



**ZAGREBAČKA  
BURZA**

*Zagreb Stock Exchange*

## **Market Model “Continuous Auction”**

**in the trading system**

**XETRA® Zagreb**

*Version 1.4*

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## Contents:

1	Introduction .....	2
2	Basic principles of the Xetra® trading system.....	2
3	Market Participants.....	3
3.1	Exchange members and User Identifications.....	3
3.2	Exchange Trader .....	3
3.3	Exchange Member acting as a Liquidity Provider (Issuer) .....	3
3.4	Other users.....	3
4	Types of Orders.....	4
4.1	Persistent Orders and Non-persistent Orders .....	4
4.2	Market Orders .....	4
4.3	Limit Orders.....	4
4.4	Validity Restrictions .....	4
4.5	Stop Orders .....	5
4.5.1	Stop Market Order .....	5
4.5.2	Stop Limit Order .....	5
4.6	Order Attributes .....	5
4.7	Liquidity Provider Quotes .....	6
4.7.1	Standard Quotes .....	6
4.7.2	Matching Quotes .....	7
4.7.3	Price-without-turnover .....	7
4.7.4	Indicative Quote .....	7
4.8	Quote Attributes .....	7
4.9	Exceptional Trading Situations.....	8
5	Continuous Auction in the Trading System Xetra® .....	9
5.1	Trading Phases .....	9
5.1.1	Pre-Trading Phase.....	9
5.1.2	Main-Trading Phase .....	9
5.1.3	Post-Trading Phase .....	10
5.2	Trading Procedures.....	10
5.2.1	Continuous Auction .....	<b>Error! Bookmark not defined.</b>
5.2.2	Duration of Trading Sessions.....	<b>Error! Bookmark not defined.</b>
6	Tasks and Obligations of Liquidity Providers .....	12
7	Price Determination Process .....	13
7.1	Basic Matching Rules .....	13
7.2	Prices- without-turnover (PWT) .....	13
7.3	Examples for the determination of the auction price .....	13

## Change History

Date	Version	Description of change
11.01.2017	1.0	Final version
20.01.2017.	1.1	Updated chapter 2 Basic principles of Xetra trading system Updated 5.1.1, 5.1.2, 5.2.1, 5.2.1.1, 5.2.1.2 - visible market depth
05.05.2017	1.2	Compliance with Stock Exchange Rules
23.06.2017.	1.3	Smaller changes in Chapter 7.
27.12.2017.	1.4	Changes in Chapter 4.6. Order Attributes and 4.8. Quote Attributes.

## 1 Introduction

This document describes basic principles of trading in the market model “Continuous Auction” on the Xetra® Zagreb trading system (hereinafter referred to as Xetra®) at the Zagreb Stock Exchange (hereinafter referred to as Exchange). The Xetra® market model defines the mechanism through which orders are matched and trades concluded under the trading system of Exchange. This includes price determination rules, the order of priority in which orders are executed through the Xetra® and the type and scope of information provided to the market during trading sessions.

Market model “Continuous Auction” may involve trading in structured products only.

## 2 Basic principles of the Xetra® trading system

The following basic principles were laid down for the trading in the market model “Continuous Auction” on the Xetra® trading system:

- Trading is anonymous, i.e., market participants cannot view their counterparties on the trading screen and are not named in the trade confirmation note.
- All order sizes can be traded.
- The validity of an order ends at the latest 360 days after the date it was entered. (T+359).
- The entry of stop orders is supported.
- One exchange member shall act as liquidity provider for the given structured product.
- During the main trading phase, the exchange member acting as a liquidity provider enters quotes. These quotes may be changed or deleted.
- Quotes entered by a liquidity provider have to be double sided. The limit for bid quotes being greater than or equal to zero. Ask quote limits may be equal to the bid quote limit or higher.
- The order book is open to all market participants during the pre-trading phase (PRETR), pre-call phase (XPREC) and call phase (XCALL). The visible market depth depends on the connectivity type and has a maximum of 20 orders (maximum of 20 best bids and asks with their cumulated volumes and the last price are displayed to the market).
- At any point in time, only one single price will exist for each instrument.
- Prices are determined taking into account the price and time priority according to the principle of highest executable volume only within the range given by the quote or at the bid or ask limit of the quote.
- Price determination: If there are several possible limits with the same surplus on the bid and the ask side or with no surplus on hand, the midpoint of the possible prices is taken into account as an additional criterion.
- After price determination, remaining portions of quotes remain in the order book.
- Execution confirmations are sent out immediately after a trade has been closed.

