# Regulatory Circular RG15-133

**Date:** **September 29, 2015**

**To:** All Volatility Index Derivatives Market Participants
**From:** Regulatory Services Division
Research and Product Development Department
**Re:** Modified HOSS Opening Procedures and Special Opening Quotation and Settlement
Methodology for Volatility Index Option Contracts

---

**This circular updates CBOE Regulatory Circular RG14-062**

Chicago Board Options Exchange, Incorporated (CBOE) is reissuing this circular in connection with the listing of weekly expirations in CBOE Volatility Index (VIX) options. This circular modifies and replaces CBOE Regulatory Circular RG14-062 by among other things: (1) deleting references to short-term (nine day) volatility index contracts, since those products are no longer listed for trading on CBOE and CBOE Futures Exchange, LLC (CFE); and (2) deleting references to volatility index security futures, since those products are no longer listed for trading on CFE.

\* \* \* \* \*

This circular describes the current modified Hybrid Opening System (HOSS) opening procedures utilized on CBOE for all option series that are used to calculate the exercise / final settlement value for expiring volatility index options and futures contracts. These option series are referred to in this circular as "constituent option series".[1]

## Modified HOSS Opening Procedures and Special Opening Quotation

The exercise / final settlement value for volatility index contracts is a Special Opening Quotation (SOQ) of the respective volatility index calculated from the sequence of opening prices, as traded on CBOE, of a single strip of the constituent option series used to calculate the volatility index on the exercise / final settlement date. The opening price for any constituent option series in which there is no trade on CBOE will be the average of that option's bid price and ask price as determined at the opening of trading.

The opening prices for the constituent option series used in calculating the SOQ are determined through an automated auction mechanism (modified HOSS opening procedures) that matches buy and sell orders residing on the electronic order book prior to the opening of trading. Immediately after the series is opened, but prior to dissemination of an opening bid/ask quote, the mechanism automatically cancels all un-executed "OPG" (Opening) contingency orders. If the first bid disseminated to OPRA by CBOE is 0, the limit price of the best OPG buy order(s) with quantity remaining, if any, will be used as the opening bid in the calculation of the SOQ. As a result, the first market disseminated by CBOE may differ from the bid/ask quote used in the calculation of the SOQ of the respective volatility index. For example, assume a constituent option series has only 1 order to buy, and that order is priced at $.05 (OPG), and the best offer is $0.15. The first market disseminated to OPRA by CBOE would be $0 - $0.15, but the bid/ask quote used to calculate the SOQ would be $.05 - $0.15.

---

[1] Options expire on an expiration date and settle to an exercise settlement value and futures settle on a final settlement date and settle to a final settlement value.

## Expiration / Final Settlement Date for Volatility Index Derivatives

**Standard 30-Day Volatility Index Options and Futures that Expire Monthly**

The expiration / final settlement date for standard 30-day volatility index contracts that expire once a month is on the Wednesday that is 30 days prior to the third Friday of the calendar month immediately following the month in which the option or futures contract expires. If that Wednesday or that third Friday is a CBOE holiday, the expiration / final settlement date for the contract shall be on the CBOE business day immediately preceding that Wednesday.[2]

**Weekly (Non-Standard) 30-Day CBOE Volatility Index Options and Futures**

The expiration date (usually a Wednesday) for weekly (non-standard) 30-day CBOE Volatility Index (VIX) options will be identified explicitly in the expiration date of the product. For weekly (non-standard) VX futures, the final settlement date is on the Wednesday of the week specifically denoted in the ticker symbol of the futures contract.[3] If that Wednesday or the Friday that is 30 days following that Wednesday is a CBOE holiday, the expiration / final settlement date shall be on the business day immediately preceding that Wednesday.[2]

## Order Submission Deadlines for Participation in Modified HOSS Opening Procedures

**Strategy Orders**

On the days that the modified HOSS opening procedures are utilized, all option orders for participation in the modified HOSS opening procedures that are related to positions in, or a trading strategy involving, volatility index options or futures ("strategy order"), and any change to or cancellation of any such strategy order:

1) Must be received prior to 8:15 a.m. (Chicago time) for all constituent option series; and

2) May not be cancelled or changed after 8:15 a.m. (Chicago time), unless the strategy order is not executed in the modified HOSS opening procedures and the cancellation or change is submitted after the modified HOSS opening procedures are concluded. Strategy orders may be changed or cancelled after 8:15 a.m. (Chicago time) and prior to the opening of trading in order to correct a legitimate error. In this event, the Trading Permit Holder shall send an email (by no later than the next business day) setting forth the circumstances that resulted in the change or cancellation to the Regulatory Services Division at Strat_Order_Cancels@cboe.com.

