APPROVED

By CCP NCC Management Board

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Chairman

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CCP NCC MARGIN CALCULATION PRINCIPLES FOR DERIVATIVES

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Article 1.   Definitions

Clearing Center – CCP NCC.

Clearing rules – CCP NCC Clearing rules including Part I. Common part and Part IV. Clearing rules for derivatives.

Instrument – a futures contract on a certain underlying asset and with a certain maturity and/or an option.

Exchange – Moscow Exchange.

Group of instruments – a futures contract and an option if available, on that futures. The group's underlying asset is the futures contract.

Intermonth spread – the group of futures contracts on the same underlying asset that show correlated prices. The list of available intermonth spreads and futures contracts in an intermonth spread are determined by the Clearing Center.

Inter-contract spread – the group of futures contracts on different underlying assets that show correlated prices. The list of available inter-contract spreads and futures contracts in an inter-contract spread are determined by the Clearing Center.

Principles – CCP NCC Margin Calculation Principles for Derivatives.

Option series – options on the same underlying asset and with the same last Trading Day.

Terms in this document are as defined in Russian law, Clearing Rules, specifications for the Instruments and Trading Rules.

The following key risk parameters are used in the Principles:

No	Parameter	Sign
1	The settlement price of a futures contract	P
2	The settlement price of the underlying asset at the end of the clearing session as converted to match the dimension of the futures contract according to the Moscow Exchange Derivatives Market	$Spot$
3	The underlying asset of the futures contract	$БА$
4	Minimum initial margin rate of the 1, 2 or 3 level It is set by the Clearing Center individually for each underlying asset	$MR1, MR2, MR3$
5	Concentration limit of the 1 or 2 level It is set by the Clearing Center individually for each underlying asset	$LK1, LK2$
6	Interest risk rates in percent per annum. Determined by the Clearing Center individually for every underlying asset for every key point $m = 1, …, M$	$IR(БА,m)$
7	The upside/downside risk rate to implied volatility. It is set by the Clearing Center individually for each underlying asset and each key point $m = 1, …, M$.	$VR(БА)$
8	The implied volatility surface twist risk factor. It is set by the Clearing Center individually for each underlying asset and key point $m = 1, …, M$	$VVR(БА)$
9	The number of the volatility curves.	$VolatNum(БА)$

	Set by the Clearing Center	
10	The number of settlement periods for which exercise scenarios are applied to calculate initial margin for positions recorded on the position register section Set by clearing members	*NClrToDelivery*
11	The number of settlement periods for which exercise scenarios are applied to calculate initial margin for positions of the brokerage firm Set by clearing members	*NClrToDeliveryBF*
12	The number of settlement periods for which exercise scenarios are applied to calculate initial margin for positions of the settlement code It is set by the Clearing Center	*ExpClearingSA*
13	Parameter of the weight for factoring the exercise risk with respect to the position register sections	W.cl
14	Parameter of the weight for factoring the exercise risk with respect to positions of a brokerage firm	W.br
15	The premium for FX volatility Procedure for calculating the premium is set by the Clearing Center	R
16	Minimum margin for selling a naked option. It is set by the Clearing Center as a proportion of the market risk rate MR1	SOMC(БА)
17	Premium on the minimum margin for selling a naked option. It is set by clearing members in respect of the position register section. Possible value range from 0 to 5 inclusive.	SOMC(БА,7kk)
18	Half-width of the scenarios range factoring inter-contract spreads to calculate initial margin for the settlement code It is set by the Clearing Center	window_size
19	A price scenario for the futures contract	F_{scen}

Values of the risk parameters are published on the Clearing Center's website.

Article 2.   Summary

2.1.   These Principles set out major rules and approaches applied to calculate the Initial Margin.

2.2.   The algorithm is based on a scenario approach.

It implies that each group of Instruments has a range of scenarios for the Instruments' price parameters:

- The futures contract price;

- Interest rate curve;

- Implied volatility of the futures contract.

Each scenario is a specific combination of the above-mentioned inputs.

2.3. Profit/loss from closing out all positions in the Instruments in the group at the prices of the scenario is calculated per each scenario.

2.4. The size of the Initial Margin per contract is called the Basic Size of the Initial Margin.

2.5. The Basic Size of the Initial Margin is determined for futures and option contracts.

2.6. The Basic Size of the Initial Margin is calculated for one futures contract bought and one futures contract sold. The values are transmitted to the Workstations and Gateways as well as published on MOEX's website.

2.7. The Basic Size of the Initial Margin is calculated for one option bought and one option sold across all options. The values are transmitted to the Workstations and Gateways as well as published on MOEX's website.

