



## MARKET MODEL DESCRIPTION

*This document aims to provide the reader with a summary of the ETS ("European Trading System") Market Model that will be used on the "Equiduct Trading" segment of Börse Berlin. Börse Berlin AG is a regulated market operator under article 36 of MiFID. In the remainder of this document, the commercial name "Equiduct Trading" will be used when referring to Börse Berlin AG.*

*In order to finalise the Market Model, this document is issued for review and discussion to a number of potential market participants. As such, certain described behaviour of the Market Model may be altered in subsequent updates of this document, which will be made available on the Equiduct Trading website ([www.equiduct-trading.com](http://www.equiduct-trading.com)).*

*The ETS Market Model and the corresponding **Börse Berlin Exchange Rules ("Börsenordnung")** are subject to approval by the Börsenrat and the Berlin Supervisory Authorities ("Börsenaufsichtsbehörde").*

*For more information on the market model or technical connectivity documents, please send a query to [sales@equiduct-trading.com](mailto:sales@equiduct-trading.com).*

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## Executive Summary

The implementation of the Markets in Financial Instruments Directive (MiFID) in November 2007 has fundamentally altered the European securities industry in general and the exchange landscape in particular. The introduction of a pan-European best execution obligation and the abolition of the concentration rule create a competitive level playing field that is challenging the dominant position of the established domestic exchanges.

European exchanges which continue to simply offer a central limit order book and trade reporting services in their own listed products have lost market share to new entrants offering new services with an extended product range at aggressive prices.

Equiduct Trading aims to be at the forefront of this radical competitive shift through the introduction of the ETS platform on 20<sup>th</sup> March 2009. ETS is the only trading platform to offer pan-European, on-exchange, best execution facilities through its unique PartnerEx function. PartnerEx also provides a regulated, neutral third party platform for the execution of internalised order flow. By using ETS as its platform for liquid securities, Equiduct Trading offers a full range of services to enable firms to comply with MiFID in a cost and time efficient manner.

PartnerEx is a facility which allows Order Flow Providers and Market Makers to establish best execution relationships within ETS. Once established, Order Flow Providers are able to submit orders directly into ETS, which will then calculate the best possible price for the order on a range of European reference markets. Once the price has been determined pre-defined price improvement may be included and the Order Flow Provider trades against their preferred Market Maker at this price. Order Flow Providers and Market Makers may be part of the same financial institution, thereby enabling "on-exchange internalisation".

This model offers a number of benefits for market participants:

- The ability for Order Flow Providers to satisfy Europe-wide best execution by submitting orders to ETS, and letting ETS scan reference markets on their behalf
- The ability for Market Makers and Order Flow Providers to establish and customise multiple PartnerEx relationships without specific development costs
- The ability to obtain the advantages of internalisation, while not having to build expensive IT solutions
- The ability to offer price improvement for internalised trades and to attract order flow for PartnerEx relationships
- The use of the ETS best execution, transparency and record keeping features to achieve MiFID compliance with minimal costs and minimal delay

ETS is a trading system that was originally developed by Nasdaq Europe to support the Nasdaq Deutschland exchange. More recently, The Nasdaq Stock Market Inc bought the rights to use the ETS system in North America and has since integrated components into its MarketSite technology. Equiduct continually upgrades and fine-tunes ETS for use by Equiduct Trading.

ETS is a highly scalable, fully-resilient distributed system which has a proven track record in delivering the Market Model outlined in this document. In particular, a basic form of the PartnerEx concept as well as the SafeOrders (a Market Peg order with zero price offset) described in this document were deployed and used in the live operation of the Nasdaq Deutschland market.

The ETS Matching Engine has been tested to handle up to 200,000 business transactions per second while achieving average round-trip response time of below 1 millisecond.

## 1. Market Overview

Equiduct Trading is an authorised market operator under article 36 of MiFID.

Equiduct Trading intends to offer trading on ETS in the most liquid financial instruments as defined by CESR, plus any additional instruments that are generally considered to be liquid (e.g. because they are included in a main index). Other security classes may be added at a later stage subject to participant demand.

Securities on the market will be organised into a series of segments on the basis of the home market of those securities. Whilst all segments will follow the same trading day format, timings such as market open and close may vary across segments.

The ETS platform offers the following services for the instruments traded thereon. Each of these services is discussed in further detail in the remainder of this document:

### 1.1. PartnerEx

PartnerEx allows Order Flow Providers (OFP) and Market Makers that participate in the HybridBook to establish and maintain a bilateral trading agreement within the trading system. Establishing this relationship allows the OFP to submit orders into the trading system, and trade at Europe's best prices, with the potential to benefit from a price improvement from the Market Maker.

PartnerEx also gives OFP and Market Makers the flexibility to agree non-standard settlement conditions to accommodate longer or shorter settlement cycles, or to agree alternate settlement locations or agents.

### 1.2. HybridBook

In the HybridBook, orders and Market Maker quotes compete seamlessly alongside each other. The ability to display quotes in the HybridBook provides a Pan-European venue for market participants obligated to provide pre-trade transparency requirements as Systematic Internalisers under MiFID. Standard order types are available, including Primary and Market Pegged orders with a price offset to allow order prices to be pegged to the near or far side of the EBB0. The SafeOrder, a Market Pegged order with zero price offset, is designed to ensure that order book executions continue to represent the best prices in Europe.

