

APPROVED
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**METHODOLOGY FOR SETTING PRICE FLUCTUATION LIMITS
FOR DERIVATIVES**

NCC CLEARING BANK

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I. Introduction

This Methodology for Setting Price Fluctuation Limits (the “Methodology”) is to set out how price fluctuation limits are calculated and set with regard to futures contracts traded on the Moscow Exchange Derivatives Market.

The following abbreviations and definitions are used in this Methodology:

Clearing Centre (the “CC”) means the Bank “National Clearing Centre” (Joint-stock company) operating based on the clearing license and the Clearing Law.

Clearing Rules (the “Clearing Rules”) means the Clearing Centre Clearing Rules.

Derivatives Market Trading Rules (the “Trading Rules”) means rules of on-exchange trading on the Moscow Exchange Derivatives Market.

Trading System (TS) means the trading system of the Moscow Exchange Derivatives Market.

Inter-contract spread means a group of futures contracts on different underlying assets with correlation between their prices. Inter-contract spreads and futures contracts in the spread are determined by the CC.

Other terms have the meanings ascribed to them by the laws of the Russian Federation, the Clearing Rules, other internal documents of the Clearing Centre, and the Trading Rules.

The following basic risk parameters are used in this Methodology:

No	Parameter	Designation
1	Futures contract settlement price	<i>SP</i>
2	Futures contracts tick size	<i>MinStep</i>
3	Minimum basic size of initial margin (%)	<i>MinIM</i>
4	Futures contract price fluctuation limit (the “Limit”)	<i>Lim</i>
5	Futures contract price fluctuation limit up/down (the “Limit up”, “Limit down”)	<i>Lim_H, Lim_L</i>
6	Spread coefficient (in fractions). Set for each expiration date of Minor Contracts.	<i>Spread</i>

The parameters *PII* and *MinStep* are determined in accordance with Contract Specifications and/or the Trading Rules.

The parameters *Spread* and *МинБГО* are set and changed as decided by the CC. The parameter *Spread* is set for each expiration date of Minor Contracts on the same underlying asset in the group, and the unified parameter *МинБГО* is set for all futures on the same underlying asset. The CC may decide to set different values of *МинБГО* for certain underlying assets depending on futures expiration dates. The parameters *Lim*, *Lim_H* and *Lim_L* are determined in accordance

with this Methodology.

For the purpose of this Methodology, futures contracts on the same underlying asset are brought into a group as decided by the Clearing Centre.

The base contract of the group is a derivative contract with the product of the Limit and the Spread Coefficient being the minimum allowed Limit for the group's Minor Contract. The CC determines the group's base contract (the "Base Contract") and announces it on its website.

All contracts within a group are Minor Contracts except the group's Base Contract.

II. Determining risk parameters during the clearing session

- The following additional risk parameters are used to determine the risk parameters Lim , Lim_H and Lim_L during the clearing session:

No	Parameter	Designation
1.	Number of Settlement Periods with high volatility when the rule "u" to increase the Limit is applied	I_{num_u}
2.	Fluctuation of the contract's Settlement Price (in fractions of the Limit). Used as a volatility increase factor when the rule "u" to increase the Limit is applied	$I_{criteria_u}$
3.	Fluctuation of the contract's Settlement Price (in fractions of the Limit). Used to change the Limits when volatility rises	I_{perc_u}
4.	Calculation precedence for $Lim_{model_{up}}$. $Priority_{up}$ = "min" or "max"	$Priority_{up}$
5.	Calculation precedence for $Lim_{model_{down}}$. $Priority_{up}$ = "min" or "max"	$Priority_{down}$
6.	Calculation precedence for Lim_{model} . $Priority$ = "up" or "down"	$Priority$
7.	Number of Settlement Periods with low volatility when the rule "d" to decrease the Limit is applied	D_{num_d}
8.	Fluctuation of the contract's Settlement Price (in fractions of the Limit). Used as a volatility decrease factor when the rule "d" to decrease the Limit is applied	$D_{criteria_d}$
9.	Fluctuation of the contract's Settlement Price (in fractions of the Limit). Used to change the Limits when volatility declines and the rule "d" to decrease the Limit is applied	D_{perc_d}
10.	Time spent to control the adequacy of the Limit up (Limit down) (in minutes) before the Settlement Period ends	E_{time}
11.	Width of the monitoring range (in fractions). Used to control the adequacy of the Limit up (Limit down)	Th
12.	Minimum percentage of open interest in the futures contract in open interest in all same underlying asset futures contracts executed under one Specification	Th_{OI}
13.	Limit value in the model	Lim_{model}
14.	The model's Limit calculated using the rules to increase the Limits	$Lim_{model_{up}}$

