quantity: Min 1 tonne
 Location: Delivered China
 Unit: CNY/tonne
 Payment terms: Cash
 Publication: Twice weekly. Wednesday and Friday, between 2pm and 3pm London time

Cobalt hydroxide

CHINA
MB-CO-0021 Cobalt hydroxide payable indicator, min 30% Co, cif China, % payable of Fastmarkets' standard-grade cobalt price (low-end)

Quality: Units produced from large-scale mining activity, with the following chemical composition: Co 30% min, Mn 6.5% max, Mg 6.5% max, S 5% max; Cd 100ppm max; limited concentration of natural radioactivity: GB20664-2006 (suitable for customs clearance into China).
 Quantity: Min 50 tonnes (cobalt content)
 Location: cif China (other terms normalized)
 Timing: 45 days
 Unit: % payable of Fastmarkets' standard-grade cobalt price (low end, \$/lb)
 Payment terms: Letter of credit at sight, current and following price month ('M' and 'M+1')
 Publication: Twice weekly, Wednesday and Friday, between 2pm and 3pm London time.
 Notes: Where the publication day falls on a public holiday in China, the assessment will be rolled over from previous pricing session.

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Your investment actions should be solely based upon your own decisions and research and appropriate independent advice should be obtained from a suitably qualified independent adviser before any such decision is made.