This order book will feature an imported crossing mechanism to set the closing price, allowing participants perfect exposure to benchmark European prices.

### 1.3. Historical Data Services

Equiduct Trading will provide a proprietary solution for retrieving detailed trade records and full order book depth for any trades executed on the market for up to 5 years following a trade. This data may be used by participants to analyse the quality of their executions on ETS, or to demonstrate best execution to their clients.

### 1.4. Clearing and Settlement Services

Equiduct Trading intends to develop direct connections to the clearing and settlement providers of Europe's main markets as the default clearing and settlement location for the HybridBook. In addition, Equiduct Trading will offer broad flexibility to participants that make

use of the PartnerEx function by allowing them to choose the most appropriate clearing and settlement location.

### 1.5. Market Data Services

Equiduct Trading will offer full pre and post trade transparency for the HybridBook. Equiduct Trading will also publish the Equiduct VBBO calculated for a number of shares representative of retail market size (RMS) and standard market size (SMS) up to a precision of four decimal places where appropriate. Equiduct VBBO will be the de facto pre trade transparency for the PartnerEx market with post trade data being provided as usual. The Market Data Specification contains a summary of the Market Data Services that Equiduct Trading intends to offer for the ETS market model.

### 1.6. Connectivity Solutions

Equiduct Trading will offer a range of connectivity options tailored to meet the needs of different types of market participant, including a FIX API connection. All options will provide member access to all ETS services, as well as supply real-time market data.

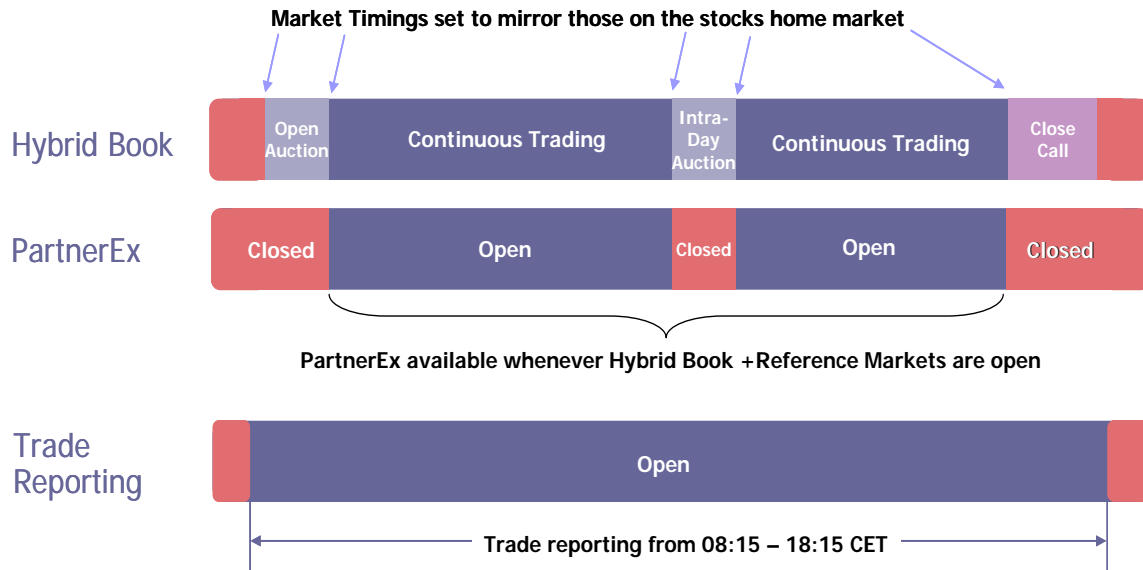
Connections are available through a number of major software vendors such as Fidessa, GLTrade and Ullink.

The remainder of this document presents further detail on these services.

## 2. Equiduct Trading Day for ETS market

ETS will group equities into segments on the basis of their home market. Each segment is assigned a trading calendar and trading day schedule, which in turn is influenced by the trading calendar and schedule of the securities on their home market.

Whilst the exact timings may vary, it is anticipated that the format of the trading day will follow a similar pattern in all segments. As an example, trading in UK equities is expected to follow the following schedule:



Each market segment will transition from a closed state into a pre-opening auction at a defined point in the day. During this time, participants may enter and amend their quotes and orders, ready for the opening auction. The opening auction will commence at a scheduled time, plus any extensions that Equiduct Trading deems appropriate should the potential opening price deviate too far from the previous closing price, or there be unexecuted market order volume remaining on the book.

Once the opening auction is completed, the HybridBook moves into a period of continuous trading where quotes and orders entering the book are immediately executable. Like most major European markets, Equiduct Trading provides price monitoring relative to the EBBO during the continuous trading phase, to ensure that price movements in the HybridBook occur in an orderly manner. Significant or fast price movements will trigger an unscheduled intra-day auction designed to re-establish market prices in an orderly fashion before returning the security to continuous trading.

The HybridBook will move into a closing cross phase at a scheduled time, aligned to the start of the closing auction process in the home market for the security. This closing cross phase will remain in effect for a scheduled duration beyond the final closing time of the reference market. This extra time allows participants to detect the security's closing price on the home market and place any remaining order volume that they might wish to execute at the Equiduct closing cross price into the HybridBook. Once the scheduled time has been reached, ETS will match any remaining orders and quotes at the Equiduct closing price determined as the mid price of the RMS VBBO at the start of the closing cross phase.

