INVESTORS EXCHANGE AUCTION PROCESS

Version 1.20

Updated: September 7, 2018

Table of Contents

INTRODUCTION

Overview

The Investors Exchange ("IEX") Auction Process provides electronic price discovery mechanisms that efficiently match orders in IEX-listed securities at a single price using a double auction. These auctions enable IEX participants to execute against On-Open and On-Close interest at IEX. They also allow for participation in IEX corporate initial public offerings ("IPOs"), the initial pricing of any other security pursuant to Rule 11.280(h)(9), auctions resulting from security halts, and auctions resulting from LULD trading pauses. During the auction process, IEX will calculate and disseminate current price, size, imbalance information, auction collar information, and other relevant information about upcoming auctions, as described below.

Securities Eligible

Only IEX-listed securities are eligible for IEX Auctions. Listings on IEX will be added to the Opening and Closing Auctions either after the IPO Auction or after the listing has transferred to IEX from another listing exchange. On-Open and On-Close orders submitted for non-IEX-listed securities will be rejected.

Orders Eligible

In general, orders on the continuous order book and orders queued prior to the auction (collectively, the "Order Book") are eligible for the auction match. Orders on the continuous order book and orders queued prior to the auction are consolidated to calculate the single clearing price for the Opening/Closing Auction. For all other auctions, orders queued prior to the auction are used to calculate the single clearing price for the auction.

Ineligible Orders

Pegged orders are not eligible for the Opening/IPO/Halt/Volatility Auction. Non-displayed interest resting on the continuous order book at the time of a halt/pause dissemination are not eligible for the Halt/Volatility Auction.

Time Zone

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

Time-in-Force Values

The time-in-force ("TIF") determines the periods of time during which an order is available for execution and includes:

- IOC – immediate-or-cancel
- FOK – an IOC order where the entire size must be filled, else the order will be canceled
- DAY – available for trading during the Regular Market Session, and expires at the end of the Regular Market Session
- GTX – available for trading during the Regular Market Session and Post-Market Session, and expires at the end of the Post-Market Session
- SYS – available for trading during System Hours, and expires at the end of the Post-Market Session
- GTT – expires at the earlier of specified expire time or end of the Post-Market Session
- On-Open – available for trading only when determining the opening price of an IEX-listed security

- On-Close – available for trading only when determining the closing price of an IEX-listed security

Definitions

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

Auction Book: The specified orders queued prior to the auction match.

- Opening Auction (i.e., Opening Auction Book)
    - On-Open orders.
    - Limit orders marked DAY or GTX.
    - Market orders marked DAY, except such orders that are designated to route.
- Closing Auction (i.e., Closing Auction Book)
    - On-Close orders.
- IPO Auction (i.e., IPO Auction Book)
    - On-Open orders.
    - Limit orders.
    - Market orders marked DAY, except such orders that are designated to route.
- Halt Auction (i.e., Halt Auction Book) [1]
    - On-Open orders, limit orders marked DAY or GTX, and market orders marked DAY, if the Halt Auction is occurring during the Regular Market Session and the security has not traded during the Regular Market Session on that trading day.
    - Limit orders received during the Order Acceptance Period marked GTT, SYS, FOK, IOC, DAY (within the Regular Market Session), GTX (within the Regular Market Session or Post-Market Session).
    - Market orders received during the Order Acceptance Period within the Regular Market Session.
    - Displayed portions of limit orders on the _Continuous Book_ at the time of the halt dissemination.
- Volatility Auction (i.e., Volatility Auction Book) [2]
    - On-Close orders, if an LULD trading pause exists at or after the Closing Auction _Lock-in Time_ and before the Closing Auction.
    - Limit orders received during the Order Acceptance Period marked GTT, SYS, FOK, IOC, GTX, or DAY (within the Regular Market Session).
    - Market orders received during the Order Acceptance Period within the Regular Market Session.
    - Displayed portions of limit orders on the _Continuous Book_ at the time of the pause dissemination.

Auction Eligible Orders: All orders that are eligible to participate in the upcoming auction on the _Auction Book_ and _Continuous Book_ (collectively, the Order Book) and are not _Auction Ineligible Orders_; such orders are used by the System to calculate IEX Auction Information and to determine the clearing price of IEX Auctions. For the Opening/Closing Auction, non-displayed buy (sell) orders on the _Continuous Book_ with a resting price within the Reference Price Range will be priced at the lower (upper) threshold of the Reference Price Range for the purpose of determining the clearing price, but will be ranked and eligible for execution in the Opening/Closing Auction match at the order's resting price. If the Reference Price Range is a single price, non-displayed buy (sell) orders on the Continuous Book with a resting price above (below) the Reference Price Range will be priced equal to the Reference Price Range for the purpose of determining the clearing price, but will be ranked and eligible for execution in the

---

[1] If a Volatility Auction originally scheduled to occur during Regular Market Hours receives an automatic extension which causes the auction to occur in the Post-Market Session, non-routable limit orders with a TIF of DAY and market orders which were submitted during the Order Acceptance Period within Regular Market Hours are included and are only canceled by the System after the auction match or if the auction is extended to the end of Post-Market Hours.

[2] See above.

Opening or Closing Auction match at the order's resting price. For the Opening/Closing Auction, orders must be on the _Auction Book_ prior to their applicable _Lock-out Time_ or on the _Continuous Book_ prior to the auction match. For the IPO/Halt/Volatility Auction, orders must be on the _Auction Book_ prior to the auction match.

Auction Ineligible Orders: The specified orders that are not eligible to participate in an auction. These orders are neither used to calculate IEX Auction Information nor to determine the clearing price of the auction match. TIF permitting, _Auction Ineligible Orders_ are released to the _Continuous Book_ at the conclusion of the auction match, otherwise they are canceled. Specifically, auction ineligibility is determined as follows:

- Opening Auction
    o Pegged orders.
- IPO Auction
    o Pegged orders.
- Halt Auction
    o Pegged orders.
    o Non-displayed interest on the _Continuous Book_ at the time of the halt.
- Volatility Auction
    o Pegged orders.
    o Non-displayed interest on the _Continuous Book_ at the time of the pause.

Continuous Book: All orders resting on the Order Book that are not on the _Auction Book_ and are available for continuous trading. Market orders and orders marked IOC or FOK do not rest on the _Continuous Book_. During the Pre-Market Session, _Auction Ineligible Orders_ queued for the Regular Market Session are not on the _Continuous Book_ (e.g., pegged orders queued during the Pre-Market Session are not on the _Continuous Book_). There is no _Continuous Book_ when continuous trading in a security is halted/paused; in the event of a halt/pause, _Auction Eligible Orders_ on the _Continuous Book_ shall be incorporated into the Halt/Volatility Auction Book, as applicable.

Final Consolidated Last Sale Eligible Trade: The last trade prior to end of Regular Market Hours (i.e., 9:30 a.m. – 4:00 p.m.), or where applicable, prior to trading in the security being halted/paused, that is last sale eligible and reported to the Consolidated Tape System ("Consolidated Tape"), rounded to the nearest MPV or Midpoint Price calculated by the System, whichever is closer. If there is no qualifying _Final Consolidated Last Sale Eligible Trade_ for the current day, the previous official closing price (or for a new security that is not the subject of an IPO or otherwise being priced pursuant to Rule 11.280(h)(9), the issue price). In the case of an IPO or the initial pricing of a security pursuant to Rule 11.280(h)(9), the issue price.

Final Last Sale Eligible Trade: The last trade on IEX prior to end of Regular Market Hours, or where applicable, prior to trading in the security being halted/paused, that is last sale eligible and reported to the Consolidated Tape. If there is no qualifying _Final Last Sale Eligible Trade_ for the current day, the previous official closing price (or for a new security that is not the subject of an IPO or otherwise being priced pursuant to Rule 11.280(h)(9), the issue price). In the case of an IPO or the initial pricing of a security pursuant to Rule 11.280(h)(9), the issue price.

Hyper-aggressive Auction Orders: For Opening Auctions, MOO orders and market orders marked DAY, as well as LOO orders and limit orders marked DAY or GTX to buy (sell) priced above (below) the latest upper (lower) threshold of the _Opening/Closing Auction Collar_ calculated by the System. For Closing Auctions, MOC orders, and LOC orders to buy (sell) priced above (below) the latest upper (lower) threshold of the _Opening/Closing Auction Collar_ calculated by the System.

Impermissible Price: For a Volatility Auction, an indeterminable auction price due to a market order imbalance, or an above (below) the upper (lower) threshold of the _Volatility Auction Collar_ at the scheduled auction match.

Initial Consolidated Last Sale Eligible Trade: The first trade during Regular Market Hours that is last sale eligible and reported to the Consolidated Tape, including the Closing Auction. If there is no qualifying _Initial Consolidated Last Sale Eligible Trade_ for the current day, the previous official closing price will be used.

Initial Last Sale Eligible Trade: The first trade on IEX during Regular Market Hours that is last sale eligible and reported to the Consolidated Tape, including the Closing Auction.[3] If there is no qualifying _Initial Last Sale Eligible Trade_ for the current day, the previous official closing price will be used.

Latest Consolidated Last Sale Eligible Trade: The last trade immediately prior to a security being subject to a halt or pause that is last sale eligible and reported to the Consolidated Tape, rounded to the nearest MPV or Midpoint Price calculated by the System, whichever is closer. If there is no qualifying _Latest Consolidated Last Sale Eligible Trade_ for the current day, the previous official closing price will be used.

Lock-in Time: The time when _Auction Eligible Orders_ on the _Auction Book_ may not be canceled or modified prior to the auction match (i.e., locked in). Additionally, the time when _Hyper-aggressive Auction Orders_ are rejected upon receipt. Lastly, the time when IEX begins to disseminate IEX Auction Information. The _Lock-in Time_ for each auction is below; IPO/Halt/Volatility Auctions do not have a _Lock-in Time_.

- Opening Auction: 9:28 a.m. (2 minutes prior to the start of the Regular Market Session)
- Closing Auction: 3:50 p.m. (10 minutes prior to the end of the Regular Market Session)

Lock-out Time: The time when new _Auction Eligible Orders_ otherwise eligible for the _Auction Book_ are restricted from entering the _Auction Book_ and are rejected upon receipt (i.e., locked out). Orders must be on the _Auction Book_ prior to the _Lock-out Time_ to guarantee eligibility for the auction. Orders submitted to the _Continuous Book_ after the _Lock-out Time_ remain eligible for execution on the _Continuous Book_, and in the upcoming Opening/Closing Auction match. The _Lock-out Time_ for each auction is below; IPO/Halt/Volatility Auctions do not have a _Lock-out Time_.

- Opening Auction: 9:29:50 a.m. (10 seconds prior to the auction match)
- Closing Auction: 3:59:50 p.m. (10 seconds prior to the auction match)

Maximum Percentage: The _Maximum Percentage_ will vary depending on the value of the midpoint of the national best bid and offer that are each a protected quotation ("Protected **Midpoint Price**").

Protected Midpoint Price	_Maximum Percentage_
Less than or equal to $25.00	5%
Greater than $25.00 but less than or equal to $50.00	2.5%
Greater than $50.00	1.5%

Opening/Closing Auction Collar: Collectively, the upper and lower threshold prices at or within which the Opening/Closing Auction match must occur. The _Opening/Closing Auction Collar_ is established by taking the greater of fifty cents ($0.50) or ten percent (10%) of the _Opening/Closing Auction Collar Reference Price_, which is added to (subtracted from) the national best offer (bid) that is a protected quotation ("Protected **NBO**" or "**Protected NBB**," respectively) to establish the upper (lower) threshold of the _Opening/Closing Auction Collar_.

