**Theoretical Intermarket
Margin System (TIMS®) Methodology**

**ENCORE Risk Based Haircuts (RBH) and
Customer Portfolio Margin (CPM) User Guide**

**Version 1.16
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Contents

Theoretical Intermarket Margin System (TIMS) Methodology Overview

The Risk Based Haircut (RBH) and Customer Portfolio Margin (CPM) methodologies may be used to calculate theoretically based capital charges as set forth within SEA net capital rule 15c3-1 and customer account margin requirements as set forth in FINRA Rule 4210. The OCC Theoretical Intermarket Margin System (TIMS®) methodology applies option pricing theory and portfolio theory to positions involving listed options for the computation of capital charges and margin requirements.

Under this risk-based method, option pricing theory is utilized to project portfolio liquidating values under various potential market scenarios. Portfolios may consist of positions in options, stocks, futures, and options on futures with offsets provided between positions on the same underlying instrument or on different highly correlated underlying instruments. Option positions can include equity, index, and currency products. In customer portfolio margin accounts futures and currency options are not permitted.

OCC utilizes several pricing models depending on the product being priced. For American style options a proprietary derivation of the Cox-Ross-Rubinstein binomial option pricing model is used to calculate projected liquidating prices. For European style options a Black Scholes model is used. Projected prices are calculated based upon the closing underlying asset price for each day with plus and minus price moves at ten equidistant data points over a broad range of market movement.

For broker-dealers other than non-clearing specialists and/or market makers, the appropriate percentages of the daily market price of the underlying are +/-15% for equities, narrow-based indexes, and non-high capitalization diversified indexes, +/-10% for high capitalization diversified indexes, +/-6% for major market foreign currencies, and +/-20% for all other currencies. For non-clearing specialists, market makers, and customers, the percentages of the daily market price of the underlying are +/-15% for equities and narrow-based indexes, +6/-8% for high capitalization diversified indexes, and +/-10% for non-high capitalization diversified indexes. For market maker accounts +/-4.5% is the market move percentage for major market foreign currencies and +/-20% for all other currencies.

The implied volatility curve is specific to an option's underlying security and maturity and is unchanged at potential market scenarios in the calculation of projected prices for that option. OCC utilizes SOFR (Secured Overnight Financing Rate) for interest rate determination, and utilizes forecasted dividends provided by a third-party vendor. For securities that do not have forecasted dividends, OCC projects forward the most recently announced dividend frequency and amount.

Prices for all instruments are projected, and the resulting profits and losses of the portfolio are summed to estimate the projected aggregate gain or loss at the underlying price move.

Profit and loss values are aggregated first at the class group level, then the product group level, and finally at the portfolio group level, if the positions are part of product groups that are contained in a portfolio group.

A Class Group contains options, futures, and equities relating to the same underlying instrument. Within a class group 100% of a position's gain at any one valuation point is allowed to fully offset another position's loss at the same valuation point.

Other offsets are provided within product groups and portfolio groups. A Product Group contains class groups whose underlying securities exhibit a high degree of historical price change correlation. Product groups are comprised of closely related broad-based index or sector index class groups. Portfolio groups consist of closely related product groups. Not all product groups are contained in a portfolio group.

In the case of index options and their related instruments, where offset by a qualified stock basket is available (as defined in Appendix A of the net capital rule), there will be a 95% offset between the basket and the net gains and losses of the class group. A minimum charge of 5% of the market value of the basket for high capitalization indexes or 7.5% of the market value of the basket for non-high capitalization indexes will be applied if the net risk is less than the minimum charge.

The largest projected loss for the entire class group, product group, or portfolio group over the range of ten potential market scenarios is the required risk charge for a portfolio.

To account for liquidation risk, a minimum charge of $0.25 per contract for noncustomers and $0.375 for customers multiplied by the contract multiplier is applied when the class, product, or portfolio group reflects less market exposure than the group's total minimum charge.

OCC computes and makes available the theoretical profit and loss values for all listed option series, OCC cleared futures, OCC cross margined products, and the related underlying instruments at the end of each trading day. An accounts' open positions and the theoretical values can be combined to compute the appropriate margin requirement or capital charge.