As described later in this document, the PartnerEx function takes real-time prices from both the HybridBook and reference markets to provide a best execution price. Since these prices must be “tradable” in nature (i.e. immediately executable on ETS or the reference market), PartnerEx is available only whenever the HybridBook and a significant other relevant market are in continuous trading phases.

### 3. PartnerEx

PartnerEx is a unique facility which enables Market Makers and OFPs to establish relationships within ETS which allow OFPs to direct orders towards their preferred Market Maker for execution. These relationships guarantee automated acceptance of an order at the prevailing best prices in a specified security up to an agreed size, with possible price improvement.

It is possible for an Equiduct Trading participant to establish a PartnerEx relationship with other parts of its own organisation. This arrangement may be desirable for large organisations which may have both retail and market-making arms, and who wish to “internalise” retail flow against their Market Making desks without breaching internal divisions or Chinese walls and without having the overhead of becoming a Systematic Internaliser. By establishing an internal PartnerEx relationship on ETS, the price search and internalisation function occurs on a regulated third party system, thereby converting internalised trades into regular on-exchange executions.

#### 3.1. Establishing and Maintaining PartnerEx Relationships

The PartnerEx function has been designed to allow maximum flexibility in the construction of Market Maker to OFP relationships. The facility is available for any security in which the Market Maker is registered and is providing quotes to the HybridBook, and allows the Market Maker to vary the terms of this relationship (maximum volume, price improvement, settlement conditions and allocation of the Equiduct Trading execution fee) on a security-by-security and OFP-by-OFP basis. The terms can be different based on the side (i.e. buy/sell) of the relationship.

An OFP may establish PartnerEx relationships with multiple Market Makers for any given security, if required. Where multiple relationships have been created in a single security, the OFP can assign each Market Maker a priority rating. Incoming PartnerEx orders will then be routed to the appropriate PartnerEx Market Maker in priority order.

PartnerEx also allows an OFP to override the existing prioritisation by specifying a particular Market Maker on an individual order. Such orders would be routed to the specified Market Maker in preference to all others for that particular order only.

Details of PartnerEx relationships will not be published to the market as a whole by Equiduct Trading, although the current status of the Participant’s PartnerEx relationships can be viewed by both Market Maker and OFP party to the relationship and can be modified as required. The following table summarises the set of possible updates to PartnerEx relationships and an indication of when these are possible:

Action	Who Can Apply Action (*)	Times
Create a new relationship	Market Control	Daily
Delete an existing relationship	Market Control	Daily
Halt an existing relationship**	Market Maker or OFP	Intra-day
Suspend an existing relationship	Market Control	Intra-day
Resume an existing relationship**	Market Maker or OFP	Intra-day
Adjust price improvement parameter**	Market Maker only	Intra-day
Adjust the maximum size parameter**	Market Maker only	Intra-day
Adjust the settlement parameters	Market Control	Daily
Adjust the trade fee allocation	Market Control	Intra-day
Adjust the priority**	OFP only	Intra-day

(\*) This schedule applies in case of direct connections to Equiduct Trading. Functionality for OFP and Market Makers may be more limited in case you connect through an ISV or OMS.

(\*\*) These terms can be adjusted on a per side basis.

### 3.2. PartnerEx Price Determination and Execution

Once the PartnerEx relationship has been established in ETS, the OFP will be able to submit PartnerEx orders towards a specific Market Maker that they have an active PartnerEx relationship with, or use the prioritisation option described previously. Provided the OFP has a valid, active relationship with a Market Maker in the security, the order will be accepted and the price determined.

For the purpose of setting PartnerEx prices, ETS imports real-time Level 2 (market depth) prices from a range of external reference markets through low latency direct or commercial data feeds. Equiduct Trading can decide to throttle these feeds to avoid excessive update rates of the resulting Equiduct VBBO.

Equiduct Trading will import the order book data at the market depth levels that are required to be able to calculate the VBBO of a financial instrument at standard market size. Equiduct Trading will periodically review the typical market depth levels required to calculate the Equiduct VBBO and adjust depth where appropriate and feasible.

ETS will use the external reference prices - together with those found on the HybridBook - to create a virtual, consolidated European order book for the security. It will then calculate the theoretical volume weighted average price that the order would receive if it was executed in that consolidated book<sup>1</sup>. In the unlikely event that the incoming order requires more volume than is possible in the virtual consolidated book, the remaining volume is assumed to be priced at the highest / lowest price for incoming buy / sell orders respectively.

Any price improvement agreed as part of the PartnerEx relationship is then applied to the calculated price to determine the end execution price. This price improvement is specified as a multiple of the tick size. Equiduct Trading can offer more granular tick sizes in the PartnerEx segment to allow sub-tick price improvements relative to the HybridBook and reference markets for those shares where the VBBO spread is just one tick. Provided this final execution price is acceptable given any limit price attached to the incoming PartnerEx order, this is used to generate an electronic execution (single fill) between the OFP and Market Maker.

If the OFP has directed a PartnerEx order towards a particular Market Maker with whom they have a relationship, then the order will be filled up to the maximum size permitted by that Market Maker, and the remainder is returned to the OFP.