- The order book is closed for all market participants during the post-trading phase (POSTR).
- The accounting cut-off takes place daily after the post-trading phase.

### **3 Market Participants**

#### **3.1 Exchange members and User Identifications**

Only exchange members are allowed to participate in securities trading through the Xetra®.

Each transaction contains a unique identifier which identifies exchange member.

Exchange member will use unique user identification code (Xetra® traderID) to establish a connection with their own applications for the purposes of:

- trading by its exchange trader;
- perform liquidity providers's obligations;
- e-trade system.

#### **3.2 Exchange Trader**

Exchange trader is a physical person who is authorized to place, change and withdraw orders and to conclude trades.

An exchange trader may trade:

- on behalf of clients („Agent Trader“, Account A) or
- on their own account („Proprietary Trader“, Account P).

#### **3.3 Exchange Member acting as a Liquidity Provider (Issuer)**

Members who act as liquidity providers (Account I) in the trading procedure “Continuous Auction” are admitted to exchange trading. These exchange members enter binding quotes into the system.

#### **3.4 Other users**

Users of Xetra® who are not admitted to trade, especially users who are personnel engaged in operating and supervisory functions.

## 4 Types of Orders

Orders of all sizes may be traded through Xetra® trading system. The minimum trading lot may be defined by Exchange for individual instruments .

An order modification which is relevant for execution results in a change of its price/time priority. This modification results in the deletion of the order and the entry of a new order with a new time stamp and a new order number.

However, an order modification which is not relevant with regard to the priority of execution (e.g. change of internal order number, text field etc.) will not result in a new order number.

### 4.1 Persistent Orders and Non-persistent Orders

Orders can be entered as:

- **Persistent orders** – will not be deleted from the order book in exceptional circumstances, i.e. in case of a partially or fully interruption of the Xetra® trading system (Market Halt);
- **Non-persistent orders** – will be deleted from the order book automatically in exceptional circumstances, i.e. in case of a partially or fully interruption of the Xetra® Prague trading system (Market Halt).

In Xetra® trading procedure “Continuous Auction” orders and stop orders can only be entered as persistent orders. Quotes are never persistent.

### 4.2 Market Orders

Market order is order without a specified price. Market orders are unlimited buy or sell orders (orders to buy or sell at the best available price) to be executed at the next price that is determined.

### 4.3 Limit Orders

Limit order is order with a specified price. Limit orders are limited buy or sell orders to be executed at the set limit price or better.

### 4.4 Validity Restrictions

Further restrictions may be imposed to specify the period of time for which an order is valid. The Xetra provides the following options:

- **Good-for-day** – This order is valid only for the current trading day;
- **Good-till-date** – This order is valid only up until a specified date (not later than 360 days after the time the order was entered) (T+359);
- **Good-till-canceled** – This order is valid until it has either been executed or canceled by the trader or - when the maximum validity period of 360 days has expired - by the system.

## 4.5 Stop Orders

To support trading strategies, two different types of stop orders are available that can be executed after a predefined price level is reached.

In contrast to other existing XETRA® trading procedures, stop orders in trading procedure “Continuous Auction” are not triggered when a price is determined, but by quotes of the liquidity provider.

### 4.5.1 Stop Market Order

When the stop limit is reached (or exceeded for stop buy orders or falls below it for stop sell orders), the stop order is automatically placed in the order book as a market order.

### 4.5.2 Stop Limit Order

In the case of a stop-limit order, when the stop limit is reached (or exceeded for stop buy orders or if it falls below it for stop loss orders), the stop order is automatically placed in the order book as a limit order.

- A stop-buy order is triggered when the ask limit of the quote equals the stop limit or exceeds it.
- A stop-loss order is triggered when the bid limit of the quote equals the stop limit or falls below it.

When a stop order is triggered, the order is always given a new time stamp. The market and limit orders resulting from triggered stop limit or stop market orders will be considered for execution in the current auction and might be executed immediately.

