Classification: Public

LME Base metals Margin Calculations

SETTING THE GLOBAL STANDARD

Margin Calculations

Overview

- Initial margin (IM) = Scanning Risk + Inter-prompt Spread - Inter-contract Credit
- 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.
- Total requirement = IM - DCVM – NLV + Additional Margin
- On the LME, 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

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Scanning Risk calculation

Overview

- **Scanning Risk =**

- 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 in line with the variation margin calculation.

Example

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

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

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Scanning Risk calculation

Multiple contract example

Product	Expiry	Long/Short	Position	Scanning Range per lot	Discount Factor
AH	15/12/2021	Long	20	4925	0.999625
CA	15/12/2021	Short	15	15275	0.999625

- Scanning Risk for AH position = 4,925 x 20 x 0.999625 = $98,463
- Scanning Risk for CA position = 15,275 x 15 x 0.999625 = $229,039

=> **Total IM = $98,463 + $229,039 = $327,502**

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Inter-prompt spread charge calculations

Illustration

Product	Expiry	Long/Short	Position	Discount Factor
AH	19/01/2022	Long	20	1.000000
AH	16/02/2022	Short	15	1.000000
AH	15/06/2022	Short	5	1.000000

Aluminium HG (AH)											
Tier Number	Start	End	Tiers	1	2	3	4	5	6	7	8
1	Cash	1 week	1	24	37	39	44	63	114	170	170
2	1 week + 1day	1 month	2		22	22	28	56	113	170	170
3	1 month + 1day	2 month	3			11	19	50	111	168	168
4	2 month + 1day	3 month	4				13	47	109	166	166
5	3 month + 1day	9 month	5					36	102	163	163
6	9 month + 1day	27 month	6						84	160	160
7	27 month + 1day	63 month	7							91	100
8	63 month + 1day	123 month	8								44

- If today is 07/12/2021, the positions are allocated as follows:
  - 19/01/2022 to tier 3
  - 16/02/2022 to tier 4
  - 15/06/2022 to tier 5
- The spread charges per tonne (contract size is 25) are as follows:
  3 vs 4 = $19
  3 vs 5 = $50
- **The lower charge is applied first.**
- Inter-month spread charge for 3 vs 4 = spread charge per tonne x lot size x spread position
  = 19 x 25 x 15 = **$7,125**
- Inter-month spread charge for 3 vs 5 = 50 x 25 x 5 = **$6,250**

=> Total IM = $7,125 + $6,250 = $13,375

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