If the OFP has entered an undirected PartnerEx order, then a series of PartnerEx executions will take place against Market Makers in the order of their relationship prioritisation as discussed before. Each partial execution will be up to the maximum size permitted by that Market Maker relationship and the Equiduct VBBO will be calculated on the basis of the number of shares remaining on the order up to the amount offered by the relationship. If, after all PartnerEx relationships have received a full execution, there is further remaining volume on the incoming order, then this balance is returned to the OFP.

Within PartnerEx, the execution price is calculated on an order-by-order basis, and includes bespoke price improvements agreed between Market Maker and OFP. To provide a level of

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<sup>1</sup> Since ETS uses public price feeds for external reference market prices, hidden iceberg order volume on external markets can not be reflected in the volume-weighted average price calculation.

market-wide pre-trade transparency to PartnerEx, Equiduct Trading will also publish an indicative PartnerEx Equiduct VBBO, which represents the theoretical execution price if a standard sized order<sup>2</sup> was executed in a PartnerEx relationship without price improvement.

Given the principles of PartnerEx, this VBBO can be considered a close proxy for a consolidated, Europe wide best bid and offer for a standardised order size. Equiduct VBBO is currently already available as a separate product offering.

### 3.3. Availability of the PartnerEx Function

Market Makers are bound by live reference market prices in the PartnerEx function. It is important that these prices are live and executable, to protect Market Makers from potential price manipulation.

For this reason, the PartnerEx function will only be available where the security is in a state of continuous trading on both the HybridBook and a significant external market, and where these markets do not report a crossed BBO.

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<sup>2</sup> In fact, two distinct Equiduct VBBO values will be disseminated - one equal to an order for the Standard Market Size for the security and one equal to Retail Market Size order of €7,500 consideration (as defined by CESR).

## 4. The HybridBook

The HybridBook provides a venue for electronic trading between participant orders and executable quotes from registered Market Makers. Whilst this order book resembles many others in Europe, it also offers three unique differences designed to improve execution functionality and to remove unnecessary costs from the trade process:

- A closing auction which matches buy and sell interests at the Equiduct Trading Closing Cross Price
- An execution mechanism which automatically detects and preferentially matches buy and sell interest from the same member - reducing the settlement process to an accounting transfer
- Pegged orders, including an innovative SafeOrder, designed to track the best prices available in external reference markets, to ensure that ETS always provides best execution.

The remainder of this section discusses the HybridBook in more detail.

### 4.1. Order Types and Execution Conditions

The HybridBook will offer a range of European standard order types;

- Limit orders
- Market orders
- Iceberg orders

Equiduct Trading will set a minimum required peak size for iceberg orders. Iceberg orders will not be flagged in any way to the market, with visible peaks appearing identical to conventional limit orders. When a peak is fully exhausted, a new peak is introduced into the book from the hidden volume. New peaks are given a new timestamp as they enter the book.

Participants are able to enter, amend<sup>3</sup> and cancel orders at any time during the trading day, from the start of the opening auction, until the end of the closing cross. Depending on the order execution conditions specified on the order, orders may either expire at the end of the day or be retained in ETS until the opening auction on the next business day.

Participants entering orders into the HybridBook will be able to choose from a range of execution conditions which govern the treatment of their orders:

- **Good For Day (GFD/DAY)**. These orders will automatically expire at the end of the closing cross on the day they are entered. This is the default condition.
- **Good Till Cancel (GTC)**. These orders will never expire. It is the responsibility of the entering party to cancel the order.
- **Good Till Date (GTD)**. These orders require participants to specify a date until which the order is to remain valid. At the end of normal trading on that date the order will be

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<sup>3</sup> Although the ability to amend an order into a different type (e.g. limit to market) is not permitted. Participants will also not be able to move hidden iceberg order volume into the visible portion of the order using the amend function.

- expired by the system. If the market segment is closed on that date the order will be expired at the start of the next valid trading day for that segment.
- **Good Till Time (GTT).** These orders allow participants to specify a precise expiry time up to the end of the day in which they are entered<sup>4</sup>.
  - **At The Close (ATC).** These orders can be entered into ETS at any time during the trading day, but will only pass into the HybridBook at the start of the closing cross. If an ATC order is received during the closing cross, then the order will pass directly into the HybridBook. Any unexecuted portion of an ATC order will be automatically expired at the end of the closing cross.
  - **At The Open (ATO).** These orders can be entered into ETS at any time but will only pass into the HybridBook at the start of the next opening auction. If an ATO order is received during an opening auction, then the order will pass directly into the HybridBook. Any unexecuted portion of an ATO order will be automatically expired at the end of the opening auction.
  - **Fill Or Kill (FOK).** These orders will either be executed in full (possibly with multiple fills) or not at all, in the same way that they would on other European exchanges. This execution condition is not allowed during auction phases.
  - **Immediate Or Cancel (IOC).** These orders will be executed as far as possible (possibly with multiple fills) given order and market conditions and any remainder is immediately expired back to the participant. This execution condition is not allowed during auction phases.

Not all order execution conditions are available on all order types. The following matrix shows the set of permitted combinations;

	Limit Order	Market Order	Iceberg Order
Good for Day (GFD)	Y	N	Y
Good till Cancel (GTC)	Y	N	Y
Good till Date (GTD)	Y	N	Y
Good till Time (GTT)	Y	N	Y
Immediate or Cancel (IOC)	Y	Y	Y
Fill or Kill (FOK)	Y	Y	Y
At the Open (ATO)	Y	Y	Y
At the Close (ATC)	Y	Y	Y

Additionally, ETS provides a Pegged order type, and executable quotes. They are discussed in the sections which follow.

