

# Shanghai Metals Market Price Assessment Methodology

## Spot Didymium Oxide

Spot didymium oxide prices  
Last consultation date: April 8, 2021  
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### 1. Guidelines to SMM price assessment methodology

Shanghai Metals Market ("SMM") is an independent service provider that does not participate in trades. SMM is a market observer that engages buyers and sellers in the commodities market. By consulting with industry independent participants, SMM drafts the methodology, examines and revises it regularly based on the specifications and terms of trade that are generally used in the market, with equal weighting given to transactions that meet the standards. SMM reserves the right to exclude any unreliable or unrepresentative price data from its price assessment, in line with this methodology and other related Benchmark governance policies and procedures. SMM believes the processes and procedures documented in their Methodologies represent the most accurate way of representing the underlying economic reality of the markets each Benchmark seeks to measure.

SMM price assessments refer to metals spot prices or price indices of both the Chinese and overseas markets reported by SMM on a daily basis. All SMM prices are published according to a set of defined methodologies, indicating how the prices are accessed and reported. These methodologies are published on our website [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese) or for all market participants to understand and refer to.

To reflect the actual trades in the spot market, SMM will update the methodology for SMM price assessments and publish all the revisions on our website [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese) 28 days ahead of the changes. For queries or suggestions on the methodology, please contact SMM customer services (please find contact information on the SMM official websites). **Please read this paragraph in conjunction with the SMM methodology review and changes policy, and the SMM Complaint Policy available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

This document specifies the standards and management methods for the SMM didymium oxide spot price assessment. These standards are formulated to establish a transparent and verifiable SMM price setting mechanism and provide market participants with an important pricing indicator.

## 2. Guidelines to SMM didymium oxide spot prices

### 2.1 Definition

The SMM didymium oxide spot price is assessed and reported based on the methodology defined in this document. As a benchmark, it can be referred to by both parties of a didymium oxide spot transaction for price settlement. The prices reflect the most tradable levels of spot didymium oxide, ex-works, at the time of publication on each complete trading day. The prices are assessed based on spot transactions that happened nationwide, including transportation costs and taxes.

### 2.2 Introduction of price assessment

SMM collects data information used to evaluate the spot price of didymium oxide by means of standard acquisition (that is, the collection of raw data information that complies with the SMM Data Standards Policy), from certain price submitters. Collected data include the bids and offers from the buyer and seller that were not traded on the same day, and the actually traded price of spot transaction provided by the price submitters. The amount of each transaction that can be deemed as the standard didymium oxide quote or transaction in the price collection will be not less than 1 mt. Data collection, assessment (calculation) and daily management of SMM didymium oxide spot prices are conducted by SMM didymium oxide operational team (consists of 2 price analysts and a price manager).

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**Please read this paragraph with the SMM Benchmark Guidelines on Hierarchy of Data Inputs available at available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

### 2.3 Source of raw price data

#### 2.3.1 Collecting from price data submitters

Please note that the following standards and procedures need to be read together with the **For more information, please refer to the Submitter Exclusion or Inclusion policy available at available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

##### 2.3.1.1 Criteria for price data submitters

SMM will select representative market participants from the industry chain as targeted price submitters for SMM didymium oxide spot price assessment (data providers include smelters, traders, downstream users and other related units).

SMM will take reasonable care to determine and verify the authenticity and reliability of price provider. The procedure SMM adopts is designed to minimise the risk of using any abnormal price data and oppose any manipulation of the

Benchmark.

The SMM policy includes, but is not limited to, steps to take as follows:

- Collect relevant public domain documents (such as business licenses) for each price submitter and verify the authenticity of the documents.
- Ensure that each price submitter engages in the transaction, procurement, sales or production of didymium oxide industry chain.
- Ensure that each employee designated as the contact person of the price submitter can have direct access to relevant data in the company, and have the necessary authority and ability to submit the data to the price analyst of SMM in a timely manner and in accordance with the SMM Benchmark Submitter Code of Conduct.
- Invite other reputable market participants to help verify the credibility of price submitters.

#### **2.3.1.1.1 Criteria for smelters**

- Smelters should be one of the six state-owned groups or their subsidiaries; conduct standardised transactions smoothly across channels with stable sales performance; possess operational integrity, and enjoy good reputation in the market, in the view of SMM.
- Smelters should provide objective and honest feedback on their didymium oxide production and sales, including output, operating rate, quality of the product, sales price, sales volume, buyers and inventory, and be able to engage with SMM Operational Teams in accordance with the SMM Benchmark Submitter Code of Conduct.
- Smelters should have a sound understanding of and insight into the macro economy, spot market situation and trades of the didymium oxide market, and be able to engage with SMM Operational Teams in accordance with the SMM Benchmark Submitter Code of Conduct.