If the **national best bid and offer that are protected quotations** ("Protected NBBO") is crossed, the greater of fifty cents ($0.50) or ten percent (10%) of the _Opening/Closing Auction Collar Reference Price_, is added to (subtracted from) the IEX best offer (bid) to establish the upper (lower) threshold of the _Opening/Closing Auction Collar_.

---

[3] If the Closing Auction is the _Initial Last Sale Eligible Trade_, the IEX Official Opening Price will be represented by a sale condition code of 'Q' (Market Center Official Open) in Category 4. Then, IEX will also publish the normal IEX Official Closing Price messages.

If the Protected NBBO, or, when utilized, the IEX best bid and best offer ("IEX BBO"), is not two-sided, the greater of fifty cents ($0.50) or ten percent (10%) of the _Opening/Closing Auction Collar Reference Price_, is added to (subtracted from) the _Opening/Closing Auction Collar Reference Price_ to establish the upper (lower) threshold of the _Opening/Closing Auction Collar_.

For example, if the Protected NBBO is $10.00 x $11.00, then the _Opening/Closing Auction Collar Reference Price_ equals $10.50 and the threshold percentage is 10%, resulting in a threshold value of $1.05 (10% of $10.50 = $1.05). This threshold value is then added to the Protected NBO and subtracted from the **Protected NBB to obtain the auction's** _Opening/Closing Auction Collar_. In this example, it would result in a lower threshold of $8.95 ($10.00 - $1.05 = $8.95) and an upper threshold of $12.05 ($11.00 + $1.05 = $12.05), thus creating a range of $8.95 to $12.05, within which the auction can occur. This means $8.95 is the lowest price at which the auction can occur and $12.05 is the highest price at which it can occur. The _Opening/Closing Auction Collar_ is dynamic; as the Protected NBBO changes, the _Opening/Closing Auction Collar_ updates to reflect such changes.

Opening/Closing Auction Collar Reference Price: The _Volume Based Tie Breaker_.

Reference Price Range: For a Volatility Auction, the prices between and including the _Volatility Auction Collar_. For an IPO Auction, the prices between and including the most current IPO Price Band published by the Exchange. If the underwriter has not provided an IPO Price Band to the Exchange for publication, the _Reference Price Range_ will be equal to the _Volume Based Tie Breaker_. For an Opening or Closing Auction, the prices between and including the Protected NBB and Protected NBO where the Protected NBBO is a Valid Protected NBBO. The Protected NBBO is a "Valid Protected NBBO" where:

1. there is both a Protected NBB and Protected NBO for the security,
2. the Protected NBBO is not crossed, and
3. the Protected Midpoint Price is less than or equal to the _Maximum Percentage_ away from both the Protected NBB and Protected NBO.

In the event the Protected NBBO is not a Valid Protected NBBO, the IEX BBO will be used where the IEX BBO is a Valid IEX BBO. The IEX BBO is a "Valid IEX BBO" where:

1. there is both an IEX best bid and an IEX best offer for the security, and
2. the midpoint of the IEX BBO is less than or equal to the _Maximum Percentage_ away from both the IEX best bid and the IEX best offer.

If there is neither a Valid Protected NBBO nor a Valid IEX BBO and the market is one-sided, the Reference Price Range shall be equal to the price of the Final Consolidated Last Sale Eligible Trade, unless such price is:

1. Lower than the Protected NBB, in which case the Reference Price Range shall be equal to the price of the Protected NBB; or
2. Higher than the Protected NBO, in which case the Reference Price Range shall be equal to the price of the Protected NBO.

If there is neither a Valid Protected NBBO nor a Valid IEX BBO and the market is two-sided, the Reference Price Range shall be equal to the price of the Final Consolidated Last Sale Eligible Trade, unless:

1. The Protected NBBO is not crossed and the price of the Final Consolidated Last Sale Eligible Trade is either:
    a. Lower than the Protected NBB, in which case the Reference Price Range shall be equal to the price of the Protected NBB; or
    b. Higher than the Protected NBO, in which case the Reference Price Range shall be equal to the price of the Protected NBO.
2. The Protected NBBO is crossed and the price of the Final Consolidated Last Sale Eligible Trade is either:
    a. Lower than the IEX best bid, in which case the Reference Price Range shall be equal to the price of the IEX best bid; or

b. Higher than the IEX best offer, in which case the Reference Price Range shall be equal to the price of the IEX best offer.

If there is neither a Protected NBBO nor an IEX BBO (i.e., a zero-sided market), the _Reference Price Range_ will be the _Final Consolidated Last Sale Eligible Trade_.

The _Reference Price Range_ is used only for the purposes of calculating the _Reference Price_ of the Volatility/Opening/Closing Auction and will not be disseminated as part of the IEX Auction Information.

Volatility Auction Collar: Collectively, the upper and lower threshold prices at or within which the Volatility Auction match must occur. If the _Volatility Auction Collar Reference Price_ is the Lower (Upper) Price Band, the initial lower (upper) threshold of the _Volatility Auction Collar_ is 5% less (greater) than the _Volatility Auction Collar Reference Price_, rounded to the nearest passive minimum price variation ("MPV") and the upper (lower) threshold of the _Volatility Auction Collar_ is the Upper (Lower) Price Band. For securities with a _Volatility Auction Collar Reference Price_ of $3.00 or less, the initial lower (upper) threshold of the _Volatility Auction Collar_ is $0.15 less (greater) than the _Volatility Auction Collar Reference Price_, rounded to the nearest passive MPV and the upper (lower) threshold of the _Volatility Auction Collar_ is the Upper (Lower) Price Band.

For example, if the Lower and Upper Price Bands are $10.00 and $11.00, respectively, and a pause is triggered following a Limit State at the Lower Price Band, the _Volatility Auction Collar Reference Price_ would be equal to the Lower Price Band, $10.00. The lower threshold of the _Volatility Auction Collar_ ("lower _Volatility Auction Collar_") would be calculated by subtracting 5% of the _Volatility Auction Collar Reference Price_, or $0.50 (5% of $10.00 = $0.50), from the _Volatility Auction Collar Reference Price_. The upper threshold of the _Volatility Auction Collar_ ("upper _Volatility Auction Collar_") would be equal to the Upper Price Band. In this example, it would result in a lower _Volatility Auction Collar_ of $9.50 ($10.00 - $0.50 = $9.50) and an upper _Volatility Auction Collar_ of $11.00, thus creating a range of $9.50 to $11.00, within which the Volatility Auction can occur. This means $9.50 is the lowest price at which the Volatility Auction can occur and $11.00 is the highest price at which it can occur. The _Volatility Auction Collar_ is static during the Order Acceptance Period and only updates at the beginning of each Volatility Auction Order Acceptance Period extension caused by an _Impermissible Price_.

At the beginning of each Volatility Auction Order Acceptance Period extension caused by an _Impermissible Price_, the upper (lower) threshold of the _Volatility Auction Collar_ will be increased (decreased) by 5% of the original _Volatility Auction Collar Reference Price_ in the direction of the _Impermissible Price_, rounded to the nearest passive MPV. For securities with a _Volatility Auction Collar Reference Price_ of $3.00 or less, the upper (lower) threshold of the _Volatility Auction Collar_ will be increased (decreased) in $0.15 increments in the direction of the _Impermissible Price_.

In this example, if the pause was triggered at 12:00 p.m., the above calculated _Volatility Auction Collar_ would be in effect during the Order Acceptance Period from 12:00 until 12:05 p.m. To continue the example, if the was above the upper _Volatility Auction Collar_ at the time of the scheduled auction match, 12:05 p.m., then the Volatility Auction would receive an extension of 5 minutes (the "Initial Extension Period") and the upper _Volatility Auction Collar_ would be updated by adding $0.50 to the upper _Volatility Auction Collar_ (which is equal to 5% of the original Volatility Auction Reference Price of $10.00). The lower _Volatility Auction Collar_ remains unchanged. In this example, it would result in an upper _Volatility Auction Collar_ of $11.50 ($11.00 + $0.50 = $11.50) and a lower _Volatility Auction Collar_ of $9.50, thus creating a range of $9.50 to $11.50, within which the Volatility Auction can now occur. This means $9.50 is the lowest price at which the Volatility Auction can occur and $11.50 is the highest price at which it can now occur at the next scheduled auction match 5 minutes from now, at 12:10 p.m.

Furthermore, continuing the example, if the Indicative Clearing Price was below the lower _Volatility Auction Collar_ at the time of the scheduled auction match of 12:10 p.m., then the Volatility Auction would receive an extension of 5 minutes (an "Additional Extension Period") and the lower _Volatility Auction Collar_ would be updated by subtracting $0.50 from the lower _Volatility Auction Collar_ (which is equal to 5% of the original _Volatility Auction Reference Price_ of $10.00). In this example, it would result in a lower _Volatility Auction Collar_ of $9.00 ($9.50 - $0.50 = $9.00) and an upper _Volatility_

Auction Collar or $11.50, thus creating a range of $9.00 to $11.50 within which the Volatility Auction can now occur. This means $9.00 is the lowest price at which the Volatility Auction can occur and $11.50 is the highest price at which it can now occur, and the Exchange shall attempt to conduct a Volatility Auction every one second during the course of each Additional Extension Period until the clearing price falls at or within the Volatility Auction Collar.

Volatility Auction Collar Reference Price: The reference price for calculating the applicable *Volatility Auction Collar*, and is equal the price of the Upper or Lower Price Band that triggered the LULD trading pause.

Volume Based Tie Breaker: In an Opening/Closing Auction, the midpoint of the *Reference Price Range*. In an Opening/Closing Auction, when the *Reference Price Range* is equal to the IEX BBO for Pilot Securities in Test Groups 2 and 3 of the Tick Size Pilot Program, the *Volume Based Tie Breaker* will be rounded to the nearest MPV. If the *Reference Price Range* is a single price (e.g., the previous official closing price), then such price is used.

In a Halt Auction, or Volatility Auction that is not determining the IEX Official Closing Price, the *Latest Consolidated Last Sale Eligible Trade* is used. In a Volatility Auction that is determining the IEX Official Closing Price, the *Final Consolidated Last Sale Eligible Trade* is used.

For IPO Auctions, the issue price is used.

IEX AUCTION INFORMATION

IEX disseminates IEX Auction Information every one second between the _Lock-in Time_ and the auction match for the Opening/Closing Auction, and during the Display Only Period for IPO/Halt/Volatility Auction. IEX Auction Information is available to subscribers of the IEX Top of Book Quote and Last Sale feed ("TOPS"), the IEX Depth of Book and Last Sale feed ("DEEP"), the IEX Data Platform ("IEX API"), and is also made available to other market participants by various market data vendors.

IEX Auction Information is also available on the IEX public website via various IEX apps.

Order Acceptance Period

No orders will be accepted for an IPO/Halt Auction until the start of the Order Acceptance Period. Orders entered during the Order Acceptance Period can be canceled until the auction match begins. No executions in the subject security will occur until the auction has completed.

The Order Acceptance Period begins:

- IPO Auction: 8:00 a.m., but is subject to change based on underwriter request.
- Halt Auction: 5 minutes prior to the scheduled auction match, or immediately after a Market-Wide Circuit Breaker ("MWCB") Level 1 or Level 2 breach.
- Volatility Auction: immediately after the pause dissemination.

