



## Cboe Limit Up/Limit Down FAQ

Last Updated February 19, 2020

### What is Limit Up/Limit Down?

On May 31, 2012 the Securities and Exchange Commission (SEC) approved on a pilot basis a National Market System Plan, also known as Limit Up/Limit Down (LULD), to address extraordinary market volatility. As LULD was phased in, Single Stock Circuit Breakers (SSCBs) were phased out. Upper and Lower Price Bands are calculated based on a continually updated Reference Price and disseminated market-wide by the consolidated feeds (SIPs) with trading prohibited outside of the specified price bands. For more details, refer to [SEC Release 34-67091](#).

### How is the Reference Price calculated?

The Reference Price will be the arithmetic mean price of Eligible Reported Transactions over the past five minutes. Transactions that do not update Last Sale are not considered eligible. If no eligible trades have occurred in the previous five minutes the previous Reference Price shall remain in effect. The Reference Price is updated only if the new Reference Price is at least 1% away in either direction from the current Reference Price.

Effective July 18, 2016, the calculation of the initial Reference Price when there is no volume or an odd lot size in the Opening Auction changed. The previous day closing price is now used in lieu of the quote midpoint to establish the initial Reference Price.

### What is the difference between Tier 1 and Tier 2 LULD Securities?

Tier 1 securities include all securities in the S&P 500 or Russell 1000 Index and all ETPs defined in the [LULD Tier 1 ETP List](#).

Tier 2 encompasses all other securities that are not in Tier 1.

Warrants and rights are excluded from LULD and will not have any LULD Price Bands.

### How are the Upper and Lower Price Bands calculated?

Price Band = (Reference Price) +/- ((Reference Price) x (Percentage Parameter))

The Upper and Lower Price Bands are calculated by multiplying the current Reference Price by the appropriate Percentage Parameter and then adding or subtracting that value from the Reference Price. The resulting values are then rounded to the nearest penny.

The Percentage Parameters for all Phase 1 (Tier 1) securities are:

Previous Closing Price	Percentage Parameter
Greater than \$3.00	5%
\$0.75 up to and including \$3.00	20%
Less than \$0.75	Lesser of \$0.15 or 75%

The Percentage Parameters for all Tier 2 (only included in Phase II) securities are:

Previous Closing Price	Percentage Parameter
Greater than \$3.00	10%
\$0.75 up to and including \$3.00	20%
Less than \$0.75	Lesser of \$0.15 or 75%

## What is a Limit State?

A security will enter a Limit State when the National Best Offer (NBO) equals the Lower Price Band or when the National Best Bid (NBB) equals the Upper Price Band. If a security remains in a Limit State for 15 seconds the security will enter a five minute Trading Pause and then re-open with an auction at the Primary Listing Exchange for the security. Note that since the NBO or NBB must equal a Price Band, a single odd lot bid or offer cannot cause a security to enter a limit state because the total shares in the limit state must equal or exceed one round lot.

## What is a Straddle State?

A Straddle State exists when the NBB is below the Lower Price Band or when the NBO is above the Upper Price Band. The Primary Listing Exchange may declare a Trading Pause for a security in a Straddle State if trading in that security deviates from normal trading characteristics.

## Is the LULD Trading Pause similar to the previous Single Stock Circuit Breaker (SSCB)?

Yes, the same five minute halt period and re-opening procedures is used. All resting orders are cancelled or preserved based on a configurable port-level setting unless the security is BZX-listed. For BZX-listed securities, MOC and LOC orders remain open when a Trading Pause is triggered and all other orders are cancelled or preserved based on a configurable port-level setting.

## **Does Cboe have any enhanced protections during periods when LULD Price Bands have not yet been received from the SIP for a new corporate or ETP listing?**

Yes, for any new corporate or ETP listing where Cboe BZX is not the listing exchange, Cboe will reject all orders on the BYX, BZX, EDGA, and EDGX Exchanges until the LULD Price Bands are received from the SIP after the listing exchange has completed its opening auction. For IPO and New Issue Auctions where BZX is the listing exchange, BZX will calculate and enforce LULD Price Bands until the LULD Price Bands are received from the SIP. The BYX, EDGA, and EDGX exchanges will reject all orders on the BZX listing until LULD Price Bands are received from the SIP.

## **Does Cboe have any enhanced protections during periods when LULD Price Bands have not yet been received from the SIP after a Halt?**

Yes, for any security where Cboe BZX is not the listing exchange, Cboe will not execute any orders on the BYX, BZX, EDGA, and EDGX Exchanges until the LULD Price Bands are received from the SIP after the listing exchange has resumed the halted security. For securities where BZX is the listing exchange, BZX will calculate and enforce LULD Price Bands on newly resumed securities until the LULD Price Bands are received from the SIP. The BYX, EDGA, and EDGX exchanges will not execute any orders on the BZX listing until LULD Price Bands are received from the SIP.