RBH and CPM Documents

Documentation, products lists, parameters, and other information related to the RBH and CPM programs can be found on the RBH and CPM Documentation page of the OCC website www.theocc.com **> Risk Management > RBH and CPM Documentation**.

https://www.theocc.com/Risk-Management/RBH-and-CPM-Documentation

Product Group Parameters

For a current list of product groups and parameters being used by OCC for RBH and CPM, see the RBH/CPM Product Groups file at www.theocc.com **> Risk Management > RBH and CPM Documentation > RBH/CPM Product Groups**

https://www.theocc.com/Risk-Management/RBH-and-CPM-Documentation

Valid Basket Codes

For the valid basket codes being used by OCC, see the Valid RBH and CPM Basket Codes file at www.theocc.com **> Risk Management > RBH and CPM Documentation > Valid RBH and CPM Basket Codes**

https://www.theocc.com/Risk-Management/RBH-and-CPM-Documentation

OCC Contact List

Member Services and OCC Help Desk

If you have questions or comments, please contact your Member Services representative or the OCC Help Desk at one of the following:

800-621-6072 or 800-544-6091 (U.S.)
800-424-7230 (Canada)
312-322-6200 (outside U.S.)
memberservices@theocc.com

Options Industry Council
options@theocc.com

Pricing and Margins
PricingandMargins@theocc.com

OCC Profit & Loss Values File Descriptions

Types of Profit & Loss Values Files

OCC is the provider of profit & loss values for the Risk Based Haircut and Customer Portfolio Margin methodologies used for Theoretical Intermarket Margin System (TIMS) calculations and margin requirements.

RBH and CPM users can acquire the profit/loss data via an SFTP transmission consisting of FIXML files of profit & loss values, contract data, prices, and calculation parameters. Contact OCC Member Services to acquire the files.

FIXML File Description

OCC provides FIXML Risk Based Haircut/Customer Portfolio Margin output files for nightly download. For record layout, message structures, samples, and data service mappings please see the *ENCORE DDS Guide – Risk Based Haircuts / Customer Portfolio Margining (RBH/CPM)*:

https://www.theocc.com/Risk-Management/RBH-and-CPM-Documentation

Theoretical Intermarket Margin System (TIMS) Calculations

Key Components

- <u>Firm Open Positions</u> – Positions to be used in the TIMS calculations.

- <u>Profit/Loss Values</u> – The projected aggregate gain or loss at each of the ten equidistant data points which represent the underlying price move.

- <u>Scenarios</u> – Scenarios are each of the 10 underlying price points. The P&L value at each price point is multiplied with the position quantity resulting in 10 profit/loss scenarios for the position.

- <u>Class Group</u> – A combination of products that derive their value from the same underlying security or index.

- <u>Product Group</u> – A combination of class groups that have highly correlated underlying instruments. Gains and losses of included class groups may be offset at a certain percentage.

- <u>Portfolio Group</u> – A combination of product groups whose gains and losses may be offset.

- <u>Offset Percentage</u> – The percentage of offset calculated between a position's gain at any one valuation point and a closely related position's loss at the same valuation point.

- <u>Minimum Charge</u> – This charge is used to account for liquidation risk in low-risk portfolios. It is the minimum requirement for each option or future.

- <u>Basket Minimum</u> – The percentage of a stock basket's net market value that is lowest risk amount required for the basket.

- <u>Risk Charge</u> – The largest projected portfolio loss over the market scenarios at the relevant level of totaling (portfolio, product, or class group).

- <u>Net Minimum Charge</u> – The sum of each position minimum haircut aggregated at the class, product, or portfolio level.

- <u>Account Requirement</u> – The greater of the Risk Charge and the Minimum Charge.

Calculate Profit/Loss Scenarios

Options, Futures, and Stocks

For options (equity, index, or future), futures, and stock positions that are not a part of a basket, apply the appropriate profit/loss values to the position quantity to calculate per contract a potential profit/loss scenario:

$$\text{Profit/loss Scenario}^N = (\text{Profit/Loss Value}^N \text{ times Quantity})$$

Where:
- Quantity is equal to the position quantity: positive for long and negative for short positions.
- N relates to each profit/loss scenario that is calculated based on one of the 10 equidistant projected price moves. (N=1…N=10)
- Profit/Loss Value is equal to each of the ten PROFIT/LOSS VALUE fields found on the PROFIT/LOSS VALUE RECORD. Ten values exist per record.

Baskets

For Stock positions that are a part of a basket, the calculation is as follows:

$$\text{Profit/Loss Scenario}^N = (\text{Price times Percentage}^N) \text{ times (quantity)}$$

Where:
- Price is equal to the current market value.
- Percentage is equal to the product group market move per each of the 10 equidistant price moves. See Basket Stock Moves described below.
- Quantity is equal to the position quantity: positive for long and negative for short positions
- N relates to each profit/loss scenario that is calculated based on one of the 10 equidistant projected price moves. (N=1...N=10)

Basket Stock Moves:
- Each individual basket stock profit/loss must be calculated using the corresponding market move percentages of the related index/class group being processed. To accomplish this, match the BASKET ID from the position to the PRODUCT GROUP RECORD field called PRODUCT GROUP that corresponds to the class group of the basket ID.