2.8. In addition to values calculated under Clause 2.7 above, the Initial Margin is also calculated with regard to all option contracts for one sold option covered by the underlying futures contract (one call option sold covered by one futures contract bought or one put option sold covered by one futures contract sold). This value is referred to as the Initial Margin for the synthetic position. It is transmitted to the Workstations and Gateways of Member Firms and published on MOEX's website.

Article 3.   Scenario design; treatment of exercise risk

3.1. The futures contract price scenarios are determined by the minimum IM rates. They are a set of equally spaced points (scenarios) each of which is the futures contract's price.

At the end of the clearing session, a range of scenarios is determined within the range $[P - MR1 \cdot Spot; P + MR1 \cdot Spot]$

The following scenarios are added for positions exceeding concentration limits LK1 or LK2 to the extent of the excess in the concentration limits:

$[P - MR2 \cdot Spot]$ and $[P + MR2 \cdot Spot]$, $[P - MR3 \cdot Spot]$ and $[P + MR3 \cdot Spot]$

3.1.1. The Minimum IM rates for a futures contact is set by the Clearing Center.

3.1.2. The Minimum IM rate for a futures contract is expressed as the proportion of the Settlement Price of the underlying assets. It is set by the Clearing Center before the Exchange offers the futures contract for trading and published on the Clearing Center's website.

3.1.3. The procedure for revising the Minimum IM rates is set out in the Clearing Rules and Derivatives Market Risk Parameters Methodology.

3.2. Scenarios for interest rate curves show forecasts for the curve move up or down for each key term. The scenarios are designed based on IR(БА) pre-determined for key points. The IR(БА) rates may be changed throughout the Settlement Period in accordance with the Moscow Exchange Derivatives Market Risk Parameters Methodology.

3.3. Scenarios to forecast changes in implied volatility of futures contracts are a range of volatility curves comprising of:
- A volatility curve determined as per the Moscow Exchange Derivatives Market Risk Parameters Methodology, and
- Volatility curves derived from the curve mentioned above by increasing it by scenarios calculated based on *VR(БА)* subject to the option price monotonicity at the strikes.

The option price is determined under MOEX's Methodology for the Option Theoretical Value and Delta based on the price and implied volatility of the underlying futures.

3.4. Scenarios for the implied volatility surface twist forecast the surface twists up or down at each key term. They are determined based on VVR(БА) pre-determined for key points.

3.5. Option exercise scenarios can be considered along with the futures contract price scenarios.

3.5.1. Scenarios to forecast changes in the underlying futures price at option exercise (exercise scenarios) are a range of scenarios for option exercise.

Exercise scenarios are considered for options with the expiration date other than that of the underlying futures.

Exercise scenarios complement futures price scenarios and volatility scenarios. Exercise scenarios are determined within the following range:

$$[P - 0.5 \cdot MR1 \cdot Spot; P + 0.5 \cdot MR1 \cdot Spot]$$

Only price scenarios for the underlying futures are taken that are spaced from the exercise scenario by no more than $L = 0.5 \cdot MR1 \cdot Spot$.

3.6. The Clearing Center sets the number of scenarios described in clauses 3.1-3.4 above.

3.7. To determine the IM for positions recorded on a certain position register section, exercise scenarios are accounted for starting from NClrToDelivery*Settlement Periods before the expiration date of the option.

Number NClrToDelivery of Settlement Periods in which the exercise scenarios are accounted for is set by the Clearing Member.

3.7.1. To determine the IM for positions of a Brokerage Firm, exercise scenarios are accounted for starting from NClrToDeliveryBF*Settlement Periods before the expiration date of the options.

NClrToDeliveryBF is set by the Clearing Member as a common value across all position register sections registered for the Brokerage Firm including those registered through the submission of the relevant application to the Clearing Center by the Clearing Member.

3.7.2. To determine the IM for a Settlement Code, exercise scenarios are accounted for starting from ExpClearingSA*Settlement Periods before the expiration date of the options.

Number ExpClearingSA of Settlement Periods in which the exercise periods are accounted for is set by the Clearing Center.

3.7.3. If exercise scenarios are accounted for a certain option, profit/loss from closing out the positions is calculated with respect to implied volatility scenarios and futures price scenarios as per clauses 3.1-3.4 above, as well as profit/loss from closing out the positions is calculated with respect to exercise scenarios as per clauses 3.7.3.1-3.7.3.3 above.

3.7.3.1. If the call option's strike price is lower than the underlying futures price in a specific scenario, profit/loss from closing out the position in the futures that was opened at the price being equal to the strike price, is calculated for all futures price scenarios.

If the call option strike price is greater than the underlying futures price in a specific scenario, profit/loss from closing out the position is set to zero for all futures price scenarios.

Futures price scenarios are determined according to clause 3.1 above.

3.7.3.2. If the put option's strike price is lower than the underlying futures price in a specific scenario, profit/loss from closing out the position is set to zero for all futures price scenarios.