## **How will Cboe handle an IOC or Market order priced aggressively through a Price Band?**

Cboe will accept IOC orders priced through an Upper or Lower Price Band; however, the order will only execute against liquidity resting within the Price Bands. Accordingly, Market orders will only be allowed to execute within the Price Bands. Any remaining quantity on an IOC or Market order will be cancelled back to the Member. A non-routable Market order with a time-in-force of Day will be re-priced to the Price Bands.

## **How will Cboe handle a non-IOC order priced aggressively through a Price Band?**

After an initial sweep of the book, Cboe will price slide or reject the order based on the *BOE DisplayIndicator* (FIX Tag 9479) field on the order. An aggressive buy (sell) order priced through the Upper (Lower) Band that is eligible to price slide will be re-priced to the Upper (Lower) Band.

## **With respect to reject vs. price slide behavior, which is the default?**

Price sliding is the default for non-IOC orders that cross an Upper or Lower Price Band.

## How does one specify reject vs. price sliding action?

The same flags and defaults used to control display price sliding functionality are used to control LULD sliding behavior. The default behavior can be set at the port level and overridden on the order via the BOE *DisplayIndicator* (FIX Tag 9479). By default, price sliding is enabled at the port level. The following values for *DisplayIndicator* will control the behavior on an order-by-order basis:

- *DisplayIndicator*=V: Enforce port level settings (default).
- *DisplayIndicator*=P: Price Adjust
- *DisplayIndicator*=m: Multiple Price Adjust
- *DisplayIndicator*=S: Display Price Sliding
- *DisplayIndicator*=M: Multiple Display Price Sliding
- *DisplayIndicator*=R: Cancel Back

To configure at the port level, submit a *Modify* port request via the Cboe Customer Web Portal [Logical Port Request](#) form.

## How will a Member know when an order has been re-priced (slid) on entry?

Members can opt-in to receive BOE *InitialDisplayPrice* (FIX Tag 9691) and BOE *WorkingPrice* (FIX Tag 9690) fields on Order Acknowledgements. When the *WorkingPrice* field is not equal to the order's limit price, it indicates that the order has been slid. Orders will not un-slide back towards their original limit price after a Price Band update unless *DisplayIndicator*=M or m (9479=M or m). Members may also use the Cboe market data feeds to determine the display price of their orders.

## What will happen if a Price Band moves such that a previously booked order is now priced aggressively through the Price Band?

Depending on the order's price sliding setting (defined above), the order will either be re-priced to the new Price Band (default) maintaining price/time priority or immediately cancelled back to the Member.

## How will Cboe handle orders priced passively outside of Price Bands?

Buy (sell) orders priced below (above) the Lower (Upper) Price Band will be accepted and are eligible for inclusion in the NBBO. However, since these orders are outside of the Price Bands they are not executable. If the Price Bands move in such a way that an order that was previously outside of the Price Bands is now within the Price Bands, then the order will become executable.

## **How will Cboe handle pegged orders that would be priced outside of the Price Bands?**

Pegged orders that would be priced aggressively through a Price Band will be collared to the band price. For example, if the Upper Price Band is \$10.01 and the NBBO is \$10.00 x \$10.05, a Midpoint Peg order to buy will be priced at \$10.01 instead of \$10.025 to avoid crossing the Upper Price Band. A peg order that is priced passively outside of a Price Band will not be collared, but will not be executable until the peg has obtained a working price that puts it within the LULD Price Bands.

## **How will Cboe handle discretionary orders with respect to LULD Price Bands?**

An order's discretionary price will not be allowed to aggressively cross a LULD Price Band. The discretionary price will be capped automatically by the Cboe system in order to prevent an execution from occurring outside of a Lower or Upper Price Band.

## **How will Options order handling change as a result of LULD?**

Market orders will be rejected when the underlying security is in a Limit state or a Straddle state. If the underlying security enters a trading pause all open option orders for the security will be cancelled. New option orders will not be accepted until the security has resumed trading.

## **How will Cboe handle a LULD pause at the market close?**

If a security is halted due to a LULD pause between 3:50 pm and 4:00 pm ET, a Volatility Closing Auction will be held at 4:00 pm. This will end the LULD pause and set the Closing Price for the security.

- The Quote-Only period will begin when the security is halted. Auction Updates will be disseminated every 5 seconds throughout the halt.
- Previously booked orders intended for the closing cross, including Market On Close (MOC), Limit On Close (LOC), and Late-Limit-On-Close (LLOC) Orders, will remain on the book and will participate in the Volatility Closing Auction.
- New Auction Orders (i.e. MOC, LOC, and LLOC orders) can be entered, modified, and cancelled during the pause for participation in the Volatility Closing Auction. There is no cutoff for On-Close interest.
- New Market or Limit orders may be entered, modified, and cancelled during the pause for participation in the Volatility Closing Auction.
- Any Regular Hours Only (RHO), LOC, LLOC, or MOC shares that are not executed in the Volatility Closing Auction will be cancelled at the conclusion of the auction.