- If a match is not found, verify the BASKET ID and contact OCC to report an error. See the OCC Contact List.
- If a match is found use the PRODUCT GROUP field to match to the PRICE MOVE RECORD field associated with the PRODUCT GROUP ID.ID.
- If a match is found the percentages are equal to the +/- 10 MOVE PERCENTS of the product group.

Currency Spots and Forwards

- Match a position to the PROFIT/LOSS VALUES RECORD by matching on the SYMBOL field. The position must contain a valid OCC Currency SYMBOL with the PRODUCT TYPE set to 'X' in order to match the correct PROFIT/LOSS VALUE RECORD. This record will be used to provide data values required for subsequent steps outlined below.
- If a match is NOT found, contact OCC to report an error.
- If a match is found, the profit/loss calculation for Currency Spots and Forwards is as follows:

  Profit loss scenario^N = (price times percentage^N) times (quantity)

  Where:
- Price is equal to the CURRENT MARKET VALUE divided by the SPOT CURRENCY DIVISOR; both values can be found on the PROFIT/LOSS VALUES RECORD matched in a previous step.
- Percentage is equal to the 10 price moves, see special spot/forward information described below
- Quantity is equal to the position quantity
- N relates to each profit/loss scenario that is calculated based on one of the 10 percentages corresponding to 10 equidistant projected price moves. (N=1... N=10)

Special spot/forward information:

- Obtain the PRODUCT GROUP ID for the currency spot or forward contract from the PROFIT/LOSS VALUES RECORD and store for use in selecting the appropriate price move percentages.

  o If a match is found, the percentages are equal to the +/- 10 PRODUCT GROUP PRICE MOVE values

  o If a match is NOT found, use the default +/- 10 CURRENCY PRICE MOVE percentages.

Unmatched Positions

Special information when no match is found on the profit/loss file:

- If there is no match found on the profit/loss file for an Option or Future product, verify the position and if necessary contact the OCC to report an error.

- If there is no match on the profit/loss file for a stock position that is not a part of a basket, the calculation is as follows:

Profit loss scenario^N = (price times percentage^N) times (quantity)

Where:
- Price is equal to the current market value from the position record
- Percentage is equal to the 10 price moves, see special stock info described below
- Quantity is equal to the position quantity, positive for long and negative for short positions
- N relates to each profit/loss scenario that is calculated based on one of the 10 percentages corresponding to 10 equidistant projected price moves (N=1, ... , N=10)

Special stock info:

If the stock is NOT a part of a basket:

- Product group will be equal to the default value of 00999
- The market move Percentage is equal to +/- 5 EQUITY default PRICE MOVE values.

Requirement Calculations

The explanation of the TIMS calculations has been segmented into two sections:

1. Totaling Overview at the Class, Product, and Portfolio Group Levels - outlines the steps to be taken to calculate the minimum charge, risk charge, and actual charge.

2. Totaling Calculations - outlines the individual calculations that are used in the totaling at the different levels: Class, Product, and Portfolio Group. These calculations use the 10 profit/loss scenarios that were calculated for each position, as outlined in the previous section.

Portfolio and product group offset and minimum values to be used in the calculations can be found in the RBH/CPM Parameters File.

Totaling Overview at the Class, Product, and Portfolio Group Levels

Class Group Level Haircut Calculations

- For each Class Group:
- Calculate Class Group Sum
- At the Class Group Level:
- Calculate the Minimum Charge Value
- Calculate the Risk Charge Value
- Determine the Actual Charge Value
- Calculate the Product Group Charge
- Calculate the Account Gross Charge Value

Product Group Level Haircut Calculations

- For each Class Group:
- Calculate Class Group Sum
- At the Product Group Level:
- Calculate Product Group Gains
- Calculate Product Group Losses
- Calculate Product Group Offset
- Calculate the Minimum Charge Value
- Calculate the Risk Charge Value
- Determine the Actual Charge Value
- Calculate the Account Gross Charge Value

Portfolio Group Level Haircut Calculations

These calculation steps are for product groups that do have a match on the PORTFOLIO GROUP RECORD.

- For each Class Group:
- Calculate Class Group Sum
- For each Product Group:
- Calculate Product Group Gains
- Calculate Product Group Losses
- Calculate Product Group Offset
- At the Portfolio Group Level:
- Calculate Portfolio Group Gains
- Calculate Portfolio Group Losses
- Calculate Portfolio Group Offset
- Calculate the Minimum Charge Value
- Calculate the Risk Charge Value
- Determine the Actual Charge Value
- Calculate the Account Gross Charge Value

Totaling and Offset Calculations

Class Group Sum

Class Group Sum

CALCULATION is a straight sum (adding gains and losses together) for each of the 10 profit/loss amounts calculated for each position within the class group.

$$\text{CLASS GROUP SUM}^N = \text{profit/loss scenario}^{X,N}$$

Where:

- $\underline{X}$ refers to the number of positions within the class group
- $\underline{N}$ refers to the profit/loss scenario (N = 1,...,10) corresponding up/down price movements
- Profit/loss scenario is defined in Section IV B.