**Non-Strategy Orders**

All other option orders for participation in the modified HOSS opening procedures, and any change or cancellation to any such order, must be received prior to the opening of the series.

---

[2] When CBOE is closed on Wednesday due to a CBOE holiday, the amount of time until expiration for the constituent option series used to calculate the exercise settlement / final settlement value would be increased to reflect the extra day of trading in the constituent option series.

[3] For symbology purposes, the first week of a calendar year is the first week of that year with a Wednesday on which a weekly VX futures contract could expire.

### Strategy Order Characteristics

In general, the Exchange shall consider option orders to be related to positions in, or a trading strategy involving, volatility index options or futures for purposes of Rules 6.2B.01 and 6.2B.08 if the orders possess the following three characteristics:

1) The orders are for option series with the expiration that will be used to calculate the exercise settlement or final settlement value of the applicable volatility index contract. For example, in the case of VIX options, the orders would be in standard SPX option series that expire one month following the expiration date of the expiring VIX option.

2) The orders are for option series spanning the full range of strike prices in the appropriate expiration for option series that will be used to calculate the exercise or final settlement value of the applicable volatility contract, but not necessarily every available strike price.

3) The orders are for put options with strike prices less than the "at-the-money" strike price and for call options with strike prices greater than the "at-the-money" strike price. The orders may also be for put and call options with "at-the-money" strike prices.

Whether option orders are related to positions in, or a trading strategy involving, volatility index options or futures for purposes of Rules 6.2B.01 and 6.2B.08 depends upon the specific facts and circumstances. Other types of orders may also be deemed by the Exchange to fall within this category of orders if the Exchange determines that to be the case based upon the applicable facts and circumstances.

### Order Eligibility for Modified HOSS Opening Procedures

All orders for participation in the modified HOSS opening procedures must be submitted electronically into the book and orders with any valid origin code are eligible to participate.

**Hybrid 3.0 Option Series**

Non-customer orders in Hybrid 3.0 option series must include an "OPG" contingency to be accepted into the book and to participate in the modified HOSS opening procedures. Examples of Hybrid 3.0 option series used to calculate volatility indexes include standard SPX option series.

**Hybrid Option Series**

Non-customer orders in Hybrid option series may (but are not required to) include an "OPG" contingency to be accepted into the book and to participate in the modified HOSS opening procedures. Examples of Hybrid option series used to calculate volatility indexes include End-of-Week (weekly) expirations on the S&P 500 Index (SPXW).

**Both Hybrid 3.0 and Hybrid Option Series**

For Hybrid 3.0 and Hybrid option series, CBOE's trading systems will automatically cancel any unexecuted remainder of OPG orders after the opening of the series.

## Certain DPM or LMM Requirements in Connection with Modified HOSS Opening Procedures

**Hybrid 3.0 Option Series**

For Hybrid 3.0 series (e.g., standard SPX and SPXQ), only LMMs are required to enter opening quotes that must comply with the best opening bid/ask differential requirements in the modified HOSS opening procedures. LMMs are permitted to enter orders, in addition to quotes, to participate in the opening. All other market participants interested in participating in the opening must use orders and may not submit quotes.

**Hybrid Option Series**

For Hybrid series, Market-Makers with an appointment in the constituent option series may enter opening quotes and orders in the modified HOSS opening procedures. Market-makers without an appointment in the constituent option series may not enter quotes and may only enter orders in the modified HOSS opening procedures.

**Both Hybrid 3.0 and Hybrid Option Series**

For Hybrid 3.0 and Hybrid series, in series where there will be an opening trade, the best composite quote must be within the published Opening Exchange Prescribed Width (OEPW).

## Prohibition Against Submission of Orders with Improper Purpose

Market participants that submit orders for participation in the modified HOSS opening procedures may not do so for the purpose of creating or inducing a false, misleading, or artificial appearance of activity or for the purpose of unduly or improperly influencing the opening price or settlement or for the purpose of making a price which does not reflect the true state of the market.

Violations of these requirements and other requirements with regard to the modified HOSS opening procedures are subject to disciplinary action.

## Publication of Certain Information in Connection with Modified HOSS Opening Procedures

For certain constituent option series, prior to the opening of these series, the system will generate "Expected Opening Price/Size" (EOP/S) messages for series which have quantity to trade, have buy or sell imbalances or do not have a best composite Market-Maker quote that is within an acceptable width.