The Order Acceptance Period will end when the auction match begins.

Situations that can result in the Order Acceptance Period being extended include, but are not limited to:

- Unmatched Market Order Shares: automatic 1-minute (Halt) extension.
- Impermissible Clearing Price: automatic 5-minute (Volatility) extension for an _Impermissible Price_.
- Volatility Closing Auction: automatic extension to the end of the Regular Market Session (i.e., 4:00 p.m.) (Volatility), if the auction will be in an Order Acceptance Period at or after the Closing Auction _Lock-in Time_.
- Volatility: automatic 5-minute (Volatility) or 1-minute (Halt) extension when the Indicative Clearing Price differs by the greater of 5% or $0.50 from any of the previous fifteen Indicative Clearing Price disseminations at the scheduled auction match.
- IPO Launch: automatic extension (IPO), if the following conditions to launch have not been satisfied:
    - All market orders will be executed in the IPO Auction;
    - The IPO Auction clearing price is at or within the latest IPO Price Band selected by the underwriter; and
    - IEX receives notice from the underwriter of the IPO that the security is ready to trade.
- Legitimate Underwriter Request: manual extension (IPO only).

Display Only Period

IEX will disseminate IEX Auction Information in the subject security during the Display Only Period for an upcoming auction. IEX will also disseminate a trading status message in the symbol to the Consolidated Tape that contains a _Halt Reason_ = 'D' (News Dissemination) at the start of the Display Only Period. The default Display Only Period for each applicable auction is specified below:

- IPO Auction: 10:00 a.m., but is subject to change based on underwriter request.
- Halt Auction: the start of the Order Acceptance Period (5 minutes prior to the scheduled auction match, or immediately after a MWCB Level 1 or Level 2 breach).
- Volatility Auction: the start of the Order Acceptance Period (immediately after the pause dissemination).

Messages

IEX Auction Information to be disseminated during an IEX Auction is as follows:

- Timestamp: Time of the update event.
- Symbol: Symbol of the subject IEX-listed security.
- Auction Type: Opening (O), Closing (C), IPO (I), Halt (H), Volatility (V) Auction.
- Reference Price: The single price at or within the _Reference Price Range_ at which orders on the _Auction Book_ would match if the IEX Auction were to occur at that time of dissemination. The Reference Price is set to the price that maximizes the number of the shares from orders on the _Auction Book_ to be executed in the auction. If more than one price maximizes the number of shares that will execute, resulting in an auction price range, the Reference Price is set to the price at or within such range that is not lower (higher) than the most aggressive unexecuted buy (sell) order. If more than one price satisfies the above conditions, the Reference Price is set to the price closest or equal to either the _Volume Based Tie Breaker_ (if such range includes prices in the _Reference Price Range_) or the _Reference Price Range_ (if such range does not include prices in the _Reference Price Range_) at the time of dissemination. In the case of an IPO or Halt Auction, the Reference Price shall be the same as the Auction Book Clearing Price.
- Paired Shares: The number of shares from orders on the _Auction Book_ that can be matched with other orders on the _Auction Book_ at the Reference Price at the time of dissemination.
- Imbalance Shares: The number of shares from orders on the _Auction Book_ that may not be matched with other orders on the _Auction Book_ at the Reference Price at the time of dissemination.
- Imbalance Side: The buy/sell direction of any imbalance at the time of dissemination: buy-side imbalance (B); sell-side imbalance (S); no imbalance (N).
- Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which _Auction Eligible Orders_ would match if the IEX Auction were to occur at the time of dissemination pursuant to the procedures for determining the clearing price set forth in the applicable auction rule. In the case of an IPO, Halt, or Volatility Auction, the Indicative Clearing Price shall be the same as the Auction Book Clearing Price.
- Auction Book Clearing Price: The single price at which orders on the _Auction Book_ would match if the IEX Auction were to occur at the time of dissemination pursuant to the procedures for determining the clearing price set forth in the applicable auction rule, but shall not be constrained by the _Opening/Closing Auction Collar_, as applicable. If shares from market orders would remain unexecuted, IEX shall disseminate an indicator for "market buy" or "market sell."
- Collar Reference Price: _Opening/Closing Auction Collar Reference Price_ for the Opening/Closing Auctions. _Volatility Auction Collar Reference Price_ for the Volatility Auction. The value will be zero for IPO/Halt Auctions. For an IPO Auction, the _Volume Based Tie Breaker_, unless such price is above (below) the most current Upper (Lower) IPO Price Band published by the Exchange, in which case the _Collar Reference Price_ shall be equal to the Upper (Lower) IPO Price Band
- Lower Auction Collar: The lower threshold of the _Opening/Closing Auction Collar_ for the Opening/Closing Auctions. The lower threshold of the _Volatility Auction Collar_ for the Volatility Auction. The value will be zero for IPO/Halt Auctions. For an IPO Auction, the most current Lower IPO Price Band published by the Exchange. If the underwriter has not provided an IPO Price Band to the Exchange for publication, the _Lower Auction Collar_ will be equal to the _Volume Based Tie Breaker_.
- Upper Auction Collar: The upper threshold of the _Opening/Closing Auction Collar_ for the Opening/Closing Auctions. The upper threshold of the _Volatility Auction Collar_ for the Volatility Auction. The value will be zero for IPO/Halt Auctions. For an IPO Auction, the most current Upper IPO Price Band published by the Exchange. If the underwriter has not provided an IPO Price Band to the Exchange for publication, the _Upper Auction Collar_ will be equal to the _Volume Based Tie Breaker_.

- Scheduled Auction Time: The projected time of the auction match. For an IPO Auction, the projected start time is not specified.
- Extension Number: The total number of automatic Order Acceptance Period extensions a Halt or Volatility Auction has received.

Auction Book Clearing Price is zero when there is a market order imbalance. The Imbalance Side and Imbalance Shares indicate the side and size of the imbalance from market order shares.

IEX AUCTION PRIORITY

Orders resting on the Order Book are ranked and maintained for the auction based on the following priority:

- Price. The best priced _Auction Eligible Order_ (the highest priced resting order to buy or the lowest priced resting order to sell) has priority over all other orders to buy (or orders to sell) in all cases. Market orders have precedence over limit orders.
    - o Resting Price. _Auction Eligible Orders_ resting on the _Continuous Book_ are ranked by the price at which they are resting on the _Continuous Book_; _Auction Eligible Orders_ resting on the _Auction Book_ are ranked by the limit price defined by the User, if any (in either case, the order's "resting price"), as follows:
        - ▪ Orders on the Continuous Book are ranked and eligible for execution in the Opening/Closing Auction at the order's resting price.
            - Primary and Discretionary Peg orders to buy (sell) may exercise price discretion up (down) to the Closing Auction match price, except during periods of quote instability. When exercising price discretion, such orders are ranked behind any non-displayed interest at the auction match price for the duration of the Closing Auction. If multiple orders are exercising price discretion during the Closing Auction, they maintain their relative time priority at the auction match price.
        - ▪ Limit orders, including LOO and LOC orders, on the _Auction Book_ are ranked and eligible for execution in an auction at the order's limit price.
    - o Halt or Volatility Auction. Displayed portions of limit orders on the _Continuous Book_ at the time of a halt or pause dissemination are ranked on the _Auction Book_ by the price at which such orders were resting on the _Continuous Book_ at the time of the halt or pause dissemination.
- Display. Equally priced _Auction Eligible Orders_ are ranked by display priority.
    - o On-Open and On-Close orders are ranked with display priority.
    - o Limit orders with a TIF of IOC or FOK are ranked with display priority.
    - o Displayed orders (including On-Open and On-Close orders) and displayed portions of orders on the _Auction Book_ and _Continuous Book_ will have precedence over non-displayed orders and non-displayed portions of orders on the _Auction Book_ and _Continuous Book_ at a given price.
- Time. Equally priced _Auction Eligible Orders_ with the same display priority are ranked in time priority.
    - o Where orders to buy (or sell) are ranked at the same price with the same display priority, the oldest order at such price and display shall have precedence at that price and display. Orders are ranked by the time at which they are posted to the Order Book at a given price, the first to be posted at a given price being the oldest. Orders maintain their time priority once booked until one of the following occur, at which time the order will receive a new timestamp:
        - ▪ An order on the _Auction Book_ is incremented by the User.
        - ▪ An order on the _Auction Book_ is re-priced by the User.
        - ▪ Minimum Quantity for an order on the Auction Book is amended by the User.
        - ▪ Any one of the events specified in IEX Rule 11.220(a)(1)(C) occurs to an order on the _Continuous Book_.

OPENING/CLOSING AUCTION

The IEX Opening/Closing Auction has been designed to efficiently maximize the number of shares executed at a single price for securities during the Regular Market Session open/close, respectively, while minimizing the opportunities for information leakage within the NBBO. If more than one price maximizes the number of shares that will execute resulting in an auction price range (i.e., a volume based tie at multiple price levels), the Opening/Closing Auction will occur at the price at or within such range that is not lower (higher) than the most aggressive unexecuted buy (sell) order. If more than one price satisfies the above conditions, the Opening/Closing Auction will occur at the price closest or equal to the _Volume Based Tie Breaker_. If the auction price would be below (above) the lower (upper) threshold of the _Opening/Closing Auction Collar_, the Opening/Closing Auction will occur at the price at or within the range of prices between the lower (upper) threshold of the _Opening/Closing Auction Collar_ and the lower (upper) threshold of the _Reference Price Range_ that best satisfies the conditions above.

At the Opening and Closing Auction _Lock-in Time_, IEX begins disseminating IEX Auction Information to market participants via TOPS, DEEP, IEX API, and on the IEX public website. IEX Auction Information contains valuable details about opening and closing orders as well as relevant pricing information for a security and its collars. Additionally, at the _Lock-in Time_, orders on the Auction Book may not be canceled or modified, and _Hyper-aggressive Auction Orders_ submitted to the Exchange will be rejected upon entry. Orders eligible for the _Auction Book_ received between the _Lock-out Time_ and the auction match will be rejected.

When the Opening (Closing) Auction takes place, the _Continuous Book_ is consolidated with the _Auction Book_ to create a single opening (closing) price for each security. Once the Opening Auction is complete, any On-Open and market orders that are unexecuted in the auction will be canceled. Additionally, limit orders marked DAY or GTX with a limit price more aggressive than the _Opening/Closing Auction Collar_ that are unexecuted in the auction will be canceled. Once the Closing Auction is complete, any On-Close orders, pegged orders, and orders marked DAY that are unexecuted in the auction will be canceled. All other unexecuted orders in the auction along with _Auction Ineligible Orders_ queued for trading in the Regular Market Session will be released to the _Continuous Book_ for normal processing.

An Opening/Closing Auction will only take place if _Auction Eligible Orders_ have overlapping prices, meaning that the highest bid price is equal to or higher than the lowest offer price ("crossing interest"). If no crossing interest exists in the Opening (Closing) Auction, IEX will not conduct the Opening (Closing) Auction in that security, and will instead use the _Initial Last Sale Eligible Trade_ (_Final Last Sale Eligible Trade_) as the security's IEX Official Opening (Closing) Price.

If a halt is disseminated in a security prior to the Opening Auction, all orders on the _Auction Book_ will remain open. Users may resume submission of new or modifications to existing On-Open orders or other _Auction Eligible Orders_ for the halted security during the Order Acceptance Period. Participants may cancel open _Auction Eligible Orders_ at any time during the halt. If the halt exists at the start of Regular Market Hours (i.e., 9:30 a.m.), the security will open for trading after the Halt Auction, and the Halt Auction will determine the IEX Official Opening Price.