Stock Basket Total

CALCULATION is a straight sum for the 10 scenarios of the profit/loss amounts calculated for each stock within the basket.

- CLASS GROUP SUM^N = profit/loss scenario^{X,N}

where:

- $\underline{X}$ refers to each stock position within the index basket
- $\underline{N}$ refers to the profit/loss scenario (N = 1,...10) corresponding up/down price movements
- Profit/loss scenario is defined in Section IV B
- Basket total gains are haircut by 5% prior to offset with class group totals

Product Group Gains, Losses, and Offset

Product Group Gains

CALCULATION is the total of all positive CLASS GROUP SUM values at each of the 10 profit/loss scenarios for each class group within the product group.

PRODUCT GROUP GAINS^N = class group sum$^{N(1)}$ + ... + Class group sum$^{N(Y)}$

Where:

- $\underline{Y}$ refers to the number of positive class group sum values within the product group at a given profit/loss scenario
- $\underline{N}$ refers to the profit/loss scenario (N = 1,...,10) corresponding up/down price movements

Product Group Losses

CALCULATION is the total of all negative CLASS GROUP SUM values at each of the 10 profit/loss scenarios for each class group within the product group.

PRODUCT GROUP LOSSES^N = class group sum$^{N(1)}$ + ... + Class group sum$^{N(Z)}$

Where:

- Z refers to the number of negative class group sum values within the product group at a given profit/loss scenario
- N refers to the profit/loss scenario ($N = 1,...,10$) corresponding up/down price movements

Product Group Offset

Based on the product group gains and losses and the OFFSET value that is found on the PRODUCT GROUP AND BASKET RECORD.

If the PRODUCT GROUP GAINS^N $\geq$ (PRODUCT GROUP LOSSES^N divided by OFFSET):

PRODUCT GROUP OFFSET^N = PRODUCT GROUP GAINS^N minus (PRODUCT GROUP LOSSES^N divided by OFFSET)

If the PRODUCT GROUP GAINS^N < (PRODUCT GROUP LOSSES^N divided by OFFSET):

PRODUCT GROUP OFFSET^N = (PRODUCT GROUP GAINS^N times OFFSET) minus PRODUCT GROUP LOSSES^N

Where:

- N refers to the profit/loss scenario ($N = 1,...,10$) corresponding up/down price movements
- OFFSET -- match the product group from the positions to the PRODUCT
GROUP AND BASKET RECORD field called PRODUCT GROUP
- If a match is found, use the OFFSET value
- If a match is not found, use the OFFSET from the default record.

Portfolio Group Gains, Losses, Offset

Portfolio Group Gains

CALCULATION is the total of all positive PRODUCT GROUP OFFSET values at each of the 10 profit/loss scenarios for each product group within the portfolio group.

PORTFOLIO GROUP GAINS^N = product group offset$^{N(1)}$ + ... + product group offset$^{N(Y)}$

> Where:

- $\underline{Y}$ refers to the number of positive product group offset values within the portfolio group at a given profit/loss scenario
- $\underline{N}$ refers to the profit/loss scenario (N = 1,...,10) corresponding up/down price movements

Portfolio Group Losses

CALCULATION is the total of all negative PRODUCT GROUP OFFSET values at each of the 10 profit/loss scenarios for each product group within the portfolio group.

> PORTFOLIO GROUP LOSSES^N = product group offset$^{N(1)}$ + ... + product group offset$^{N(Z)}$

> Where:

- $\underline{Z}$ refers to the number of negative product group offset values within the portfolio group at a given profit/loss scenario
- $\underline{N}$ refers to the profit/loss scenario (N = 1,...,10) corresponding up/down price movements

Portfolio Group Offset

Based on the portfolio group gains and losses and the PORTFOLIO OFFSET value that is found on the PORTFOLIO GROUP RECORD (#5).

