Cboe Titanium U.S. Equities Auction Process

Version 1.5.21

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Contents

Introduction

Overview

The Cboe Titanium Cboe U.S. Equities Auction Process provides electronic price discovery mechanisms that efficiently match orders in Cboe Listed securities at a single price using a Dutch auction. These auctions enable Cboe BZX Exchange (BZX) Members to execute against on-open and on-close interest at Cboe. They also allow for Member participation in Corporate IPOs, Exchange Traded Product (ETP) new issues and auctions resulting from security halts. During the auction process, Cboe will calculate and disseminate current price and size information, as described below.

Securities Eligible

Only Cboe Listed securities are eligible for Auctions. Cboe Listed securities will be added to the Opening and Closing Auctions either after the IPO/New Issue Auction or after the listing has transferred to BZX from another listing exchange. On-Open and On-Close orders submitted for non-Cboe Listed securities will be rejected.

Time Zone

Note that all times referenced within this document are Eastern Time (ET).

Acronyms

- **ETP:** Exchange Traded Product
- **IPO:** Initial Public Offering
- **LLOC:** Late-Limit-On-Close
- **LLOO:** Late-Limit-On-Open
- **LOC:** Limit-On-Close
- **LOO:** Limit-On-Open
- **MOC:** Market-On-Close
- **MOO:** Market-On-Open
- **RHO:** Regular Hours Only

Definitions

References to terms defined in this section will be italicized and underlined within the document.

Eligible Auction Orders: On-Open and On-Close orders that are entered prior to the cut-off or Late-Limit orders entered after the cut-off for an Opening/Closing Auction. RHO orders that are entered prior to 9:30 a.m. ET. All orders entered prior to the auction match for an IPO/New Issue/Halt Auction.

Final Last Sale Eligible Trade: The last trade during regular market hours (9:30AM - 4PM) on the Cboe BZX Exchange if the trade was executed within the last one second prior to either the Closing Auction or trading in the security being halted/paused. Otherwise, the last trade reported to the Consolidated Tape and received by Cboe during regular trading hours and, where applicable, prior to trading in the security being halted/paused will be used. If there is no qualifying Final Last Sale Eligible Trade for the current day, the official previous closing price will be used.

Volume Based Tie Breaker: The midpoint of the NBBO, if valid. The NBBO is valid when,

1. There is both an NBB and NBO for the security, and
2. The NBBO is not crossed, and
3. The midpoint of the NBBO is less than the Maximum Percentage away from both the NBB and NBO.

In the event the NBBO is not valid the price of the Final Last Sale Eligible Trade will be used.

For IPO Auctions, the issue price will be used.

Maximum Percentage: The Maximum Percentage will vary depending on the price of the NBBO Midpoint.

Table 1. NBBO Midpoint Maximum Percentage

NBBO MIDPOINT PRICE	MAXIMUM PERCENTAGE
Less than or equal to $25	5%
Greater than $25 but less than or equal to $50	2.5%
Greater than $50	1.5%

Collar Midpoint: The Volume Based Tie Breaker for all applicable auctions, except for IPO Auctions in ETPs, for which the Collar Midpoint will be the issue price.

Collar Price Range: The range from the set percentage below the Collar Midpoint to the set percentage above the Collar Midpoint. Specifically, the Collar Price Range will be determined as follows:

- Where the Collar Midpoint is $25.00 or less, the set percentage is 10%.
- Where the Collar Midpoint is greater than $25.00 but less than or equal to $50.00, the set percentage is 5%.
- Where the Collar Midpoint is greater than $50.00, the set percentage is 3%.

Cboe Auction Information

Cboe disseminates Cboe Auction information **every five seconds** between 8:00 and 9:30 a.m. for the Opening Auction and during a defined Quote-Only period for Halt/IPO/New Issue Auctions. Cboe disseminates Cboe Closing Auction information **every 5 seconds** between 3:00 and 3:59 p.m. and **every 1 second** between 3:59 and 4:00 p.m. for the Closing Auction. Cboe Auction data is available to subscribers of Cboe PITCH data feeds and Cboe Auction Feed and is also made available to other market participants by various market data vendors, maximizing transparency for all investors.

Cboe Auction information is also available on the Cboe website.

Message Dissemination

Cboe Auction information to be disseminated during the following time periods for Cboe Auctions.

Table 2. Auction Message Dissemination

AUCTION TYPE	TIME RANGE
Opening	8:00 - 9:30 a.m. ET
Closing	**Every 5 seconds** between 3:00 and 3:59 p.m. and **every 1 second** between 3:59 and 4:00 p.m.
IPO/New Issue	During Quote Only Period
Halt	During Quote Only Period

The following fields will be included on all auction update messages:

- **Time:** Message event time.

- **Security:** Symbol of the subject security.

- **Auction Type:** O-Opening Auction; C-Closing Auction; H-Auction for Halt; I-Auction for IPO/New Issue

- **Reference Price:** The Reference Price is based upon Eligible Auction Orders only. The price is calculated at or within the Reference Price Range for the security. The Reference Price is set to the price that maximizes the shares associated with the lesser of the Reference Buy Shares and the Reference Sell Shares (as determined at each price level within the Reference Price Range), that minimizes the absolute difference between Reference Buy Shares and the Reference Sell Shares, and minimizes the distance from the Volume Based Tie Breaker. Shares of Eligible Auction Orders may be unmatched at the Reference Price.

- **Reference Price Range:** The prices between and including the NBB and the NBO. In the event that there is no NBBO, this will be the price of the Final Last Sale Eligible Trade. The Reference Price Range is used only for the purpose of calculating the Reference Price and will not be disseminated as part of the Cboe Auction information.

- **Reference Buy Shares:** The total number of shares associated with buy-side Eligible Auction Orders that are priced equal to or greater than the Reference Price.

- **Reference Sell Shares:** The total number of shares associated with sell-side Eligible Auction Orders that are priced equal to or less than the Reference Price.

- **Indicative Price:** The price at which the auction book and the continuous book would match. Shares in the auction book and continuous book may be unmatched at the Indicative Price.

- **Auction Only Price:** The price at which the auction book would match using **only** Eligible Auction Orders. In the event there is no price at which the auction book would match, the value will be zero. Shares in the auction book may be unmatched at the Auction Only Price.

Opening/Closing Auction

The Cboe Opening/Closing Auction has been designed to efficiently maximize the number of shares executed at a single price for securities during the regular market open/close. In the event of a volume based tie at multiple price levels the system will look for the price that minimizes imbalance, and finally if there is a still a tie across multiple price levels, then the auction price will be determined by the price closest to the Volume Based Tie Breaker. Additionally, Opening/Closing Auction prices will be collared such that they are within the Collar Price Range as measured immediately prior to the conclusion of the auction.

During the Opening and Closing Auction Cboe disseminates Cboe Auction information to market participants via PITCH and the Cboe Auction Feed. Cboe Auction information contains valuable details about opening and closing orders as well as relevant pricing information for a security.

When the Opening/Closing Auction takes place, the Cboe continuous book will be brought together with the opening/closing auction book to create a single opening/closing price for each security. Once the auction is complete, any On-Open/On-Close orders that are unable to participate in the auction will be cancelled as will unexecuted Day and GTC orders at the Closing Auction. All other unexecuted orders will be released to the continuous book for normal processing.

If a halt is disseminated in a Cboe Listed security prior to the Opening or Closing Auction all orders on the Opening and Closing auction book will remain open. Members may cancel open auction orders, but may not submit new On-Open/On-Close orders for the halted security. If the halt persists through the Opening or Closing Auction all live On-Open/On-Close orders will be cancelled.