If a halt/pause is disseminated in a security prior to the Closing Auction, all orders on the _Auction Book_ will remain open. Users may resume submission of new or modifications to existing On-Close orders or other _Auction Eligible Orders_ for the halted/paused security during the Order Acceptance Period. Participants may cancel open _Auction Eligible Orders_ at any time during the halt/pause. If a halt persists through the end of Regular Market Hours (e.g., 4:00 p.m.), all On-Open orders, On-Close orders, and pegged orders will be canceled at the conclusion of Regular Market Hours, and the _Final Last Sale Eligible Trade_ will be the IEX Official Closing Price. If a pause exists at or after the Closing Auction _Lock-in Time_ and before the Closing Auction, On-Close orders are added to the Volatility Auction and such auction will be used to determine the IEX Official Closing Price at the conclusion of Regular Market Hours.

IEX Official Opening Price

Upon completion of the Opening Auction (or the Halt Auction for IEX-listed securities that have not traded during the Regular Market Session on that trading day), the IEX Official Opening Price for the security will be disseminated to the Consolidated Tape along with a bulk execution. The IEX Official Opening Price will be the price of the auction.

The IEX Official Opening Price will be represented by a sale condition code of 'Q' (Market Center Official Open) in Category 4. The bulk execution will be represented by a sale condition code of 'O' (Market Center Opening Trade) in Category 2 and a sale condition code of 'X' (Cross Trade) in Category 4. If the auction match results in an odd lot execution, the bulk execution will be represented by a sale condition code of 'O' (Market Center Opening Trade) in Category 2 and a sale condition code of 'I' (Odd Lot Trade) in Category 4.

If a security does not have an Opening Auction (e.g., no crossing interest) (or no Halt Auction for IEX-listed securities that have not traded during the Regular Market Session on that trading day), the Regular Market Session begins by canceling all On-Open orders and transferring any queued orders eligible for the Regular Market Session to the _Continuous Book_; the IEX Official Opening Price will be the price of the _Initial Last Sale Eligible Trade_ and will be represented by a sale condition code of 'Q' (Market Center Official Open) in Category 4.

IEX Official Closing Price

Upon completion of the Closing Auction (or the Volatility Auction for IEX-listed securities where an LULD trading pause exists at or after the Closing Auction _Lock-in Time_ and before the Closing Auction), the IEX Official Closing Price for the security will be disseminated to the Consolidated Tape along with a bulk execution. The IEX Official Closing Price will be the price of the auction.

The IEX Official Closing Price will be represented by a sale condition code of 'M' (Market Center Official Close) in Category 4. The bulk execution will be represented by a sale condition code of '6' (Market Center Closing Trade) in Category 2 and a sale condition code of 'X' (Cross Trade) in Category 4. If the auction match results in an odd lot execution, the bulk execution will be represented by a sale condition code of '6' (Market Center Closing Trade) in Category 2 and a sale condition code of 'I' (Odd Lot Trade) in Category 4.

If a security does not have a Closing Auction, the IEX Official Closing Price 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) in Category 4.

IEX Opening and Closing Auction Times

Opening Auction	Closing Auction
8:00 a.m. – The IEX Pre-Market Session begins and order acceptance begins for Opening and Closing Auctions.	3:50 p.m. – Dissemination of Closing Auction Information begins. Orders are locked into the _Auction Book_ until the auction match, and _Hyper-aggressive Auction Orders_ are rejected upon receipt.
9:28 a.m. – Dissemination of Opening Auction Information begins. Orders are locked into the _Auction Book_ until the auction match, and _Hyper-aggressive Auction Orders_ are rejected upon receipt.	3:59:50 p.m. – New orders are locked out of entering the _Auction Book_ (rejected upon receipt).
9:29:50 a.m. – New orders are locked out of entering the _Auction Book_ (rejected upon receipt).	4:00 p.m. – The Closing Auction match occurs.
9:30 a.m. – The Opening Auction match occurs.	5:00 p.m. – The IEX Post-Market Session ends.

Opening/Closing Order Types

In the auction match, IEX will not support the Anti-Internalization attributes or Minimum Quantity instructions on any order, but will enforce the attribute or instruction for any unfilled shares which are released to the _Continuous Book_ after an auction.

Limit Orders

Limit orders are executable from 8:00 a.m. to 5:00 p.m.; includes DAY (executable from 9:30 a.m. to 4:00 p.m.), GTX (executable from 9:30 a.m. to 5:00 p.m.), SYS, GTT, IOC, and FOK orders. All limit orders, with the exception of orders marked IOC or FOK, are included during the Opening/Closing Auction.

DAY and GTX limit orders are accepted between 8:00 a.m. and 4:00 p.m. (DAY orders) / 5:00 p.m. (GTX orders), except between the Opening Auction _Lock-out Time_ and the Opening Auction match. _Hyper-aggressive Auction Orders_ received after the Opening Auction _Lock-in Time_ are rejected. DAY and GTX limit orders cannot be canceled between the Opening Auction _Lock-in Time_ and the Opening Auction match.

Unfilled limit order shares remaining after the Opening Auction will be released to the _Continuous Book_. Unfilled limit order shares on the _Continuous Book_ at the Closing Auction will participate in the Closing Auction. Unfilled DAY limit order shares remaining at the conclusion of the Closing Auction will be canceled. Unfilled shares from all other limit orders remaining at the conclusion of the Closing Auction will be released to the _Continuous Book_.

An imbalance only order is not an available order type, and imbalance only orders are not accepted or executed by IEX.

Market Orders

Executable from 9:30 a.m. to 4:00 p.m., includes DAY, IOC, and FOK. DAY market orders are included in the Opening Auction, while all other market orders are excluded from the Opening/Closing Auction and rejected upon receipt outside of the Regular Market Session.

DAY market orders are accepted between 8:00 a.m. and 4:00 p.m., except between the Opening Auction _Lock-in Time_ and the Opening Auction match. DAY market orders received after the Opening Auction _Lock-in Time_ are rejected. DAY market orders cannot be canceled between the Opening Auction _Lock-in Time_ and the Opening Auction match.

Unfilled DAY market order shares remaining at the conclusion of the Opening Auction will be canceled.

Pegged Orders

Pegged orders are executable from 9:30 a.m. to 4:00 p.m.; includes DAY, GTX, SYS, GTT, IOC, and FOK. All pegged orders are ineligible for the Opening Auction. Unfilled pegged order shares on the _Continuous Book_ at the Closing Auction will participate in the Closing Auction using their resting price for ranking purposes; IOC and FOK pegged orders do not participate in the Closing Auction.

DAY pegged orders are accepted between 8:00 a.m. and 4:00 p.m., but do not participate in the Opening Auction. Finally, DAY pegged orders can be canceled between the Opening Auction _Lock-in Time_ and the Opening Auction match. Unfilled pegged order shares remaining at the conclusion of the Closing Auction will be canceled.

Routable Orders

Limit or market orders may be marked as routable. Routable DAY market orders are rejected during the Pre-Market Session. At the conclusion of an Opening Auction, any remaining shares from a routable DAY or GTX limit order

becomes part of the *Continuous Book*. A routable limit order will be routed when an away market locks or crosses the **order's limit price**, per Re-sweep specifications.

On-Open Orders

Specifically request an execution at the IEX Official Opening Price. Executable only in the Opening Auction (or the Halt Auction for IEX-listed securities that have not traded during the Regular Market Session on that trading day). Can be Limit-On-Open ("LOO") or Market-On-Open ("MOO").

MOO orders must be received prior to the Opening Auction *Lock-in Time* to guarantee eligibility for the Opening Auction. *Hyper-aggressive Auction Orders* (which includes any MOO orders) received after the Opening Auction *Lock-in Time* are rejected. LOO orders must be received prior to the Opening Auction *Lock-out Time* to guarantee eligibility for the Opening Auction. LOO orders received after the Opening Auction *Lock-out Time* are rejected. On-Open orders cannot be canceled between the Opening Auction *Lock-in Time* and the Opening Auction match.

On-Close Orders

Specifically request an execution at the IEX Official Closing Price. Executable only in the Closing Auction (or Volatility Auction for IEX-listed securities where an LULD trading pause exists at or after the Closing Auction *Lock-in Time* and before the Closing Auction). Can be Limit-On-Close ("LOC") or Market-On-Close ("MOC").

MOC orders must be received prior to the Closing Auction *Lock-in Time* to guarantee eligibility for the Closing Auction. *Hyper-aggressive Auction Orders* (which includes any MOC orders) received after the Closing Auction *Lock-in Time* are rejected. LOC orders must be received prior to the Closing Auction *Lock-out Time* to guarantee eligibility for the Closing Auction. LOC orders received after the Closing Auction *Lock-out Time* are rejected. Between the Closing Auction *Lock-in Time* and immediately prior to 3:55 p.m. (i.e., five minutes before the Closing Auction match), On-Close orders can be canceled only if the User requests that IEX correct a legitimate error in the order (e.g., side, size, symbol, price, or duplication of an order). On-Close orders cannot be canceled at or after 3:55 p.m. (i.e., five minutes before the Closing Auction match) for any reason.

Order Entry Reference for the Auction Book

Order Type	IEX FIX Specification Field (FIX Tag)	
Market-On-Open (MOO)	OrdType(40) = 1 (Market) ExecInst(18) = i (IEX Only)	TimeInForce(59) = 2 (At the open)
Market-On-Close (MOC)		TimeInForce(59) = 7 (At the close)
Limit-On-Open (LOO)	OrdType(40) = 2 (Limit) ExecInst(18) = i (IEX Only) Price(44) = [price]	TimeInForce(59) = 2 (At the open)
Limit-On-Close (LOC)		TimeInForce(59) = 7 (At the close)
Day	TimeInForce(59) = 0 (DAY)	
Good 'til Extended Day	TimeInForce(59) = 5 (GTX)	

Note that the above is not a complete list of all FIX tag combinations eligible for auctions on Investors Exchange. Refer to this specification and the [IEX FIX Specification](#) for details about order eligibility in each IEX auction type and their FIX implementation.

Any On-Open or On-Close order with a non-zero MinQty(110) will be rejected upon receipt. In addition, On-Open or On-Close orders with OrdType(40) = P will be rejected. Any On-Open or On-Close order with a MaxFloor(111) or Anti-Internalization Group ID(7928) value will be accepted, however these instructions will not be enforced during the auction match.

Cancel On Disconnect

IEX offers participants three (3) options for canceling orders as a result of a session disconnect:

1. All: Cancel all open orders (*Continuous Book*, On-Open, and On-Close)
2. All, excluding On-Open/On-Close: Cancel all open orders, excluding On-Open and On-Close orders
3. None: Do not cancel any open orders

If disconnect occurs between the *Lock-in Time* and the Opening (Closing) Auction match: orders on the *Opening (Closing) Auction Book* will not be canceled, however, for the Opening Auction, any unfilled portion of DAY and GTX limit orders will be canceled at the conclusion of the auction match in a manner similar to LOO orders.

To change the Cancel on Disconnect setting for any order entry sessions, contact IEX Market Operations or submit an updated Equities Port Request Form (pages 8-9 of the Connectivity Agreements and Forms packet).

Execution Priority

Orders on the Order Book are ranked and execute in the Opening and Closing Auctions in *Auction Priority*, which can be described simply as price – display – time priority.