#### **2.3.1.2 Formation and adjustment of the price submitter list**

SMM selects price contributing companies based on the above criteria to produce a stable list. SMM signs a formal agreement with each price contributing company to ensure the accuracy and timeliness of the data provided as well as protect confidential information of the price submitter.

SMM delegates specific price analysts to collect transaction data and data related market information from price submitters. SMM will continue to evaluate every price submitter based on criteria above and make amendments to the lists for price contributing companies based on the results of evaluations. When a company fails to meet the criteria, it would be required to rectify within a limited period. If it refuses to rectify or fails to meet the criteria after within 30 days from the date of issue of the rectification notice, SMM will revoke its qualification for price contributing companies.

The updated list of SMM didymium oxide spot price contributing companies is as follows:

<b>Market Participant</b>	<b>Company</b>
Smelter	Baogang Rare Earth International Trade Co., Ltd
Smelter	Gansu Rare Earth New Material Limited-liability Company
Smelter	Baotou Huamei Rare Earth Technology Co., Ltd
Smelter	Leshan Shenghe Rare Earth Co., Ltd
Smelter	Jiangsu Guosheng New Material Co., Ltd
Smelter	Sichuan JCC Rare Earth Metals Co., Ltd
Smelter	China Minmetals Corporation
Smelter	Fujian Changting Golden Dragon Rare Earth Co., Ltd

Note: SMM will amend the list based on the selection criteria in this document. Data providers will not receive incentives, rewards or benefits from SMM for providing data, but they may have free subscription of SMM.

### **2.3.1.3 Process of price data collection**

SMM's Operational Teams will collect didymium oxide spot transaction data from price submitters by means of phone, fax, email, QQ, WeChat and other forms of communication between 10:30 -11:15 China Standard Time ("CST") on every trading day. (Price data that are submitted after 11:15 CST will not be included in price assessment on the day, while data that does not contain the required minimum information details will not be included either, even if the data are submitted before the deadline)

The data will include traded prices within the day, and the most likely traded prices, bids and offers. All communication content on instant messengers, WeChat messaging and emails as well as face-to-face communication will be recorded, while phone communication via phone calls will also be recorded in summary and input into the database. Price data must be a typical, repeatable transaction between unaffiliated market participants (completely financially and legally independent).

SMM looks to collect as much data as possible, including transactions, offers, bids and specifications of samples. SMM confirms and analyses submissions, and encourages all market participants to become submitters to the SMM Benchmarks, as more extensive data will increase the accuracy of the Benchmarks.

SMM's Operational teams aim to collect comprehensive information related to the underlying markets the index seeks to measure.

Submissions received that do not fully adhere to SMM's defined requirements will not be incorporated into the index calculation.

SMM takes into account the principle of confidentiality, and all employees must strictly abide by SMM confidentiality and Conflicts of Interest policies, and never disclose any Benchmark and index compilation-related information, whether regarding Benchmark and index values, data or customers, unless required to by law.

SMM strictly prohibits Operational team employees and management from participating in transactions, offers, or bids as individuals or on behalf of market participants in the underlying markets the Benchmarks and indices seek to measure or any related derivative markets. They are also not permitted to provide market participants with free subscriptions or any other benefits in exchange for price or market information. A specific Conflicts of Interests declaration is required annually by Operational team employees, managers and any other staff involved in the production of SMM Benchmarks and indices, declaring that they have not benefited from non-public information. All staff involved in the calculation or management of SMM Benchmarks and indices receive regular training on Conflicts of Interest. **SMM maintains a Conflicts of Interest Register. For more information please refer to the SMM Conflicts of Interest Policy, available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

SMM's Operational Teams will report to their manager about any threat by market participants that could undermine or influence the assessment during the price collection process.

Price data provided by the submitters to SMM should include at least the following kinds of information. SMM analysts should encourage the price submitter to report as much detailed information as possible, not just the minimum requirements specified:

### **Product specification**

Didymium oxide: meets GB/T 31965-2015 standards, (Pr6O11 + Nd2O3)/TREO≥99%. **For details, please see attachment 1.**

### **Major producers**

- Baosteel Rare Earth International Trade Co., Ltd.