#### 4.2. Pegged Orders (including SafeOrders)<sup>5</sup>

<sup>4</sup> Orders will be expired at the specified time except where the expiry time falls during a scheduled auction. In this case, the order will continue to participate until the end of the auction and then expire.

<sup>5</sup> Pegged order type only described as *SafeOrder* by Art. 40 I No. 4 of the Terms and Conditions for transactions on Börse Berlin for a transition period.

Pegged Orders are dynamically priced limit orders set in relation to the EquiductEBBO and appear in the book in the same way as normal limit orders. The EquiductEBBO, the Europe-wide best bid and offer ("EBBO"), is calculated using prices from the reference markets for the financial instrument. Equiduct supports two types of Pegged Order.

- Primary Peg: pegged to same side of the EBBO, and
- Market Peg: pegged to the opposite side of the EBBO

Pegged orders allow clients to specify an optional price offset amount up to 4 decimal places in the instrument's trading currency (rounded to the applicable tick size). A positive offset is always added to the dynamic limit price and a negative offset is always subtracted from the dynamic limit price. The SafeOrder is a specific case of a Market Peg Order with zero price offset.

Each time the best bid / offer in a reference market updates, the limit price of the Pegged Order will adjust accordingly, until it is either cancelled by the owner, or fully executes against other trading interest in the HybridBook.

Note that the ability to offer tracking orders as described here requires reference prices to be firm and executable. HybridBook auction or continuous matching is only enabled when a significant relevant market for a security is in continuous trading providing firm and executable prices.

### 4.3. Quotes

A quote is a pair of executable buy and sell prices (with volumes) at which a Market Maker is committing to trade in the HybridBook with other Equiduct Trading participants. Participants registering as Market Makers will be required to maintain principal quotes in securities for which they are registered in at least a required Minimum Quote Size (MQS). Quotes should be reasonably related to the prevailing market<sup>6</sup>.

Equiduct Trading may impose a maximum spread requirement on quotes. Where such a maximum quote spread rule is in force, it will be monitored off-line by the Equiduct Trading Market Supervision team ("Handelsüberwachungsstelle") rather than technically enforced by ETS.

At any given point in time, a quote has one of three possible states:

- **Closed** No execution is possible against the quote, although Market Makers may adjust prices and / or sizes if they wish.
- **Open** Execution is possible against the quote.
- **Indicative** Not executable, although Market Makers may adjust prices and / or sizes if they wish. This status will typically be granted by Equiduct Trading Market Supervision where the Market Maker is facing technical problems.

Under normal circumstances, Equiduct Trading will require Market Makers to open their quotes for trading by the end of the opening auction, and maintain these open quotes until the start of the closing cross, when they will be automatically closed by ETS. Quotes may be updated at any time.

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<sup>6</sup> This principal is laid down in MiFID under 4(a) of Article 27.

Quotes within ETS are electronically executable in the HybridBook and will be displayed and ranked *pari passu* with conventional orders. As with other order maintenance, each side of the quote will have a timestamp which governs time priority within a given order book price level. An increase to the size of the quote volume will generate a new timestamp, although changing the state of the quote (from closed to open) will not affect the timestamp.

HybridBook executions against quotes will decrease the remaining quantity of the relevant side of the quote. If this size falls beneath the MQS, then ETS will automatically refresh the size of the quote back up to MQS and move the price of the quote away from the market by a number of ticks specified by the Market Maker at the time of order entry.

For example, if the tick size for a security is €0.01 and a Market Maker is quoting €78.90 - €80.10 in a security, and has set a quote refresh value of 10 ticks. An incoming buy order which matches reduces the size of the sell side of the quote down to below MQS would trigger a quote refresh at a price of €80.20.

This quote Auto-Refresh facility is only triggered at the end of all possible executions of an incoming order, ensuring that a Market Maker's exposure to aggressive incoming orders is limited to their posted price and quote size only for any incoming order.

#### 4.4. HybridBook Visibility and Ordering

The HybridBook will contain a mixture of orders and quotes. The following information will be made available:

- Orders and open firm quotes at the same price level will be presented as an aggregated volume and price, with an indication of the number of quotes or orders contributing to the total. Note that only the visible volume of iceberg orders will be included in this volume total, and that no attribution of market makers will take place.
- The full depth of the market will be available for each security (all price levels).

Where an order or quote is amended or refreshed, then the order / quote will receive a new timestamp where either the price of the order / quote is changed, or the displayed size of the order / quote has increased. In all other cases, the original timestamp of the quote or order is retained.

#### 4.5. Market Opening Procedure

The trading day commences with an opening auction period during which Market Makers can open and modify their quotes, and all participants may enter, amend and delete orders. Market Makers will be obliged to have opened their quotes by the end of this opening auction phase. At the start of this phase any "At the Open" (ATO) orders in the system will pass into the order book.

At a scheduled time, ETS will run an auction algorithm to determine the single market trading price, and match any executable quotes and orders at this single price. The algorithm used by ETS to calculate the auction price is identical to that used by other major European exchanges and uses the following criteria:

- 1) **Maximum executable volume.** If a single auction price can be chosen which uniquely maximises the auction volume, then this is chosen as the auction price.