Opening/Closing Auction Execution Priority

1. Market and MOO/MOC orders execute in time priority.
2. All other *Auction Eligible Orders* priced more aggressively than the official auction price execute in price – display – time priority.
3. *Auction Eligible Orders* priced equal to the official auction price execute in display – time priority.

Contingency Procedures

In the event of systemic issues, the determination to use the Closing Auction Primary or Secondary Contingency Procedures will be made by the President of IEX or any senior level employee designated by the President. IEX will publicly announce at the earliest possible time the initiation of the Closing Auction Primary or Secondary Contingency Procedures via System Status and email notification directories. IEX will employ the Closing Auction Primary Contingency Procedures if at all possible, and will employ the Closing Auction Secondary Contingency Procedures only if it determines that both the standard closing procedures and the Primary Contingency Procedures are unavailable.

If IEX employs the Contingency Procedures for the Opening Auction, the Regular Market Session will begin either as scheduled at 9:30 a.m. or upon resolution of the disruption that triggered IEX to operate the contingency procedures.

If IEX employs the Primary or Secondary Contingency Procedures for the Closing Auction, the Post-Market Session will begin either as scheduled at 4:00 p.m. or upon resolution of the disruption that triggered IEX to operate the contingency procedures.

In the event of systemic issues at IEX at the time of an Opening/Closing Auction, IEX reserves the right to employ the following Contingency Procedures.

Opening Auction Contingency Procedures

IEX will publicly announce that no Opening Auction will occur. The price of the *Initial Consolidated Last Sale Eligible Trade* will be used for the IEX Official Opening Price. The IEX Official Opening Price will be published to the Consolidated Tape. All orders on the Order Book will be canceled, and the security will open for trading without an auction.

If a security's IEX Official Opening Price cannot be determined based on this procedure, IEX will not publish an Official Opening Price.

Closing Auction Primary Contingency Procedures

IEX will publicly announce that no Closing Auction will occur. The price of the _Final Consolidated Last Sale Eligible Trade_ will be used for the IEX Official Closing Price. The IEX Official Closing Price will be published to the Consolidated Tape. IEX will execute orders on the _Auction Book_ at the IEX Official Closing Price. All remaining orders on the Order Book will be canceled at the conclusion of the contingency process. IEX will report the resulting execution to the Consolidated Tape and deliver execution reports to Users.

If a security's IEX Official Closing Price cannot be determined based on this procedure, IEX will not publish an Official Closing Price for the security and cancel all orders on the Order Book.

Closing Auction Secondary Contingency Procedures

If IEX publicly announces at or before 3:00 p.m. that it will employ the Secondary Contingency Procedures for one or more securities, it will designate a back-up exchange for those securities, cancel all open interest on the Order Book in order to give Users the opportunity to route their orders to alternative execution venues, and the IEX Official Closing Price for each security will be determined based on the following hierarchy:

1. The IEX Official Closing Price will be the official closing price established for the security under the rules of the designated back-up exchange.
2. If there is no official closing price in a security on the designated back-up exchange, the IEX Official Closing Price will be the **volume weighted average price ("VWAP")** of the last sale eligible trades reported to the Consolidated Tape during the last five minutes of Regular Market Hours on that trading day, including any closing transactions on an exchange and any trade breaks or corrections up to the time the VWAP is processed.
3. If there are no last sale eligible trades reported to the Consolidated Tape during the last five minutes of Regular Market Hours, the IEX Official Closing Price of such security will be the _Final Consolidated Last Sale Eligible Trade_ for the security on that trading day.
4. If there were no last sale eligible trades reported to the Consolidated Tap on that trading day, the IEX Official Closing Price will be the previous official closing price.

If IEX publicly announces after 3:00 p.m. that it will employ the Secondary Contingency Procedures for one or more securities, it will cancel all open interest on the Order Book in the subject securities in order to give participants the opportunity to route their orders to alternative execution venues, and the IEX Official Closing Price for each security will be determined based on the following hierarchy:

1. The IEX Official Closing Price will be the VWAP of the last sale eligible trades reported to the Consolidated Tape during the last five minutes of Regular Market Hours on that trading day, including any closing transactions on an exchange and any trade breaks or corrections up to the time the VWAP is processed.
2. If there are no last sale eligible trades reported to the Consolidated Tape during the last five minutes of Regular Market Hours, the IEX Official Closing Price of such security will be the _Final Consolidated Last Sale Eligible Trade_ for the security on that trading day.
3. If there were no last sale eligible trades reported to the Consolidated Tape on that trading day, the IEX Official Closing Price will be the previous official closing price.

If a security's IEX Official Closing Price cannot be determined based on these hierarchies, IEX will not publish an IEX Official Closing Price for the security.

IPO/HALT AUCTION

The IEX IPO/Halt Auction provides a mechanism that has been designed to allow participants to match a maximum number of shares at a single price for IPOs or the initial pricing of any other security pursuant to Rule 11.280(h)(9), and securities coming out of a trading halt based on supply and demand. If more than one price maximizes the number of shares that will execute resulting in an auction price range, the IPO/Halt Auction will occur at the price at or within such range that is not lower (higher) than the most aggressive unexecuted buy (sell) order. If more than one price satisfies the above conditions, the IPO/Halt Auction will occur at the price closest or equal to the _Volume Based Tie Breaker_. The IPO Auction is used for a corporate IPO and, pursuant to Rule 11.280(h)(9), for the initial pricing of any other security that has not been listed on a national securities exchange or traded in the over-the-counter market pursuant to FINRA Form 211 immediately prior to the initial pricing, provided that a broker-dealer serving in the role of financial advisor to the issuer of the securities being listed is willing to perform the functions under IEX Rule 11.280(h)(8) that are performed by an underwriter with respect to an IPO. The Halt Auction is used to resume trading after a regulatory halt or Market-Wide Circuit Breaker Level 1 or Level 2 breach.

At 7:45 a.m. on the morning of the IPO Auction, IEX will disseminate a halt for securities scheduled for an IPO Auction. In addition, an administrative message will be published to the Consolidated Tape on the morning of the IPO Auction. IEX Auction Information will contain information about the issue price and the expected time of the IPO Auction.

During an IPO/Halt Auction, IEX disseminates IEX Auction Information to market participants via TOPS, DEEP, IEX API, and the IEX public website at the start of the Display Only Period. The default Display Only Period of an IPO Auction is 10:00 a.m., but is subject to change based on underwriter request. IEX Auction Information contains valuable details about IPO/Halt Auction orders as well as relevant pricing information of IPO Auctions and securities coming out of a trading halt.

Between the start of the Display Only Period and the start of the Pre-Launch Period (as defined below), the lead underwriter, or broker-dealer serving in the role of financial advisor for securities being priced pursuant to Rule 11.280(h)(9) (collectively, the "underwriter"), will provide the Exchange with an upper price band ("Upper IPO Price Band") and a lower price band ("Lower IPO Price Band") for publication, which together reflect the price range within which the underwriter anticipates the IPO Auction match to occur. When published, the Upper and Lower IPO Price Bands (collectively, the "IPO Price Band") will be disseminated via the securities information processor and proprietary data feeds. If the current published IPO Price Band spread is greater than $1.00, the underwriter will make best efforts to provide an updated IPO Price Band with a spread of $1.00 or less for publication before the IPO Auction match. A minimum of one minute must elapse between publication of the last IPO Price Band and the IPO Auction match.

At least fifteen (15) minutes after the start of the Display Only Period, the underwriter shall advise the Exchange to enter into a "Pre-Launch Period" of indeterminate duration. The Pre-Launch Period and the Display Only Period shall end, and the security shall be released for trading by IEX when the following conditions are all met:

- All market orders will be executed in the IPO Auction;
- The IPO Auction clearing price is at or within the latest IPO Price Band selected by the underwriter; and
- IEX receives notice from the underwriter of the IPO that the security is ready to trade.

The failure to satisfy the conditions above will result in a delay of the release for trading of the IPO, and a continuation of the Pre-Launch Period, during which the underwriter may provide one or more updated IPO Price Bands to the Exchange for publication, until all of the conditions above have been satisfied. Market participants may continue to enter orders and order cancellations for participation in the IPO Auction during the Pre-Launch Period until the auction match.

Once the IPO Auction is conducted, the IEX Official IPO Opening Price for the security will be disseminated to the Consolidated Tape along with a bulk execution. Once the Halt Auction is conducted, the IEX Reopening Trade for the

security will be disseminated to the Consolidated Tape as a bulk execution. If there is insufficient trading interest to execute the Halt Auction (i.e., no crossing interest), IEX will not conduct the Halt Auction in that security; *Auction Eligible Orders* marked IOC or FOK and market orders will be canceled, and the security will be opened for trading without an auction.

Note that limit orders marked IOC or FOK and market orders received during a Halt Auction Order Acceptance Period are accepted and are not canceled until they have been processed in the auction or they have been explicitly canceled by the User. Such orders that are not filled in the auction will be canceled at the conclusion of the auction.

IEX Official IPO Opening Price

Upon completion of an IPO Auction, the IEX Official IPO Opening Price for the newly issued security will be disseminated to the Consolidated Tape along with a bulk execution. The IEX Official IPO Opening Price will be the price that resulted from the IPO Auction.

The IEX Official IPO Opening Price will be represented by a sale condition code of 'Q' (Market Center Official Open) in Category 4. The bulk execution will be represented by a sale condition code of 'O' (Market Center Opening Trade) in Category 2 and a sale condition code of 'X' (Cross Trade) in Category 4. If the auction match results in an odd lot execution, the bulk execution will be represented by a sale condition code of 'O' (Market Center Opening Trade) in Category 2 and a sale condition code of 'I' (Odd Lot Trade) in Category 4.

These are the same codes used for the standard IEX Official Opening Price disseminated at market open.

IEX Reopening Trade

Upon completion of a Halt Auction, the IEX Reopening Trade for the security will be disseminated to the Consolidated Tape as a bulk execution. The IEX Reopening Trade will be the execution that resulted from the Halt Auction.

The IEX Reopening Trade will be represented by a sale condition code of '5' (Market Center Reopening Trade) in Category 2 and a sale condition code of 'X' (Cross Trade) in Category 4. If the auction match results in an odd lot execution, the IEX Reopening Trade will be represented by a sale condition code of '5' (Market Center Reopening Trade) in Category 2 and a sale condition code of 'I' (Odd Lot Trade) in Category 4.

If a security does not have a Halt Auction, continuous trading begins by canceling *Auction Eligible Orders* with a time-in-force of FOK or IOC and market orders, and releasing all remaining orders to the *Continuous Book*.

IPO/Halt Auction Order Types

In the auction match, IEX will not enforce the Anti-Internalization attributes or Minimum Quantity instructions on any order, but will enforce the attribute or instruction for any unfilled shares which are released to the *Continuous Book*.

Limit Orders

Limit orders are executable from the IPO/Halt Auction time to 5:00 p.m.; includes DAY (executable from the IPO/Halt Auction time, if after 9:30 a.m., to 4:00 p.m.), GTX (executable from the IPO/Halt Auction time, if after 9:30 a.m., to 5:00 p.m.), SYS, GTT, IOC, and FOK orders. All limit orders are eligible for the IPO/Halt Auction. IOC limit orders may be used in Halt Auctions to achieve on-auction behavior, similar to an LOO in the IPO Auction (i.e., cancel any unexecuted portions of the limit order at the conclusion of the auction process).

