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# **CME Direct Auction Platform**

Platform Calculation Methodology

Version 2.1

## REVISION HISTORY

Date	Version	Change Summary
29-07-2014	0.1	Document draft created
30-07-2014	0.2	Included legal feedback, and included some further sections
31-07-2014	0.3	Included team review feedback
31-07-2014	0.4	Included team review feedback
01-08-2014	0.5	Included team review feedback
11-08-2014	1.0	Updated to launch release version: -Removed credit limit section -Updated auto new price thresholds and price increments -Included fat finger capability in order submission section -Included information on Thomson Reuters RICS in distribution section -Minor textual updates to various sections -Removed draft version
29-08-2014	1.1	Updates: -Renamed London Silver Price to LBMA Silver Price -Section 4, CME Benchmark Europe Limited rather than GCC -Section 5, Notification phase 60 seconds rather than 30s -Section 6, Reworded credit limit reference to take account of the agreed consensus limit -Section 11, removed note about credit limits in line with section 6 update.
16-09-2014	1.2	Updates due to launch and patch version release: Section 2: <ul style="list-style-type: none"> <li>• Removed pre-launch dates</li> </ul> Section 6: <ul style="list-style-type: none"> <li>• Included max order and fat finger error message description</li> <li>• Auction platform enforces 1 order per firm at a time.</li> <li>• Included modify event audit log when an order is modified and platform behavior for changing sides.</li> <li>• Included secondary trader capability description</li> </ul> Section 11: <ul style="list-style-type: none"> <li>• Included explanation of discretion trade allocation when a secondary trader at a firm places an order.</li> </ul>
16-03-2016	2.0	Updated to reflect recent changes plus changes to be introduced in version 2.0 <ul style="list-style-type: none"> <li>• Removed registration and availability section to be ported to user guide</li> <li>• Updated initial auction price section to reflect automation</li> <li>• Updated order submission section to reflect house and client trader segregation, and include removal of anonymous order information during the round</li> <li>• Updated limits section to cover participate override of trading limits</li> <li>• Rephrased auto round price section</li> <li>• Included new section to detail equilibrium tolerance (diff) override during auction</li> <li>• Updated section imbalance sharing section for new rule to share with all registered participants</li> <li>• Various formatting improvements</li> </ul>
14-03-2016	2.1	Updated to reflect participant feedback <ul style="list-style-type: none"> <li>• Improved description of section 4.2 on client order entry</li> <li>• Removed sponsored client references</li> <li>• Removed default trader allocation detail of imbalance sharing in section 10.1</li> <li>• Minor typo corrections</li> </ul>

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# 1 OVERVIEW

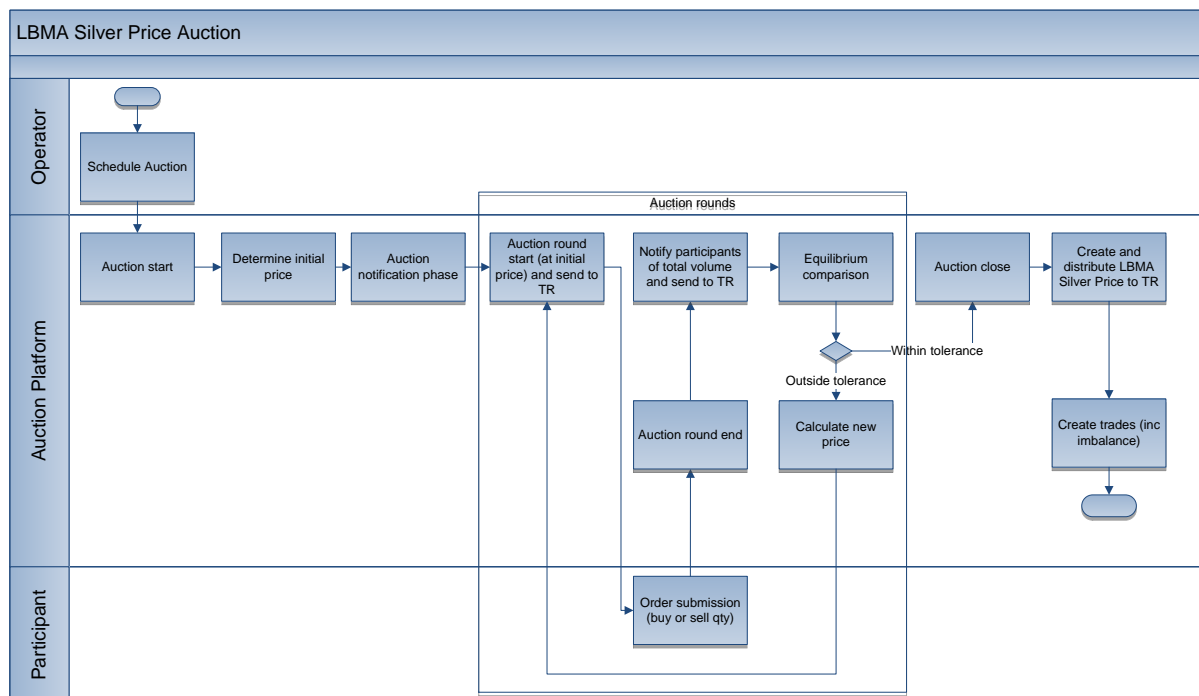
The LBMA Silver Price will be determined using a daily 'equilibrium' auction (12pm) that will be conducted over a number of auction rounds.