Official Opening Price

Upon completion of the Cboe Opening Auction for Cboe Listed securities, the Cboe Official Opening Price for the security will be disseminated to the consolidated tape along with a bulk execution. The Cboe Official Opening Price will be represented by a sale condition code of O (Market Center Opening Trade).

If an Opening Auction results in an odd lot execution the Cboe Official Opening Price will be the price of the auction. However, the execution will be represented by a sale condition code of Q (Market Center Official Open).

If an issue does not have an Opening Auction Price (e.g. there is insufficient interest to open the security), the Cboe Official Opening Price will be the price of the Final Last Sale Eligible Trade, which will be the official previous closing price and will be represented by a sale condition code of Q (Market Center Official Open).

Official Closing Price

Upon completion of the Cboe Closing Auction, the Cboe Official Closing Price for Cboe Listed securities will be disseminated to the consolidated tape along with a bulk execution. In the event the Cboe Closing Auction results in an execution of at least one round lot, the Cboe Official Closing Price (OCP) will be represented by a sale condition code of 6 (Market Center Closing Trade). A sale condition code of M (Market Center Official Close) can be expected to be represented at the close. Even in the event the security is in a regulatory trading halt.

Additionally, sale condition codes of M and 9 (Corrected Consolidated Close Price as Per Listing Market) will be disseminated to the consolidated tape during the post market trading session to represent the OCP. These updates will be distributed at:

- 16:10 ET
- 18:30 ET
- 20:00 ET

Certain market data vendors reference the consolidated tape's Consolidated Last Sale during the end of day spin as a security's OCP. Given non-primary market closing auctions may update the Consolidate Last Sale at market close for Cboe-listed securities as a result of race conditions, these spins help ensure market data vendors are referencing the correct OCP.

Odd Lot or Zero Size Closing Auctions in Corporate Issues

If a Closing Auction in a Cboe Listed corporate security results in an odd lot execution, no auction execution, or the security is halted at the close, the price of the Final Last Sale Eligible Trade will be used to establish the OCP. The OCP will be represented by a sale condition code of M (Market Center Official Close).

Odd Lot or Zero Size Closing Auctions in ETPs

If a Closing Auction in a Cboe Listed ETP results in an odd lot execution or no auction execution, the OCP will be derived from either a time-weighted average price of the NBBO midpoint or Final Last Sale Eligible Trade if one exists during the final 5 minutes before the end of Regular Trading Hours.

If a Final Last Sale Eligible Trade exists in the final 5 minutes prior to 4 p.m. ET of the current trading day, the final last sale regular-way consolidated trade from Regular Trading Hours will be used as the OCP. If regular-way trades occur within the final second of Regular Trading Hours, the last trade on BZX in that second will be used as the OCP instead of the consolidated trade. The OCP will be represented by a sale condition code of M (Market Center Official Close).

If no Final Last Sale Eligible Trade exists in the final 5 minutes prior to 4 p.m. ET, of the current trading day, the time-weighted average price (TWAP) of the NBBO midpoint will be used as the Cboe Official Closing Price for the ETP. The computation will span the final five minutes before the end of Regular Trading Hours, averaging the midpoint of the NBBO by time. The OCP calculation methodology will exclude any quote from the TWAP calculation if the quote spread is greater than 10 percent of the midpoint price. A crossed NBBO will also be excluded. The OCP will be represented by a sale condition code of M (Market Center Official Close). If no two-sided quote exists for some portion of the 5-minutes, that time period will be excluded from the computation.

If an issue does not have a Closing Auction Price (e.g. there is insufficient interest to conduct a closing auction or the ETP is halted), there is no Final Last Sale Eligible Trade present in the final 5 minutes of Regular Trading Hours, and there are no quotes to calculate the NBBO midpoint, then the OCP will be the price of the Final Last Sale Eligible Trade and will be represented by a sale condition code of M (Market Center Official Close).

Opening and Closing Auction Times

Table 3. Equities Auction Opening and Closing Times

OPENING AUCTION	CLOSING AUCTION
8:00 a.m. - The Cboe Pre-market Trading session begins. Dissemination of Opening Auction information begins.	3:00 p.m. - Dissemination of Closing Auction information begins.
9:28 a.m. - MOO/LOO orders are cutoff and LLOO orders are accepted at this time.	3:55 p.m. - MOC orders are cutoff at this time. 3:59 p.m. - LOC orders are cutoff at this time. 3:59 p.m. - LLOC are accepted at this time.
	3:59 p.m. - LOC orders are cutoff at this time.
	3:59 p.m. - LLOC are accepted at this time.
9:30 a.m. - The Opening Auction Match occurs.	4:00 p.m. - The Closing Auction Match occurs.
	8:00 p.m. - The Cboe Post-market Trading session ends.

Order Types

Table 4. Auction Eligible Order Types

AUCTION ELIGIBLE ORDER TYPES	DESCRIPTION
Regular Market and Limit Orders	Day, GTC, GTX, RHO (Regular Hours Only) and Immediate Or Cancel (IOC) orders are executable from 7:00 a.m. to 8:00 p.m., including during the Opening/Closing Auction. At the time of an auction match Cboe will not honor the MinQty, Discretion, Post Only or Match Trade Prevention (MTP) attributes on a regular market or limit order; however, these attributes will be re-applied to the order immediately following the auction. An imbalance only order is not an available order type, and imbalance only orders are never accepted or executed by Cboe.
Routable Orders	Regular Hours Only orders may be marked as routable. At the conclusion of an Opening Auction, a routable, RHO limit order will be added to the Cboe continuous book. If the routable limit order has Re-Route enabled, the order will be routed out when an away market locks the order.
Limit On-Open Orders	Specifically request an execution at the opening price. Executable only in the Opening Auction. Limit-On-Open (LOO) orders must be received prior to 9:28 a.m. (Opening cutoff) to guarantee eligibility for participation in the Opening Auction. LOO orders received after 9:28 a.m. will be rejected. LOO orders cannot be cancelled between 9:28 and 9:30 a.m.
Market On-Open Orders	Specifically request an execution at the opening price. Executable only in the Opening Auction. Market-On-Open (MOO) orders must be received prior to 9:28 a.m. (Opening cutoff) to guarantee eligibility for participation in the Opening Auction. MOO orders received after 9:28 a.m. will be rejected. MOO orders cannot be cancelled between 9:28 and 9:30 a.m.
Limit On-Close Orders	Specifically request an execution at the closing price. Executable only in the Closing Auction. Limit-On-Close (LOC) orders must be received prior to 3:59 p.m. (Closing cutoff) to guarantee eligibility for participation in the Closing Auction. LOC orders received after 3:59 p.m. will be rejected. LOC orders cannot be cancelled between 3:59 p.m. and 4:00 p.m.
Market On-Close Orders	Specifically request an execution at the closing price. Executable only in the Closing Auction. Market-On-Close (MOC) orders must be received prior to 3:55 p.m. (Closing cutoff) to guarantee eligibility for participation in the Closing Auction. MOC orders cannot be modified or canceled after 3:55 p.m.
Late-Limit-On-Open Orders	Specifically request an execution at the open. Late-Limit-On-Open (LLOO) orders differ from a standard On-Open order in that at the time of entry, the effective price is set to be no more aggressive than the NBB for bids and the NBO for offers. As the NBBO changes, the effective price will be adjusted to be more aggressive (to a defined limit price), but will never be adjusted to a less aggressive effective price. If there is no NBBO, the Late order will assume its full limit price.The effective price is the