DAY and GTX limit orders are accepted between 8:00 and 4:00 p.m. (DAY orders) / 5:00 p.m. (GTX orders). DAY and GTX limit orders do not participate in Halt Auctions occurring during the Pre-Market Session. DAY limit orders do not participate in Halt Auctions scheduled to occur during the Post-Market Session, unless entered prior to 4:00 p.m.

Displayed interest from limit orders on the _Continuous Book_ at the time of the halt dissemination will participate in the auction process using their resting price for ranking purposes, and will be reflected in the IEX Auction Information published. Non-displayed and non-displayed portions of limit orders on the _Continuous Book_ at the time of the halt dissemination will not participate in the Halt Auction. Non-displayed limit orders and reserve orders with non-displayed portions are accepted during the Order Acceptance Period and participate in the IPO/Halt Auction ranked at their limit price with display priority for the display quantity and non-display priority for the remainder of their order quantity. Unfilled shares from limit orders remaining at the conclusion of the IPO/Halt Auction are released to the _Continuous Book_, with the exception of IOC and FOK limit orders.

An imbalance only order is not an available order type, and imbalance only orders are not accepted or executed by IEX.

Market Orders

Executable from 9:30 a.m. to 4:00 p.m., includes DAY, IOC, and FOK. All market orders are eligible for IPO/Halt Auctions during the Regular Market Session. Market orders are not included in a Halt Auction scheduled to occur outside of the Regular Market Session, unless DAY market orders are entered prior to 4:00 p.m. DAY market orders are accepted during the Order Acceptance Period for an IPO Auction, however IOC and FOK market orders are rejected during this time. Unfilled market order shares remaining at the conclusion of the IPO/Halt Auction will be canceled.

Pegged Orders

Pegged orders are executable from the IPO/Halt Auction time to 4:00 p.m.; includes DAY, SYS, GTX, GTT, IOC, and FOK. All pegged orders are excluded from an IPO/Halt Auction.

Routable Orders

Limit or market orders may be marked as routable. At the conclusion of a Halt Auction, a routable DAY (between 9:30 a.m. and 4:00 p.m.), GTX (between 9:30 a.m. and 5:00 p.m.), SYS, or GTT limit order that was resting on the Order Book prior to the halt and not fully executed during the auction will be released to the _Continuous Book_. A routable limit order will be routed when an away market locks or crosses the order's limit price, per Re-sweep specifications. Routable orders are rejected during the Order Acceptance Period.

On-Open Orders

Specifically request an execution at the IEX Official Opening Price. Executable in an IPO Auction, or a Halt Auction for securities that have a Halt Auction scheduled to occur during the Regular Market Session that has not traded during the Regular Market Session on that trading day. Can be Limit-On-Open ("LOO") or Market-On-Open ("MOO").

LOO and MOO orders may be entered during the Order Acceptance Period for an IPO Auction, or Halt Auctions for securities that have not traded during the Regular Market Session on that trading day. LOO and MOO orders must be received prior to the auction match to guarantee eligibility for the IPO/Halt Auction. Unfilled shares remaining from LOO and MOO orders at the conclusion of the IPO/Halt Auction will be canceled.

On-Close Orders

Executable only in the Closing/Volatility Auction. Can be Limit-On-Close ("LOC") or Market-On-Close ("MOC"). LOC and MOC orders received prior to the start of the IPO Auction Order Acceptance Period will be rejected.

Execution Priority

Orders on the Order Book are ranked and execute in the IPO/Halt Auction in _Auction Priority_, which can be described simply as price – display – time priority. Note that all orders are ranked with display priority in the IPO/Halt Auction.

1. Market and MOO orders execute in time priority.
2. All other *Auction Eligible Orders* priced more aggressively than the official auction price execute in price – display – time priority.
3. *Auction Eligible Orders* priced equal to the official auction price execute in display – time priority.

Contingency Procedures

In the event of systemic issues at IEX at the time of an IPO/Halt Auction, IEX reserves the right to employ the following Contingency Procedures.

IEX will publicly announce at the earliest possible time via System Status and email notification directories that the Order Acceptance Period for the IPO Auction will reset for the subject security. IEX will then cancel all orders on the Order Book and disseminate a new scheduled time for the Order Acceptance Period and IPO Auction match.

IEX will publicly announce at the earliest possible time via System Status and email notification directories that no Halt Auction will occur. All orders on the Order Book will be canceled, and the security will open for trading without a Halt Auction.

If IEX employs these Contingency Procedures for the IPO/Halt Auction, trading for the security will begin upon resolution of the disruption that triggered IEX to operate the Contingency Procedures.

VOLATILITY AUCTION

The IEX Volatility Auction provides a mechanism that has been designed to allow Users to match a maximum number of shares at a single price for securities coming out of an LULD trading pause based on supply and demand. If more than one price maximizes the number of shares that will execute resulting in an auction price range, the Volatility Auction will occur at the price at or within such range that is not lower (higher) than the most aggressive unexecuted buy (sell) order. If more than one price satisfies the above conditions, the Volatility Auction will occur at the price closest or equal to the _Volume Based Tie Breaker_.

If the Volatility Auction price established by the above determination is outside the _Volatility Auction Collar_, such price is an _Impermissible Price_, the Volatility Auction Order Acceptance Period will receive an automatic five-minute extension, and the _Volatility Auction Collar_ is expanded in the direction of the _Impermissible Price_. This first automatic extension is called the Initial Extension Period. The Exchange attempts an auction match at the end of the Initial Extension Period. Once again, if the Volatility Auction price established by the above determination is an _Impermissible Price_, the Volatility Auction Order Acceptance Period will receive an automatic five-minute extension, and the _Volatility Auction Collar_ is expanded in the direction of the _Impermissible Price_. All subsequent automatic extensions are each called an Additional Extension Period. This process of extension and collar expansion continues until such time as sufficient trading interest exists at a clearing price inside the _Volatility Auction Collar_. Every one second during an Additional Extension Period the Exchange will attempt an auction match.

If an LULD trading pause exists at or after the Closing Auction _Lock-in Time_ (i.e., 3:50 p.m.) and before the Closing Auction, IEX will not conduct a Closing Auction in the subject security and will instead utilize the Volatility Auction to determine the IEX Official Closing Price at the conclusion of Regular Market Hours. If IEX continues to extend the Volatility Auction Order Acceptance Period until 5:00 p.m., IEX will not conduct a Volatility Auction in the subject security and will instead use the _Final Last Sale Eligible Trade_ as the IEX Official Closing Price in that security for that trading day. In that event, all orders will be canceled back to the entering firms at 5:00 p.m.

During a Volatility Auction, IEX disseminates IEX Auction Information to market participants via TOPS, DEEP, IEX API, and the IEX public website at the start of the Display Only Period. IEX Auction Information contains valuable details about Volatility Auction orders as well as relevant pricing information for securities coming out of a trading pause and its collars.

Once the Volatility Auction is conducted, the IEX Reopening Trade for the security will be disseminated to the Consolidated Tape as a bulk execution. If there is insufficient trading interest to execute the Volatility Auction (i.e., no crossing interest), IEX will not conduct the Volatility Auction in that security; Auction Eligible Orders marked IOC or FOK and market orders will be canceled, and the security will be opened for trading without an auction.

Note that limit orders marked IOC or FOK and market orders received during a Volatility Auction Order Acceptance Period are accepted and are not canceled until they have been processed in the auction or they have been explicitly canceled by the User. Such orders that are not filled in the auction will be canceled at the conclusion of the auction.

Closing with a Volatility Auction

If an LULD trading pause exists at or after the Closing Auction _Lock-in Time_ (i.e., 3:50 p.m.) and before the Closing Auction, the Volatility Auction will be conducted at 4:00 p.m. with On-Close orders and produce the IEX Official Closing Price. Participants may continue to submit LOC and limit orders marked DAY, GTX, GTT, SYS, FOK, or IOC, however MOC and market orders are rejected upon submission. Orders will remain open and participants may cancel open orders until the auction match. At the later of the Closing Auction _Lock-in Time_ or the pause dissemination, all On-Close orders will be transferred into the Volatility Auction, and non-displayed DAY limit orders and pegged orders that were

on the *Continuous Book* at the time of the pause are canceled in order to allow participants to re-enter such interest as *Auction Eligible Orders*.[4] Once the auction is complete, unfilled shares from On-Close and market orders as well as *Auction Eligible Orders* marked DAY, FOK, and IOC will be canceled. All other unexecuted orders or non-displayed interest that did not participate in the auction will be released to the *Continuous Book* for normal processing.

If there is insufficient trading interest in the IEX System to execute a Volatility Auction at 4:00 p.m. (i.e., no crossing interest), IEX will not conduct a Volatility Auction in that security. In that case, IEX will instead use the *Final Last Sale Eligible Trade* as the IEX Official Closing Price in that security for that trading day, as it does when there is no crossing interest in the Closing Auction on a daily basis.

IEX Reopening Trade

Upon completion of a Volatility Auction, the IEX Reopening Trade for the security will be disseminated to the Consolidated Tape as a bulk execution. The IEX Reopening Trade will be the execution that resulted from the Volatility Auction.

The IEX Reopening Trade will be represented by a sale condition code of '5' (Market Center Reopening Trade) in Category 2 and a sale condition code of 'X' (Cross Trade) in Category 4. If the auction match results in an odd lot execution, the IEX Reopening Trade will be represented by a sale condition code of '5' (Market Center Reopening Trade) in Category 2 and a sale condition code of 'I' (Odd Lot Trade) in Category 4.

If a security does not have a Volatility Auction (e.g., no crossing interest), continuous trading begins by canceling all on-auction orders and transferring any queued orders to the *Continuous Book*.

Volatility Auction Order Types

In the auction match, IEX will not enforce the Anti-Internalization attributes or Minimum Quantity instructions on any order, but will enforce the attribute or instruction for any unfilled shares which are released to the *Continuous Book*.

Limit Orders

Limit orders are executable from 8:00 a.m. to 5:00 p.m.; includes DAY (executable from 9:30 a.m., to 4:00 p.m.), GTX (executable from 9:30 a.m., to 5:00 p.m.), SYS, GTT, IOC, and FOK orders. All limit orders are eligible for the Volatility Auction. IOC limit orders may be used in Volatility Auctions to achieve on-auction behavior, similar to an LOO in the Opening Auction (i.e., cancel any unexecuted portions of the limit order at the conclusion of the auction process).

Displayed interest from limit orders on the *Continuous Book* at the time of the pause dissemination will participate in the auction process using their resting price for ranking purposes, and will be reflected in the IEX Auction Information published. Non-displayed and non-displayed portions of limit orders on the *Continuous Book* at the time of the pause dissemination will not participate in the Volatility Auction. Non-displayed limit orders and reserve orders with non-displayed portions are accepted during the Order Acceptance Period and participate in the Volatility Auction ranked at their limit price with display priority for the display quantity and non-display priority for the remainder of their order quantity. Unfilled shares from limit orders remaining at the conclusion of the Volatility Auction will are released to the *Continuous Book*, with the exception of IOC or FOK limit orders.

An imbalance only order is not an available order type, and imbalance only orders are not accepted or executed by IEX.

Market Orders

---

[4] Note that non-displayed interest on the *Continuous Book* at the time of the pause is not eligible for the Volatility Auction, however orders with non-display instructions received during the Order Acceptance Period are *Eligible Auction Orders*.

Executable from 9:30 a.m. to 4:00 p.m., includes DAY, IOC, and FOK. All market orders are eligible for Volatility Auctions. Unfilled market order shares remaining at the conclusion of the Volatility Auction will be canceled.

