

**APPROVED**

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CEO of Moscow Exchange

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**Calculation Methodology**

**CCP Repo Rates**

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## 1. Overview

1.1. This Methodology sets out calculation procedures in relation to the CCP Repo Rates (hereinafter referred to as the "indicators") performed by Public Joint-Stock Company Moscow Exchange (the "Exchange") based on

CCP-cleared repos ("CCP-cleared Repo") executed on the Exchange.

1.2. This Methodology as amended from time to time is subject to approval by the Exchange. The Exchange establishes the date when the Methodology as amended comes into force.

1.3. The names of the Indicators are as follows:

1.3.1. Indicators for the CCP-cleared Repo in general collateral certificates from the GCC Bonds ("GCC Bonds"):

Full name in Russian: «Ставка денежного рынка Московской Биржи RUSFAR», «Ставка денежного рынка Московской Биржи RUSFAR REAL TIME»;

Full name in English: "Russian Secured Funding Average Rate" or "Russian Secured Funding Average Rate Real Time";

Short name: "RUSFAR", "RUSFAR REAL TIME".

1.3.2. CCP Repo Rates for bonds:

Full name in Russian: "Ставка Московской Биржи рынка РЕПО с ЦК облигации";

Full name in English: "MOEX CCP Bond Repo Rate";

Short name: "MOEXREPO".

1.3.3. CCP Repo Rates for shares:

Full name in Russian: "Ставка Московской Биржи рынка РЕПО с ЦК акции";

Full name in English: "MOEX CCP Equity Repo Rate";

Short name: "MOEXREPO EQ".

1.3.4. CCP Repo rates for general collateral certificates (GCCs):

Full name in Russian: "Ставка Московской Биржи рынка РЕПО с ЦК КСУ";

Full name in English: "MOEX CCP GCC Repo Rate";

Short name: "MOEXREPO GCC".

1.3.5. The indicators are assigned codes given in Annex 1 hereto. Those codes are compiled depending on calculation times of the indicators, currency of repos with the CCP and the settlement period of the first and second legs of repo transactions with the CCP.

1.4. This Methodology as amended from time to time is subject to recommendations of the Repo and Securities Lending Committee of the Exchange.

1.5. The creation and calculation of the indicators as well as the introduction of amendments to this Methodology are based on a set of administrative principles and rules described in the Moscow Exchange Index Management Policy.

1.6. Following its endorsement by the Exchange, this Methodology is publicly published at least one business day before coming into force, unless the Executive Board of the Exchange decides otherwise.

- 1.7. Terms and definitions used in the Methodology shall be used in accordance with their meanings given in internal documents of the Exchange, as well as the laws of the Russian Federation, the Bank of Russia regulations and other legal acts of the Russian Federation.

## **2. Input data for the calculation of Indicators**

- 2.1. The calculation of RUSFAR indicators takes into account the orders and transactions submitted/executed in GCC Bonds in the mode of trading "CCP Repo - order book orders" with settlement in RUB, and the orders submitted in the mode "Deposits with the CCP - order book orders" (hereinafter both modes - the "Order Book Orders") with settlements in RUB.
- 2.2. The MOEXREPO indicators are calculated based on transactions in bonds including Eurobonds, admitted to repo with the CCP.
- 2.3. The MOEXREPO EQ indicators are calculated based on transactions in shares admitted to repo with the CCP.
- 2.4. The MOEXREPO GCC indicators are calculated based on transactions in GCCs admitted to repo with the CCP.
- 2.5. Depending on the type of indicators, their calculation takes into account the following features:
  - 2.5.1. To calculate MOEXREPO and MOEXREPO EQ, transactions executed based on Order Book Orders and in the trading mode "Repo with the CCP – negotiated orders" (the "Negotiated Trading") are used.
  - 2.5.2. MOEXREPO and MOEXREPO EQ are calculated based on the following transactions:
    - the "overnight" settlement period: repo transactions with the settlement date of the first leg being the transaction date and the settlement date of the second leg being the next settlement day following the transaction date;
    - the "one week" settlement period: repo transactions with the settlement date of the first leg being the transaction date, the first or second settlement day after the transaction date, and the settlement date of the second leg being the 7th, 8th or 9th calendar day (or any settlement day immediately following such dates if they are non-business days) after the transaction date.
  - 2.5.3. To calculate MOEXREPO GCC, transactions executed based on Order Book Orders are used.
  - 2.5.4. MOEXREPO GCC are calculated based on the following transactions:
    - the "overnight" settlement period: repo transactions with the settlement date of the first leg being the transaction date and the settlement date of the second leg being the next settlement day following the transaction date;
    - the "one week" settlement period: repo transactions with the settlement date of the first leg being the transaction date, and the settlement date of the second leg being the 7th calendar day (or any settlement day immediately following such date if it is a non-business day) after the transaction date