- 2) **Minimum surplus.** If, within the set of prices identified in (1) which maximise executable volume, there is a price which minimises the order volume which would be left on the order book priced at the auction price, then this price level is selected.
- 3) **Market pressure.** If the set of prices identified in (1) would always level unexecuted order volume on the buy side of the book, then the highest price identified in (1) is selected as the auction price. Similarly, if the remaining volume would always be on the sell side of the book, then the lowest price would be used.
- 4) **Reference price.** Out of the set of potential prices identified in (1), the price which is closest to the reference (last traded) price for the security is chosen. If no such price can be chosen by this measure, then the reference price itself is chosen as the auction price.

#### 4.6. Continuous Trading Phase

After the auction is complete, the security will transition into continuous trading. Any unexecuted orders and quotes will pass into the continuous trading phase with the exception of orders marked as "At the Open" (ATO), which will be expired at the end of the opening auction.

During the continuous trading phase, aggressively priced orders and quotes entering the book will result in immediate, automated executions.

Unlike most other European exchanges, Equiduct Trading does not use strict price / time priority to match orders and quotes in the HybridBook during continuous trading. Instead, in order to maximise internalisation in the book and minimise the resulting settlement costs, ETS matches according to the following principles:

- **Price.** Orders and quotes at the top price level are considered for execution. Within this price level, orders and quotes are sorted according to;
- **Internalisation.** Orders or quotes from the same market participant are given preference over orders / quotes from all other market participants. This maximises the rate of internalisation on the order book. Orders and quotes from the same market participant at the top price level are then sorted according to;
- **Time.** Orders and quotes are executed and sorted such that the oldest order / quote is executed first.

Explicitly, the chain of executions resulting from an aggressive order executing down the book can be thought of as;

1. Execute all orders / quotes from my firm at the best price level (oldest first)<sup>7</sup>.
2. Execute all orders / quotes from other firms at the best price level (oldest first).
3. Execute all orders / quotes from my firm at the next best price level (oldest first).
4. Execute all orders / quotes from other firms at the next best price level (oldest first).

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<sup>7</sup> Note that this includes any hidden volume of any iceberg orders from your firm.

The addition of the internalisation criteria directly in the HybridBook match during continuous trading eliminates the requirement for participants with large order flow and seeking to internalise heavily, to build complex logic to withdraw orders from the exchange book and match internally before executing other orders at the best price level. With this approach, participants can simply submit orders to Equiduct Trading in the knowledge that internalisation will be maximised.

#### 4.7. Intra-Day Interruptions

Where ETS detects that a reference market has moved into a scheduled or unscheduled auction (typically a price monitoring interruption or regulatory action) in a reference market, an unscheduled auction may also be invoked in the ETS HybridBook.

As with the opening auction, the fact that the HybridBook must be uncrossed at the end of the auction when the security returns to continuous trading mandates that the intra-day auction on ETS is price-forming.

Once ETS detects that the reference market has resumed back into continuous trading, the Hybrid book enters a resume period after which a price-forming auction algorithm is run, any orders and quotes executed, and the security transitions back into continuous trading.

#### 4.8. Closing Procedure

At the end of the continuous trading phase, ETS will transition all securities into a closing cross phase. Market Maker quotes will be automatically closed by the system at the start of this phase, signalling the end of the required Market Maker quoting obligation.

At the start of this phase, any "At the Close" (ATC) orders received during the day will be added to the HybridBook. Participants may enter, amend and delete any quotes or orders into the HybridBook.

The end of the closing cross will be scheduled to be a known period (e.g. 5 minutes) after the end of the closing period on the home exchange for the security. The purpose of this delay is to allow participants to digest and respond to the closing price on the home exchange and to determine whether they have additional unexecuted orders which they may wish to match at the Equiduct Trading Closing Price for the security. If so, these orders can be entered into the HybridBook for execution (subject to matching volume on the opposite side of the book).

Pegged Orders remain in the HybridBook for the duration of the closing phase, but are converted into market orders just before the matching algorithm is run.

At the end of the closing phase, ETS will automatically close any remaining open quotes and expire any orders which are flagged as "At the Close" (ATC) or "Good For Day" (GFD). ETS will also automatically expire any "Good Till Time" (GTT) orders due to expire before the start of the next opening auction for the security. Subject to their execution condition, any unexecuted Pegged Orders will be carried over to the next trading day.

## 5. Pricing Integrity between PartnerEx and the HybridBook

The algorithm used by PartnerEx to calculate execution prices presented previously can lead - in three particular scenarios - to orders and / or quotes on the HybridBook being potentially "traded through"<sup>8</sup>, or the generation of unreasonable execution prices for Market Makers. In each case, additional protections have been built into ETS to correct for such issues.

This section presents these three scenarios in detail, along with the logic for handling them.

### 5.1. Equiduct Trading has best price. Incoming order exceeds volume at this price

Consider the scenario

- ✗ For a given security the set of reference markets is just the HybridBook and one other Exchange.
- ✗ The OFP enters an order to buy 2,000 shares against a valid, active relationship with a Market Maker offering PartnerEx in this size
- ✗ With a 0.05 price improvement.

HybridBook:

BUY		SELL	
Volume	Price	Price	Volume
4,000	83.50	86.00	1,000
500	83.00	87.00	15,000
...	...	...	...

Other reference exchange:

BUY		SELL	
Volume	Price	Price	Volume
2,800	83.75	86.50	1,500
2,000	83.50	87.00	3,750
...	...	...	...