If the put option's strike price is greater than the underlying futures price in a specific scenario, profit/loss from closing out the position in the futures that was opened at the price being equal to the strike price, is calculated for all futures price scenarios.

3.7.3.3. Futures price scenarios are determined as per clauses 3.1-3.5 above. Any case given in clauses 3.7.3.1 and 3.7.3.2 above is subject to the following rule:

profit/loss is diminished/increased by the option position price if the position is in surplus/deficit.

Article 4. Aggregation of positions for IM purposes; rules for accounting for calendar spread and exercise risk parameters

4.1. To calculate the IM per Settlement Code, the position in each instrument is determined by summing up positions on the position register sections.

4.2. To calculate the IM per Brokerage Firm, positions on the position register sections may be grouped according to one of the following rules:

4.2.1. The aggregation rule called Netting implies that the position is determined as per clause 4.1 above,

4.2.2. The aggregation rule called Half-Nettingimplies that the Brokerage Firm's position is not determined. Risks are determined per positions on the position register sections and summing up as per clause 5.7.9 below.

4.3. The aggregation rule is chosen by the Clearing Member per Brokerage Firm through the submission of the application.

4.4. To calculate the IM per Brokerage Firm, either the Netting or Half-Nettingrule to treat calendar spreads can be set. The rule for treating calendar spread per Brokerage Firm is set by the Clearing Member by means of an application.

4.5. The Half-Nettingrule for accounting for calendar spreads is applied to calculate the IM for positions on the position register sections.

4.6. To include exercise risk, the Clearing Member should set values for W.br and W.cl by means of an application.

Article 5. Principles of IM calculation

5.1. This article set out how IM is calculated if the Netting and Half-Nettingrules for accounting for calendar spreads are applied. Clause 5.7.4. below sets out what further calculations are needed if the Half-Nettingrule is applied.

5.2. Profit/loss from closing out a position in a futures contract is determined as the amount of the variation margin the Clearing Member will pay or receive once the position is closed at the scenario price of the futures contract.

5.3. If the Clearing Member has ticked "No discount on futures" on the position register section, the price of positions to buy the futures contract priced lower than the contract's Settlement Price, is set to the Settlement Price.

The price of positions to sell the futures contract priced higher than the contract's Settlement Price, is set to the Settlement Price.

The "No discount on futures" flag is optional for each client (position register section) of the Clearing Member.

5.4. Profit/loss from closing out a position in an option is determined as the amount of the variation margin the Clearing Member will pay or receive at closing the contract. That variation margin is calculated based on the scenario price and implied volatility of the underlying futures contract. When the IM is calculated at the position register section level, the following rules apply:

5.4.1. If positions are closed out with respect to "type=put/call" options sold and recorded on the position register section, the minimum profit/loss is calculated as follows:

$$-SOMC(БА,7kk)*SOMC(БА)*P*MR1*vol(БА,type),$$

Where vol(БА,type) is the short position in the put/call option less long positions in put/call options of the same series and the short/long position in the underlying futures contract.

5.5. Groups with off-spread and spread positions are created as per the following rule:

- The off-spread group comprises instruments other than that in the Inter-month or Inter-contract spread;

- The spread group comprises instruments from the same Inter-month or Inter-contract spread.

Cash-settled futures contracts are included into the off-spread group two settlement periods before the settlement date by virtue of the decision of the Clearing Center.

5.6. This method of calculation of the IM for positions recorded on the same position register section is applied if the Clearing Member ticks the relevant option in the Trading System. The option may be enabled or disabled at the Clearing Member's client (position register section) level.

5.7. The IM for positions calculated as per Article 4 above is determined as follows:

5.7.1. Profit/loss for a position in the instrument is calculated based on combinations of futures price scenarios and implied volatility scenarios; futures price scenarios and interest rate scenarios; futures price scenarios and implied volatility surface twist scenarios:

Scenario	**Futures contract price scenarios group**
Volatility scenarios group	The first group of combined scenarios
Interest rate curve scenarios group	The second group of combined scenarios
Implied volatility twist scenarios group	The third group of combined scenarios

5.7.2. Profit/loss is calculated for a position in every Instrument by using the first, second and third groups of combined scenarios. The profit calculated for orders is set to zero.

5.7.3. Profit/loss for the positions and orders in the futures contract and the options on the futures is summed up in every combined scenario. The loss is summed up and the profit is ignored for the third group for instruments with different settlement dates.

5.7.4. If the IM is determined based on the Half-Netting rule for calendar spreads, the following operations are also made: profit/loss from the first scenarios group and the lowest profit/loss from the second and third groups are summed up. Losses are accounted for and profits are ignored for the purpose of further calculations.

