

LCH.Clearnet SA Listed Derivatives

Additional margin: Liquidity & Concentration Risk Margin Principles

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Note: acronyms and specific terms used in the slides are defined in the glossary at the end of the presentation

1. Definition and scope

❖ Liquidity and Concentration Risk Margin (LCRM)

LCRM is to cover the risk generated by the inability to neutralise a Clearing Member concentrated or illiquid position within the standard Holding Period in Business As Usual (BAU) market conditions.

❖ This risk is mitigated by using two indicators:

✓ Comparison of the Clearing Member's net delta equivalent positions at Combined Commodity (CC) level with the **Delta Equivalent Market Daily Average Traded Volume (DEMDATV)**, considering all the available derivatives contracts on the same CC.

This calculation is used for a "liquidity indicator" approach.

✓ Comparison of the Clearing Member's net delta equivalent positions at Combined Commodity (CC) level with the **Delta Equivalent Market Open Interest (DEMOI)**, considering all the open derivatives contracts on the same CC (Futures and Options separately).

This calculation is used for a "concentration indicator" approach.

➤ Additional margin requirements are calculated by using the maximum of these two risk exposures.

❖ Scope of products for Listed Derivatives (Financial and Commodity contracts):

- All eligible contracts cleared by the CCP
- MATIF and MONEP are considered separately

2. “Liquidity Indicator”

Margin Calculation Principles & Methodology

- **The main principle** is to compare the Member net delta equivalent position at Combined Commodity level with the **Delta Equivalent Market Daily Average Traded Volume (DEMDATV)**, considering all available derivatives contracts on the same Combined Commodity.

- **The methodology**
 - ✓ assess the number of days required to liquidate this position without generating any market abnormal movements
 - ✓ using **25%* of the DEMDATV** that could be traded on the market on a daily basis, considering a 60 business days look back period

- **The margin calculation considers**
 - ✓ the potential **required delay** to liquidate the position on each Combined Commodity, compared to the standard holding period
 - ✓ the standalone Initial Margin at Combined Commodity level calculated by the SPAN® methodology

- For each corresponding position, at the Clearing Member **Margin Accounts' level**, a LCRM calculation is performed.

() Parameters are reviewed at least annually*

2. “Concentration Indicator”

Margin Calculation Principles & Methodology

- **The main principle** is to compare the Members’ net delta equivalent position, at combined commodity level with the **Delta Equivalent Market Open Interest (DEMOI)**, considering all available derivatives contracts on the same combined commodity, using Futures and Options contracts separately.

- **The methodology**
 - ✓ assess the number of days required to liquidate this position without generating any market abnormal movements
 - ✓ using **5%* of the DEMOI** as a daily liquidation, at combined commodity level, considering futures and options contracts separately

- **The margin calculation considers**
 - ✓ the potential **required delay** to liquidate the position per combined commodity, at contract level, compared to the standard holding period
 - ✓ the UPSR parameter, at contract level, used for the SPAN[®] Initial Margin calculation

- For each corresponding position, at the Clearing Member **Margin Accounts’ level**, a LCRM calculation is performed.

() Parameters are reviewed at least annually*

3. “Liquidity Indicator”

Margin Calculation - Formulas

- Calculation of the Net Delta Equivalent Position at Combined Commodity Level:

$$\mathbf{Delta\ Position}_{Underlying\ asset}^{Contract\ Type} = CN \times CVF \times \mathbf{Delta\ Coefficient}$$

$$\mathbf{Net\ Delta\ Position}_{CC} = \sum_{\substack{\text{All Contracts} \\ \text{related to the} \\ CC}} \mathbf{Delta\ Position}_{Underlying\ asset}^{Contract\ Type}$$

where CN is the number of a specific contract at Member’s level

- Calculation of the DEMDATV (Delta Equivalent Market Daily Average Traded Volume) at Combined Commodity (CC) level is the average of the Daily Delta Volume at CC level:

$$DEM\Delta TV_{CC} = \frac{1}{N} \sum_{t \in \text{last } N \text{ days}} \sum_{\substack{\text{Contract} \in CC \\ \Delta > 0}} \text{MarketVolume}_t^{\text{Contract}} \times \Delta_{\text{Asset}}^{\text{Contract}}$$

where N is the number of days with an open position over the last 60 days

- For each Combined Commodity, calculation of the new Holding Period (HP^{new}):

$$HP_{CC}^{new} = \text{Max} \left(\frac{|\mathbf{Net\ Delta\ Position}_{CC}|}{25\% \times DEM\Delta TV_{CC}}; HP^{standard} \right)$$

where **HP^{standard}** is the standard holding period, i.e. 3-day close out

The new Holding Period is capped at 8 business days*

(*) Parameters are reviewed at least annually

- For each Margin Account, calculation of the LCRM for the “liquidity indicator” approach at Combined Commodity level:

$$LCRM_{CC}^{Volume} = CC\text{Margin}^{standalone} \times \left(\sqrt{\frac{HP_{CC}^{new}}{HP^{standard}}} - 1 \right)$$

3. “Concentration Indicator”

Margin Calculation - Formulas

- For each Combined Commodity, calculation of the Delta Equivalent Market Open Interest (**DEMOI**) for Futures and for Options:

$$DEMOI_{CC}^{Futures\ contracts} = \sum_{\substack{\text{All Futures} \\ \text{Contracts} \\ \text{on the CC} \\ \text{in the market}}} CN^{Contract\ type} \times CVF^{Contract\ type} \times |\Delta\ Coefficient^{Contract\ type}|$$

$$DEMOI_{CC}^{Options\ contracts} = \sum_{\substack{\text{All Options} \\ \text{Contracts} \\ \text{on the CC} \\ \text{in the market}}} CN^{Contract\ type} \times CVF^{Contract\ type} \times |\Delta\ Coefficient^{Contract\ type}|$$

where $CN_{CC}^{Contract\ Type}$ is the number of open contracts in the market for a specific contract type on the underlying Combined Commodity