AUCTION ELIGIBLE ORDER TYPES	DESCRIPTION
	limit price that will be considered for the order at the time calculations occur for the Reference Price, Indicative Price, and the Auction Only Price. LLOO orders must be received between 9:28 and 9:30 a.m. to guarantee eligibility for participation in the Opening Auction. LLOO orders received before 9:28 a.m. or after 9:30 a.m. will be rejected. LLOO orders cannot be cancelled between 9:28 and 9:30 a.m.
Late-Limit-On-Close Orders	Specifically request an execution at the closing price. Late-Limit-On-Close (LLOC) orders differ from a standard On-Close order in that at the time of entry, the effective price is set to be no more aggressive than the NBB for bids and the NBO for offers. As the NBBO changes, the effective price will be adjusted to be more aggressive (to a defined limit price), but will never be adjusted to a less aggressive effective price. If there is no NBBO, the Late order will assume its full limit price.The effective price is the limit price that will be considered for the order at the time calculations occur for the Reference Price, Indicative Price, and the Auction Only Price. LLOC orders must be received between 3:59 and 4:00 p.m. to guarantee eligibility for participation in the Closing Auction. LLOC orders received before 3:59 p.m. or after 4:00 p.m. will be rejected. LLOC orders cannot be cancelled between 3:59 and 4:00 p.m.
Regular Hours Only Orders	The Regular Hours Only (RHO) order will only be accepted for Cboe Listed securities between 6:00 a.m. and 4:00 p.m. Not executable during pre/post-market hours, RHO orders will be executable in the Opening, Closing and in IPO/New Issue/Halt Auctions. Unfilled limit order shares remaining after participation in the Opening Auction will be transferred to the continuous book. Unfilled market order shares remaining after participation in the Opening Auction will be cancelled. Unfilled shares remaining on the continuous book at the Closing Auction will participate in the Closing Auction. Unfilled shares remaining at the conclusion of the Closing Auction will be cancelled.Market RHO orders will be rejected between 9:28 a.m. and 9:30. Limit RHO orders will be accepted between 9:28 a.m. and 9:30 a.m. and will behave as Late-Limit-On-Open Orders for the Opening Auction. Finally, limit and market RHO orders cannot be cancelled between 9:28 a.m. and 9:30 a.m.

Order Priority

Opening Auction Execution Priority

1. MOO and market RHO orders received in time priority.

2. Limit/LOO/LLOO orders priced at or more aggressively than the official auction price. Regular limit orders may include display, hidden and reserve orders. Price/time priority of the specified limit (effective price for LLOO, not ultimate target price) will be considered and hidden followed by reserve size for each price level will be executed after displayed liquidity prior to moving to the next price level.

Closing Auction Execution Priority

1. MOC orders received in time priority.

2. Limit/LOC/LLOC orders priced at or more aggressively than the official auction price. Regular limit orders may include display, hidden and reserve orders. Price/time priority of the specified limit (effective price for LLOC, not ultimate target price) will be considered and hidden followed by reserve size for each price level will be executed after displayed liquidity prior to moving to the next price level.

Delayed Auction

In the event of systemic issues at Cboe at the time of an Opening/Closing auction, Cboe reserves the right to delay the MOC or LOC cut-off and auction match time OR to specify that no auction will occur. Should no auction occur, the price of the Final Last Sale Eligible Trade will be used for the Cboe Official Opening or Closing Price.

IPO/New Issue Auction

The Cboe IPO/New Issue Auction provides a mechanism that has been designed to allow Members to match a maximum number of shares at a single price for new issues. The New Issue Auction is used to launch a new ETP on the first day of trading on Cboe. The IPO Auction is used for a corporate IPO.

Cboe will disseminate a halt for new issues prior to the start of the Early Trading Session on the morning of the IPO/New issue Auction. In addition, an administrative message will be published to the consolidated tape on the morning of the IPO/New Issue Auction for a new issue. This administrative message will contain information about the issue price and the expected time of the IPO/New Issue Auction.

In the event of a volume based tie at multiple price levels the IPO/New Issue Auction price will be determined by the price closest to the Volume Based Tie Breaker.

Note that IOC orders received during an IPO/New Issue auction will not be cancelled back until they have been processed in the auction or they have been explicitly cancelled by a Member. Such IOC orders that are not filled in the auction will be cancelled at the conclusion of the auction.

Quote Only Period

No orders will be accepted for an IPO/New Issue Auction until the start of the Quote Only period. Members may determine when a Quote Only period has begun by looking for a *TradingStatus* of Quoting on the Cboe PITCH feed. Recipients of CTS will need to look for a `Trading Status` message with a *Security Status* = 5. Recipients of CQS will need to look for a `Long Quote` message with a *Security Status* = O. A CQS quote message with this *Security Status* will be published every 5 seconds during the Quote Only period of an IPO/New Issue Auction.

During the Quote Only period of an IPO/New Issue Auction Cboe disseminates Cboe Auction information to market participants via PITCH and the Cboe Auction Feed. Cboe disseminates Cboe Closing Auction information **every 5 seconds** between 3:00 and 3:59 p.m. and **every 1 second** between 3:59 and 4:00 p.m. for the Closing Auction. Cboe Auction information contains valuable details about IPO/New Issue orders. Note that the Reference Price for an IPO/New Issue Auction will never take the NBBO into account. Additionally, the Buy Shares and Sell Shares will show the same value during an IPO/New Issue Auction. This allows market participants to determine the number of matched shares without providing information about potential differences between Buy and Sell Shares at the Reference Price.

The standard Quote Only period for a New Issue Auction is 8:00 a.m. to 9:30 a.m. ET but is subject to change based on issuer request.

The standard Quote Only period for a corporate IPO Auction is 9:45 a.m. to 10:15 a.m. ET but is subject to change based on underwriter or issuer request.

Quote Only Period Extension

Situations that can result in the Quote Only period being extended include, but are not limited to:

- Unmatched Market Order Shares (automatic)

- Legitimate Underwriter Request (manual)

- Volatility (automatic 5 minute extension for an Indicative Price movement that is the greater of 10% or 50 cents in the 15 second window prior to the auction match)

New Issue Auction (ETPs) Order Types

Regular Market and Limit Orders

Executable from New Issue Auction time to 4:00 p.m. (Day and GTC orders) and 8:00 p.m. (GTX and IOC orders). Available for entering during the auction. Day and GTC/GTX orders will be displayed during the Quote-Only period and will be included in the auction. Market and IOC orders will be queued until the auction match and will be reflected in Cboe Auction information. An imbalance only order is not an available order type, and imbalance only orders are never accepted or executed by Cboe.

Routable Orders

Limit and Regular Hours Only orders may be marked as routable. At the conclusion of an auction, a routable limit order will be added to the Cboe continuous book. If the routable order has Re-Route enabled, the order will be routed out when an away market locks the order.

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On-Open Orders

Executable only in the New Issue Auction. LOO and MOO orders will be treated as standard limit and standard market orders, respectively.

LOO and MOO orders may be entered at any time prior to a New Issue Auction. Unfilled shares remaining from LOO and MOO orders at the conclusion of the auction will be cancelled.

On-Close Orders

Executable only in the Closing Auction. Can be Limit-On-Close (LOC) or Market-On-Close (MOC). LOC and MOC orders received prior to the start of the New Issue Auction quoting period will be rejected.

LOC orders must be received prior to 3:59 p.m. ET and MOC orders must be received prior to 3:55 p.m. (Closing cutoff) to guarantee eligibility for participation in the Closing Auction. MOC orders received after 3:55 p.m. and LOC orders received after 3:59 p.m. will be rejected. MOC orders cannot be modified or canceled after 3:55 p.m.