15.	The model's Limit calculated using the rule "u" to increase the Limits	Lim_model_u
16.	The model's Limit calculated using the rules to decrease the Limits	Lim_model_{down}
17.	The model's Limit calculated using the rule "d" to decrease the Limits	Lim_model_d
18.	Futures contract price limit calculated in the previous clearing session (the previous Limit)	Lim_prev

Risk parameters 1-10 are set by the Clearing Centre.

2. During the clearing session, the CC calculates the Limit as follows for each futures contract:

2.1. An initial (first) value of the Limit is calculated as follows on the Contract's first trading day:

$$Lim = \frac{MinIM}{2} \times SP$$

2.2. The CC calculates Lim_model_u as per the following formula

$$Lim_model_u = (1 + I_perc_u) \times Lim_prev$$

if any of the following triggering events occurs and rule "u" to increase the Limits is applied:

- The two following triggering events occur simultaneously:

$|SP - SP_{prev}| \geq Lim_prev$ – i.e. the absolute fluctuation of the Settlement Price in the previous Settlement Period exceeds the previous Limit; and

The Limit was expanded in the previous Settlement Period;

- $\forall i \in I_num_u : |SP_i - SP_{i-1}| \geq I_criteria_u \times Lim_prev$ – i.e. the absolute fluctuation of the Settlement Price in every period of high volatility I_num_u in the previous Settlement Period exceeds the previous Limit multiplied by the volatility increase factor $I_criteri$;
- At least one non-negotiated working bid/ask in the futures is continuously available in the TS during the last minutes E_time , at the price that differs from the Limit up/down by no more than Th , provided that number of open futures contracts does not exceed Th_OI percent of the total open interest in the same underlying asset futures contracts executed under the same Specification.

The CC may determine more than one rule to increase the Limits. The rule "u" to increase Limits is a set of parameters ($I_perc_u, I_num_u, I_criteria_u$) determined by the CC.

If $Priority_up = \min$ and values of Lim_model_u are calculated for n rules to increase Limits, Lim_model_{up} is to be the minimum of all Lim_model_u :

$$Lim_model_{up} = \min(Lim_model_1; \dots; Lim_model_n)$$

If $Priority_up = \max$, Lim_model_{up} is the maximum of all Lim_model_u :

$$Lim_model_{up} = \max(Lim_model_1; \dots; Lim_model_n)$$

2.3. In other cases, the CC sets Lim_model_{up} to Lim_prev .

2.4. The CC calculates Lim_model_d as per the following formula:

$$Lim_model_d = (1 - D_perc_d) \times Lim_prev$$

If the following triggering event occurs and rule “d” to decrease the Limits is applied:

- $\forall i \in D_num_d : |SP_i - SP_{i-1}| < D_criteria_d \times Lim_prev$ – i.e. the absolute fluctuation of the Settlement Price in every period of low volatility D_num_d in previous Settlement Periods is less than the previous Limit multiplied by the volatility decrease factor.

The CC may determine more than one rule to decrease Limits. The rule “d” to decrease Limits is a set of parameters ($D_perc_d, D_num_d, D_criteria_d$) determined by the CC.

If $Priority_down = \min$, Lim_model_{down} is to be the minimum of all Lim_model_d :

$$Lim_model_{down} = \min(Lim_model_1; \dots; Lim_model_n)$$

If $Priority_down = \max$, Lim_model_{down} is the maximum of all Lim_model_d :

$$Lim_model_{down} = \max(Lim_model_1; \dots; Lim_model_n)$$

2.5. In any other cases, the CC sets Lim_model_d to Lim_prev .

2.6. Lim_model is determined as follows:

2.6.1. If the following conditions are true at the same time:

- $Lim_model_{up} > Lim_prev$
- $Lim_model_{down} < Lim_prev$,

then $Lim_model = Lim_model_{up}$, if $Priority = up$,

$Lim_model = Lim_model_{down}$, if $Priority = down$.