Within each auction round market participants will enter their buy or sell quantity (orders) at the auction round price. These will be compared at the end of each auction round to determine whether the auction is balanced or not.

To be balanced the total buy vs sell quantities entered by all participants will need to be within a certain tolerance.

If the auction is not balanced a new auction round price is automatically calculated and a new auction round begins at this price.

If the auction is balanced (buy vs sell quantities), the LBMA Silver Price is established and participants will transact with each other outside of the auction platform based on the buy/sell orders they entered in the last auction round.



The auction platform operator (CME Benchmark Europe Limited) will be responsible for operating the LBMA Silver Price auction.

Participants are able to access the auction platform from 0800-1700 (UK time) every week day except for London public holidays.

## 2 INITIAL PRICE

The initial auction price value will be determined automatically by the auction platform by comparing multiple market data sources to form a consensus price based on the individual sources of market data.

This initial auction price is also referred to as the seed price.

The initial auction price will be reviewed by the auction platform operator before the first auction round begins. The auction platform operator can override this initial auction price in exceptional circumstances.

The auction platform will display the initial auction price to all participants that are logged in during the first auction round. It will be denominated in USD/ounce, displayed with 3 decimal places.

In exceptional circumstances, if a subsequent LBMA Silver Price Auction is started by the auction platform operator, the same procedure as outlined above will be used for the subsequent auction's initial auction price.

## 3 AUCTION START NOTIFICATION

At 11:59:00 the auction platform will display a notification pop up to all participants that are logged in, indicating that the first auction round will start at 1200 (UK time).

The notification phase will last for 60 seconds. The auction platform will display a countdown timer showing the remaining duration of the notification phase, at the end of which the first auction round will begin.

The initial auction price will not be displayed to participants during the notification phase. It will only be displayed at 12:00:00 (UK time).

## 4 ORDER SUBMISSION WITHIN AUCTION ROUNDS

Each auction round will be 30 seconds in duration and participants will be able to view the remaining time left in the auction round.

During an auction round, participants will be able to place order(s) by entering the quantity at which they would like to transact at the auction round price. Order quantity will be entered into the auction platform in Lakhs, where 1 Lakh is 100,000 ounces. Order quantity can be entered in increments of 0.25 Lakhs, and will be displayed with 2 decimal places.

Each order will be assigned a timestamp at the time it is placed. This will be displayed on the auction platform audit log for the participant to view. The auction platform will use this timestamp for matching prioritisation after the LBMA Silver price has been established (as detailed in a later section).

During the auction round a count of the number of participants that have contributed an active order in that auction round will be displayed to all participants. This is referred to as a 'round contributor' count. The round contributor count will be updated in real time as orders are placed or removed by participants.

In addition a 'participation' count is also displayed to all participants. This represents the number of participants that have participated (i.e., placed an order) in any of the auction rounds. The participation count will be updated in real time as participants place their first order.