Late-Limit-On-Open Orders

Executable only in the New Issue Auction, LLOO orders will be treated as standard limit orders.

LLOO orders may be entered at any time prior to a New Issue Auction. Unfilled shares remaining from LLOO orders at the conclusion of the auction will be cancelled.

Regular Hours Only Orders

Executable in New Issue Auctions, limit RHO and market RHO orders will be treated as standard limit and standard market orders, respectively.

RHO orders will only be accepted for Cboe Listed securities between 6:00 a.m. and 4:00 p.m. ET.

Unfilled shares remaining from limit RHO orders after participation in a New Issue Auction will be transferred to the continuous book.

Corporate IPO Auction Order Types

Regular Market and Limit Orders

Executable from IPO Auction time to 4:00 p.m. ET (Day and GTC orders) and 8:00 p.m. ET (GTX and IOC orders). Available for entering during the auction. Day and GTC/GTX orders will be displayed during the Quote-Only period and will be included in the auction. Market and IOC orders will be queued until the auction match and will not be reflected in Cboe Auction information. An imbalance only order is not an available order type, and imbalance only orders are never accepted or executed by Cboe.

Rejected Order Types

All other order types, including Stop, Stop Limit, and Peg, will be rejected during a corporate IPO Auction. In addition, all orders entered for an IPO Auction with a non-zero *MinQty* (FIX Tag 110), a *TimeInForce* (FIX Tag 59) of FOK or At the Close, or a non-zero *DiscretionAmount* (FIX Tag 9622) will be rejected. Orders with a *TimeInForce* of 6 (GTD) will be rejected if the *ExpireTime* (FIX Tag 126) is earlier than 4:00 p.m. ET.

Ignored/Converted Fields

Cboe will also ignore or convert various fields that are entered on an order for an IPO Auction. Sending these fields will not cause an order to be rejected, but Members should note that the behavior specified by those fields may be automatically changed or ignored completely, as follows:

- Ignored Fields

  - *StopPx* (FIX Tag 99)

  - *PegDifference* (FIX Tag 211)

  - *ExecInst* (FIX Tag 18)

  - *RouteDeliveryMethod* (FIX Tag 9350)

  - *RoutStrategy* (FIX Tag 9400)

  - *ExDestination* (FIX Tag 100)

  - *MaxRemovePct* (FIX Tag 9618)

  - *AttributedQuote* (FIX Tag 9732)

  - *DisplayRange* (FIX Tag 8020)

- Converted Fields

  - *TimeInForce* (FIX Tag 59) = 3 (IOC), converted to 2 (At the Open).

  - *TimeInForce* (FIX Tag 59) = R (RHO), converted to 0 (DAY).

  - *RoutingInst(v1)* (FIX Tag 9303), all values converted to B (Book Only).

  - *RoutingInst(v2)* (FIX Tag 9303), all values converted to B (Book Only).

  - *DisplayIndicator* (FIX Tag 9479), all values converted to either R (Cancel Back) or r (Hidden Cancel Back).

  - *PreventMemberMatch* (FIX Tag 7928), not honored during IPO Auction. Will apply to the order if it is posted to the book after the IPO Auction is completed.

Execution Priority

1. Regular market and MOO orders received prior to the auction will be executed in time priority.

2. Limit, LOO and LLOO orders priced at or more aggressively than the auction price received prior to the auction match. Regular limit orders may include display, hidden and reserve orders. Price/time priority of the specified limit will be considered and hidden followed by reserve size for each price level will be executed after displayed liquidity prior to moving to the next price level.

Official IPO/New Issue Opening Price

Upon completion of an IPO/New Issue Auction the Cboe Official Opening Price for the newly issued security will be disseminated to the consolidated tape along with a bulk execution. The Cboe Official IPO/New Issue Opening Price will be represented by a sale condition code of O (Market Center Opening Trade). This is the same code used for the standard Cboe Official Opening Price disseminated at market open.

IPO/New Issue auctions that result in an odd lot execution will be allowed. In these cases the Cboe Official IPO/New Issue Opening Price will be the price that resulted from the IPO/New Issue auction. The Cboe Official Opening Price will be represented by a sale condition code of Q (Market Center Official Open).

Halt Auction

The Cboe Halt Auction provides a mechanism that has been designed to allow Members to match a maximum number of shares at a single price for Cboe Listed securities that are exiting a trading halt or pause.

Quote Only Period

No orders will be accepted for a Halt Auction until the start of the Quote Only period. Members may determine when a quoting period has begun by looking for a *TradingStatus* of Quoting on the Cboe PITCH feed. Recipients of CTS will need to look for a `Trading Status` message with a *Security Status* = 5. Recipients of CQS will need to look for a `Long Quote` message with the appropriate *Security Status* Indicator code as per the CQS Output Specifications. A CQS quote message with this *Security Status* will be published every 5 seconds during the Quote Only period of a Halt Auction.

During the Quote Only period of a Halt Auction Cboe disseminates Cboe Auction information to market participants via PITCH and the Cboe Auction Feed. Cboe Auction information contains valuable details about orders received during the Quote Only period. Note that the Reference Price for a Halt Auction will never take the NBBO into account. Additionally, the Buy Shares and Sell Shares will show the same value during a Halt Auction. This allows market participants to determine the number of matched shares without providing information about potential differences between Buy and Sell Shares at the Reference Price.

Execution Price and Priority

At the conclusion of the Quote Only period orders will be matched at the price that maximizes shares, minimizes imbalance, and is closest to the Final Last Sale Eligible Trade (FLSET). Upon completion of a Halt Auction the re-opening price for the security will be disseminated to the consolidated tape along with a bulk execution.

Priority

1. Regular market orders will be executed in time priority.

2. Limit orders priced at or more aggressively than the auction price received prior to the auction match. Regular limit orders may include displayed, hidden and reserve orders. Price/time priority of the specified limit will be considered and hidden followed by reserve size for each price level will be executed after displayed liquidity prior to moving to the next price level.

Halt Auction Order Types

Regular Market and Limit Orders

Executable from Halt Auction time to 4:00 p.m. ET (Day and GTC orders) and 8:00 p.m. ET (GTX and IOC orders). Available for entering during the auction. Day and GTC/GTX orders will be displayed during the Quote-Only period and will be included in the auction. Market and IOC orders will be queued until the auction match and will be reflected in Cboe Auction information.

Routable Orders

Limit and Regular Hours Only orders may be marked as routable. At the conclusion of a Halt auction, a routable limit order will be added to the Cboe continuous book. If the routable order has Re-Route enabled, the order will be routed out when an away market locks the order.

Regular Hours Only Orders

Executable in Halt Auctions that occur during normal trading hours, limit RHO and market RHO orders will be treated as standard limit and standard market orders, respectively.

Unfilled shares remaining from limit RHO orders after participation in a Halt Auction will be transferred to the continuous book.

Regulatory Halt

A Regulatory Halt may be declared at any time by Cboe Listings Surveillance. At the time a halt is declared, a Halted *Trading Status* will be sent on the Cboe PITCH feed as well as to the consolidated tape. An email will also be disseminated at this time; however, the email may not have the expected Quote Only period begin time and auction time if that information is not yet available. When the Quote Only period begin time and auction times are known, then another email notification will be sent.

The Cboe BZX Exchange will monitor for limit states and declare a Limit-Up Limit-Down (LULD) Trading Pause when a Cboe Listed security has been in a limit state for 15 seconds. At this time, a halt will be declared followed immediately by the initiation of a Quote Only period. The expected auction time will be set five minutes from the halt time, subject to defined extensions.