If the PORTFOLIO GROUP GAINS^N $\geq$ (PORTFOLIO GROUP LOSSES^N divided by PORTFOLIO OFFSET):

> PORTFOLIO GROUP OFFSET^N = PORTFOLIO GROUP GAINS^N minus (PORTFOLIO GROUP LOSSES^N divided by OFFSET)

If the PORTFOLIO GROUP GAINS^N < (PORTFOLIO GROUP LOSSES^N divided by PORTFOLIO OFFSET):

> PORTFOLIO GROUP OFFSET^N = (PORTFOLIO GROUP GAINS^N times PORTFOLIO OFFSET^N)
>
> minus PORTFOLIO GROUP LOSSES^N

Where:

- N refers to the profit/loss scenario (N = 1,...,10) corresponding up/down price movements
- PORTFOLIO OFFSET - match the portfolio group from the positions to the PORTFOLIO GROUP RECORD (#5) field called PORTFOLIO GROUP
- If a match is found, use the PORTFOLIO OFFSET value
- If a match is NOT found, use the PORTFOLIO OFFSET from the default record

Minimum Charges

Class Group Minimum Haircut

Total of the quantity from each position times the minimum for each option and future position within the class group.

CLASS GROUP MINIMUM HAIRCUT = (quantity^1 times minimum) + ... + (quantity^X times minimum)

Where:

- X refers to the number of positions within the class group
- Quantity is always a positive value for both long and short positions
- Minimum is found on the PROFIT & LOSS VALUES RECORD (#6)

There are two minimum requirements on the RBH/CPM Theoretical File. One is for customer positions (CUSTOMER MINIMUM VALUE) and the other for noncustomer positions (Noncustomer MINIMUM VALUE). The Interval distinction id on the position record controls this process.

If the extended option price of a long option position is less than the minimum contract value on the profit/loss file use the extended option price in place of the minimum contract value.

The basket minimum is equal to the sum of all stock values within the basket times the percentage taken from the basket minimum percentage field (BSKTMINPCT).

Product Group Minimum Haircut

Equals the total of the CLASS GROUP MINIMUM HAIRCUTs for each class group within the product group.

> PRODUCT GROUP MINIMUM HAIRCUT = sum of every CLASS GROUP MINIMUM within the product group

Portfolio Group Minimum Haircut

Equals the total of the PRODUCT GROUP MINIMUM HAIRCUTs for each product group within the portfolio group.

> PORTFOLIO GROUP MINIMUM HAIRCUT = sum of every PRODUCT GROUP MINIMUM within the portfolio group

Risk, Actual, Account, Firm Gross Haircut

Risk Charge

VALUE is equal to the largest negative value calculated as follows:

- If totaling at the CLASS GROUP LEVEL
  > RISK HAIRCUT VALUE = the largest negative CLASS GROUP SUM value

- If totaling at the PRODUCT GROUP LEVEL
  > RISK HAIRCUT VALUE = the largest negative PRODUCT GROUP OFFSET value

- If totaling at the PORTFOLIO GROUP LEVEL
  > RISK HAIRCUT VALUE = the largest negative PORTFOLIO GROUP OFFSET value

Actual Charge

VALUE is the largest value of either the RISK CHARGE VALUE or the MINIMUM CHARGE calculated at each specific level of totaling.

- If totaling at the CLASS GROUP LEVEL

  ACTUAL CHARGE VALUE = the largest value of either the RISK CHARGE VALUE calculated at this level of totaling or the CLASS GROUP MINIMUM CHARGE

- If totaling at the PRODUCT GROUP LEVEL

  ACTUAL CHARGE VALUE = the largest value of either the RISK CHARGE VALUE calculated at this level of totaling or the PRODUCT GROUP MINIMUM CHARGE

- If totaling at the PORTFOLIO GROUP LEVEL

ACTUAL CHARGE VALUE = the largest value of either the RISK CHARGE VALUE calculated at this level of totaling or the PORTFOLIO GROUP MINIMUM CHARGE

Account Gross Charge

VALUE is the total of all ACTUAL CHARGE VALUEs calculated within the account.

Firm Gross Charge

VALUE is the total of all ACCOUNT CHARGE VALUEs calculated within the firm.

Calculation Examples

The following are examples of TIMS calculations.

Clearing Firm
Account C
BBIDX
Product Group 9
Class Group 18

Symbol	Type	Series / Contract	Expiration	Strike	C/P	Quantity	Price	NAV	Requirement	Minimum	-5	-4	-3	-2	-1	1	2	3	4	5	
SPX	O	12/16/2022	12/16/2022	4,000	C	1	$12,031	$12,031		-$37.50	-$8,714	-$7,573	-$6,164	-$4,462	-$2,445	$1,887	$4,063	$6,431	$8,989	$11,730	
SPY	S					500	$384	$192,045			-$15,364	-$12,291	-$9,218	-$6,146	-$3,073	$2,305	$4,609	$6,914	$9,218	$11,523	Note 1
							Class Group Totals	$204,076		-$38	-$24,078	-$19,864	-$15,382	-$10,608	-$5,518	$4,192	$8,672	$13,345	$18,207	$23,253	

