LME Base metals Margin Calculations

LMEClear
An HKEX Company

Margin Calculations

Overview

- SPAN (Standard Portfolio Analysis of Risk*) is a portfolio based margining system that incorporates both futures and options and calculates the net Initial Margin requirement. SPAN considers how the value of an entire portfolio of options and futures will respond to changes in futures (or underlying) prices and volatilities. SPAN simulates potential market moves and calculates the profit or loss on individual contracts. LME Clear uses 16 scenarios in its SPAN calculation. The scanning risk is the worst-case loss of a portfolio.

- Initial margin (IM) = Scanning Risk + Inter-prompt Spread - Inter-contract Credit

- On the LME forward contracts, profits and losses are not realised until the prompt date. The Variation Margin needs to be discounted, as it is the present value to cover possible losses in the future (DCVM). An appropriate discount factor in the relevant currency is applied to the gain or loss in that currency i.e. variation margin for each contract. All VM is netted to US Dollars after discounting at each individual currency level. Netting is performed on present values by using the spot rate in the currency concerned.

- Options on the LME are margined using Net Liquidation Value (NLV).

  Net Liquidation value = price of option x contract size x number of lots

- Total margin requirement = IM - DCVM – NLV + Additional Margin

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Scanning Risk calculation

Overview

- **Scanning Risk =**

Scanning Range	**X**	Net Position	**X**	Discount Factor

- LME profits and losses on the majority of contracts are not realised until the prompt date, therefore the Scanning Risk is discounted to get the present value of the Initial Margin that would be required on the prompt date.

Example

A portfolio has a 5 lot position in a metal which has a scanning range of $1820

Scanning Risk = scanning range (per lot) x net position x discount factor = 1820 x 5 x 0.996412 = $9,067

Scanning Risk calculation

Illustration

Using a portfolio containing Aluminium Alloy (AAD) and Copper (CAD) positions:
Long 20 AAD - Expiry 31/10/17 - Discount Factor 0.999195
Short 15 AAD - Expiry 31/10/17 - Discount Factor 0.999195
Long 10 CAD - Expiry 31/10/17 - Discount Factor 0.999195

Scanning ranges: AAD $2,380; CAD $12,525

- Net delta for AAD positions = net position x discount factor= 5 x 0.999195 = 4.995975

- IM for AAD positions = scanning range x net delta = 2380 x 4.995975 = $11,890

- IM for CAD positions = 12525x 10 x 0.999195 = $125,149

=> **Total IM = $11,890 + $125,149 = $137,039**

Inter-prompt spread charge calculations

Illustration

A portfolio contains three positions:

A. Long 60 Lead Futures Expiry 31/10/2017 - Discount Factor = 0.999195
B. Short 30 Lead Futures Expiry 30/11/2017   - Discount Factor = 0.998232
C. Short 20 Lead Futures Expiry 30/04/2018 - Discount Factor = 0.99254

- If today is 01/10/2017, the positions are allocated as follows:
  - A to tier 2
  - B to tier 3
  - C to tier 5
- The spread charges per tonne (contract size is 25) are as follows:
  2 vs 3 = $21
  2 vs 5 = $30
- **The lower charge is applied first.**
- Inter-month spread charge for 2 vs 3= spread charge per lot x net delta = 21 x 25 x 30 x 0.998232= **$15,722**
- Inter-month spread charge for 2 vs 5= 30 x 25 x 20 x 0.99254= **$14,888**
- As there is still some delta remaining that cannot be used as part of an inter-month spread, the remaining delta of 10.15394 will need to be fully margined at the full scanning range for lead, which is $5,000 per lot.
- Scanning risk = 5,000 x 10.1539 = **$50,769**

  => Total IM = $15,722 + $14,888 + $50,769 = $81,379

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