- Gansu Rare Earth New Material Co., Ltd.
- Baotou Huamei Rare Earth High-Tech Co., Ltd.
- Leshan Shenghe Rare Earth Co., Ltd.
- Jiangsu Guosheng New Materials Co., Ltd.
- Sichuan JCC Rare Earth Metals Co., Ltd.
- China Minmetals Corporation
- Fujian Changting Golden Dragon Rare-Earth Co., Ltd.

Note: This list is in no particular order. SMM didymium oxide spot price assessments cover producers that include but are not limited to the above ones.

### **Traded prices/bids/offers, etc.**

It could be a specific price number or the price range that is likely to be traded.

### **Volumes**

The minimum volumes for a single transaction is 1 mt.

### **Delivery location**

Factory of buyer

### **Payment terms**

Payment terms in the negotiated transaction agreement, such as bank cash transfer, etc.

(插入Submission Detail)

### **2.3.2 Collecting price data from other submitters**

SMM's policy on collecting market information and data is that SMM welcomes all information from various sources or organisations, as long as the data submitter provides them for good faith and authentic purposes. However, the data submitter is required to accept the SMM code of conduct on data submitters. SMM does not accept instant messaging requests from unidentified individuals. SMM price analysts are required to confirm the identity of market participants at least in accordance with the procedures specified in 2.3.1.1 before conducting instant messaging communication with the data submitter.

## **2.4 Detailed formation process and related regulations**

### **2.4.1 Data collection**

SMM price analysts will collect price data and information based on the standards mentioned above. And a preliminary raw dataset is finally generated after taking into account offers and bids, spot market conditions, future market conditions, the macroeconomy, industry status, transactions, demand and supply, inventories, and political, economic, and natural factors. In terms of order of priority, the actually traded prices in the market take precedence over market offers; offers from the six major groups take precedence over offers from small companies.

### **2.4.2 Data normalisation**

The SMM didymium oxide prices are on a delivery to factory basis. If the prices provided by upstream smelting and separation companies are ex-works prices (excluding freight rates), SMM will add ex-works prices and the actual freight rates together to obtain the actual didymium oxide prices on a delivery to factory basis. SMM price analysts will normalise the preliminary data results, and the finalised prices will be in the form of a price range of the lowest and highest levels that are actually traded or most likely to be traded in the current day.

The price data will be recorded both electronically and in writing. All electronic and written records are archived by analysts and kept for a long time in a secure network environment and physical environment. **For more details, please refer to the SMM Recordkeeping Policy available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

### **SMM didymium oxide spot price assessment**

#### **2.4.3 Information data analysis, verification and screening**

SMM will always do its best to confirm bids, offers and deals information with related parties. SMM will perform multi-party verification on information provided by the buyers/sellers with their counterparties, and will cross-validate with other relevant participants if the buyers and sellers are unable or unwilling to provide the information.

SMM will exclude any questionable, irreproducible or apparently abnormal quote and transaction in the price evaluation process, and note the reason for removal in the original data set, which will also be kept for long. For instance, SMM ensures that only transactions and quotes made between financially and legally independent parties will be included in the price evaluation process. SMM price analysts will compare and analyse data submitted by SMM price submitters, verifying whether the prices show trends that run counter to the wider market. The cases include but are not limited to:

- Traded prices are significantly higher due to the inclusion of special circumstances or special services
- A company's quotes are intentionally higher due to a special sales plan or policy of the company
- A company's bids reflect its prospects for the market price and is intentionally made public in advance

SMM analysts will investigate into the data submitted once any abnormal condition is detected. They will contact the price submitter to verify the accuracy, applicability and completeness of the data. If it is confirmed that errors, such as input errors, are made in the submission process, SMM price analysts will correct the error and conduct verification and screening. If no mistakes are

found in the data submission process, it could be concluded that the data submitted is disqualified and has to be removed from the original data set. The finalised price assessment is in the form of a price range.

Minimal subjective judgment from analysts is required in the SMM price evaluation process. The established standards and procedures will be applied to manage the actions taken by SMM price analysts in screening the collected data, and to evaluate the data included in the price assessment is valid or if the abnormal data has been excluded. **For more details, please refer to the SMM Guidelines for the Exercise of Expert Judgment available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese)**

The experience of SMM price analysts in the didymium oxide trading market is to ensure that only data that clearly meets methodological requirements can be included in the price evaluation process. After screening the original dataset and removing disqualified data, SMM price analysts will not have any subjective judgment about the normalised data or the price assessments.

The SMM Benchmark Management Committee regularly reviews the implementation of these procedures to ensure compliance with its published standards. To attain the highest possible standards, SMM price analysts are trained and regularly appraised in their respective markets in which they are responsible for assessing prices. This ensures that SMM analysts follow the requirements of the methodology in a consistent manner.

