

APPROVED

By CCP NCC Management Board

As of 10 September 2020 (Minutes No 40)

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Chairman

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**CCP NCC MARGIN CALCULATION PRINCIPLES FOR DERIVATIVES**

**Moscow  
2020**

## Article 1. Definitions

**Clearing Center** – CCP NCC.

**Clearing rules** – CCP NCC Clearing Rules comprising 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.

**Calendar spread/Intermonth spread** – the group of futures contracts on the same underlying asset that show correlated prices. The list of available Calendar Spreads and futures contracts in a Calendar 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** – these 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	$NormalizedSpot(UA, Num)$
3	The underlying asset of the futures contract	$UA$
4	The number of the futures contract. The contracts on the same underlying asset are numbered in ascending order of the last trading date.	Num
5	Minimum initial margin rate of the 1, 2 or 3 level. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	$MR1(UA), MR2(UA), MR3(UA)$
6	Upward risk surcharge to the minimum margin rate of the 1 <sup>st</sup> level. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	$MRaddonUp(UA, Num)$
7	Downward risk surcharge to the minimum margin rate of the 1 <sup>st</sup> level. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	$MRaddonDown(UA, Num)$
8	Concentration limit of the 1 or 2 level. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	$LK1(UA), LK2(UA)$
9	Interest risk rates in percent per annum. Determined for every key point $m = 1, \dots, M$	$IR(UA, m)$

	It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	
10	The upside/downside risk rate to implied volatility. It is set each key point $m = 1, \dots, M$ .	$VR(UA)$
11	The implied volatility surface twist risk factor. It is set by the Clearing Center individually for each underlying asset and key point $m = 1, \dots, M$ . It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	$VVR(UA)$
12	The number of the volatility curves. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	$VolatNum(UA)$
13	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	$NClrToDelivery(UA)$
14	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	$NClrToDeliveryBF(UA)$
15	The number of settlement periods for which exercise scenarios are applied to calculate initial margin for positions of the settlement code. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	$ExpClearingSA(UA)$
16	Parameter of the weight for factoring the exercise risk with respect to the position register sections. Set by clearing members.	W.cl
17	Parameter of the weight for factoring the exercise risk with respect to positions of a brokerage firm. Set by clearing members	W.br
18	The premium for FX volatility. Procedure for calculating the premium is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	R
19	Minimum margin for selling a naked option. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	SOMC(UA)
20	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(UA,7kk)
21	Half-width of the scenarios range factoring inter-contract spreads to calculate initial margin for the settlement code. It is set in accordance with the CCP NCC Risk Parameters Methodology for the Moscow Exchange Derivatives Market	window_size(UA)
22	A price scenario for the futures contract	$F_{scen}$
23	The theoretical price of a call option	Call
24	The theoretical price of a put option	Put
25	Exercise price of an option	Strike
26	An option pricing model, which is either The Black Model or Bachelier Model. It is set in accordance with the Methodology for the calculation of option theoretical price and delta.	OptionModel(UA)

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  $[P - MR1 \cdot NormalizedSpot(UA, Num); P + MR1 \cdot NormalizedSpot(UA, Num)]$

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

**$[P - MR2 \cdot NormalizedSpot(UA, Num)]$  and  $[P + MR2 \cdot NormalizedSpot(UA, Num)]$ ,  $[P - MR3 \cdot NormalizedSpot(UA, Num)]$  and  $[P + MR3 \cdot NormalizedSpot(UA, Num)]$**

3.1.1. The Minimum IM rates for a futures contract 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(UA) pre-determined for key points. The IR(UA) rates may be changed in the Settlement Period in accordance with the CCP NCC Risk Parameters Methodology for Moscow Exchange Derivatives Market and in or outside the clearing session outside the Settlement Period by virtue of the Clearing Center's decision unless otherwise set out in the Clearing Rules.

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  $VR(UA)$  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 in accordance with the option pricing model (OptionModel(UA)).