## 4.6 Order Attributes

Xetra® allows traders to specify attributes for their orders. The order attributes are listed in the table below:

Order attribute	Description / contents	Mandatory
Buy / Sell	Buy / Sell	Yes
Exchange	Exchange on which the instrument is traded	Yes
Security	Security identification code or ISIN or symbol	Yes
Volume	Order volume	Yes
Limit	Limit price (if not specified: market order)	No
Type of order	M = Market Order L = Limit Order	Yes
Validity restrictions	Good-for-day (GFD), Good-till-date (GTD), Good-till-cancelled (GTC), not specified = GFD.	No
Execution restrictions	Stop Market Order (STP), Stop Limit Order (STP)	No

Order attribute	Description / contents	Mandatory
Settlement account number	Number of account for the settlement if there is no predefined omnibus account or own member account	No
Member internal order number	Available for use	No
Account	A („Agent“), P („Proprietary“)	Yes
Member-ID	Xetra® identification code assigned by the Exchange	Yes
User-ID	Xetra® identification code assigned by the Exchange	Yes
Xetra®-order number	Xetra® identification assigned by the system	Yes
Time stamp	Xetra® identification assigned by the system	Yes
Client ID	Short code of the client assigned by the member	Yes
Decision maker ID	Short code of the person or algorithm within the member who is responsible for investment decision; it is assigned by the member	Yes
Execution maker ID	Short code of the person or algorithm within the member who is responsible for the execution; it is assigned by the member	Yes
Liquidity provision flag	Indicates whether an order is submitted as part of a market-making strategy pursuant to Articles 17 and 48 of Directive 2014/65/EU, or is submitted as part of another activity in accordance with Article 3 of this Regulation.	Yes

## 4.7 Liquidity Provider Quotes

Xetra® allows liquidity providers to enter quotes. Quote is a simultaneous entry of limited buy and sell order. Quotes are valid only for the day on which they are entered into the system.

The following types of quotes are supported:

- Standard quote;
- Matching quote – to end a call phase;
- Price without turnover, PWT – to determine a price without turnover;
- Indicative quote.

### 4.7.1 Standard Quotes

Standard quotes can be entered during the pre-trade and pre-call phase only. This quote must be entered double sided –always with a bid and ask limit. There are no predefined minimum quantities for quotes so that the quantity also can be zero.



## 4.7.2 Matching Quotes

Matching quotes can be entered during the pre-trade, pre-call and call phase and can be used to initiate a change from the pre-call phase to the call phase. This quote must be entered double sided – always with a bid and ask limit. There are no predefined minimum quantities for quotes so that the quantity also can be zero.

## 4.7.3 Price-without-turnover

Price without turnover quotes can only be entered by the liquidity provider and only during the pre-call phase. This quote must be entered double sided – always with a bid and ask limit and a quantity of zero (price without turnover).

Determination of the reference price:

- If the bid limit equals the ask limit, the reference price corresponds to the bid limit of the quote.
- If the bid limit is lower than the ask limit, the reference price corresponds to the bid limit of the quote.

This quote remains in the order book.

## 4.7.4 Indicative Quote

Indicative quote can only be entered by the liquidity provider and only during the pre-call phase. This quote must be entered double sided – always with a bid and ask limit and a quantity of equal to or greater than zero.

If liquidity provider enters the indicative quote he is not obliged to execute the order.

If liquidity provider enters indicative quote into the order book and orders are matched, pre call phase will end and a call phase will be triggered. Liquidity provider will be called to place a matching quote.

Indicative quote has the same characteristics as price-without-turnover, however unlike the price-without turnover, volume of indicative quote can be equal to or greater than zero.

## 4.8 Quote Attributes

The quote functionality for Xetra® enables liquidity providers to send their quotes into the system.

Quote attribute	Descriptions / contents	Mandatory
Exchange	Exchange on which the security is traded	Yes
Bid limit	Limit set for bid side	Yes
Ask limit	Limit set for ask side	Yes
Security	Security identification code or ISIN or symbol	Yes
Bid volume	Volume quoted by buying side	Yes
Ask volume	Volume quoted by selling side	Yes
Account	I (Liquidity provider)	Yes