- For each Combined Commodity, calculation of the Market Open Interest Ratios at Combined Commodity level:

$$Market\ Open\ Interest\ Ratio_{CC}^{Futures\ Contracts} = \frac{Net\ Delta\ Position_{CC}^{Futures\ contracts}}{DEMOI_{CC}^{Futures\ contracts}}$$

$$Market\ Open\ Interest\ Ratio_{CC}^{Options\ Contracts} = \frac{Net\ Delta\ Position_{CC}^{Options\ contracts}}{DEMOI_{CC}^{Options\ contracts}}$$

- For each Combined Commodity, calculation of the new Holding Periods (HP^{new}):

$$HP_{Futures-CC}^{new} = Max\left(\frac{Market\ Open\ Interest\ Ratio_{CC}^{Futures\ Contracts}}{5\%*}; HP^{standard}\right)$$

$$HP_{Options-CC}^{new} = Max\left(\frac{Market\ Open\ Interest\ Ratio_{CC}^{Options\ Contracts}}{5\%*}; HP^{standard}\right)$$

The new Holding Period is capped to 8 business days*

(*) Parameters are reviewed at least annually

3. “Concentration Indicator” Margin Calculation - Formulas

- For each Margin Account, calculation of the LCRM for each Future contract and for each Option contract:

$$LCRM_{Account}^{CC-Open Interest \text{ Future } i} = CN_{CC}^{Future \ i} \times CVF_{CC}^{Future \ i} \times \text{Delta Coefficient}_{CC}^{Future \ i} \times UPSR_{Future \ i} \times \left(\sqrt{\frac{HP_{new}^{Futures-CC}}{HP_{standard}}} - 1 \right)$$

$$LCRM_{Account}^{CC-Open Interest \text{ Option } i} = CN_{CC}^{Option \ i} \times CVF_{CC}^{Option \ i} \times \text{Delta Coefficient}_{CC}^{Option \ i} \times UPSR_{Option \ i} \times \left(\sqrt{\frac{HP_{new}^{Options-CC}}{HP_{standard}}} - 1 \right)$$

where $CN_{CC}^{Contract \ Type}$ is the number of open contracts in the market for a specific contract type on the underlying Combined Commodity

- For each Margin Account, calculation of the LCRM on the Open Interest for a given Combined Commodity use the “concentration indicator” approach and is defined as the sum of all LCRM on the CC:

$$LCRM_{CC}^{open \ Interest} = \sum_{\text{All Futures on the CC}} LCRM_{future \ i}^{open \ interest} + \sum_{\text{All Options on the CC}} LCRM_{option \ i}^{open \ interest}$$

4. Aggregated LCRM

□ For each Combined Commodity, an aggregated final LCRM is calculated at Clearing Member level (i.e. Margin Account) and is based on the maximum of the two risk amount calculations based on the two approaches (Traded Volume and Open Interest):

$$LCRM_{CC} = \text{Max}(LCRM_{CC}^{\text{Volume}}; LCRM_{CC}^{\text{Open Interest}})$$

□ For each Margin Account of a Clearing Member, an aggregated final LCRM is calculated by summing up the LCRMs of each Combined Commodity:

$$LCRM_{\text{Margin Account}} = \sum_{\text{All } CC_i} LCRM_{CC_i}$$

5. LCRM Margins calls

➤ Monthly LCRM:

- ✓ The monthly LCRM is based on **the LCRM daily average of the previous month** (including all business days)
- ✓ It will be effectively called if its amount is **positive and above** the materiality threshold
- ✓ The monthly LCRM is called the same day as the Default Fund contribution: **4th business day of the month**

Monthly LCRM Threshold = 100k€

➤ Daily LCRM:

- ✓ The Additional Margin due to LCRM is calculated daily based on the previous COB positions
- ✓ When the daily uncovered LCRM exceeds the last month LCRM + a daily LCRM materiality threshold, then a daily additional margin requirement is performed as follows:
 - If $(\text{Daily LCRM Calculation} - \text{LCRM}_{\text{latest month}}) > \text{Daily LCRM Threshold}$
then the difference is called as additional daily LCRM to mitigate such uncovered risk
 - If $(\text{Daily LCRM Calculation} - \text{LCRM}_{\text{latest month}}) < \text{Daily LCRM Threshold}$
then no additional Daily LCRM is required

Daily LCRM Threshold = Min [5Mln€; Max(10% x Daily Initial Margin ; 100k€)]

➤ Timing and treasury report:

- ✓ The LCRM call (monthly or daily one) is done during the regular intraday margin call.
- ✓ The LCRM amount will be visible under the 'Additional margins' tab of the AC102E treasury report.

Appendix - Glossary

Terms	Definition
CC	Combined Commodity is a set of contracts having the same underlying instrument. Please, refer to latest Risk Notice for the list of Combined Commodities: http://www.lchclearnet.com/risk_management/sa/risk_notices/
CCMargin ^{standalone}	The Combined Commodity Standalone Margin. This corresponds to the Initial Margin associated for the member's position on the underlying Combined Commodity
CVF	Contract Value Factor
DEMDATV	Delta Equivalent Market Daily Average Traded Volume
DEMOI	Delta Equivalent Market Open Interest
MDATV	Market Daily Average Traded Volume
UPSR	Underlying Price Scanning Range

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