The auction platform will respond to commands to place orders as quickly as possible, however, each command takes a finite time to process. In extreme circumstances it is possible that a submitted order may not be accepted if it is entered at the moment the auction round is closing. For this reason, timely submission of orders within the auction round is recommended.

A participant can place an order in one auction round and refrain from placing an order in subsequent auction rounds or vice-versa.

A participant can log in to the auction platform at any time after the auction has begun. It will then be able to view auction audit log information from the start of the auction and participate in the ongoing auction.

Participants can enter orders as a house trader or a client trader. Orders entered by a client trader at a participant will not be identifiable as such by a house trader at that participant, and vice versa.

#### 4.1 HOUSE TRADER

During an auction round a house trader will be able to place 1 order on either the buy or sell side by entering the quantity they would like to transact.

When an order is placed by a house trader, a corresponding entry on the audit log will be created that can be viewed by any house trader or compliance officer within the participant.

Only 1 house order per participant can be live within the auction platform at any given time. If a second house trader within a participant attempts to place an order when a house order has already been submitted by that participant that is still live within the auction platform, the auction platform will display an order submission error message indicating that multiple house orders per registered participant are not allowed.

Orders entered by a house trader will be automatically cancelled when the auction round ends. They will not be automatically resubmitted if another auction round begins.

## 4.2 CLIENT TRADER

During an auction round, or before any auction round starts, a client trader can elect to enter client orders in the following ways:

- A single order on the buy or sell side – to represent the net total of client orders
- A single buy order and/or a single sell order – to represent the aggregated buys and aggregated sells of client orders
- Individual orders on the buy and sell side – to represent each separate client order.

When an order is placed by a client trader, a corresponding entry on the audit log will be created that can be viewed by any client trader or compliance officer within the participant.

Orders entered by a client trader will be automatically resubmitted if another auction round begins. If a client trader does not want a submitted order to persist in a subsequent auction round, it will need to cancel that order.

## 4.3 ORDER MODIFICATION

Once a participant has placed an order within the auction round it will be able to amend the quantity, the side it placed the order on, or remove its order until the end of the auction round. All orders entered are considered firm. When a participant increases or decreases the quantity of its order a 'modify' event is recorded on the audit log together with the amendment time.

When an order has been amended to increase the quantity on either side, the amended order will be assigned an updated timestamp reflecting the time the order was updated. If an order is amended to decrease the quantity on either side, the original timestamp will remain unamended. The auction platform will use these timestamps for matching prioritisation, as detailed in a following section.

When a participant changes the side it has placed the order on, the auction platform will treat this as two separate order actions: a cancel order and a new order being placed, with corresponding audit log entries.

As with submitted orders, the auction platform will respond to commands to modify orders as quickly as possible, however each command takes a finite time to process. In extreme circumstances a submitted modification may not be accepted if entered at the moment the auction round is ending. For this reason, timely modification of orders within the auction round is recommended. This is particularly important when switching sides, as the auction platform processes this as two separate order actions. It is possible that only the first order action may be completed before the end of the auction round, which would result in the original order being cancelled and the modified order not being accepted.

## 4.4 TRADING LIMITS

The auction platform will ensure that an order entered by a participant will not result in that participant exceeding a specific daily limit threshold against any single trade counterparty, determined bilaterally amongst the participants. If a participant attempts to enter an order beyond this limit, the auction platform will reject the order and display an order submission error message

indicating the quantity entered is above the limit, with the value of the limit included in the error message.

The verification officer within a participant is responsible for maintaining a daily limit threshold within the auction platform.

The auction platform can apply fat finger limits and each participant can set its own fat finger limit value. Once set, a participant will not be able to enter an order beyond this limit. If it attempts to do so, the auction platform will display an order submission error message indicating that the order size limit has been exceeded.

#### 4.5 LOSS OF CONNECTIVITY

In exceptional circumstances, during an auction round, the auction platform operator will be able to cancel orders on behalf of a participant following verification with the CME Group Auctions Market team.

Also in exceptional circumstances, a secondary trader can take over from a primary trader in the event of any issues faced by the primary trader. The secondary trader can either modify or cancel/replace the primary trader's submitted order (should the need arise). If modification is selected the primary trader will remain the owner of the order.

Note a secondary house trader will not be able to enter a new order until the primary house trader's order has been cancelled.