In calculating the correct PartnerEx execution price, ETS will create a (virtual) combined order book as below:

Virtual, consolidated order book:

BUY		SELL	
Volume	Price	Price	Volume
2,800	83.75	86.00	1,000
6,000	83.50	86.50	1,500
...	...	...	...

An incoming order to buy 2,000 shares into this consolidated book would receive a volume weighted price of 86.25. PartnerEx will then apply the 0.05 price improvement offered by the Market Maker, and set a final execution price of 86.20.

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<sup>8</sup> An order or quote on the HybridBook is said to be "traded through" where an execution takes place in PartnerEx at a strictly worse price than the limit price associated with the order / quote. Explicitly, a buy order is traded through if PartnerEx yields a strictly lower price than its price, and a sell order is traded through if PartnerEx generates a strictly higher price.

If PartnerEx were to execute this trade immediately, the order to sell 1,000 shares at 86.00 on the HybridBook will have been “traded through”, as they were willing to sell at least part of the volume a strictly better price than that offered in PartnerEx.

In such scenarios, ETS will automatically generate a special order on behalf of the Market Maker called a Sweep Order and send this to the book. Sweep Orders are designed to interact with the HybridBook and fully execute orders / quotes which are about to be traded through.

In our example above, a Sweep Order is generated to buy 1,000 shares on behalf of the Market Maker. This will remove the order to sell at 86.00 and allow the PartnerEx trade to continue at the previously calculated price of 86.20.

Note: The generation and execution of the Sweep Order acts to decrease the exposure of the Market Maker in this scenario. They will face two executions as a result of satisfying the incoming PartnerEx order - one buy trade of 1,000 shares from the Sweep Order, and one sell trade of 2,000 from the PartnerEx trade. Their net position change therefore is to short 1,000 shares.

## 5.2. Price Improvement exceeds the opposite side of the book

Where the price improvement offered by a Market Maker in a PartnerEx relationship is large compared to the trading spread of the security in the reference market(s), it is possible for a potential PartnerEx price to lie outside the opposite side of the Equiduct VBBO.

Consider again the scenario

- ✗ The set of reference markets for a security is set as just HybridBook and one other Exchange.
- ✗ The OFP enters an order to sell 500 shares against a valid, active relationship with a Market Maker offering PartnerEx in this size
- ✗ With a 0.02 price improvement.

HybridBook;

BUY		SELL	
Volume	Price	Price	Volume
24,050	1.03	1.05	10,000
45,100	1.02	1.07	15,860
...	...	...	...

Other reference exchange;

BUY		SELL	
Volume	Price	Price	Volume
2,800	1.04	1.05	11,600
2,000	1.03	1.06	23,750
...	...	...	...

In calculating the correct PartnerEx execution price, ETS will create the virtual order book as below;

Virtual, consolidated order book;

BUY		SELL	
Volume	Price	Price	Volume

2,800	1.04	1.05	21,600
26,050	1.03	1.06	23,750
...	...	...	...

An incoming order to sell 500 shares would receive an execution price of 1.04 (as set by the external reference market). PartnerEx would then apply the 0.02 price improvement offered by the Market Maker, and set a theoretical execution price of 1.06.

If PartnerEx generated this price, however, then the order to sell 10,000 shares at a price of 1.05 on the HybridBook would be "traded through", as they were willing to sell the total volume of shares at a strictly better price.

The Sweep Order introduced in the previous section is not appropriate here, as a buy Sweep Order of 10,000 shares would be required to remove the problematic order. This would imply that the Market Maker would face significantly increased exposure - buying from the HybridBook as a result of the Sweep Order, and buying again from the OFP in the PartnerEx function.

Instead, ETS will automatically cap the PartnerEx price improvement offered by the Market Maker in this scenario, so as to ensure that no HybridBook order is traded through. A final execution price of 1.05 is therefore applied in our example above.

Note: Where the reference markets are locked (i.e. best buy price on one market = best sell price on another), this price capping ensures that all PartnerEx trades are executed at this price.

### 5.3. Crossed reference markets

Should the VBBO for the incoming order size be crossed (i.e. the best volume weighted bid of the reference markets be strictly higher than the volume weighted best offer), this would result in a negative effective spread for the Market Maker, and potential issues for the integrity between PartnerEx and the HybridBook.

Such scenarios are considered to be unlikely due to natural forces of arbitrage in the financial markets. Where they do occur, however, ETS will reject incoming PartnerEx orders for that security to ensure that Market Makers do not offer an effective negative spread in PartnerEx. Rejected orders may be resent by the participants to the HybridBook as normal and dealt with according to their attached execution conditions.

## 6. Market Information

To support trading on its markets, ETS will provide a range of real-time market information to participants both directly via all of the market connectivity methods and via all major data vendors.

### 6.1. HybridBook Information

Information on orders and quotes in the HybridBook will be disseminated. Details will include:

- Aggregated quote and order volume at each price level, for the complete order book.
- The best bid and offer prices available in the HybridBook.
- Status information relating to securities (e.g. halt, suspend, auction, continuous trading).