Auction Status messages are exclusive to LULD Trading Pauses and will not be generated for any other Regulatory Halts.

Auction Collars

Regulatory Halt Auction collars will be in place for both ETPs and corporate issues.

The initial upper and lower collars for **Regulatory Halts (non-LULD)** will be 5% (or $0.15 for prices $3.00 or less) from the Final Last Sale Eligible Trade (FLSET). The FLSET will be used as the Reference Price.

For **LULD Trading Pauses**, the upper or lower band that triggered the Trading Pause will be multiplied by 5% to obtain the collar price for that side. The band that did not trigger the Trading Pause will be kept in place as the collar limit for the other side. If a Price Band is less than $3.00, then a fixed value of $0.15 will be used to widen that side of the auction collar.

Table 5. Auction Collars

SCENARIO	UPPER COLLAR	LOWER COLLAR
Regulatory Halt, FLSET >$3	FLSET x 1.05	FLSET x 0.95
Regulatory Halt, FLSET <=$3	FLSET + $0.15	FLSET - $0.15
Limit Up, Upper Band > $3	(Limit Up Band Price) x 1.05	Limit Down Band Price
Limit Down, Lower Band > $3	Limit Up Band Price	(Limit Down Band Price) x 0.95
Limit Up, Upper Band <= $3	(Limit Up Band Price) + $0.15	Limit Down Band Price
Limit Down, Lower Band <= $3	Limit Up Band Price	(Limit Down Band Price) - $0.15

The auction collars will widen by the designated amount at each Quote Only period extension either towards the Indicative Price or the imbalance.

Quote Only Period Extensions

Situations that can result in the Quote Only period being extended include, but are not limited to:

- Unexecuted Market Order Shares.

- Indicative Price remains outside of the collars.

Volatility Close Auction

If a scheduled Regulatory Halt re-opening is not completed prior to 3:50 p.m. ET, then a Volatility Close Auction will be completed in lieu of the Regulatory Halt Auction. The Volatility Close will occur at 4:00 p.m. ET and will include all orders submitted for the Regulatory Halt Auction plus any On-Close interest. There will be no MOC or LOC cutoff time for a Volatility Close Auction.Cboe disseminates Cboe Closing Auction information**every 5 seconds** between 3:00 and 3:59 p.m. and **every 1 second** between 3:59 and 4:00 p.m. for the Closing Auction. The last calculated halt re-opening collar in effect at 3:50 p.m. ET, as described above, will be retained and applied for the Volatility Close Auction.

Short Sale Order Handling

Opening Auction: Short sale orders for covered securities subject to Rule 201 of Regulation SHO that are in an active short sale circuit breaker will only be eligible for execution at a price above the National Best Bid (NBB) at the time of the auction match.

Halt Auction: Short sale orders for covered securities subject to Rule 201 of Regulation SHO that are in an active short sale circuit breaker will only be eligible for execution at a price above the last National Best Bid (NBB) prior to the halt.

Closing Auction: Short sale orders for covered securities subject to Rule 201 of Regulation SHO that are in an active short sale circuit breaker will only be eligible for execution at a price above the last National Best Bid (NBB) at the time of the auction match.

Transfers

Securities that transfer from another listing exchange to the Cboe BZX Exchange will follow normal Opening and Closing Auction Times on page 13 on the effective date of the transfer. Pre-market trading prior to the Opening Auction match at 9:30 a.m. ET will also be available for these securities.

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Auction Contingency Plans

Cboe takes pride in the reliability and resiliency of its systems. Historically, Cboe's systems have been up and available more than 99.9% of the time; however, Cboe has also spent extensive time and resources toward planning and preparing for system failures, including those that might affect the primary auctions of securities listed on Cboe.

Matching Engine Resiliency

Cboe's technology includes rigorously engineered matching engine resiliency to ensure markets operate in a fair and orderly manner, especially for Cboe Listed securities. Cboe Listed products trade on a dedicated matching engine, and each matching engine has a primary and secondary instance. If the primary instance fails (software or hardware), the secondary instance automatically takes over continuous trading in approximately 45 seconds.

Cboe matching engine resiliency also applies during BZX Exchange auction periods. Cboe has a detailed auction resiliency matrix that automatically drives matching engine recovery during critical auction periods. Cboe endeavors to fail over to the secondary matching engine during these critical periods to conduct the auction.

Order Persistence

Cboe offers Members a cancel on disconnect option. This automatically cancels the Member's orders on that session if they disconnect. Members have the option to persist only auction orders in Cboe Listed Securities through a session disconnect to ensure they participate in the auction even if their session is down.

In the event of a matching engine or order handler failure during an Opening, Closing, or Halt Auction the default behavior is to cancel all orders back to Members. In contrast, orders are persisted by default for IPO/New Issue Auctions. Each of these behaviors is configurable and controlled by setting at the session-level that may be updated upon Member request.

Proactive Issue Detection for IPO/New Issue Auction

Cboe has also implemented automated IPO auction monitoring and validation to detect software problems that may impact the IPO/New Issue Auction well in advance of the actual auction match time. If a problem is detected, the IPO Auction can be extended until the software issue is resolved. This proactive monitoring runs every five seconds during the quoting period of an Auction so that once the IPO Auction match occurs there is a high degree of confidence in the ability of the system to perform the auction match and all subsequent actions required to release the IPO symbol for continuous trading.

Opening Auction Contingency Matrix

Cboe plans to take the following actions if a matching engine failure occurs prior to the Opening Auction. Normal matching engine fail over occurs in approximately 45 seconds.

Table 6. Opening Auction Contingency Matrix

TIME OF MATCHING ENGINE RECOVERY	RESULT
Prior to 9:28 a.m. ET (opening cutoff)	Opening Auction occurs as scheduled at 9:30 a.m. ET
Between 9:28 a.m. and 9:30 a.m. ET	Opening Auction occurs as scheduled at 9:30 a.m. ET
After 9:30 a.m. ET	No Opening Auction is performed.

Closing Auction Contingency Matrix

Cboe systems will automatically take the following actions if a matching engine failure occurs prior to the Closing Auction. Normal matching engine fail over occurs in approximately 45 seconds.

Table 7. Closing Auction Contingency Matrix

TIME OF MATCHING ENGINE RECOVERY	RESULT
Prior to 3:59 p.m. ET (closing cutoff)	Closing Auction occurs at 4:00 p.m. ET
Between 3:59 p.m. ET and 4:00 p.m. ET	Closing Auction occurs at 4:05 p.m. ET
After 4:00 p.m. ET	No Closing Auction performed. Official Closing Price will be reported to the consolidated tape for each Cboe Listed security. The price will be the price of the Final Last Sale Eligible Trade (FLSET).

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IPO/New Issue Auction Contingency Matrix

Cboe systems will automatically take the following actions if a matching engine failure occurs prior to the IPO/New Issue Auction. Normal matching engine fail over occurs in approximately 45 seconds.

Table 8. IPO/New Issue Auction Contingency Matrix

TIME OF MATCHING ENGINE RECOVERY	RESULT
Prior to quoting period start	IPO/New Issue Auction occurs as originally scheduled
During quoting period	IPO/New Issue Auction will be rescheduled within minutes for the same day
After scheduled auction time	IPO/New Issue Auction will be rescheduled within minutes for the same day

LULD Halt Auction Contingency Matrix

Cboe systems will automatically take the following actions if a matching engine failure occurs near an LULD Halt Auction. Normal matching engine fail over occurs in approximately 45 seconds.