- Limit order shares on the Continuous Book that are not executed in the Volatility Closing Auction will remain on the Continuous Book during the After Hours Trading Session, subject to the Member's instructions.
- Orders will be executed at the price that maximizes the number of shares executed in the auction.
  - In the event of a volume based tie at multiple price levels, the price level closest to the Final Last Sale Eligible Trade will be used for Volatility Closing Auctions.
  - Where no limit orders from one or both sides (the buy side, the sell side, or both the buy and sell side) would participate in a Volatility Closing Auction, the Volatility Closing Auction will occur at the price of the Final Last Sale Eligible Trade.
  - The Volatility Closing Auction will not execute at a price that is greater than the Cboe Exchange Clearly Erroneous Execution Policy guidelines: 10% for securities priced \$0 to \$25, 5% for securities priced \$25 to \$50, or 3% for securities priced greater than \$50.
- A Volatility Close Auction will not be extended past 4:00 p.m. ET.
- The Closing Auction fees will be used for executions that result from a Volatility Closing Auction.
- If the Quote-Only period of a Halt Auction for a security halted before 3:50 p.m. would otherwise be extended by the Exchange after 3:50 p.m., the Exchange will conduct a Volatility Close Auction for that security.

## **Will there be any email notification when a security enters a Volatility Close Auction?**

Yes, Cboe will send a Trade Halt Notification that states the security is entering a Volatility Close Auction. Members subscribed to the Auction Notifications distribution list will receive this email. Contact Cboe Trade Desk ([tradedesk@bats.com](mailto:tradedesk@bats.com)) to subscribe to this email list.

## **LULD Amendment 12 Update**

### **Why was LULD Amendment 12 introduced?**

LULD Amendment 12 was created to standardize automated re-openings across markets following a Trading Pause. LULD Amendment 12 was made effective on November 20, 2017.

## **How will Trading Pause Resumption Auctions function?**

Halt Auctions will be collared to reduce volatility coming out of a Trading Pause, and trading may not resume until the Auction has completed on the Primary Listing Exchange (PLE) and LULD Price Bands have been disseminated. The collar price will initially be set to 5% wider than the LULD Band that triggered the Trading Pause in the direction of the triggering LULD Band. The initial Halt Auction will run for five minutes. If, at the end of the Halt Auction period the symbol cannot reopen, the collar price is widened again by the same initial amount and the Auction is extended five additional minutes. All subsequent extensions operate the same, but re-openings can occur at any time following the second extension provided the execution is within the auction collar. For Halt Auctions that had a LULD Band trigger price under \$3, a \$0.15 initial price collar will be used and additional halt extensions will widen the collar price in \$0.15 increments.

## **What if the Trading Pause is to resume after 3:50 pm ET?**

If the expected end time of a Halt Auction is to occur after 3:50 p.m. ET the Primary Listing Exchange will not execute the Halt Auction and will instead transition and hold a single closing auction at 4:00 p.m. ET. The BZX Exchange will conduct a Volatility Close Auction (as described above) in this case.

## **What if the Primary Listing Exchange is unable to Re-open?**

If the Primary Listing Exchange is unable to re-open a security due to technical issues, then other Exchanges may re-open upon receipt of a LULD Price Band from the SIP. The Reference Price for the security will be equal to the Price Band that caused the limit state which led to the Trading Pause. No other exchanges can resume trading until at least 10 minutes after a Trading Pause is triggered.

## **What if the Re-opening price is far away from the previous trade?**

Trades that occur during the Halt Auction are not eligible for review under Clearly Erroneous Execution rules.

## **LULD Amendment 18 Update**

### **Why was LULD Amendment 18 introduced?**

LULD Amendment 18 was implemented to eliminate the doubling of the LULD Price Bands for some securities following the open and preceding the close. LULD Amendment 18 is expected to be effective February 24, 2020.

## What is changing?

Prior to February 24, 2020, LULD Price Bands are calculated by applying double the percentage parameters between 9:30 a.m. and 9:45 a.m. and between 3:35 p.m. and 4:00 p.m. ET.

LULD Amendment 18 eliminates the doubling of percentage parameters:

- Between 9:30 a.m. and 9:45 a.m. ET for all securities; and
- Between 3:35 p.m. and 4:00 p.m. ET for Tier 2 NMS securities with a reference price above \$3.00.

Tier 1 NMS securities and Tier 2 NMS securities with a reference price at or below \$3.00 will continue to apply double percentage parameters between 3:35 p.m. and 4:00 p.m. ET.