Pegged Orders

Pegged orders are executable from the Volatility Auction time to 4:00 p.m.; includes DAY, SYS, GTX, GTT, IOC, and FOK. All pegged orders are excluded from a Volatility Auction.

Routable Orders

Limit or market orders may be marked as routable. At the conclusion of a Volatility Auction, a routable DAY (prior to 4:00 p.m.), GTX, SYS, or GTT limit order that was resting on the Order Book prior to the pause and not fully executed during the auction will be released to the _Continuous Book_. A routable limit order will be routed when an away market **locks or crosses the order's limit price, per Re**-sweep specifications. Routable orders are rejected during the Order Acceptance Period.

On-Open Orders

Not executable in a Volatility Auction.

On-Close Orders

Executable in a Volatility Auction if an LULD trading pause exists at or after the Closing Auction _Lock-in Time_ and before the Closing Auction. Can be Limit-On-Close ("LOC") or Market-On-Close ("MOC").

MOC orders must be received prior to the Closing Auction _Lock-in Time_ to guarantee eligibility for the Volatility Auction. MOC orders received after the Closing Auction _Lock-in Time_ are rejected from the Volatility Auction. LOC orders must be received prior to the time of the Volatility Auction match to guarantee eligibility for the Volatility Auction.

Execution Priority

Orders on the Order Book are ranked and execute in a Volatility Auction in _Auction Priority_, which can be described simply as price – display – time priority. Note that all orders are ranked with display priority in the Volatility Auction.

Volatility Auction Execution Priority

1. Market and MOC orders execute in time priority.
2. All other _Auction Eligible Orders_ priced more aggressively than the official auction price execute in price – display – time priority.
3. _Auction Eligible Orders_ priced equal to the official auction price execute in display – time priority.

Contingency Procedures

In the event of systemic issues at IEX at the time of a Volatility Auction, IEX reserves the right to employ the following Contingency Procedures.

IEX will publicly announce at the earliest possible time via System Status and email notification directories that no Volatility Auction will occur. All orders on the Order Book will be canceled, and the security will open for trading without an auction once the SIP publishes the LULD Price Bands.

If IEX employs these Contingency Procedures for the Volatility Auction, trading for the security will begin upon resolution of the disruption that triggered IEX to operate the Contingency Procedures.

Note that IEX will employ the Closing Auction Contingency Procedures for a Volatility Auction being used to determine the IEX Official Closing Price (i.e., closing with a Volatility Auction).

SHORT SALE ORDER HANDLING

Opening/Closing Auction: Short sale orders not marked short exempt 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 current NBB at the time of the auction match.

Halt/Volatility Auction: Short sale orders not marked short exempt 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 NBB prior to the halt/pause.

In accordance with the above, "referenced NBB price" is defined as either the current NBB at the time of the auction match for an Opening/Closing Auction or the last NBB prior to the halt/pause for the Halt/Volatility Auction, respectively.

Note that a short sale *Auction Eligible Order* not marked short sale exempt for a covered security subject to Rule 201 of Regulation SHO during an active short sale circuit breaker with a limit price lower than the auction match price may not receive an execution in the auction match if such **short sale order's participation in the** clearing price determination of the auction would push the auction match price to or below the referenced NBB price.

Execution priority is outlined in more detail below to identify specifically how short sale orders not marked short exempt for covered securities subject to Rule 201 of Regulation SHO that are in an active short sale circuit breaker are prioritized in an auction.

Auction Execution Priority with Short Sale Order Handling

- *Auction Eligible Orders* that are market orders, including MOO and MOC orders, to buy, sell long, or sell short marked short exempt, as well as sell short not marked short exempt that do not push the auction match price to a price at or below the referenced NBB price, will execute in time priority.
- All other *Auction Eligible Orders* priced more aggressively than the auction match price to buy, sell long, or sell short marked short exempt, as well as sell short not marked short exempt that do not push the auction match price to a price at or below the referenced NBB price, will execute in price – display – time priority.
- All other *Auction Eligible Orders* priced equal to the auction match price to buy, sell long, or sell short marked short exempt, as well as sell short not marked short exempt that do not push the auction match price to a price at or below the referenced NBB price, will execute in display – time priority.

During the auction match, if the inclusion of one or more sell short order not marked short exempt would push the auction match price to or below the referenced NBB price, then such sell short order and all other sell short orders not marked short exempt with lesser priority are excluded from the auction match. Note that a sell short order not marked short exempt may receive a partial execution or even no execution in an auction where the auction match price is above the referenced NBB price, but **such order's resting price is at or below the referenced NBB price.**

NEWLY LISTED SECURITIES

Newly listed securities that are neither an IPO nor subject to initial pricing pursuant to Rule 11.280(h)(9) (e.g., a security that transfers from another listing exchange to IEX or a new when-issued security) will be available for trading in the Pre-Market Session and follow the normal Opening and Closing Auction schedules on the first day of trading on IEX.

CLEARING PRICE EXAMPLES

The following examples are designed to illustrate the clearing price determination process described above. Each example below assumes the Protected NBBO is $10.09 by $10.11 at the time of the Closing Auction match.

Example 1

- The Closing Auction Book includes the following orders:
    - LOC order to buy 1,500 shares with a limit price of $10.10; and
    - LOC order to sell 1,000 shares with a limit price of $10.10.
- Shares are maximized at $10.10; therefore
    - 1,000 shares would execute at the IEX Official Closing Price of $10.10.

Example 2

- The Closing Auction Book contains the following orders:
    - LOC order to buy 1,500 shares with a limit price of $10.10; and
    - MOC order to sell 1,000 shares.
- Shares are maximized at each price at and between the lower threshold of the _Opening/Closing Auction Collar_ (i.e., $9.08) and $10.10, resulting in an auction price range, but the only price at or within such range that is not lower than the most aggressive unexecuted buy order is $10.10; therefore
    - 1,000 shares would execute at the IEX Official Closing Price of $10.10.

Example 3

- The Closing Auction Book contains the following orders:
    - LOC order to buy 2,000 shares with a limit price of $10.11;
    - LOC order to sell 2,000 shares with a limit price of $10.09.
- The Continuous Book contains the following orders:
    - Displayed limit order to buy 500 shares with a limit price of $10.09;
    - Displayed limit order to sell 600 shares with a limit price of $10.11.
- Shares are maximized at each price at and between $10.09 and $10.11 resulting in an auction price range. Each price at and between such range is not lower (higher) than the most aggressive unexecuted buy (sell) order, $10.09 and $10.11 respectively;
- The price closest or equal to the Volume Based Tie Breaker (i.e., the midpoint of the Protected NBBO) within the resulting range is $10.10; therefore
    - 2,000 shares would execute at the IEX Official Closing Price of $10.10.

PRIORITY OF EXECUTION EXAMPLES

The following examples are designed to illustrate the clearing price determination and priority of execution including non-displayed orders on the Continuous Book with a resting price within the _Reference Price Range_. Each example below assumes the Protected NBBO is $20.19 by $20.21 at the time of the Closing Auction match.

Example 1

- The Regular Market Continuous Book Contains the following orders:
  - o Midpoint Peg order to buy 2,500 shares with a resting price of $20.20.
- The Closing Auction Book includes the following orders:
  - o LOC order to buy 500 shares with a limit price of $20.18; and
  - o LOC order to sell 2,000 shares with a limit price of $20.18.
  - o For purposes of determining the clearing price, the Midpoint Peg order is priced to the Protected NBB ($20.19), but remains ranked and eligible to execute at its resting price;
- Accordingly, shares are maximized at each price at and between $20.18 and $20.19, but $20.19 is the only price at or within such range that is not lower than the price of the most aggressive unexecuted buy order; therefore
  - o 2,000 shares would execute at the IEX Official Closing Price of $20.19;
    - ▪ Both the Midpoint Peg buy order and LOC sell order would receive an execution of 2,000 shares; and
    - ▪ The LOC buy order would not receive an execution, because the LOC sell order is fully filled after matching with the Midpoint Peg buy order with superior priority.

Example 2

- The Regular Market Continuous Book contains the following orders:
  - o Midpoint Peg order to buy 2,500 shares with a resting price of $20.20.
- The Closing Auction Book includes the following orders:
  - o LOC order to buy 500 shares with a limit price of $20.19; and
  - o LOC order to sell 2,000 shares with a limit price of 20.18.
  - o For purposes of determining the clearing price, the Midpoint Peg order is priced to the Protected NBB ($20.19), but remains ranked and eligible to execute at its resting price;
- Accordingly, shares are maximized between $20.18 and $20.19, but $20.19 is the only price at or within such range that is not lower than the price of the most aggressive unexecuted buy order; therefore
  - o 2,000 shares would execute at the IEX Official Closing Price of $20.19;
    - ▪ The Midpoint Peg buy order would receive an execution of 2,000 shares;
    - ▪ The LOC sell order would receive an execution of 2,000 shares; and
    - ▪ The LOC buy order would not receive an execution, because the LOC sell order is fully filled after matching with the Midpoint Peg buy order with superior priority.

Example 3

- The Regular Market Continuous Book Contains the following orders:
  - o Primary Peg order to buy 2,500 shares with a resting price of $20.18, and a limit price of $20.20.
- The Closing Auction Book includes the following orders:
  - o LOC order to buy 500 shares with a limit price of $20.19; and

- o LOC order to sell 2,000 shares with a limit price of 20.19.
- For purposes of determining the clearing price, the Primary Peg order is priced at its resting price ($20.18) because it is resting outside the _Reference Price Range_ ($20.19 to $20.21); the Primary Peg order is eligible to exercise price discretion up to the auction match price, so long as the match price is at or below the less **aggressive of the NBB or the order's limit price.**
- Accordingly, shares are maximized at $20.19; therefore
  - o 2,000 shares would execute at the IEX Official Closing Price of $20.19;
    - The LOC buy order would receive an execution of 500 shares;
    - Assuming IEX has determined the quote to be stable pursuant to IEX Rule 11.190(g), the Primary Peg buy order would exercise discretion up to the auction match price and receive an execution of 1,500 shares; and
    - Assuming IEX has determined the quote to be stable, the LOC sell order would receive an execution of 2,000 shares. If IEX has determined the quote to be unstable pursuant to IEX Rule 11.190(g), the LOC sell order would receive an execution of 500 shares.

Example 4

- The Regular Market Continuous Book Contains the following orders:
  - o Midpoint Peg order to buy 2,500 shares with a resting price of $20.20.
- The Closing Auction Book includes the following orders:
  - o LOC order to buy 500 shares with a limit price of $20.20; and
  - o LOC order to sell 2,000 shares with a limit price of $20.20.
  - o For purposes of determining the clearing price, the Midpoint Peg order is priced to the Protected NBB ($20.19), but remains ranked and eligible to execute at its resting price;
- Accordingly, shares are maximized at $20.20; therefore
  - o 2,000 shares would execute at the IEX Official Closing Price of $20.20;
    - The LOC buy order would receive an execution of 500 shares;
    - The Midpoint Peg buy order would receive an execution of 1,500 shares; and
    - The LOC sell order would receive an execution of 2,000 shares.