2.6.2. If the following conditions are true at the same time:

- $Lim_model_{up} > Lim_prev$
- $Lim_model_{down} = Lim_prev$,

then $Lim_model = Lim_model_{up}$.

2.6.3. If the following conditions are true at the same time:

- $Lim_model_{up} = Lim_prev$,
- $Lim_model_{down} < Lim_prev$,

then $Lim_model = Lim_model_{down}$.

2.7. The final Limit is set as follows for Base Contracts and Derivatives outside the group:

$$Lim = \max \left[Lim_model; \frac{MinIM}{2} \times SP \right]$$

2.8. The final Limit is set as follows for Minor Contracts:

$$Lim = Lim(BaseContract) \times Spread$$

3. During the clearing session, the *Limit up* and *Limit down* are calculated for each futures contract as per following formulae:

$$Lim_H = SP + Lim$$

$$Lim_L = SP - Lim$$

4. *Lim* is rounded up to *MinStep*.

III. Monitoring and changing risk parameters during the Settlement Period

1. The following additional risk parameters are used to monitor the adequacy and to change risk parameters *Lim*, *Lim_H* and *Lim_L* during the clearing session:

No	Parameter	Designation
1	Time spent to control the adequacy of the Limit up (Limit down) (in minutes) during the Settlement Period	<i>Th_time</i>
2	Width of the monitoring range (in fractions). Used to control the adequacy of the Price Fluctuation Limit up (Limit down)	<i>Th</i>
3	Minimum share of open interest in the contract vs. open interest in all futures contracts on the same underlying asset regulated by the same Specifications	<i>Th_OI</i>
4	Maximum number of changes of the Limits over the Settlement Period	<i>Max_shift</i>
5	Size of the first increase from the beginning of the Settlement Period (in fractions of the Limit)	<i>Shift_1</i>
6	Size of the second and further increase from the beginning of the Settlement Period (in fractions of the Limit)	<i>Shift_2</i>
7	Current Limit in the Settlement Period	<i>Lim_cur</i>
8	Current price deviation Limit Up and Limit Down	<i>Lim_H_cur</i> , <i>Lim_L_cur</i>

2. The CC increases the Limit for a futures contract during the Settlement Period if the following conditions are met one after another:

- a. At least one non-negotiated working bid/ask in the futures at the price not varying from the Limit up/down by more than *Th* is available in the Exchange's trading system continuously during the *Th_time*.
- b. Number of open positions in the futures is greater than the established minimum *Th_OI* of the total open interest in all futures contracts on the same underlying asset regulated by the same Specifications.

3. If conditions a and b of clause 2, Section III above are true throughout the Settlement Period, the CC notifies the Exchange of the necessity to halt trading in the futures, all same underlying asset futures contracts executed under one Specification, all futures contracts in the same inter-contract spread with the futures contract and all options on futures contracts quoted in this paragraph. In this case, trading is halted for up to fifteen (15) minutes.
4. To trigger a trading halt for the reason given in clause 3 above, the CC sends a relevant notice to the Exchange via the TS.
5. When the Limit is increased for the first time in the Settlement Period, it, the Limit up and Limit down are recalculated as follows:

$$Lim_{cur} = (1 + Shift_1) \times Lim$$

$$Lim_{H_{cur}} = SP + Lim_{cur}$$

$$Lim_{L_{cur}} = SP - Lim_{cur}$$

6. When the Limit is increased for the second (further) time in the Settlement Period, the Limit Up and Limit Down are recalculated as follows:
 - a. If prices rise:

$$Lim_{L_{cur}} = Lim_L$$

$$Lim_{H_{cur}} = PI + (1 + Shift_2) \times Lim_{cur}$$

- b. If prices fall:

$$Lim_{H_{cur}} = Lim_H$$

$$Lim_{L_{cur}} = SP - (1 + Shift_2) \times Lim_{cur}$$

7. When the Limit increased for the second (further) time in the Settlement Period, it is recalculated as follows:

$$Lim_{cur} = \frac{(Lim_{H_{cur}} - Lim_{L_{cur}})}{2}$$

8. The CC changes the Limits for Minor Contracts as follows after changing the Limits for the Base Contract:

$$Lim_{cur} = Lim_{cur}(BaseContract) \times Spread$$

$$Lim_{H_{cur}} = SP + Lim_{cur}$$

$$Lim_{L_{cur}} = SP - Lim_{cur},$$

unless the Limit for the Minor Contract has already been increased more times than the Limit for the Base Contracts.