<b>Quote attribute</b>	<b>Descriptions / contents</b>	<b>Mandatory</b>
Member-ID	Xetra® identification code assigned by Exchange	Yes
User-ID	Xetra® identification code assigned by the trader	Yes
Xetra®-order number	Xetra® identification assigned by the system	Yes
Timestamp	Xetra® identification assigned by the system	Yes
Quote type	S - Standard quote M - Matching quote W- PWT – Price-without- turnover I - Indicative quote	Yes
Decision maker ID	Short code of the person or algorithm within the member who is responsible for investment decision; it is assigned by the member	Yes
Execution maker ID	Short code of the person or algorithm within the member who is responsible for the execution; it is assigned by the member	Yes
Liquidity provision flag	Indicates whether an order is submitted as part of a market-making strategy pursuant to Articles 17 and 48 of Directive 2014/65/EU, or is submitted as part of another activity in accordance with Article 3 of this Regulation.	Yes

#### **4.9 Exceptional Trading Situations**

Trading can be suspended in the event of an exceptional trading situation for a single security or for the entire market. An exceptional situation is given, for example, when a knock-out limit is reached.

Structured products for which the knock-out limit has been reached in the course of a trading day are suspended from trading after this event and are not re-entered into trading again. Orders and quotes existing in the system are deleted.

## 5 Continuous Auction in the Trading System Xetra®

Groups of instruments tradable in the continuous auction in the Xetra® are listed in the table below:

Instr. Group	Term	Description / Content
ZCXR	ZSE Certificate Continuous Auction Regulated Market	Continuous auctions of structured products on the Regulated market

### 5.1 Trading Phases

Trading takes place throughout the entire day and starts with the pre-trading phase followed by the main trading phase and ends with the post-trading phase. The system is not available in the time between the post-trading phase and the pre-trading phase.

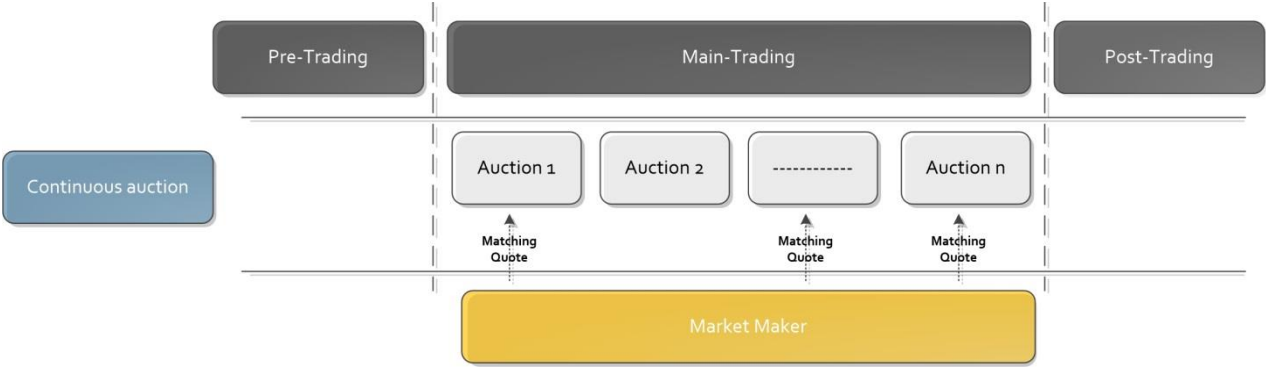


Figure 1. Trading phases in trading procedure “Continuous Auction”

#### 5.1.1 Pre-Trading Phase

The trading day starts with the pre-trading phase. All traders and liquidity providers may enter orders and quotes to prepare for the given trading day and may modify or delete their existing orders or quotes.

The order book is open (order book depth = maximum 20 orders, depending on the connectivity type) for all market participants. If available, the last price determined from previous trading day displayed.

#### 5.1.2 Main-Trading Phase

The start of the main trading phase is triggered at the end of the pre-trading phase. Orders are matched in auctions. An auction consists of the pre-call phase, an optional call phase and price determination phase.

During the pre-call and call phase all market participants may enter, modify or delete orders. Furthermore, exchange members acting as liquidity providers may enter or delete quotes.

The order book is open (order book depth = maximum 20 orders, depending on the connectivity type) for all market participants. Additionally the last price fixed is displayed.

### 5.1.3 Post-Trading Phase

The start of the post-trading phase is triggered after the end of the main trading phase. If an auction is still running at this time, it will be ended regularly (after the scheduled period for the call-phase ends) and post-trading in concerned security might start only after the maximum period for the call-phase ends.

Orders may be entered during the post-trading phase and existing orders may be modified or deleted. Newly entered orders are considered on the next trading day in the corresponding trading procedure depending on any validity restrictions.