Example 5

- The Regular Market Continuous Book Contains the following orders:
  - o Discretionary Peg order to buy 2,500 shares with a resting price of $20.19, and limit price of $20.21.
- The Closing Auction Book includes the following orders:
  - o LOC order to buy 500 shares with a limit price of $20.20; and
  - o LOC order to sell 2,000 shares with a limit price of $20.20.
- For purposes of determining the clearing price, the Discretionary Peg order is priced at its resting price ($20.19) because it is resting at the _Reference Price Range_ ($20.19 to $20.21); the Discretionary Peg order is eligible to exercise price discretion up to the auction match price, so long as the match price is at or below the less **aggressive of the midpoint of the NBBO or the order's limit price.**
- Accordingly, shares are maximized at $20.20; therefore
  - o 2,000 shares would execute at the IEX Official Closing Price of $20.20;
    - The LOC buy order would receive an execution of 500 shares;
    - Assuming IEX has determined the quote to be stable pursuant to IEX Rule 11.190(g), the Discretionary Peg buy order would exercise discretion up to the auction match price and receive an execution of 1,500 shares; and

- Assuming IEX has determined the quote to be stable, the LOC sell order would receive an execution of 2,000 shares. If IEX has determined the quote to be unstable pursuant to IEX Rule 11.190(g), the LOC sell order would receive an execution of 500 shares.

IEX AUCTION INFORMATION EXAMPLES

To demonstrate the value of the different price indicators used in the IEX auction process for various situations, consider the following examples. Note that IEX Auction Information updates are time based and are not disseminated until the _Lock-in Time_. These examples are not indicative of what would be expected in an IEX Auction.

Market Order Only Auction

Previous official closing price is $10.05. At 9:30:00, this auction would execute 2,000 shares at $10.05.

#	Entry Time	Buy Shares	Sell Shares	Order Type/Price	Reference Price	Paired Shares	Imbalance Shares	Imbalance Side	Indicative Price	Auction Price	Collar Reference	Lower Collar	Upper Collar
1	9:27:00	1,000		MOO									
2	9:27:01		1,000	MOO									
3	9:27:02	1,000		MOO									
4	9:27:05		1,000	MOO									
5	9:28:00	-	-	-	$10.05	2,000	O	N	$10.05	$10.05	$10.05	$9.05	$11.05

No Match Occurs in the Auction

The last trade during the Regular Market Session occurred at 3:15 p.m. at $17.25. Protected NBBO becomes $15.70 x $17.30 (created by order 2 & 3). As there is no match on the Order Book in the auction match, the IEX Official Closing Price will be set to $17.25.

#	Entry Time	Buy Shares	Sell Shares	Order Type/Price	Reference Price	Paired Shares	Imbalance Shares	Imbalance Side	Indicative Price	Auction Price	Collar Reference	Lower Collar	Upper Collar
1	3:53:00	-	-	-	$17.25	O	O	N	$17.25	$17.25	$17.25	$15.53	$18.97
2	3:54:00		4,000	LOC/$17.00	$17.25	O	4,000	S	$17.00	$17.00	$17.25	$15.53	$18.97
3	3:55:00	5,000		Limit/$15.70	$17.25	O	4,000	S	$17.00	$17.00	$17.25	$15.53	$18.97

#	Entry Time	Buy Shares	Sell Shares	Order Type/Price	Reference Price	Paired Shares	Imbalance Shares	Imbalance Side	Indicative Price	Auction Price	Collar Reference	Lower Collar	Upper Collar
4	3:56:00		3,000	Limit/$17.30	$16.50	O	O	N	$16.50	$16.50	$16.50	$14.05	$18.95
5	3:58:00		3,000	LOC/$17.50	$16.50	O	O	N	$16.50	$16.50	$16.50	$14.05	$18.95

Limit Order Only Auction

Protected NBBO is $13.75 x $14.00 (created by order 2 & 3) until 9:29:55 a.m. at which point it becomes $13.80 x $14.00 due to the introduction of order 11 on the _Continuous Book_. Previous official closing price is $13.05.

#	Entry Time	Buy Shares	Sell Shares	Order Type/Price	Reference Price	Paired Shares	Imbalance Shares	Imbalance Side	Indicative Price	Auction Price	Collar Reference	Lower Collar	Upper Collar
1	9:28:29	-	-	-	$13.05	O	O	N	$13.05	$13.05	$13.05	$11.75	$14.35
2	9:28:30	5,000		Limit/$13.75	$13.75	O	O	N	$13.75	$13.75	$13.75	$12.38	$15.12
3	9:28:31		5,000	Limit/$14.00	$13.875	O	O	N	$13.875	$13.875	$13.875	$12.37	$15.38
4	9:28:42	2,000		LOO/$14.00	$14.00	O	2,000	B	$14.00	$14.00	$13.875	$12.37	$15.38
5	9:28:43		1,000	LOO/$13.75	$14.00	1,000	1,000	B	$14.00	$14.00	$13.875	$12.37	$15.38
6	9:28:54		2,000	LOO/$13.90	$13.90	2,000	1,000	S	$13.90	$13.90	$13.875	$12.37	$15.38
7	9:29:00		2,000	LOO/$13.00	$13.75	2,000	1,000	S	$13.75	$13.75	$13.875	$12.37	$15.38
8	9:29:06		6,000	LOO/$12.37	$13.75	2,000	7,000	S	$13.00	$12.37	$13.875	$12.37	$15.38
9	9:29:29	7,000		LOO/$13.50	$13.75	2,000	7,000	S	$13.50	$13.50	$13.875	$12.37	$15.38
10	9:29:30	9,000		LOO/$13.75	$13.75	9,000	2,000	B	$13.75	$13.75	$13.875	$12.37	$15.38
11	9:29:55	1,000		Limit/$13.80	$13.80	2,000	7,000	S	$13.75	$13.75	$13.90	$12.41	$15.39

At 9:30:00, this auction would execute 9,000 shares at $13.75.

Market/Limit Order Auction

Protected NBBO is $10.00 x $10.01 (created by order 1 & 2) until 9:29:50 a.m. at which point it becomes $10.01 x $10.02 due to the introduction of order 12 on the *Continuous Book*. Previous closing price is $10.05.

#	Entry Time	Buy Shares	Sell Shares	Order Type/Price	Reference Price	Paired Shares	Imbalance Shares	Imbalance Side	Indicative Price	Auction Price	Collar Reference	Lower Collar	Upper Collar
1	9:27:01	10,000		Limit/$10.00									
2	9:27:01		10,000	Limit/$10.01									
3	9:27:02		10,000	Limit/$10.02									
4	9:27:02	100,000		MOO									
5	9:27:03		50,000	MOO									
6	9:28:00	-	-	-	$10.01	50,000	50,000	B	$10.02	$0.00 *	$10.005	$9.00	$11.01
7	9:28:07		20,000	LOO/$9.90	$10.01	70,000	30,000	B	$10.02	$0.00 *	$10.005	$9.00	$11.01
8	9:28:20		30,000	LOO/$10.05	$10.01	70,000	30,000	B	$10.05	$10.05	$10.005	$9.00	$11.01
9	9:29:09	20,000		LOO/$10.10	$10.01	70,000	50,000	B	$10.05	$10.10	$10.005	$9.00	$11.01
10	9:29:20		30,000	Limit/$10.10	$10.01	70,000	50,000	B	$10.05	$10.10	$10.005	$9.00	$11.01
11	9:29:31		50,000	LOO/$9.99	$10.005	120,000	0	N	$10.005	$10.005	$10.005	$9.00	$11.01
12	9:29:50	50,000 (40,000 remain after fill against order 2)		Limit/$10.01	$10.015	120,000	0	N	$10.015	$10.015	$10.015	$9.01	$11.02

At 9:30:00, this auction would execute 120,000 shares at $10.015.

* Auction Book Clearing Price is zero when there is a market order imbalance.

REFERENCES

Order Entry

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

- [IEX FIX Specification](#)

Market Data

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

- [IEX TOPS Specification](#)
- [IEX DEEP Specification](#)
- [IEX API Developer Docs](#)

SUPPORT

Please email questions or comments regarding this document to marketops@iextrading.com

REVISION HISTORY

Version	Date	Change
1.00	May 25, 2017	Initial document
1.10	July 10, 2017	Specified rounding behavior for the _Final Consolidated Last Sale Eligible Trade_ and _Latest Consolidated Last Sale Eligible Trade_. Added an _Offset Time_ to the Opening/Closing Auction and defined _Hyper-aggressive Pile-on Auction Orders_ subject to rejection after the _Offset Time_. Added clarity to the _Lock-out Time_. Removed extraneous language from the _Maximum Percentage_ definition. Clarified language in the final two cases of the _Reference Price Range_ definition. Clarified how the _Volatility Auction Collar_ is expanded in the direction of the Impermissible Price. Specified rounding behavior for the _Volume Based Tie Breaker_ for Pilot Securities in Test Groups 2 and 3 of the Tick Size Pilot Program. Clarified the Reference Price definition. Clarified the clearing price determination for all auctions. Updated the IEX Opening and Closing Auction Times table. Updated examples to conform to the updated clearing price determination language.
1.11	July 24, 2017	Clarify that the Reference Price Range is used when calculating the Reference Price of a Volatility Auction.
1.12	August 16, 2017	Removed _Offset Time_ from the Opening/Closing Auction and definition of _Hyper-aggressive Pile-on Auction Orders_ subject to rejection after the _Offset Time_, as this functionality will not be included in the initial launch of IEX-listed securities. **Added the IEX Data Platform ("IEX API") as a source for IEX Auction** Information messages. Added clarification to the Short Sale Order Handling section to specify that the handling applies to short sale orders not marked short exempt.
1.13	September 5, 2017	Updated the IEX Auction Information Examples.
1.14	September 15, 2017	Clarified Official Opening Price dissemination when no Opening Auction occurs.
1.15	September 21, 2017	Updated the clearing price and priority of execution examples.
1.16	October 12, 2017	Clarified that non-routable limit DAY orders are not canceled at the conclusion of Regular Market Hours if a Volatility Auction is extended beyond conclusion of Regular Market Hours.
1.17	February 28, 2018	Clarified the volatility conditions that cause an Order Acceptance Period extension.

		Clarified the pricing of non-displayed orders on the Continuous Book when calculating the Indicative Clearing Price for the Opening/Closing Auction.
		Clarified the Final Last Sale Eligible Trade and Final Consolidated Last Sale Eligible Trade used during the initial pricing of any other security pursuant to Rule 11.280(h)(9).
		Clarified the Reference Price Range calculation when there is neither a Valid Protected NBBO nor a Valid IEX BBO.
		Clarified the Cancel On Disconnect options available to Users.
		Clarified how new securities will begin trading on their first day: either follow normal Opening and Closing Auction schedules on the first day of trading with Pre-Market Session trading prior to the Opening Auction match at 9:30 a.m. (e.g., new when-issued security) or an IPO Auction at 10:15 a.m. (or another time set by the underwriter) (e.g., the initial pricing of any other security pursuant to Rule 11.280(h)(9)).
1.18	April 3, 2018	Clarified what Rule 11.280(h)(9) refers to in the IPO Auction section. Modified the Final Last Sale Eligible Trade and Final Consolidated Last Sale Eligible Trade definitions to include a provision for new securities.
1.19	August 28, 2018	Updated the IPO Auction process in the following ways: • Introduced the concept of the IPO Price Band • Update the Collar Reference Price, Lower Auction Collar, and Upper Auction Collar to include the IPO Price Band details • Automatically extend IPO Auctions based on new criteria • Update the timing of the Display Only Period Modified the Auction Information message in the following ways: • Extension number is no longer provided for IPO Auctions • Scheduled Auction Time is no longer utilized for IPO Auctions
1.20	September 7, 2018	Clarified that routable orders are not accepted for an IEX-listed security during a trading halt or trading pause due to an invalid Router Constraint Reference Price during such halt or pause.