### 5 END OF AUCTION ROUND COMPARISON

After an auction round has completed, a participant will be able to see the total buy and total sell quantities entered in that auction round on the audit log, i.e. the sum of all of the buy orders entered by all participants and the sum of all of the sell orders entered by all participants entered in that auction round, in each case taking into account any order modifications or withdrawals accepted up to the end of that auction round.

At the end of each auction round the auction platform will compare the total buy and total sell quantities to determine if the auction is balanced. Any difference between the total buy and sell order quantities at the end of an auction round is an 'imbalance'.

If the auction is not balanced at the end of an auction round:

- if the imbalance amount is less than or equal to the tolerance value, the auction platform will determine that the auction is balanced, close the auction and establish the LBMA Silver Price; or
- if the imbalance amount is greater than the tolerance value, the auction platform will determine that the auction is not balanced, calculate a new price, and start a new auction round with the new price.

Note, gross buy and sell volumes are used for any client orders entered for the end of auction round total buy and sell quantity and the end of auction round comparison.



The auction platform will continue to start new auction rounds until the auction is balanced using a default tolerance value of 3 Lakhs (which may be amend up to a maximum tolerance value of 5 Lakhs in accordance with the tolerance value change procedure set out below). The auction platform will process the end of auction round comparison instantaneously such that either a new auction round will begin straight away or the auction will be closed as it is determined to be balanced.

In addition, the auction platform will determine the auction balanced:

- if no buy and sell orders have been entered by any participant in the auction round; or
- if orders have only been entered on one side (bid or offer) such that the total quantity of those orders, taking into account any order modifications or withdrawals accepted up to the end of the auction round, is less than or equal to the tolerance.

## 6 AUTO NEW PRICE

If the auction platform determines that the auction is not balanced at the end of the auction round, a new price will automatically be calculated taking into account the volume and direction of the imbalance using the following method:

$$\text{if } Q_B^n > Q_S^n + T \text{ then } P_t^{n+1} = P_t^n + M$$

$$\text{or if } Q_S^n > Q_B^n + T \text{ then } P_t^{n+1} = P_t^n - M$$

Where:

$Q_B^n$  = total buy quantity in auction round n

$Q_S^n$  = total sell quantity in auction round n

T = tolerance value

$P_t^n$  = Price being used for reference in time n, so that for the first auction round,  $P_t^1 = S_t$

M = New price increment based on absolute volume difference between  $Q_B^n$  and  $Q_S^n$

## 7 MANUAL PRICE OVERRIDE

In exceptional circumstances, the auction platform operator can overrule the automatically calculated new price of the next auction round in cases when more significant or finer changes are required.

When doing so, the auction platform operator will refer to a composition of live market data sources while the auction is in progress, and will be able to change the price by increments of 0.005 (usd/ounce).

Participants will see an audit log entry indicating that a manually overridden price is in use in the auction round and get a visual indication on the auction platform to indicate that a manually overridden auction round new price is being used.

## 8 TOLERANCE VALUE CHANGES

In exceptional circumstances during an auction round, the default tolerance value can be increased from 3 Lakhs up to a maximum of 5 Lakhs, in increments of 0.25 Lakhs.

In such circumstances participants will be notified of the change via the auction platform, and the new tolerance value will be used for the end of auction round comparison. The modified tolerance value will continue to be used in any subsequent auction rounds, rather than the default value, unless the value is modified again to the default value (which will be notified to the participants via the auction platform).

## 9 ESTABLISHING THE LBMA SILVER PRICE

Once the auction is balanced, the auction platform will close the auction and use the auction round price as the LBMA Silver Price.

The auction platform will display the LBMA Silver Price together with the time the auction closed.

If a participant logs in after an auction has closed it will be able to see:

- the LBMA Silver Price established in the auction; and
- audit log information from the beginning of the first auction round up to the end of the auction.

## 10 MATCHING/FILL RULES

The auction platform will automatically match orders submitted in the last auction round at the end of which the auction was balanced, such that each participant's order will always be fully matched/filled. Note, a client trader's orders will be netted before matching.

The auction platform will match submitted orders using time priority until the unfilled quantity on one side is exhausted. This could result in multiple matches against different counterparties for each order entered by a participant.