9. After increasing the Limit, the CC sends to the Exchange a notice to allow trading resumption.
10. The Price Fluctuation Limit may be increased no more than *Max_shift* times in the Settlement Period for a specific futures contract.

11. *Limit_cur* is rounded up to *MinStep*.

IV. Particular features of determining risk parameters for RUONIA futures contracts during the clearing session

1. The following additional risk parameters are used to determine *Lim*, *Lim_H* and *Lim_L* for RUONIA futures contracts during the clearing session:

№	Parameter	Designation
1	Tick size, set in the futures contract specifications	<i>R</i>
2	Tick value, set in the futures contract specifications	<i>W</i>
3	Notional value, set in the futures contract specifications	<i>N</i>
4	Time to the last trading day for the futures contract (in fractions of a calendar year), calculated as a number of calendar days in the given period divided by 365.	<i>T</i>
5	Limit decrease start time, set by the Clearing Centre (in fractions of a calendar year), calculated as a number of calendar days in the given period divided by 365.	<i>T_{max}</i>
6	Limit decrease end time, set by the Clearing Centre (in fractions of a calendar year), calculated as a number of calendar days in the given period divided by 365.	<i>T_{min}</i>
7	Limit decrease velocity, set by the Clearing Centre	<i>α</i>

2. If for the futures contract $T > T_{max}$ during the clearing session, then the Limit (inclusive of an initial (first) value of the Limit) for such contracts is calculated as follows on the Contract's first trading day:

$$Lim = \frac{1}{2} \cdot N \cdot MinIM \cdot T_{max} \cdot \frac{R}{W}$$

3. If for the futures contract $T \leq T_{max}$, then the Limit for such contracts is calculated as follows during the interim clearing session:

$$Lim = \frac{1}{2} \cdot IM \cdot \frac{R}{W},$$

where

$$IM = N \cdot MinIM \cdot ((T_{max} - T_{min}) \cdot \varphi^\alpha + T_{min}),$$

$$\varphi = \min(\max\left(\frac{T - T_{min}}{T_{max} - T_{min}}; 0\right); 1),$$

The Limit for such futures contract as determined during the evening clearing session is equal to the Limit calculated during the previous interim clearing session.

4. *Lim* is rounded up to *MinStep*.

5. During the clearing session, the *Limit up* and *Limit down* are calculated for each futures contract as per following formulae:

$$Lim_H = SP + Lim$$

$$Lim_L = SP - Lim$$

6. *Spread* for RUONIA futures contract *i* is calculated as follows during the clearing session:

$$Spread = \frac{Lim_i}{Lim(BaseContract)},$$

where

Lim_i means the Limit for the futures contract *i*, calculated during the current clearing session as per paragraph 2 of this section; and

Lim(BaseContract) means the Limit for the base futures contract calculated during the current clearing session as per paragraph 2 of this section.

V. Other provisions

1. The Limit may be changed during and beyond the clearing session, and beyond the Settlement Period based on the decision of the CC unless the Clearing Rules provides otherwise.
2. If the Limit is changed due to paragraph 1 of this section, the CC sets also the value *Lim* of the Limit.
3. If the Limit is changed due to paragraph 1 of this section before the start of the main trading session on the Moscow Exchange Derivatives Market, the value *Lim_prev* of the Limit to be applied in the next clearing session is set equal to the value *Lim* as specified in paragraph 2 of this section.
4. If the Limit is changed due to paragraph 1 of this section before the start of the main trading session on the Moscow Exchange Derivatives Market, the CC notifies clearing members of the change by publishing the relevant notification on the CC's website and/or in the TS at least 15 minutes before the start of the session.