- 2.5.5. To calculate MOEXREPO and MOEXREPO EQ with "overnight" settlement period and RUB as the settlement currency, transactions executed at the rates not below the deposit rate set by the Bank of Russia for the money market, are used.
- 2.5.6. To calculate MOEXREPO GCC, MOEXREPO and MOEXREPO EQ with the 1W settlement period, or indicators with USD as the settlement currency, transactions executed at the rates with positive values are used;
- 2.5.7. The indicator with RUB as the settlement currency is not calculated if the total size of transactions used for the calculation is less than RUB 1 billion.

### 3. Algorithm for calculating RUSFAR indicators

3.1. From 10:00:00 to 12:30:00 MSK, inclusive, unless otherwise established by the Exchange, each RUSFAR indicator is calculated by the following algorithm on the basis of data on Order Book Orders in GCC Bonds and deposit contract Order Book Orders (the "Orders"):

3.1.1. Each second, ranges of Orders matched by the price separately for placement and raising of funds (the "Price Levels") are determined. All Orders with the same price are referred to the same Price Level.

3.1.2. For each RUSFAR indicator, the values of the minimum and maximum volume of Price Level Orders are set out in Appendix 2 to the Methodology. If the minimum volume of the Price Level is not met, the value will not be taken into account in the calculation of the Rate for that indicator. If the volume of an Order exceeds the value of the maximum volume of Price Level Orders, the value equal to the value of the maximum volume of the Price Level shall be taken into account.

Each Price Level referred to transactions to raise and deposit funds is assigned a weighting factor  $k$ . The weighting factor is assigned in descending order from largest to smallest, respectively  $1, 1/2, 1/4, \dots 1/2^m$ .

3.1.3. The average value of the price of the Asks ( $R_{ask}$ ) placed by the trading members at each calculation moment and meeting the requirements of clause 3.1.2 of the Methodology is calculated:

$$R_{ask} = \frac{\sum_{i=1}^n r_i v_i k_i}{\sum_{i=1}^n v_i k_i}$$

where:

$r_i$  – value of the  $i^{\text{th}}$  Ask Level, expressed as a percentage;

$v_i$  – total volume of the Orders constituting the  $i^{\text{th}}$  Price Level;

$k_i$  – weighting coefficient.

3.1.4. The average value of the price of Bids ( $R_{bid}$ ) placed by the trading members at each calculation moment and meeting the requirements of clause 3.1.2 of the Methodology is calculated:

$$R_{bid} = \frac{\sum_{j=1}^m r_j v_j k_j}{\sum_{j=1}^m v_j k_j}$$

where:

$r_j$  – value of the  $j^{\text{th}}$  Bid Level, expressed as a percentage;

$v_j$  – total volume of the Orders constituting the  $j^{\text{th}}$  Price Level;

$k_j$  – weighting coefficient.

3.1.5. The average value of the prices of the Bids and Asks ( $R_{mid}$ ) is calculated:

$$R_{mid} = \frac{R_{ask} + R_{bid}}{2}$$

If, at the time of calculation of the Rate, there are no available Bids and/or Asks, the Rate for this time period is not calculated.

3.1.6. The average Rate across the Orders ( $R_{orders}$ ) is calculated on the basis of all Rates calculated in accordance with clause 3.1.5 of the Methodology:

$$R_{orders} = \frac{\sum^J R_{mid}}{J}$$

where:

J – the number of Rates in the calculation.