Table 9. LULD Halt Auction Contingency Matrix

MATCHING ENGINE CRASH TIME	TIME OF MATCHING ENGINE RECOVERY	RESULT
Before halt	<= 10 min after halt	Halt & start 5 minute auction
Before halt	> 10 min after halt	No halt
During halt	<= 10 min after halt	Halt & start 5 minute auction
During halt	> 10 min after halt	Unhalt with no auction
Before halt	<= 10 min after halt (between 3:50 and 4:00 p.m. ET)	Halt & start volatility close auction. See LULD FAQ for details.
During halt	<= 10 min after halt (between 3:50 and 4:00 p.m. ET)	Halt & start volatility close auction. See LULD FAQ for details.
Before or during halt	After 4:00 p.m. ET	Unhalt with no auction

Non-LULD Halt Auction Contingency Matrix

Cboe systems will automatically take the following actions if a matching engine failure occurs near a Halt Auction. Normal matching engine fail over occurs in approximately 45 seconds.

Table 10. Non-LULD Halt Auction Contingency Matrix

TIME OF MATCHING ENGINE RECOVERY	RESULT
After halt, no quoting period defined	Halt
After halt, prior to quoting period start	Halt with existing quoting period
During quoting period	Halt, quoting period will be rescheduled
After quoting end	Halt, quoting period will be rescheduled

Closing Contingency Procedures

When a determination to implement Closing Contingency Procedures has been made by the Chief Executive Officer of the Exchange or any Executive Officer designated by the Chief Executive Officer, the Exchange shall publicly announce this determination at the earliest possible time via system status alerts, Trade Desk notices, and email notification directories. The following procedures shall apply:

1. If the Exchange determines to follow Closing Contingency Procedures for one or more securities at or before 3:00 p.m. ET, the Exchange will designate an alternate exchange and the Exchange's Official Closing Price for those securities will be:

    a. The official closing price established for such security under the rules of the designated alternate exchange (ARCA is Alternate Exchange for BZX).

    b. If there is no official closing price in a security on the designated alternate exchange, the Exchange's Official Closing Price will be the Volume-Weighted Average Price (VWAP) of the consolidated last-sale eligible prices of the last five minutes of trading during regular trading hours, including any closing transactions on an exchange and any trade breaks or corrections up to the time the VWAP is processed.

    c. If there were no consolidated last-sale eligible trades in the last five minutes of trading during regular trading hours, the Exchange's Official Closing Price of such security will be the last consolidated last-sale eligible trade for such security during regular trading hours on that trading day.

    d. If there were no consolidated last-sale eligible trades, the Exchange's Official Closing Price of such security will be the prior day's Official Closing Price.

    e. If no Official Closing Price for a security can be determined under subsections (A), (B), (C) or (D) above, the Exchange would not publish an Official Closing Price for such security.

2. If the Exchange determines to follow Closing Contingency Procedures for one or more securities after 3:00 p.m. ET, one of the following shall occur:

    a. The VWAP of the consolidated last-sale eligible prices of the last five minutes of trading during regular trading hours, including any closing transactions on an exchange and any trade breaks or corrections up to the time the VWAP is processed.

    b. If there were no consolidated last-sale eligible trades in the last five minutes of trading during regular trading hours, the Exchange's Official Closing Price of such security will be the last consolidated last-sale eligible trade for such security during regular trading hours on that trading day.

    c. If there were no consolidated last-sale eligible trades on the day in question, the Exchange's Official Closing Price of such security will be the prior day's Official Closing Price.

    d. If no Official Closing Price for a security can be determined under subsections (A), (B) or (C) above, the Exchange would not publish an Official Closing Price for such security.

3. The Exchange shall cancel all open interest designated for the Exchange's close residing in the Exchange's systems to give members the opportunity to route orders to alternative execution venues.

4. After hours trading shall begin either as scheduled at 4:00 p.m. ET or upon resolution of the disruption that triggered the Exchange to operate the Closing Contingency Procedures.

Examples

To demonstrate the value of the different price indicators used in the Cboe auction process for various situations, consider the following examples. Note that Cboe Auction information updates are time based, and these examples are not indicative of what would be expected in a Cboe Auction update.

Table 11. Example: No Match Occurs in the Auction

ENTRY TIME	BUY SHARES	SELL SHARES	ORDER TYPE/ PRICE	REFERENCE PRICE	REFERENCE BUY SHARES	REFERENCE SELL SHARES	INDICATIVE PRICE	AUCTION ONLY PRICE
3:54:00		4,000	LOC/$17.00	$17.25	0	4,000	0	0
3:55:00	5,000		Limit/$15.00	$17.25	0	4,000	0	0
3:56:00		3,000	Limit/$18.00	$16.50	0	0	0	0
3:58:00		4,000	LOC/$17.50	$16.50	0	0	0	0

The last trade during the normal session occurred at 3:15 p.m. at $17.25. As there is no match on the book at the auction match, the official closing price will be set to $17.25. Also note that the $17.50 LOC sell order at 3:59:00 would be rejected as it has been entered after the cut-off.

Table 12. Example: Market Order Only Auction

ENTRY TIME	BUY SHARES	SELL SHARES	ORDER TYPE/ PRICE	REFERENCE PRICE	REFERENCE BUY SHARES	REFERENCE SELL SHARES	INDICATIVE PRICE	AUCTION ONLY PRICE
9:27:00	1,000		MOO	$10.05	1,000	0	0	0
9:27:01		1,000	MOO	$10.05	1,000	1,000	$10.05	$10.05
9:27:02	1,000		MOO	$10.05	2,000	1,000	$10.05	$10.05
9:27:05		1,000	MOO	$10.05	2,000	2,000	$10.05	$10.05

Previous closing price is $10.05. In this auction, 2,000 shares will match at $10.05 at 9:30:00.

Late On-Open/Close Order Behavior

Consider a NBBO of $10.00 x $10.05 is present at the cut-off. Shortly thereafter an LLOO/LLOC is received to buy 10,000 shares at $10.25. The order will initially work at $10.00 as it is confined to the NBBO. The NBBO slides to $9.80 x $9.85. The order will continue to work at $10.00. Next, the NBBO jumps to $10.05 x $10.10. The effective price for the order now jumps to $10.05 as it is a more aggressive price and is still within the original limit. The NBBO jumps again to $10.30 x $10.40. The effective price will be reset to $10.25 (the original limit price), where it will remain through the conclusion of the auction.

Table 13. Example: Limit Order Only Auction

ENTRY TIME	BUY SHARES	SELL SHARES	ORDER TYPE/ PRICE	REFERENCE PRICE	REFERENCE BUY SHARES	REFERENCE SELL SHARES	INDICATIVE PRICE	AUCTION ONLY PRICE
9:27:00	5,000		Limit/$13.75	-	0	0	0	0
9:27:01		5,000	Limit/$14.00	-	0	0	0	0

ENTRY TIME	BUY SHARES	SELL SHARES	ORDER TYPE/ PRICE	REFERENCE PRICE	REFERENCE BUY SHARES	REFERENCE SELL SHARES	INDICATIVE PRICE	AUCTION ONLY PRICE
9:27:02	2,000		LOO/$14.00	$13.875	2,000	0	$14.00	0
9:27:03		1,000	LOO/$13.75	$13.875	2,000	1,000	$14.00	$13.875
9:27:04		2,000	LOO/$13.90	$13.90	2,000	3,000	$13.90	$13.90
9:27:05		4,000	LOO/$13.00	$13.875	2,000	5,000	$13.75	$13.875
9:27:06		6,000	LOO/$12.00	$13.875	2,000	11,000	$13.75	$13.875
9:27:29	7,000		LOO/$13.50	$13.875	2,000	11,000	$13.50	$13.50
9:27:30	9,000		LOO/$13.75	$13.75	11,000	11,000	$13.75	$13.75
9:28:59	1,000		Limit/$13.80	$13.89	2,000	11,000	$13.75	$13.75

The NBBO is $13.75 x $14.00 until 9:28:59 at which point it becomes $13.80 x $14.00 due to the introduction of a limit order to buy at $13.80 on the continuous book at that time. At 9:30:00, this auction would execute 11,000 shares at $13.75.