#### **2.4.4 Evaluation of published prices**

The didymium oxide spot price range will be generated between 11:15 and 11:30 CST each trading day, based on traded prices and quotes provided by price contributing companies.

After years of tracking and gathering feedback, SMM applies a price-range strategy in assessing didymium oxide spot prices as other strategies have proven unreliable. For example, a tonnage weighted calculation will be easily affected by traded price and volumes. As trading volumes are unpredictable, price assessments cannot be done if there are no deals. Low trading volumes will also be inaccurate.

#### **2.4.5 Special circumstances**

SMM reserves the right to exercise judgments when trading liquidity is thin. We will make the assessments based on the economy, relationships between products, transportation and forward market if there is a lack of credible or verifiable market information, so as to make sure that the data samples used to evaluate the spot prices are sufficient and accurate. **For more details, please refer to the SMM Illiquid Market Management Policy and SMM**

**Expert Judgment Policy available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

In addition, SMM will also make a price assessment even when there is no material offer/bid or trade, or only one offer or bid, or when the price difference between offers and bids is too big to assess a tradable price. In these cases, assessments SMM made in the previous day and other information will be taken into consideration. SMM will not set the minimum trading volume limit in the didymium oxide price assessment as sparse deals are sometimes heard in the market.

#### **2.4.6 Price publication**

The SMM didymium oxide spot price assessment is published on the SMM websites at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese) at 11:15-11:30 CST on every working day, except for weekends and public holidays in China.

Data will be verified and the finalised didymium oxide spot price assessment will be evaluated in the 15 minutes after 11:15 CST, the cut-off time for data collection. SMM does not encourage price providers to wait until the last minute to submit their data information. This is to ensure that SMM price analysts have enough time to verify the data and then incorporate it into the assessment process.

The time of the price publication may also be affected by emergencies and force majeure factors, such as power outages and natural disasters. In such cases, SMM will make every effort to inform the market of the delayed publication schedule as soon as possible. **For more details, please refer to the SMM Disaster Recovery Procedures available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

Price information published by SMM is available to subscribers of SMM services and is entitled to copyright protection. Without a clear agreement with SMM, no third party may distribute the information or use it for commercial interests.

#### **2.4.7 Modification of published prices**

If there are any errors (mistake in calculation or errors caused by incorrect operations) after the price is published, SMM will immediately issue a correction statement to reflect the correct price. **For more details, please refer to the SMM Error Correction Policy available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

### **2.5 Review of key points**

#### **2.5.1 Product specification**

Didymium oxide that meets the GB/T 31965-2015 standards, with the

specification of (Pr<sub>6</sub>O<sub>11</sub> + Nd<sub>2</sub>O<sub>3</sub>)/TREO ≥ 99%

### **2.5.2 Major producers**

- Baotou Steel Rare Earth International Trade Co., Ltd.
- Gansu Rare Earth New Material Co., Ltd.
- Baotou Huamei Rare Earth High-Tech Co., Ltd.
- Leshan Shenghe Rare Earth Co., Ltd.
- Jiangsu Guosheng New Materials Co., Ltd.
- Sichuan JCC Rare Earth Metals Co., Ltd.
- China Minmetals Corporation
- Fujian Changting Golden Dragon Rare-Earth Co., Ltd.

Note: This list is in no particular order. SMM didymium oxide spot price assessments involve producers that include but are not limited to the above ones.

### **2.5.3 Reference volume**

SMM sets the typical transaction size that reflects market circulation at above 1 mt in physical volume.

### **2.5.4 Delivery**

Delivered to factory on the transaction day, by truck.