### 6.2. PartnerEx Information

Whilst details of individual PartnerEx relationships are not publicly disseminated (although these are available for query to both Market Maker and OFP at all times), ETS will periodically disseminate an indicative Equiduct VBBO which represents the theoretical execution price of an order entering PartnerEx with the following conditions;

- The prices are calculated on the basis of a theoretical order of a specified size (i.e. both at Standard Market Size and at Retail Market Size, as defined above);
- They use the same volume weighted calculation using a "virtual" consolidated order book as used by PartnerEx itself;
- They do not incorporate any element of price improvement.

### 6.3. Trades

ETS will publish details of all trades which are concluded using exchange facilities (the HybridBook or PartnerEx) in real-time.

Each trade published to the market will contain details of the trade including date and time of trade, the security in question, the unit price and the traded volume. Each trade will also carry a trade type indicator which provides information on how the trade was generated on Equiduct Trading.

## 7. Clearing and Settlement

Equiduct Trading will define a default clearing and settlement location and cycle for supported securities<sup>9</sup>. For Europe's main markets, these clearing and settlement conditions will be inline with those available in the Home Market for the security. ETS will offer connectivity to LCH Clearnet SA, LCH.Clearnet Ltd and SIX X-Clear.

In addition to Europe's main clearing and settlement houses, Equiduct Trading expects to authorise a range of CSDs, ICSDs and global custodians across Europe, as an alternative settlement location for participants making use of PartnerEx.

Whilst the clearing & settlement conditions set by Equiduct Trading are mandatory for trades in the HybridBook, participants are free to agree alternate clearing & settlement arrangements in the PartnerEx function.

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<sup>9</sup> Since market segments are closely aligned to geography (for the purposes of aligning the trading day with a home market), it is likely that clearing and settlement conditions are also aligned to segments as a practical matter.

## 8. Glossary of terms

**ETS or European Trading System:** ETS is a proprietary trading system based on a highly scalable, fully-resilient distributed architecture with transparent failover, originally developed for Easdaq and upgraded subsequently for Nasdaq Europe, Nasdaq Deutschland, The Nasdaq Stock Market and Equiduct Trading.

**Home Market:** the most relevant market of a financial instrument in terms of liquidity as defined under MiFID and its Implementing Regulation.

**Equiduct Internaliser:** allows for PartnerEx relationships between a Market Maker and Order Flow Provider within the same bank or investment firm (see definition "PartnerEx"); trades executed using the PartnerEx or Equiduct Internaliser features are considered executed on a Regulated Market or Multilateral Trading Facility (depending on the Equiduct Trading market in which the financial instruments trade) for the purposes of MiFID.

**Market Segments:** Equiduct Trading will group securities according to geographical criteria, the trading system and cycle on their Home Market in separate "segments"; although all segments will trade according to the Market Model set forth in this document, segments may differ from each other with regard to trading schedules as well as the existence and behaviour of unscheduled intra-day auctions. As such Equiduct Trading expects to have a "UK segment", an "Amsterdam-Brussels-Lisbon-Paris segment" (for Euronext securities), a "German segment", a "Swiss segment", an "Italian segment" etc. Specific segments can be divided further in EU regulated markets and exchange regulated markets.

**Equiduct EBBO:** the consolidated reference value of a particular security which is calculated by tracking the best bid and offer (top of the book) for that security in a Pool of Reference Markets that contribute to the price formation process for that particular security; this reference value is used to price Pegged Orders and so ensure that SafeOrders entered into the HybridBook are not executed at a price which is worse than the best bid or offer on a Pool of Reference Markets; this reference value updates continuously as the best bid or offer change in one of the reference markets and is displayed continuously in the HybridBook until execution.

**Equiduct VBBO:** the consolidated volume weighted reference value of a particular security which is calculated by tracking the relevant depth of the book for a particular security in a Pool of Reference Markets and the Equiduct Trading market for that particular security (see Section 2.3); Equiduct VBBO is used as a reference price for all PartnerEx orders and is calculated at the time of the entry of the order into ETS on the basis of the size of the order; an indicative value of the Equiduct VBBO for a given size will also be calculated and displayed on ETS to provide a level of pre-trade transparency. The Equiduct VBBO represents the idealised price which an order of given volume would receive if optimally split and routed to multiple markets for immediate execution at the advertised price(s); as such it is by definition the Best Price available for given size across the pool of reference markets.

**Minimum Quotation Size (MQS):** The Minimum Quotation Size is set by Equiduct Trading and is used to determine the minimum quote size for Market Makers as well as input to the minimum size of the visible peak of an iceberg order. MQS for each security will be reviewed and published periodically by Equiduct Trading. This value will be allocated according to a share equivalent of a known value of security at the end of a review period. MQS values will be standardised to a set of MQS bands. MQS is not necessarily equal to the Standard Market Size (SMS) as defined by MiFID.

**PartnerEx:** a system of bilateral relationships between Market Makers and Order Flow Providers (potentially within the same bank or investment firm) under which the Market Maker agrees to

execute trades in one or more defined financial instruments, up to a certain size, at a price which is equal to Equiduct VBBO or better (to take account of price improvement), and in accordance with the agreed post-trade arrangements.

**Pool of Reference Markets:** all execution venues, be they regulated markets or multilateral trading facilities or non-EU exchanges, that contribute to the price formation process of a particular security traded on ETS i.e. that have a meaningful percentage of volume in overall trading of that particular security or that contributes in another manner to the price formation process.

**SafeOrder:** a specific case of a Pegged Order (with zero price offset) where the limit price tracks the Equiduct EBBO of a Pool of Reference Markets.