Class Group 15

Symbol	Type	Series / Contract	Expiration	Strike	C/P	Quantity	Price	NAV	Requirement	Minimum	-5	-4	-3	-2	-1	1	2	3	4	5	
IWV	O	2/17/2023	2/17/2023	220	C	10	$1,690	$16,903		-$375	-$8,906	-$7,447	-$5,836	-$4,071	-$2,156	$1,546	$3,263	$5,055	$6,917	$8,848	
IWV	O	2/17/2023	2/17/2023	225	C	(20)	$1,419	-$28,383		-$750	$15,732	$13,226	$10,420	$7,310	$3,895	-$2,802	-$5,946	-$9,248	-$12,702	-$16,304	
IWV	O	2/17/2023	2/17/2023	230	C	10	$1,148	$11,480		-$375	-$6,775	-$5,736	-$4,550	-$3,215	-$1,726	$1,250	$2,669	$4,172	$5,757	$7,422	
							Class Group Totals	$0		-$1,500	$51	$43	$34	$24	$13	-$6	-$14	-$21	-$28	-$34	Note 2

											-5	-4	-3	-2	-1	1	2	3	4	5	
							Product Group 9 Gains				$51	$43	$34	$24	$13	$4,192	$8,672	$13,345	$18,207	$23,253	Note 3
							Product Group 9 Losses				-$24,078	-$19,864	-$15,382	-$10,608	-$5,518	-$6	-$14	-$21	-$28	-$34	
							Product Group 9 Decreased Gains				$46	$39	$31	$22	$12	$3,773	$7,805	$12,011	$16,386	$20,928	
							Product Group 9 Increased Losses				-$26,753	-$22,071	-$17,091	-$11,787	-$6,131	-$7	-$16	-$23	-$31	-$38	
Product Group 9 Offset %			90%				Product Group 9 Total	$204,076		-$1,538	-$24,032	-$19,825	-$15,351	-$10,586	-$5,506	$4,185	$8,656	$13,322	$18,176	$23,215	
							Portfolio Group BBIDX Gains				$0	$0	$0	$0	$0	$4,185	$8,656	$13,322	$18,176	$23,215	
							Portfolio Group BBIDX Losses				-$24,032	-$19,825	-$15,351	-$10,586	-$5,506	$0	$0	$0	$0	$0	
							Portfolio Group BBDX Decreased Gains				-	-	-	-	-	3,558	7,358	11,323	15,450	19,733	
							Portfolio Group BBIDX Increased Losses				(28,273)	(23,324)	(18,060)	(12,455)	(6,478)	-	-	-	-	-	
Portfolio Group BBIDX Offset %			85%				Portfolio Group BBIDX Total	$204,076		-$1,538	-$24,032	-$19,825	-$15,351	-$10,586	-$5,506	$4,185	$8,656	$13,322	$18,176	$23,215	Note 4

USIDX
Product Group 8
Class Group 22

Symbol	Type	Series / Contract	Expiration	Strike	C/P	Quantity	Price	NAV	Requirement	Minimum	-5	-4	-3	-2	-1	1	2	3	4	5	
NDX	O	12/16/2022	12/16/2022	13,000	C	(1)	$25,315	-$25,315		-$37.50	$20,292	$18,018	$15,008	$11,132	$6,267	-$6,865	-$15,295	-$25,037	-$36,108	-$48,497	
QQQ	O	12/16/2022	12/16/2022	300	C	10	$1,268	$12,675		-$37.50	-$9,036	-$7,818	-$6,333	-$4,561	-$2,485	$2,609	$5,628	$8,951	$12,567	$16,457	
							Class Group Totals	-$12,640		-$75	$11,256	$10,200	$8,675	$6,571	$3,782	-$4,256	-$9,667	-$16,086	-$23,541	-$32,040	

Class Group 11

Symbol	Type	Series / Contract	Expiration	Strike	C/P	Quantity	Price	NAV	Requirement	Minimum	-5	-4	-3	-2	-1	1	2	3	4	5	
ONEQ	O	2/17/2023	2/17/2023	50	C	20	$154	$3,070		-$750	-$2,089	-$1,801	-$1,454	-$1,044	-$567	$603	$1,301	$2,076	$2,927	$3,855	
							Class Group Totals	$3,070		-$750	-$2,089	-$1,801	-$1,454	-$1,044	-$567	$603	$1,301	$2,076	$2,927	$3,855	