3.2. The average Rate across transactions made based on Order Book Orders from 10:00 to 12:30:00 MSK ( $R_{trades}$ ) is calculated according to the following formula:

$$R_{trades} = \frac{\sum r_t v_t}{\sum v_t}$$

where:

$r_t$  - value of the Rate in the transaction, expressed as a percentage;

$v_t$  - volume of the transaction, expressed in the indicator calculation currency.

3.3. The minimum required volume of transactions is set for each RUSFAR. The minimum required volume of transactions is RUB 30 billion for RUSFAR with RUB as the settlement currency. The minimum required volume of transactions is USD 100 million for RUSFAR with USD as the settlement currency.

3.4. In the case the volume of transactions executed based on Order Book Orders from 10:00 to 12:30 MSK exceeds the value of the minimum required volume of transactions for the relevant indicator set out in clause 3.3 of the Methodology, the value of the indicator is determined by the following formula:

$$R = R_{trades}$$

where:

R – the value of the Indicator;

$R_{trades}$  – the average Rate across transactions which is determined according to clause 3.2 above.

3.5. In the case the volume of transactions executed based on Order Book Orders from 10:00 to 12:30 MSK does not exceed the minimum required volume of transactions for the relevant indicator set out in clause 3.3 of the Methodology, the value of the indicator is determined by the following formula:

$$R = \frac{Vol}{MinVol} * R_{trades} + \left(1 - \frac{Vol}{MinVol}\right) * R_{orders}$$

where:

R – the value of the Indicator;

$R_{orders}$  – the average Rate across orders which is determined according to clause 3.1 above;

$R_{trades}$  – the average Rate across transactions which is determined according to clause 3.2 above;

Vol - volume of transactions executed based on Order Book Orders from 10:00 to 12:30 MSK, with maturities corresponding with the settlement method indicated with respect to the Indicator in Appendix 1;

MinVol – value of the minimum required volume of transactions set out in clause 3.3 above.

3.6. The RUSFAR indicator is expressed as a percentage per annum. The indicator values are accurate to two decimal places.

#### 4. Algorithm for calculating RUSFAR REAL TIME

4.1. RUSFAR REAL TIME are calculated at 10:15, 10:30, 11:00, 11:15, 11:30, 11:45, 12:00, 12:15, 12:30 unless the Exchange has established a different time, based on Orders and transactions executed based on Order Book Orders during 15 minute preceding the time of calculation.

4.2. Calculation of RUSFAR REAL TIME at 10:15, 10:30, 11:00, 11:15, 11:30, 11:45, 12:00, 12:15 is carried out according to the following algorithm.

4.2.1. The average rate ( $R_{orders\ rt}$ ) of orders for the period of fifteen minutes preceding the moment of calculation is calculated in accordance with clauses 3.1.1.-3.1.6 of the Methodology.

4.2.2. The average Rate across transactions made based on Order Book Orders during 15 minutes preceding the time of calculation ( $R_{trades\ rt}$ ) is calculated according to the following formula:

$$R_{trades\ rt} = \frac{\sum r_t v_t}{\sum v_t}$$

where:

$R_{trades\ rt}$  is the value of the Rate in transactions made during the period leading up to the time of calculation, expressed as a percentage;

$v_t$  - volume of the transaction, expressed in the indicator calculation currency.

4.2.3. The values of the indicators are determined by the following formula:

$$R_{rt} = 0.5 * R_{orders\ rt} + 0.5 * R_{trades\ rt}$$

where:

$R_{rt}$  – the value of the Indicator;

$R_{trades\ rt}$  is the value of the Rate in transactions made during the period leading up to the time of calculation, expressed as a percentage;

$R_{orders\ rt}$  is the value of the average Rate across orders ( $R_{orders\ rt}$ ) for the preceding fifteen minute period.

- 4.2.4. If there are no available transactions executed based on Order Book Orders during 15 minutes preceding the time of calculation ( $R_{trades\ rt}$ ), the indicators are calculated according to the following formula:

$$R_{rt} = R_{orders\ rt}$$

$R_{rt}$  – the value of the Indicator;

$R_{orders\ rt}$  is the value of the average Rate across orders ( $R_{orders\ rt}$ ) for the preceding fifteen minute period.