### **2.5.5 Payment terms**

Bank transfer

### **2.5.6 Delivery site**

Buyer's factory/warehouse

### **2.5.7 Unit of pricing**

Yuan/mt

### **2.5.8 Format of publishing**

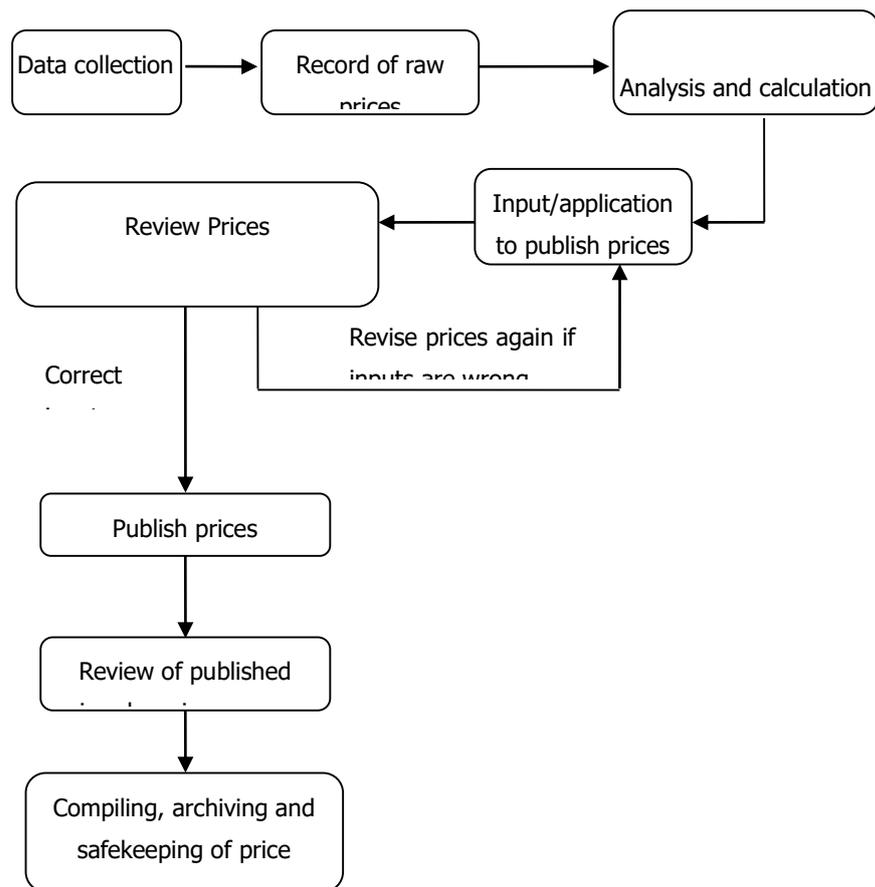
The prices are published as a price range, including 13% VAT.

### **2.5.9 Publication time**

11:15-11:30 CST, every working day (except for weekends and public holidays)

## **2.6 Price assessment process**

SMM undertakes the didymium oxide spot price assessments at 10:30-11:30 CST every working day. The detailed process is as follows:



SMM strictly controls the submission collection process, and only considers transactions, offers and bids that follow standard contract terms. SMM not only collects the submitted trade price, but also on any significant additional information. If necessary, SMM can require the submitter to provide relevant documents to judge the fulfillment of the contract and to verify the validity of data.

## 2.7 Adjustment to the price assessment methodology

SMM updates our methodologies on a regular basis to reflect a constantly changing metals trading market. Amendments will be made based on feedback by market participants, and an internal check will be also made regularly. We will follow the external consultation workflow to amend discrepancies in the methodology that may be less time-sensitive. Major revisions and updates will be published 28 days ahead of the changes, to seek opinions from market participants, unless there are unavoidable and unpreventable circumstances such as natural disasters, war or bankruptcy of the exchange, which will shorten the period. SMM promises to carefully look into any feedback to the adjustment of the price methodologies, and will amend the methodologies under certain circumstances even if some market participants do not approve of the changes. We will arrange an official consultation of the didymium oxide spot price assessment at least once a year. Dates of the most recent and the next session are at the start of this document. **For more details, please refer to the**

**SMM Methodology Review and changes Policy, available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

### **3. Historical data**

SMM maintains records of all communications with submitters, whichever collection channel is used: telephone, email or internet-based instant-communication tools, in order that all submissions used in the Benchmarks can be traced back to an original record of the received submission in line with the SMM Recordkeeping Policy. Via the Submitter Code of Conduct policy, all submitters are also subject to record keeping policies.

Submissions are stored in SMM's secure storage system to ensure the segregation and confidentiality of data, and to prevent the improper usage of the data by parties not involved in the Benchmark calculation process.

Subscribers of Shanghai Metals Market are able to access historical data of didymium oxide spot price assessments since December 25, 2006. For information on subscribing to historical price data Please visit [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese). **For more details, please refer to the SMM Recordkeeping Policy, available at [www.metal.com](http://www.metal.com) (English) or [www.smm.cn](http://www.smm.cn) (Chinese).**

### **4. Compliance with SMM Policies**

All SMM employees must comply with the methodologies published by SMM, as well as follow SMM's internal standards and policies, which include the SMM Conflict of Interest Policy, SMM Whistleblowing Policy, SMM Error Correction Policy, SMM Methodology Review, Consultation and Modification Policy, and SMM Complaint Policy.