											-5	-4	-3	-2	-1	1	2	3	4	5	
							Product Group 8 Gains				$11,256	$10,200	$8,675	$6,571	$3,782	$603	$1,301	$2,076	$2,927	$3,855	
							Product Group 8 Losses				-$2,089	-$1,801	-$1,454	-$1,044	-$567	-$4,256	-$9,667	-$16,086	-$23,541	-$32,040	
							Product Group 8 Decreased Gains				$8,442	$7,650	$6,506	$4,928	$2,837	$452	$976	$1,557	$2,195	$2,891	
							Product Group 8 Increased Losses				-$2,785	-$2,401	-$1,939	-$1,392	-$756	-$5,675	-$12,889	-$21,448	-$31,388	-$42,720	
Product Group 8 Offset %			75%				Product Group 8 Total	-$9,570		-$825	$8,471	$7,799	$6,736	$5,179	$3,026	-$3,804	-$8,691	-$14,529	-$21,346	-$29,149	

Product Group 45																				
Class Group 58																				
Symbol	Type	Series / Contract	Expiration	Strike	C/P	Quantity	Price	NAV	Requirement	Minimum	-5	-4	-3	-2	-1	1	2	3	4	5
IWO	O	1/20/2023	1/20/2023	235	C	5	$965	$4,825		-$187.50	-$3,202	-$2,747	-$2,210	-$1,583	-$862	$871	$1,886	$2,999	$4,208	$5,510
IWO	O	1/20/2023	1/20/2023	345	C	10	$2.25	$23		-$22.50	-$21	-$20	-$18	-$14	-$9	$11	$29	$55	$92	$143

Note 5

			Class Group Totals	$4,848		-$210	-$3,223	-$2,767	-$2,228	-$1,597	-$871	$882	$1,915	$3,054	$4,300	$5,653

Label	NAV	Req	Min	-5	-4	-3	-2	-1	1	2	3	4	5
Product Group 45 Gains				$0	$0	$0	$0	$0	$882	$1,915	$3,054	$4,300	$5,653
Product Group 45 Losses				-$3,223	-$2,767	-$2,228	-$1,597	-$871	$0	$0	$0	$0	$0
Product Group 45 Decreased Gains				$0	$0	$0	$0	$0	$662	$1,436	$2,291	$3,225	$4,240
Product Group 45 Increased Losses				-$4,297	-$3,689	-$2,971	-$2,129	-$1,161	$0	$0	$0	$0	$0
Product Group 45 Offset % 75% — Product Group 45 Total	$4,848		-$210	-$3,223	-$2,767	-$2,228	-$1,597	-$871	$882	$1,915	$3,054	$4,300	$5,653
Portfolio Group USIDX Gains				$8,471	$7,799	$6,736	$5,179	$3,026	$882	$1,915	$3,054	$4,300	$5,653
Portfolio Group USIDX Losses				-$3,223	-$2,767	-$2,228	-$1,597	-$871	-$3,804	-$8,691	-$14,529	-$21,346	-$29,149
Portfolio Group USIDX + BBIDX Gains				$8,471	$7,799	$6,736	$5,179	$3,026	$5,067	$10,571	$16,376	$22,476	$28,868
Portfolio Group USIDX + BBIDX Losses				-$27,255	-$22,592	-$17,579	-$12,183	-$6,377	-$3,804	-$8,691	-$14,529	-$21,346	-$29,149
Portfolio Group USIDX Decreased Gains				$4,235	$3,899	$3,368	$2,590	$1,513	$2,534	$5,286	$8,188	$11,238	$14,434
Portfolio Group USIDX Increased Losses				-$54,510	-$45,185	-$35,159	-$24,367	-$12,755	-$7,608	-$17,383	-$29,058	-$42,692	-$58,298
Portfolio Group USIDX Offset % 50% — Portfolio Group USIDX Total	-$4,722		-$1,035	-$23,020	-$18,693	-$14,211	-$9,594	-$4,864	-$1,270	-$3,406	-$6,341	-$10,108	-$14,715
Portfolio Groups Net	$199,354	-$23,020	-$2,573										

Note 6

Product Group 999																				
Class Group ISRG																				
Symbol	Type	Series / Contract	Expiration	Strike	C/P	Quantity	Price	NAV	Requirement	Minimum	-5	-4	-3	-2	-1	1	2	3	4	5
ISRG	O	1/20/2023	1/20/2023	220	C	(10)	$1,142	-$11,424		-$375	$8,360	$7,249	$5,883	$4,240	$2,306	-$2,467	-$5,310	-$8,450	-$11,878	-$15,578
ISRG	O	1/20/2023	1/20/2023	210	P	(5)	$2,348	-$11,738		-$188	-$9,900	-$7,596	-$5,446	-$3,458	-$1,632	$1,537	$2,889	$4,096	$5,166	$6,109
ISRG	S					500	$200	$99,775			-$14,967	-$11,973	-$8,980	-$5,987	-$2,994	$2,994	$5,987	$8,980	$11,973	$14,967
								$76,613	-$16,507	-$563	-$16,507	-$12,320	-$8,543	-$5,205	-$2,320	$2,064	$3,566	$4,626	$5,261	$5,498