Furthermore, orders already executed may be modified in the post-trading phase. All trade attributes that do not require the consent of counterparty (e.g. internal order number) may be changed afterwards.

Quotes may not be entered during the post-trading phase. Any quotes still left will be deleted in the end-of-day processing by the Xetra® trading system.

The order book is closed during this phase. Only the last price fixed is displayed.

## 5.2 Trading Procedure Continuous Auction

Liquidity is bundled in the auction by taking into account all applicable orders as well as liquidity provider quotes. The auction price is determined by applying the principle of highest executable volume within the range specified by a quote or exactly at the bid or ask limit of the quote. The execution of orders takes place according to price and time priority.

An auction consists of the pre-call phase, an optional call phase and price determination phase. The optional call phase serves to avoid partial execution and supports the processing of stop orders.

The number of auctions during the main trading phase and the time periods between the individual auctions and the duration of the pre-call phase is determined primarily by the issuer. This is influenced by the quality of the quotes (quote volumes and spreads) as well as his/her response times during the call phase. Moreover, further factors of influence are the defined maximum duration of the call phase and order book liquidity.

### 5.2.1 Pre-Call Phase (XPREC)

During the pre-call phase all market participants may enter, modify or delete orders. Furthermore, exchange members acting as liquidity providers may enter or delete quotes. During the pre-call phase the order book is open (order book depth = maximum 20 orders, depending on the connectivity type) for all market participants. Additionally the last price fixed is displayed. Market participants and the liquidity providers receive the same information.

From the pre-call phase a change to the price determination is possible if:

- a quote of the liquidity provider is in the order book to define the price range for the price determination and
  - if there is a crossed order book within the spread of the quote or
  - if there is a crossed order book at the ask or bid limit of the quote without generating a partial execution of an order.

From the pre-call phase a change to the call phase is possible if:

- there is a potential executable order book situation and no quotes of the liquidity provider are present or
- if the volume of the executable orders at the quote exceeds the quote volume (including the volume of executable opposing orders) or
- a stop limit is reached by the quote.

No maximum duration is defined for the pre-call phase. If there is no order in a specific instrument, the instrument remains in the pre-call phase for the entire main trading phase.

### **5.2.2 Call Phase (XCALL)**

During the call phase all market participants may enter, modify or delete orders. Furthermore, exchange members acting as liquidity providers may enter or delete quotes. During the call phase the order book is open (order book depth = maximum 20 orders, depending on the connectivity type) for all market participants. Additionally the last price fixed is displayed.

The indicative auction price is published neither to the liquidity provider nor to the market.

The call phase does not have any defined minimum duration. The duration may vary depending on the response times of the liquidity provider and on the liquidity of the respective instrument. The call phase has a maximum duration and does not end randomly. However, it can be ended by the liquidity provider before the expiry of the maximum duration.

From the call phase a change to the price determination is possible if: a matching quote is in the order book and:

- a full execution of the executable orders is possible or
- there is a crossed order book within the spread of the quote or
- the defined maximum duration of the call phase has passed.

From the call phase a change back to the pre-call phase is possible if:

- there is no executable order book situation anymore due to order modification or quote update

### **5.2.3 Price Determination**

Price determination takes place when the order book – starting out from order book situation at the end of the pre-call or call phase – is crossed within the spread defined by the quote or orders can be executed at the bid or ask limit of the quote.

Price determination takes into account all quotes and all orders that are in the order book at the time of price determination.

The auction price is the price at which the highest order volume can be executed and the lowest surplus per limit in the order book is given within the price spread defined by the quote (incl. bid and ask limit of the quote). The price/time priority ensures that a maximum of one order is executed partially.

If the order book situation is unclear, i.e., there is more than one limit with the same executable volume, further criteria are applied to determine the auction price (see section 7 “Price Determination Process”). After price determination, the remaining quote is not deleted.

The market participants are informed about trades by way of an execution confirmation which contains the price, the volume and the time of execution. The execution confirmation is followed by a trade confirmation providing participants with all the trade data. Trades of the current trading day can be modified; in this case the participants will receive an updated trade confirmation.

## **6 Tasks and Obligations of Liquidity Providers**

The issuer of a structured product is required to designate a liquidity provider, which must be a member of the Exchange. On each trading day, the liquidity provider is required to quote simultaneous buy and sell orders within the order book for a specified time pursuant to the contract concluded with the issuer.