EOP/S messages are disseminated via CBOE's proprietary market data feed, called CBOE Streaming Markets (CSM). EOP/S messages are also published periodically for certain constituent series at: http://cfe.cboe.com/data/VolatilitySettlements/ on exercise / final settlement days.

## Settlement Methodology for Volatility Index Contracts

The CBOE Research Department calculates the SOQ for volatility index contracts using the following procedure:

A. Collect the following information for each eligible option series of the applicable volatility index:

1. The opening traded price, if any; and

2. The first bid and offer disseminated to OPRA by CBOE.  If the first bid disseminated to OPRA by CBOE is 0, the limit price of the best OPG buy order(s) with quantity remaining, if any, will be used as the opening bid.

B. Determine the applicable forward index level, (F), for each eligible contract expiration based on at-the-money put and call option prices. The at-the-money strike is the strike price at which the difference between the call and put mid-quote prices is smallest.

C. Determine $K_0$ - the strike price immediately below the forward index level.

D. Select the constituent option series - Sort all of the options in ascending order by strike price. Select call options that have strike prices greater than $K_0$ and have bid prices greater than zero, beginning with the strike price closest to $K_0$ and moving to the next higher strike prices in succession.  After encountering two consecutive calls with a bid price of zero, do not select any other calls.  Next, select put options that have strike prices less than $K_0$ and have bid prices greater than zero, beginning with the strike price closest to $K_0$ and then moving to the next lower strike prices in succession.  After encountering two consecutive puts with a bid price of zero, do not select any other puts.  Select both the put and call with strike price $K_0$.

E. Calculate the volatility index SOQ using the options selected.[4]  The price of each option used in the calculation is the opening traded price of that option.  For volatility indexes that are composed of multiply listed constituent option series, **the volatility index SOQ uses only the opening prices of the constituent option series traded on CBOE.**  In the event that there is no opening traded price for an option, the price used in the SOQ calculation is the average of the first bid and offer disseminated to OPRA by CBOE for that option.  If the first bid disseminated to OPRA by CBOE in a particular series is zero the best unexecuted OPG bid, if any, is used as the opening bid.

F. The "time to expiration" used to calculate the SOQ for volatility indexes varies depending on the settlement type (A.M.-settlement, P.M.-settlement) of the constituent option series and the trading hours of the constituent option series.  For example, the "time to expiration" used to calculate the SOQ for standard 30-day VIX contracts, which are based on A.M.-settled standard SPX option series, is exactly 30 days.  Another example is the "time to expiration" used to calculate the SOQ for weekly (non-standard) 30-day VIX contracts based on P.M.-settled SPXW options, which is exactly 30 days, *plus* 390 minutes in order to reflect the extra time to trade the constituent SPXW option series until 3:00 p.m. (Chicago time).

The "time to expiration" used to calculate the SOQ accounts for the actual number of days and minutes from the opening of trading in the constituent option series on the expiration / final

---

[4] All volatility indexes are calculated in the same manner as VIX.  A more detailed description of the VIX formula and methodology is available on the CBOE's website at: http://www.cboe.com/micro/vix/vixwhite.pdf.

settlement day until expiration for the constituent option series. For example, if CBOE announces that the opening of trading in the constituent option series is delayed, the amount of time until expiration for the constituent option series used to calculate the exercise / final settlement value would be reduced to reflect the actual opening time of the constituent option series. Another example would be when the Exchange is closed on a Wednesday due to an Exchange holiday, the amount of time until expiration for the constituent option series used to calculate the exercise / final settlement value would be increased to reflect the extra day of trading in the constituent option series.

G. The exercise / final settlement value for the applicable volatility index contract is equal to the respective volatility index SOQ.

The exercise / final settlement value is rounded to the nearest $0.01. If the exercise / final settlement value is not available or the normal settlement procedure cannot be utilized due to a trading disruption or other unusual circumstance, the exercise / final settlement value will be determined in accordance with the rules and bylaws of The Options Clearing Corporation.

### Additional Information

Market participations are advised to refer to the Options Disclosure Document (ODD) for information concerning the risks associated with volatility index options. The ODD may be accessed at: http://www.optionsclearing.com/about/publications/character-risks.jsp

For regulatory questions, please contact the Regulatory Interpretations and Guidance team at RegInterps@cboe.com or (312) 786-8141 for additional information. For operational questions, please contact the Help Desk at helpdesk@cboe.com or (866) 728-2263 for additional information. For product-related questions, please contact Bill Speth at spethw@cboe.com or (312) 786-7141 or John Hiatt at hiatt@cboe.com or (312) 786-7779 for additional information.