Example:

Consider the below orders are entered in an auction round:

Time	Bid Participant	Bid Qty	Ofr Qty	Ofr Participant	Time
12:00:10	A	4	2	D	12:00:17
12:00:12	B	2	3	E	12:00:22
12:00:14	C	1	2	F	12:00:28

Resulting matches will be:

- Participant A buys 2 Lakh from Participant D
- Participant A buys 2 Lakh from Participant E
- Participant B buys 1 Lakh from Participant E
- Participant B buys 1 Lakh from Participant F
- Participant C buys 1 Lakh from Participant F

A trade report will be created for each match and the trade counterparty that a participant has been matched with will be revealed to that participant only. The traded price will be equal to the LBMA Silver Price +0.005 (usd/ounce).

## 10.1 IMBALANCE SHARING

When the auction platform establishes the LBMA silver price with an imbalance, all registered participants will make up the imbalance (i.e., it will be shared amongst them) by executing against the participant order(s) causing the imbalance. This imbalance amount is also referred to as the discretion amount, and will be subject to a maximum amount equal to the tolerance value used in the final auction round at the end of which the LBMA Silver Price was determined.

The share of the imbalance will be automatically allocated as further matches between the participants.

If a second house trader at the same participant places an order within the auction, the firm will only get 1 allocation of discretion matches, i.e. participation is at participant level and not at trader level.

A client trader at a participant will never be allocated a discretion match by the auction platform. A house trader at the participant will be allocated any discretion matches. This includes cases where a client trader at a participant enters an order, and the house trader at that participant has not entered an order.

The total imbalance volume to be made up by the discretion matches will be shared as equally as possible between all registered participants. To achieve this, the discretion amount is first divided by the number of registered participants and it is then rounded down to the nearest 0.01 Lakh. The resulting amount is that which will need to be made up by each registered participant on the

opposite side of the imbalance. To ensure that the full discretion amount is made up, the auction platform will also assign discretion match amounts equal to the discretion amount divided by the number of registered participants rounded up to the nearest 0.01 Lakh. The higher amount will be assigned to those participants that entered orders last. If a registered participant has not placed an order during the auction in any auction round, its last login date will be used.

Example:

Consider the below orders are entered in an auction round:

Order Time	Participant	Buy	Sell
12:02:31	A	5.00	
12:02:32	B		5.00
12:02:33	C		2.00
<b>Total</b>			
		<b>5.00</b>	<b>7.00</b>
<b>Imbalance</b>			<b>2.00</b>

At the end of the auction, the following match will occur:

- Participant A buys 5 Lakh from Participant B

This will leave an imbalance of 2 Lakhs to be shared amongst the 6 registered participants, resulting in discretion amounts of either 0.34 or 0.33 Lakhs each:

Order Time	Participant	Buy	Sell	Discretion allocation (buy)
12:02:31	A	5.00		0.33
12:02:32	B		5.00	0.33
12:02:33	C		2.00	0.33
NA	D			0.33
NA	E			0.34
NA	F			0.34

Note, the last login date for any trader of a registered participant that did not place an order during the auction in any auction round was:

D – yesterday

E – day before yesterday

F – one week ago.

This means that the following further discretion matches will automatically be created by the auction platform:

- Participant A buys 0.33 Lakh from Participant C
- Participant B buys 0.33 Lakh from Participant C

- Participant D buys 0.33 Lakh from Participant C
- Participant E buys 0.34 Lakh from Participant C
- Participant F buys 0.34 Lakh from Participant C
- (no match is created for Participant C buying 0.33 from itself)

## 11 DISTRIBUTION

At the beginning of each auction round, the auction platform automatically sends the auction round price to Thomson Reuters' distribution systems for dissemination.

Once each auction round has been completed, the auction platform automatically sends total buy order volume, total sell order volume, the auction round price, and participation information to Thomson Reuters' distribution systems for dissemination.

In addition, once the auction has been balanced, the auction platform will automatically send the LBMA Silver Price value to Thomson Reuters' distribution systems for price dissemination.

The Thomson Reuters' RICS that will be used will be:

"LDNXAG=" – Displays the daily established LBMA Silver Price

"0#LDNXAG" – Displays data in real-time for each auction round (price and total buy/sell quantity).

## 12 DISCLAIMER

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