5.7.5. Profit/loss is calculated for a group of contracts in the Intermonth Spread:

5.7.5.4. Profit/loss from the first group of combined scenarios is summed up,

5.7.5.5. Losses or zero results are summed separately based on the second and third groups.

5.7.6. Profits/losses are summed across the first, second and third groups.

5.7.7. Profit/loss is calculated for a group of contracts in the Inter-Contract Spread:

5.7.7.6. When the IM is calculated for a Brokerage Firm and the position register, profits are set to zero.

5.7.7.7. When the IM is calculated for a Settlement Code, profit/loss for every futures price scenario F_{scen} is determined by choosing the worst value of the range

$[F_{scen}$-window_size*Spot*MR1;F_{scen}+window_size*Spot*MR1].

5.7.7.8. Profits/losses are summed in each scenario F_{scen}-.

5.7.8. Profits are set to zero.

5.7.9. If profit/loss is calculated for positions recorded on a Brokerage Firm and the Half-Netting rule for account aggregation is applied, profits/losses calculated as per clause 5.7.6 above are summed with respect to positions on the position register.

5.7.10. The ancillary factor $IM_{volORexp}$ (subject to exercise scenarios) and/or IM_{vol} (regardless the exercise scenarios) is calculated as the absolute value of the minimum profit/loss calcaulted as per clauses 5.7.6-5.7.8 above.

5.7.11. Profit/loss for a group of contracts in the Intermonth and/or Inter-contract spread is set to the following value with respect to positions recorded on the Settlement Code:

- $IM_{vol,}$ if exercise scenarios are ignored;
- $IM_{volORexp,}$ otherwise.

5.7.12. Profit/loss for a group of contracts in the Inter-Month and/or Inter-Contract spread is set to the following value with respect to positions on Brokerage Firms and position register sections:

$$W \cdot IM_{volORexp} + (1-W) \cdot IM_{vol.}$$

W equals

- W.cl, if the value has been set. It is set by the Clearing Member per position register section;

- W.br, if the value has been set and W.cl has not been set per position register section. W.br is set by the Clearing Member for every position register sections of the same Brokerage Firm;

- 0, if the Clearing Member has not set other values for W.cl and W.br.

5.7.13. The IM for a position recorded on the position register section/Brokerage Firm/Settlement Code is the sum of profits/losses from all off-spread position groups and profits/losses from all spread groups. The IM is calculated subject to Article 6 below.

Article 6. Special provisions about the calculation of initial margin and variation margin for Instruments with the tick value determined through FX rates

6.1. The IM rate is increased by the FX risk premium (R) for groups of Instruments with the tick value determined with the use of exchange rates of currencies other than the currency of the Russian Federation.

6.2. If the Variation Margin is calculated in the intraday clearing session for positions in the Instruments specified in clause 6.1 above, the IM is increased by the absolute value of the Variation Margin for those Instruments multiplied by FX risk premium R.

6.3. If trades in Instrument specified in clause 6.1 above are executed in the Settlement Period to decrease the absolute value of the position, the IM is increased by the absolute value of the Variation Margin multiplied by FX risk premium R.

Article 7. Special provisions about the calculation of initial margin per position register section

7.1. The following signs are used in this Article:

No	Parameter	Sign
1	Available funds per position register section as per clause 7.1.1 below	$money\_free(cl)$
2	Initial Margin per position on the position register section	$money\_blocked(\mathbf{cl})$
3	Trading limit determined as per the Clearing Rules	TLr
4	Variation Margin per position register section for trades executed to decrease the absolute value of the position	$vm\_close(\mathbf{cl})$
5	Premium as per clause 7.3 below	$R\_reserve(\mathbf{cl})$
6	Position register section	cl
7	Order limit coefficient It is set by the Clearing Center	$ReserveCoeff$
8	Value calculated as per the Clearing Rules	SZ_R
9	Initial Margin after order placement	Gr
10	Initial Margin before order placement	$Gr(t\text{-}1)$
11	Initial Margin for an order submitted	$G(order)$

7.2. If the conditions set out in clause 7.3.1 is true in the trading session with respect to a position register section, the Clearing Center calculates SZr assuming that Gr= $Gr(t-1) + G(order)$, if SZr was negative.

7.2.1. These conditions are true at the same time with respect to a position register section:

- $SZr < 0$

- $Gr > 0$

- $ReserveCoeff * max(0, TLr - vm\_close(cl)) < R\_reserve(cl) - vm\_close(cl)$

7.3. The Clearing Center calculates the Client Limit on the Clearing Member's instruction to validate the order. In this case, $R\_reserve(cl)$ is:

- Is determined as per clauses 6.2 and 6.3 above for Instruments with the tick value set by using FX rates;

- 0 for other Instruments.