- 4.2.5. If no orders are available to determine the average Rate ( $R_{orders\ rt}$ ) for the preceding fifteen-minute period, the indicator values are determined using the following formula:

$$R_{rt} = R_{trades\ rt}$$

$R_{rt}$  - indicator value;

$R_{trades\ rt}$  - the transaction Rate with respect to transactions concluded during the preceding fifteen minutes, expressed in percents.

- 4.2.6. If there are no orders and transactions to determine the average Rate for orders ( $R_{orders\ rt}$ ) and Rate for transactions ( $R_{trades\ rt}$ ) for the fifteen-minute period preceding the moment of calculation, the indicators are not determined.

- 4.3. Calculation of RUSFAR REAL TIME indicators at 12:30, unless the Exchange is established at a different time, is carried out in the same way as calculation of RUSFAR indicators according to the procedure defined by section 3 of the Methodology.

- 4.4. The values of RUSFAR REAL TIME indicators are expressed as a percentage per annum. The indicator values are accurate to two decimal places.

## 5. Formula for calculating MOEXREPO indicators

- 5.1. Calculation of the indicators for CCP bond repo rate, CCP share repo rate and CCP GCC repo rate (the "MOEXREPO indicators") is made according to the following formula:

$$R = \frac{\sum_i r_i \times S_i}{\sum_i S_i}$$

where:

- |       |   |  |
|-------|---|--|
| $R$   | – | MOEXREPO indicator value   |
| $r_i$ | – | the $i^{\text{th}}$ value of the CCP repo rate in transactions on the basis of which the MOEXREPO indicator is calculated; |
| $S_i$ | – | The total amount of CCP repos concluded at the $i^{\text{th}}$ CCP repo rate.  |

- 5.2. When calculating MOEXREPO indicators at 12:30 MCK, this calculation includes transactions executed from 10:00 to 12:30 MCK of the current working day. When calculating MOEXREPO indicators at 19:00 MCK, this calculation includes transactions executed from 12:30 to 19:00 MSK of the current working day.

5.3. The values of MOEXREPO indicators are expressed as a percentage per annum. The indicator values are accurate to two decimal places.

## **6. Schedule of indicator calculation**

- 6.1. Indicator values shall not be calculated if the first or second part of a repo transaction of the respective term falls on a trading non-business day, trading days falling on Saturday and/or Sunday, as well as on the last trading day of the calendar year.
- 6.2. Indicator calculation times are given in Appendix 1 to this Methodology. The indicator calculation times may be changed by decision of the Exchange.
- 6.3. The Exchange may change the start time and/or end time of Indicators calculation. Information about decisions taken by the Exchange in accordance with this item shall be communicated to trading participants of the Exchange not later than one working day prior to the effective date of respective changes, unless the Exchange establishes another term for disclosure of respective information.

## **7. Control of Indicator Calculation**

- 7.1. In case of suspension of trading modes used to derive data on orders/transactions to calculate the indicators in periods set for calculation of such indicators according to this Methodology, or the respective trading modes were closed on the trading day, the RUSFAR (overnight bond GCC) is set equal to the key rate set by the Bank of Russia for this day, unless the Exchange decides otherwise. Other indicators are not determined on that trading day.
- 7.2. In the event of a technical failure during the calculation of indicators or a technical failure during trading of CCP repos and/or on the deposit market concerning Order Book Orders resulting in distortion of data used for the calculation of indicators, recalculation of previously calculated indicator values shall be permitted. This recalculation is carried out as soon as possible from the moment of detection of a technical failure. Upon recalculation of indicator values, an appropriate message is disclosed on the Exchange official website.
- 7.3. In case the deviation of the value calculated on the basis of quotes (Rorders) from the value calculated on the basis of transactions (Rtrades) exceeds 5% the Exchange has the right to cancel the results of RUSFAR indicator calculations. When cancelling calculation results, the Exchange shall disclose on the official website information on circumstances taken into account when making this decision, not later than 19:00 MSK of the day of calculation.