Class Group ADM																				
Symbol	Type	Series / Contract	Expiration	Strike	C/P	Quantity	Price	NAV	Requirement	Minimum	-5	-4	-3	-2	-1	1	2	3	4	5
ADM	O	12/16/2022	12/16/2022	90	P	1	$690	$690		-$37.50	$976	$747	$532	$334	$156	-$139	-$256	-$353	-$432	-$495
ADM	S					100	$87	$8,675			-$1,301	-$1,041	-$781	-$521	-$260	$260	$521	$781	$1,041	$1,301
								$9,365	-$325	-$38	-$325	-$294	-$249	-$187	-$104	$121	$265	$428	$609	$806

Note 7

			Product Group 999 Total	$85,978	-$16,832									

Note 8

			Account C Total	$285,332	-$39,852

			Clearing Firm Total	$285,332	-$39,852

Notes:

1. At the class group level, the gains and losses are summed up within each scenario.
2. The larger of the max loss from the 10 scenarios is not evaluated against the per contract minimum charge until aggregating at the portfolio group level, product group level if product group is not in a portfolio group, or at class group level if class group is in product group 999.

3. For each scenario in product group aggregation:
    a. Class group gains are added together.
    b. Class group losses are added together.
    c. If the gain is greater than the absolute value of the loss divided by the offset percentage, then the loss divided by the offset % is taken from the gain; otherwise, the loss is taken from the gain multiplied by the offset %.
4. BBIDX Portfolio scenarios are treated identically as a product group, except class group gains and losses are replaced with product group gains and losses.
    a. Product group total gains are added together.
    b. Product group total losses are added together.
    c. If the gain is greater than the absolute value of the loss divided by the BBIDX offset percentage, then the loss divided by the offset % is taken from the gain; otherwise, the loss is taken from the gain multiplied by the offset %.
5. The minimum charge for a long contract with a price less than the standard minimum charge is equal to the contract price. Short positions always receive the full minimum charge.
6. For USIDX Portfolio Group:
    a. The USIDX product group gains and losses are summed first.
    b. Next, the gains and losses from the BBIDX Totals are added to the USIDX Gains and Losses.
    c. If the gross gain is greater than the absolute value of the gross loss divided by the USIDX offset percentage, then the Total equals the loss divided by the offset % taken from the gain; otherwise, the Total is the loss taken from the gain multiplied by the offset %.
7. The Portfolio Group requirement is the largest scenario loss or the portfolio groups net minimum charge.
8. The requirement for a class group in Product Group 999 is the minimum of scenario losses or the contract minimum.
9. The margin requirements for individual class groups within product group 999 are simply summed.

Revision History

Version	Date	Version Updates
1.4	7/12/2016	• Updated styles and layout • Added Revision History table
1.5	8/16/2016	• Updated to reference both RBH and CPM • Removed all flat files descriptions • Added reference to the FIXML files
1.6	11/1/2016	Revised text under Currency Spots and Forwards on page 11
1.7	July 2018	• Updated OCC logo, styles and footers. • Updated URLs for TheOCC.com website.
1.8	9/3/2019	• Revised Position File Record Layout Detail Record information for strike prices to contain a maximum of six integers. • Updated website URL for valid RBH & CPM basket codes.
1.9	10/16/2019	Added a supplemental Position File Record Layout Detail Record to reflect a future enhancement under consideration in which strike prices may contain a maximum of six integers.
1.10	11/18/2019	Removed supplemental Position File Record Layout Detail Record related to an enhancement which was being considered which would have expanded strike price integers to six digits.
1.11	6/29/2020	Updated theocc.com new website locations and URLs.
1.12	9/30/2021	• Removed reference to FIXML transmission distributed via NDM. • Changed reference to FTP+ to SFTP.
1.13	11/15/2021	For the Foreign Marginable Securities (FMS) Program Decommission, removed the position for the FMS Exchange MIC code in the Position File Description (CSV) layout detail record.
1.14	11/30/2022	• Removed 1-888-OPTIONS phone number reference. • Removed over the counter (OTC) references from the OCC Profit & Loss Values File Descriptions table. • Updated Calculation Examples in the appendix.
1.15	4/11/2023	Removed Position File description.
1.16	3/12/2024	In the "Theoretical Intermarket Margin System (TIMS) Methodology Overview" section, updated information for interest rate determination and forecasted dividends method.