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  $VVR(UA)$  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:

$$[P - 0.5 \cdot MR1 \cdot NormalizedSpot(UA, Num); P + 0.5 \cdot MR1 \cdot NormalizedSpot(UA, Num)]$$

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

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  $NClrToDelivery \cdot Settlement\ Periods$  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 and inter-contract spreads 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 (the Position Aggregation Rule called "Netting").
- 4.2. To calculate the IM per Settlement Code, the Inter-Contract Spread Rule called "Netting" and Calendar Spread Rule called "Netting" are applied.

- 4.3. To calculate the IM per Brokerage Firm, positions on the position register sections may be grouped according to one of the following rules:
  - 4.3.1. The aggregation rule called Netting implies that the position is determined as per clause 4.1 above,
  - 4.3.2. The aggregation rule called Half-Netting implies 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.
- 4.4. The aggregation rule is chosen by the Clearing Member per Brokerage Firm through the submission of the application.
- 4.5. To calculate the IM per Brokerage Firm, the following rules may apply:
  - 4.5.1. the Calendar Spread Rule called "Netting" or "Half-Netting".
  - 4.5.2. The Inter-Contract Rules called "Netting" or "Half-Netting".

The Calendar Spread Rule and the Inter-Contract Spread Rule are set per Brokerage Firm by the Clearing Member by means of an application.
- 4.6. The Half-Netting Calendar Spread Rule and the Half-Netting Inter-Contract Spread are applied to calculate the IM for positions on the position register sections.
- 4.7. 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 sets out how IM is calculated if the Netting and Half-Netting Rules for Calendar and Inter-Contract Spreads are applied. Clause 5.7.4. below sets out what further calculations are needed if the Half-Netting rule 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:

**$-\text{SOMC}(\text{UA},7\text{kk}) * \text{SOMC}(\text{UA}) * \text{NormalizedSpot}(\text{UA},\text{Num}) * \text{MR1} * \text{vol}(\text{UA},\text{type}),$**

UAUAUAWhere  $\text{vol}(\text{UA},\text{type})$  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 Calendar or Inter-contract spread;
  - The spread group comprises instruments from the same Calendar or Inter-contract spread.
- The futures contracts are included into the off-spread group some Settlement Periods or days 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:

<b>Scenario</b>	<b>Futures contract price scenarios group</b>
<b>Volatility scenarios group</b>	The first group of combined scenarios
<b>Interest rate curve scenarios group</b>	The second group of combined scenarios
<b>Implied volatility twist scenarios group</b>	The third group of combined scenarios

The second group of combined scenarios includes Downward/Upward Risk Surcharges to the Minimum Margin Rate of the 1<sup>st</sup> level ( $\text{MRaddonUp}(\text{UA},\text{Num}), \text{MRaddonDown}(\text{UA},\text{Num})$ ).

- 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 with respect to the first group of combined scenarios: 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. Profit/loss for the second and third groups of combines scenarios is set to zero.
- 5.7.5. Profit/loss is calculated for a group of contracts in the Calendar 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:

5.7.7.1. Where the the Half-Netting Inter-Contract Spread Rule applies , profits are set to zero.

5.7.7.2. Where the Netting Inter-Contract Spread Rule applies, profit/loss for every futures price scenario  $F_{scen}$  is determined by choosing the worst value of the range

$[F_{scen} - \text{window\_size} * \text{NormalizedSpot}(\text{UA}, \text{Num}) * \text{MR1}; F_{scen} + \text{window\_size} * \text{NormalizedSpot}(\text{UA}, \text{Num}) * \text{MR1}]$ .

5.7.7.3. 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 calculated as per clauses 5.7.6-5.7.8 above.

5.7.11. Profit/loss for a group of contracts in the Calendar 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 Calendar 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	Trading limit determined as per the Clearing Rules	<i>TLr</i>
2	Variation Margin per position register section for trades executed to decrease the absolute value of the position	<i>vm_close(cl)</i>
3	Premium as per clause 7.3 below	<i>R_reserve(cl)</i>
4	Position register section	<i>cl</i>
5	Order limit coefficient It is set by the Clearing Center	<i>ReserveCoeff</i>
6	Value calculated as per the Clearing Rules	<i>SZr</i>
7	Initial Margin after order placement	<i>Gr</i>
8	Initial Margin before order placement	<i>Gr(t-1)</i>
9	Initial Margin for an order submitted	<i>G(order)</i>

- 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.