## **8. Disclosure**

- 8.1. Disclosure of indicator values is made daily on the Exchange official website.
- 8.2. In case of an event specified in clause 7.2, the Exchange may delay the publication of the RUSFAR indicator values until 19:00 MSK.
- 8.3. Archived data for the entire calculation period, as well as information about the total volume of transactions based on which the calculation was made, is disclosed on the Exchange official website.
- 8.4. Information subject to disclosure in accordance with this Methodology on the Exchange official website may additionally be disseminated by other means, including through information agencies disseminating MOEX market data.

**Appendix 1**

Indicator code	Name	Board	Instrument type	Settlement method	Settlement currency	Settlement time
RUSFAR	RUSFAR	GCRP	GCC Bonds	Overnight	RUB	12:30
RUSFAR1W	RUSFAR 1 week	GCOW	GCC Bonds	One week	RUB	12:30
RUSFAR2W	RUSFAR 2 weeks	GCSW	GCC Bonds	2 weeks	RUB	12:30
RUSFAR1M	RUSFAR 1 month	GCOM	GCC Bonds	1 month	RUB	12:30
RUSFAR3M	RUSFAR 3 month	GCTM	GCC Bonds	3 months	RUB	12:30
RUSFARUSD	RUSFAR USD	GURP	GCC Bonds	Overnight	USD	12:30
RUSFARRT	RUSFAR REAL TIME	GCRP	GCC Bonds	Overnight	RUB	10:15-12:30*
RUSFAR1WRT	RUSFAR REAL TIME One week	GCOW	GCC Bonds	One week	RUB	10:15-12:30*
RUSFAR2WRT	RUSFAR REAL TIME Two weeks	GCSW	GCC Bonds	2 weeks	RUB	10:15-12:30*
RUSFAR1MRT	RUSFAR REAL TIME One month	GCOM	GCC Bonds	1 month	RUB	10:15-12:30*
RUSFAR3MRT	RUSFAR REAL TIME Three months	GCTM	GCC Bonds	3 months	RUB	10:15-12:30*
RUSFARUSDRT	RUSFAR REAL TIME USD	GURP	GCC Bonds	Overnight	USD	10:15-12:30*
MOEXREPO	MOEXREPO Bonds Overnight		Bonds	Overnight	RUB	12:30
MOEXREPOE	MOEXREPO Bonds Overnight After-Hours		Bonds	Overnight	RUB	19:00
MOEXREPOUSD	MOEXREPO Bonds Overnight After-Hours USD		Bonds	Overnight	USD	12:30
MOEXREPOUSDE	MOEXREPO Bonds Overnight USD After-Hours		Bonds	Overnight	USD	19:00
MOEXREPO1W	MOEXREPO Bonds 1 week		Bonds	One week	RUB	12:30
MOEXREPO1WE	MOEXREPO Bonds 1 week After-Hours		Bonds	One week	RUB	19:00

MOEXREPOEQ	MOEXREPO Shares Overnight		Shares	Overnight	RUB	12:30
MOEXREPOEQE	MOEXREPO Shares Overnight After-Hours		Shares	Overnight	RUB	19:00
RPGCC	MOEXREPO GCC Overnight		GCC all	Overnight	RUB	12:30
RPGCCE	MOEXREPO GCC Overnight After-Hours		GCC all	Overnight	RUB	19:00
RPGCC1W	MOEXREPO GCC 1 week		GCC all	One week	RUB	12:30
RPGCC1WE	MOEXREPO GCC 1 week After-Hours		GCC all	One week	RUB	19:00

\* 10:15, 10:30, 11:00, 11:15, 11:30, 11:45, 12:00, 12:15, 12:30

**Appendix 2**

Indicator code	Minimum volume of transactions per Price Level	Maximum volume of transactions per Price Level.
RUSFAR RUSFARRT	RUB 20,000,000	RUB 3,000,000,000
RUSFAR1W RUSFAR1WRT	RUB 10,000,000	RUB 2,000,000,000
RUSFAR2W RUSFAR2WRT	RUB 10,000,000	RUB 2,000,000,000
RUSFAR1M RUSFAR1MRT	RUB 10,000,000	RUB 2,000,000,000
RUSFAR3M RUSFAR3MRT	RUB 10,000,000	RUB 2,000,000,000
RUSFARUSD RUSFARUSDRT	USD 100,000	USD 30,000,000