## 7 Price Determination Process

### 7.1 Basic Matching Rules

The auction price is determined based on the quotes and order book situation as fixed at the end of the call phase. The basic rules for calculation of the auction price by the system according to the modified principle of highest executable volume are explained below.

The auction price is the price at which the highest executable order volume and the lowest surplus for each limit in the order book within the price spread, set by the quote of the liquidity provider (see Example 1).

If there is more than one limit at which the highest executable order volume and the lowest surplus is given within the price spread (including bid and ask limit of the quote), then the auction price is determined on the basis of the surplus:

- if the surplus for each of the limits lies within the price spread (including bid and ask limit of the quote) on the buy side (demand surplus), then the auction price is calculated based on the highest limit (see Examples 2 and 6).
- if the surplus for each of the limits lies within the price spread (including bid and ask limit of the quote) on the sell side (supply surplus), then the auction price is calculated based on the lowest limit (see Examples 3 and 7).

If consideration of the surplus does not lead to a clear auction price, the midpoint of the possible prices is included as additional criterion. This may be the case:

- if there is for several limits no surplus on hand (see examples 4 and 8) or
- if there is an equal surplus on the bid and the ask side (see examples 9).

The midpoint is calculated on the eligible highest and lowest limits and serves as auction price.

If there are no executable orders within the price spread (including bid and ask limit of the quote), then it is not possible to determine an auction price with turnover (Example 5).

### 7.2 Prices- without-turnover (PWT)

This type of price determination is triggered exclusively by the exchange member acting as liquidity provider by entering a separate quote (price-without-turnover quote). If the order book situation is not executable, a price without turnover is generated corresponding to the bid side of the quote.

### 7.3 Examples for the determination of the auction price

The examples below illustrate the calculation of the auction price.

The following codes are used:

- M – Market order
- L – Limit order
- Q – Liquidity provider quote

**Example 1:** There is exactly one limit at which the highest order volume can be executed and which has the lowest surplus.

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
L	300	200,00	197,00	400	L
L	200	199,00	198,00	300	L
L	300	198,00	200,00	100	Q
Q	100	196,00			

Determination of the auction price:

BID				ASK					
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
	0	0	0	201,00	800	800	0		0
L	300	300	0	200,00	500	800	100	Q	300
L	200	500	0	199,00	200	700	0		500
L	300	800	100	198,00	0	700	300	L	700
	0	800	400	197,00	0	400	400	L	400
Q	100	900	900	196,00	0	0	0		0

An auction price at a limit of 198,00 HRK with a quantity of 700 and a surplus of 100 on the bid side is calculated.



**Example 2:** There are several possible limits and there is a surplus of demand.

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
L	600	200,00	197,00	300	L
Q	200	197,00	198,00	100	L
			199,00	100	L
			201,00	400	Q

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
		0	0	202,00	900	900	0		0
		0	0	201,00	900	900	400	Q	0
L	600	600	100	200,00	0	500	0		500
	0	600	100	199,00	0	500	100	L	500
	0	600	200	198,00	0	400	100	L	400
Q	200	800	500	197,00	0	300	300	L	300

An auction price corresponding to the highest limit at 200,00 with a quantity of 500 and a surplus of 100 on the bid side is calculated.

**Example 3:** There are several possible limits and there is a surplus of supply.

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
L	300	202,00	198,00	600	Lt
L	100	201,00	201,00	200	Q
Lt	100	199,00			
Q	400	197,00			

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
L	300	300	0	202,00	500	800	0		300
L	100	400	0	201,00	400	800	200	Q	400
	0	400	0	200,00	200	600	0		400
L	100	500	0	199,00	100	600	0		500
	0	500	0	198,00	100	600	600	L	500
Q	400	900	900	197,00	0	0	0		0

An auction price corresponding to the lowest limit at 198,00 with a quantity of 500 and a surplus of 100 on the ask side is calculated.

**Example 4:** There are several possible limits and no surplus on hand..

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
L	300	202,00	198,00	200	L
L	200	201,00	199,00	300	L
Q	100	197,00	203,00	100	Q

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
	0	0	0	203,00	600	600	100	Q	0
L	300	300	0	202,00	200	500	0		300
L	200	500	0	201,00	0	500	0		500
	0	500	0	200,00	0	500	0		500
	0	500	0	199,00	0	500	300	L	500
	0	500	300	198,00	0	200	200	L	200
Q	100	600	600	197,00	0	0	0		0

An auction price corresponding to the midpoint of the possible prices is calculated at 200,00 HRK  $((199,00 \text{ HRK} + 201,00 \text{ HRK}) / 2 = 200,00 \text{ HRK})$  with a quantity of 500.