Table 14. Example: Market/Limit Order Auction

ENTRY TIME	BUY SHARES	SELL SHARES	ORDER TYPE/ PRICE	REFERENCE PRICE	REFERENCE BUY SHARES	REFERENCE SELL SHARES	INDICATIVE PRICE	AUCTION ONLY PRICE
9:27:00	10,000		Limit/$10.00	-	0	0	0	0
9:27:01		10,000	Limit/$10.01	-	0	0	0	0
9:27:02		10,000	Limit/$10.02	-	0	0	0	0
9:27:02	100,000		MOO	$10.005	100,000	0	$10.005	0
9:27:03		50,000	MOO	$10.005	100,000	50,000	$10.005	$10.005
9:27:04		20,000	LOO/$9.90	$10.005	100,000	70,000	$10.005	$10.005
9:27:05		30,000	LOO/$10.05	$10.005	100,000	70,000	$10.005	$10.05
9:27:06	20,000		LOO/$10.10	$10.005	120,000	70,000	$10.05	$10.05
9:27:07		30,000	Limit/$10.10	$10.005	120,000	70,000	$10.05	$10.05
9:27:31		50,000	MOO	$10.005	120,000	120,000	$10.005	$10.005
9:27:59	50,000 (40,000 remainder after fill against 9:27:01 order)		Limit/$10.01	$10.015	120,000	120,000	$10.015	$10.015

The NBBO is $10.00 x $10.01 until 9:27:59 at which point it becomes $10.01 x $10.02. At 9:30:00, this auction would execute 120,000 at $10.015.

Periodic Auctions (BYX Only)

The Periodic Auction process is a price forming auction that runs for a fixed time period of 100 milliseconds and is only available during the regular trading session. A Periodic Auction starts when two opposite side Periodic Auction orders of either type can match. Continuous book displayed and non-displayed orders are not eligible to initiate a Periodic Auction but may be swept into the auction at the end of the auction process. *CrossTradeFlag* (FIX Tag 9355) can be used to enter Periodic Auction orders.

Periodic Auction Only
- Will only execute in a Periodic Auction. Will not be eligible for trading in the continuous book.
- Eligible to initiate a Periodic Auction when matched with a contra-side Periodic Auction order.
- Must include a limit price.
- Periodic Auction Only Orders must have a *TimeInForce* (FIX Tag 59) of RHO.

Periodic Auction Eligible
- Eligible to trade in both Periodic Auction and continuous book orders.
- Eligible to initiate a Periodic Auction when matched with a contra-side Periodic Auction order.
- Upon entry will (1) trade immediately on the continuous book when the Periodic Auction Eligible order matches with a non-Periodic Auction Eligible order; (2) Initiate a Periodic Auction if the Periodic Auction Eligible order matches with a Periodic Auction Only or Periodic Auction Eligible Order; or (3) post to the book and be ranked as Non-Displayed Limit Orders consistent with Rule 11.12(a). Whether an incoming Periodic Auction Eligible Order trades immediately with the continuous book, initiates a Periodic Auction, or posts to the book is determined by the ranking of resting continuous book orders, Periodic Auction Eligible orders, and Periodic Auction Only Orders that reside in the System at the time of Periodic Auction Eligible Order entry.
- Will be locked from trading in the continuous book upon initiation of a Periodic Auction.
- Periodic Auction Eligible Orders with a *TimeInForce* of IOC or FOK will not be accepted.

Periodic Auction Order Details
- Displayed continuous book orders will be executed first using price/time priority. Next will be Periodic Auction orders using size/time priority. Hidden continuous book orders will be executed third using standard BYX Priority.
- For odd lot orders in symbols trading below $500 (based on Last Sale), Periodic Auction Only orders will be rejected upon entry. Periodic Auction Only orders initially entered as round or mixed-lot lot orders, but subsequently modified or partially traded to odd lot quantities, will be prevented from initiating a Periodic Auction. Periodic Auction Eligible orders for odd lot quantities will be restricted from initiating an auction.
- The auction process will not allow for broker preferencing.

- To prevent potential capacity or performance issues, the Exchange will cancel a Periodic Auction at the end of the Periodic Auction Period if it is unable to successfully process such Periodic Auction after three attempts.

At the end of the auction period, the price where the most shares will trade within the collar will be the auction price. If there are multiple prices where the same number of shares can trade, the price that leaves the smallest imbalance will be the auction price. If there are multiple prices where the same number of shares can trade and leave the smallest imbalance, the price closest to the volume-based tie breaker will be the auction price.

The volume-based tie breaker refers to the midpoint of the NBBO for a particular security where the NBBO is a valid NBBO. A valid NBBO refers to where there is both a NBB and NBO for the security and the NBBO is not crossed. The execution price of the auction must be within the NBBO and the Collared Price Range. The Collared Price Range varies based on the NBBO midpoint.

Table 15. NBBO Midpoint Collared Price

NBBO MIDPOINT PRICE	COLLARED PRICE RANGE FROM MIDPOINT
Less than or equal to $25	10%
Greater than $25 but less than or equal to $50	5%
Greater than $50	3%

Periodic Auction Market Data Messages

- All Periodic Auction messages will be published only over the BYX PITCH Depth of Book feed.

- An `Auction Update` message will be sent when a Periodic Auction starts. It will be sent at a randomized time between the start of an auction period and the end of the auction period minus 1 millisecond to inform participants that an auction is taking place.

- The `Auction Update` message will not include order imbalance information or information for continuous book orders.

- The `Auction Update` message will include the following information:

  - Reference Price - The collared, auction execution price at the point in time the message is sent using only orders eligible for Periodic Auctions.

  - Buy Shares/Sell Shares - Both fields will contain the same value and will represent the paired size that would be executed in the Periodic Auction using only orders eligible for Periodic Auctions.

  - Auction Type - The auction will be identified as a Periodic Auction (P).

Periodic Auctions Port Attributes

The Default CrossTradeFlag port attribute enables Members to designate all orders sent on a port as either Periodic Auction Only or Periodic Auction Eligible using *CrossTradeFlag* = 1 or 2.

- If this port attribute is set, *CrossTradeFlag* = 0 can be used to override the port setting on an order-by-order basis.

- When set to 2:
    - IOC, FOK, and displayed orders are not converted to a Periodic Auction Eligible order and are sent to the book as-is.
    - *DisplayIndicator* (9479) will be ignored if *ExecInst* (18) = m or M.

- When set to 3:
    - IOC, FOK, IOC/FOK orders with *ExecInst* (18) = M, and all other orders where *ExecInst* (18) does not = m will not be converted and will be sent to the book as-is.
    - All non-IOC/FOK orders with ExecInst (18) = M will be converted to RHO Midpoint Peg - Periodic Auction Only orders.

- Orders with the following RPI instructions will set this port attribute to 0:
    - *ExtendedExecInst* (9416) = R or P, plus is an IOC, or *ExtendedExecInst* = T.

The Lock Auction Orders port attribute allows Members to configure whether orders that are participating in a Periodic Auction may be cancelled. A value of False (default) will allow cancellations to occur during a Periodic Auction.

All port attributes may be updated by using the Logical Port Request tool located within the Customer Web Portal.

References

Order Entry

For more information regarding auction specific order types such as LOO, LOC, LLOO, LLOC, MOO, and MOC refer to the appropriate order entry specification:

- Cboe US Equities BOE Specification

- Cboe US Equities FIX Specification

Market Data

For more information regarding Cboe Auction information messaging, refer to the appropriate market data specification:

- Cboe Auction Feed Specification

- Cboe Equities/Options Multicast PITCH Specification

- Cboe Depth - TCP PITCH Specification

Support

Please direct questions or comments regarding this document to tradedesk@cboe.com.

Revision History

DOCUMENT VERSION	DATE	DESCRIPTION
1.0.0	05/09/11	Initial draft version.
1.0.1	05/27/11	Final draft based on feedback.
1.0.2	06/24/11	Added clarification of RHO order handling behavior during the opening cut-off period. On-Open/On-Close Orders must send 9303=B.
1.0.3	07/19/11	Added further clarification regarding limit RHO order handling behavior during the opening cut-off period.
1.0.4	07/21/11	Clarification added regarding prioritization of hidden versus reserve orders during an auction.
1.0.5	08/17/11	For Volume Based Tie Breakers as well as Collars, only use NBBO as a reference if there is no ZBBO and there is at least one limit order on the BZX Exchange book.
1.0.6	11/02/11	Removed reference that indicated LOO and LOC orders would be automatically converted to LLOO and LLOC orders after the cutoff.
1.0.7	12/15/11	Added BOE references. For IPO Auctions Cboe will halt issue in morning and send administrative message to consolidated tape. Opening/Closing Auction orders will not be cancelled automatically due to halt dissemination. Updated automatic extensions. Updated RHO orders.
1.1.0	01/05/12	Clarification added to IPO/Halt Auction language to include other types of new issues such as Exchange Traded Products.
1.2.0	02/01/12	Added description for routable order behavior during auctions. Added clarification regarding use of 'Q' versus 'O' and 'M' versus '6' for Cboe Official Opening/Closing pricing. Added support for RHO, LOO, MOO and LLOO during IPO/New Issue auctions. *Effective 02/10/12.*
1.2.1	02/17/12	Clarification added noting market RHO orders cannot be cancelled between 9:28 a.m. and 9:30 a.m.
1.2.2	03/07/12	Clarification added noting that Buy Shares and Sell Shares will be equal during IPO/New Issue/Halt Auction.
1.2.3	04/04/12	Omitted support for RHO orders in non-BZX Listed Securities.
1.2.4	07/20/12	Added clarification regarding acceptable attributes for auction order types. Added clarification regarding odd lot handling in auctions.
1.2.5	08/01/13	Added *Collar Midpoint* to definitions. Updated *Collar Price Range* definition. Added update to behavior when no limit orders would participate on one or both sides. Effective 08/05/13 for Opening/Closing Auctions and effective 08/09/13 for New Issue/IPO/Halt Auctions.
1.3.0	04/02/15	Updated definitions of *Eligible Auction Orders, Volume Based Tie Breaker, Final Last Sale Eligible Trade, Reference Price Range* (effective 5/1/15). Removed auction behavior where no limit orders would participate on one or both sides (effective 5/1/15). Clarification to RHO orders. Updated behavior of Late Orders to use NBBO instead of ZBBO (effective 5/1/15). Fixed broken links throughout document.

DOCUMENT VERSION	DATE	DESCRIPTION
		Updated references to NBBO instead of ZBBO (effective 5/1/15).
1.3.1	05/01/15	Removed references to legacy auction behavior.
1.3.2	12/16/15	Updated order types allowed in corporate IPO Auction. Transfer section added.
1.3.3	01/26/16	Increased length of Auction information dissemination periods for Opening/Closing Auctions (effective 3/4/16).
1.4.0	02/16/16	Added Auction Contingency Plans section. Added IPO/New Issue/Halt Auction Quoting Period section.
1.5.0	02/19/16	Bats branding/logo changes.
1.5.1	03/04/16	Fixed MinQty FIX Tag error. Additional Bats branding changes.
1.5.2	10/17/17	Cboe branding/logo changes. Updates for LULD Amendment 12.
1.5.3	11/30/18	CQS field name changed from *Quote Condition* to *Security Status*. Updates to Official Closing Price calculation for ETPs (effective 12/07/18).
1.5.4	01/11/19	Updated Regulatory Halt section detailing new collar calculations and Volatility Close Auction processes (effective 01/23/19).
1.5.5	04/15/20	Clarified Sale Condition Code "M" will be disseminated to the SIP for Cboe-listed securities, even those that are halted at the close. Condition Code "M" and "9" will be disseminated at 3 intervals after the close. Effective 04/17/20. Various updates to time references.
1.5.6	11/04/20	Clarification to how auction price is determined in Opening/Closing Auction section.
1.5.7	04/27/21	Added new Periodic Auctions section (BYX only) (Effective 04/14/22 Effective Q3 2021 TBD).).
1.5.8	05/19/21	Updated closing auction cutoff time, MOC/LOC order cutoff time, and LLOC acceptance time to 3:59 p.m. ET (effective 06/11/21).
1.5.9	07/19/21	Updated Periodic Auctions effective date to (Effective 04/14/22 TBD).
1.5.10	09/01/21	Updated the IPO/New-Issue Auction and Halt Auction Quote Only Period Sections to indicate that CTS recipients will need to look for a `Trading Status` message and for CQS to look for a `Long Quote` message.
1.5.11	11/17/21	Updated details regarding Periodic Auction orders (BYX Only) (Effective 04/14/22 ~~TBD~~).
1.5.12	02/14/22	When there is no round lot closing auction, the OCP calculation will exclude any quote from the TWAP calculation if the quote spread is greater than 10 percent of the midpoint price (effective 03/11/22).
1.5.13	03/25/22	Updated Periodic Auctions effective date to 04/14/22 (BYX Only).
1.5.14	07/15/22	When Default CrossTradeFlag = 2, IOC, FOK, and displayed orders will not be converted to a Periodic Auction Eligible order and will be sent to the book as-is (BYX Only) (effective 07/29/22).
1.5.15	11/17/23	When Default CrossTradeFlag = 3, IOC, FOK, IOC/FOK orders with *ExecInst* (18) = M, and all other orders where *ExecInst* (18) does not = m will not be converted and will be sent to the book as-is (effective 12/15/23).
1.5.16	9/20/24	Added new Closing Contingency Procedures.
1.5.17	11/27/24	Clarified odd lot behavior in Periodic Auction Order Details on page 54.

DOCUMENT VERSION	DATE	DESCRIPTION
		Effective 12/13/24, when the Default CrossTradeFlag port attribute set to 2, *DisplayIndicator* (9479) will be ignored if *ExecInst* (18) = m or M. Additionally, orders with RPI instructions will set this port attribute to 0 (BYX only).
1.5.18	01/15/25	Updated with Cboe Titanium branding.
1.5.19	04/21/25	Cboe will disseminate Cboe Closing Auction information every 5 seconds between 3:00 and 3:59 p.m. every 1 second between 3:59 and 4:00 p.m. for the Closing Auction (effective 06/06/25). Updated the MOC cutoff time to 3:55 p.m. (effective 06/06/25).
1.5.20	06/06/25	Updated Order Types on page 14 formatting.
1.5.21	08/12/25	Updated IPO/New Issue Auction on page 19 to indicate that Cboe will disseminate a halt for new issues prior to the start of the Early Trading Session on the morning of the IPO/New issue Auction.

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