**Example 5:** There is no possible limit..

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
L	100	200,00	201,00	200	L
Q	300	199,00	202,00	300	Q

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
	0	0	0	202,00	500	500	300	Q	0
	0	0	0	201,00	200	200	200	L	0
L	100	100	100	200,00	0	0	0		0
Q	300	400	400	199,00	0	0	0		0

It is not possible to determine an auction price.

**Example 6:** Only market orders are executable in the order book with a surplus of demand. The Liquidity Provider offers no additional liquidity.

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
M	200	Market	Market	100	M
Q	0	199,00	202,00	0	Q

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
M	200	200	100	market	0	100	0		100
	0	200	100	202,00	0	100	0	Q	100
	0	200	100	201,00	0	100	0		100
	0	200	100	200,00	0	100	0		100
Q	0	200	100	199,00	0	100	0		100
	0	200	100	market	0	100	100	M	100

An auction price corresponding to the limit of the quote on the ask side at 202,00 HRK with a quantity of 100 and a surplus of 100 on the bid side is calculated.

**Example 7:** Only market orders are executable in the order book with a surplus of supply. The Liquidity Provider offers no additional liquidity.

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
M	100	market	market	200	M
Q	0	199,00	202,00	0	Q

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
M	100	100	0	market	100	200	0		100
	0	100	0	202,00	100	200	0	Q	100
	0	100	0	201,00	100	200	0		100
	0	100	0	200,00	100	200	0		100
Q	0	100	0	199,00	100	200	0		100
	0	100	0	market	100	200	200	M	100

An auction price corresponding to the limit of the quote on the ask side at 199,00 HRK with a quantity of 100 and a surplus of 100 on the bid side is calculated.

**Example 8:** Only market orders are executable in the order book with no surplus. The Liquidity Provider offers no additional liquidity.

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
M	100	Market	Market	100	M
Q	0	199,00	202,00	0	Q

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
M	100	100	0	market	0	100	0		100
	0	100	0	202,00	0	100	0	Q	100
	0	100	0	201,00	0	100	0		100
	0	100	0	200,00	0	100	0		100
Q	0	100	0	199,00	0	100	0		100
	0	100	0	market	0	100	100	M	100

An auction price corresponding to the midpoint of the possible prices is calculated at 200,50 HRK  $((199,00 \text{ HRK} + 202,00 \text{ HRK}) / 2 = 200,50 \text{ HRK})$  with a quantity of 100.

**Example 9:** Orders are executable within or at the quote and an equal surplus on both sides (price determination between order limits).

The order book status:

Bid			Ask		
Type	Quantity	Limit	Limit	Quantity	Type
L	100	202,00	198,00	100	L
L	100	199,00	201,00	100	L
Q	1000	198,00	202,00	1000	Q

Determination of the auction price:

BID				ASK					
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
	0	0	0	203,00	1.200	1.200	0		0
L	100	100	0	202,00	1.100	1.200	1.000	Q	100
	0	100	0	201,00	100	200	100	L	100
	0	100	0	200,00	0	100	0		100
L	100	200	100	199,00	0	100	0		100
Q	1.000	1.200	1100	198,00	0	100	100	L	100

An auction price corresponding to the midpoint of the possible prices is calculated at 200,00 HRK  $((198,00 \text{ HRK} + 202,00 \text{ HRK}) / 2 = 200,00 \text{ HRK})$  with a quantity of 100.



**Example 10:** There are no executable orders in the order book. The Liquidity Provider enters a price-without turnover quote.

The order book status:

BID			ASK		
Type	Quantity	Limit	Limit	Quantity	Type
Q	0	200,00	202,00	0	Q

Determination of the auction price:

BID					ASK				
Type	Quantity	Cumulated Quantity	Surplus	Limit	Surplus	Cumulated Quantity	Quantity	Type	Maximum quantity
	0	0	0	202,00	0	0	0	Q	0
	0	0	0	201,00	0	0	0		0
Q	0	0	0	200,00	0	0	0		0

An auction price corresponding to the bid limit of the pwt-quote is calculated at 200,00 HRK with a quantity of 0.