

# TURQUOISE (MTF) EQUITIES TRADING SERVICE DESCRIPTION

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Version 3.18

Updated 5 October 2015





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## 1.0 About Turquoise

Turquoise Global Holdings Limited<sup>1</sup> (TGHL or Turquoise) is an investment firm authorised and regulated by the Financial Conduct Authority of the United Kingdom. Initially founded by a consortium of nine investment banks, it is now majority owned by the London Stock Exchange Group (LSEG). In addition to LSEG, its shareholders now include twelve of the leading investment banks.

Turquoise was established to engender greater competition in the secondary trading of European equities, and offers a combination of innovative services, superior technology and competitive pricing.

Turquoise operates a Multilateral Trading Facility (MTF) with a discrete trading platform for cash equities. Members of Turquoise can access the equity platform providing they have the appropriate post-trade arrangements in place.

The Turquoise Equity platform offers the secondary trading of Pan-European and US equities, Exchange Traded Funds, Global Depository Receipts, American Depository Receipts, Exchange Traded Currency funds and Exchange Traded Commodity funds. Turquoise Equities comprises of the Turquoise Integrated Order Book and Turquoise Dark Midpoint Order Book, each covering approximately 4,200 securities (including 175 liquid US equities, ETFs, GDRs and ADRs) over 20 countries, including all major European markets, Czech, Hungary, Poland and the United States. Turquoise supports member-choice of central clearer under an interoperable CCP model.

The Turquoise trading platform is hosted in the data-centres of the LSEG and has interfaces common to other markets of LSEG, ensuring that customers accessing other LSEG markets can enjoy access to Turquoise with little incremental cost or effort.

Turquoise also operates as an investment firm which is used for the provision of **Turquoise Block Discovery™**.

Turquoise Participants benefit from fully risk-managed clearing solutions, and market surveillance to ensure fair and orderly operations.

Membership is uniformly open to qualified firms, with members today ranging from the largest global banks and brokers to institutions with local, regional and sector focus, and specialist trading and market-making firms. Sponsored Access and Direct Market Access are available to non-members.

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<sup>1</sup> © 2015. Turquoise is a trademark of Turquoise Global Holdings Limited.

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## 2.0 About this Document

The objective of this document is to provide an understanding of the most relevant technical, operational and business features of the Equities platform of Turquoise.

This document is not intended to be used as a Technical Specification for the development of any software application.

This document has been updated to reflect changes to the service being introduced as part of the scheduled upgrades to the Millennium Exchange platform.

Anyone already familiar with previous versions of the document is strongly encouraged to read this update.

For any feedback or queries about this document please contact [sales@tradeturquoise.com](mailto:sales@tradeturquoise.com).

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## 3.0 Change History

Date	Version	Changes
27/04/2012	3.4	<p>Updates to functionality of the Dark Midpoint Order Book</p> <p>Change in priority of resting orders from Time to Size/Time</p> <p>Change in Minimum Fill logic from MAQ to MES</p> <p>Addition of a Continuous-only execution instruction</p> <p>Updates to reflect the availability of Sponsored Access</p> <p>Update to reflect the availability of EMCF as an interoperable CCP in addition to ECCP, LCH and X-Clear</p>
11/06/2012	3.5	<p>Accommodates text that was previously contained in the Turquoise Rule Book</p>
22/10/2012	3.6	<p>Updated to reflect changes to Price Band Controls and new order parameters</p>
30/09/2013	3.7	<p>Updates reflecting new and existing Terms and Acronyms used (e.g. Security, Participants, Minimum Quantity, <b>Turquoise Uncross™</b> replacing Periodic Uncrossing terminology etc.)</p> <p>Updates reflecting new TIF 'GFA' and changes to GTD (for FIX)</p> <p><i>Updates reflecting new Call Market message for <b>Turquoise Uncross™</b>. (For Future Use Only – This is NOT available in Production, but is available in CDS for testing purposes)</i></p> <p>Updates reflecting enhancements to Iceberg Orders, where Participants can now elect to randomise their Iceberg peaks</p> <p>Updates reflecting Self Execution Prevention, Passive Only and Distance from BBO and option to change Order level default for Execution Instruction features</p> <p>Updates reflecting new Trade Liquidity Indicator</p> <p>Updates to include Trade Reporting Service</p>
24/10/2013	3.8	<p>Update to add Iceberg Randomisation parameters</p> <p>Updates reflecting GTT and <b>Turquoise Uncross™</b> Only behaviour</p>
13/02/2014	3.8.0.1	<p>Section 5.9 and 5.10 updated for trading US and Spanish Securities.</p> <p>Section 6.1 updated in respect to EuroCCP and EMCF merger.</p>
10/02/2014	3.8.1	<p>Updates reflecting new Call Market message for <b>Turquoise Uncross™</b> is now available in Production.</p> <p>Sections updated: 4.0 (Call Market, Order Submission Interval, GFA, GTT terms); 9.4 (TIFs – GFA, GTT, GTD); 9.7; 9.7.1; 9.7.1.1; 9.7.1.2; 10.3 and 16.5(iii).</p>
18/06/2014	3.8.2	<p>Section 4.0 – Updated Order Submission Interval definition. This will not be published via MITCH Symbol Directory Message.</p>

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Date	Version	Changes
22/07/2014	3.8.3	<p>Section 1.0 – Updated Introduction.</p> <p>Section 4.0 – Updated Definitions/Terms; added Good Till Date (GTD) definition.</p> <p>Section 5.4 – Added clarity to text for Lot Size.</p> <p>Removed TQ acronym, replacing with Turquoise; Removed TQ Dark and TQ Lit references; Removed ‘ – ’ from Primary-market.</p> <p>Updated terms Client &amp; User (where appropriate) to “Participant”.</p> <p>Deleted sections 9.7.1 which referred to Call Market being ‘disabled’.</p> <p>Updated Disclaimer (Back Page).</p>
26/08/2014	3.8.4	<p>Section 9.7.1 – Behaviour of Execution Instruction ‘<b>Turquoise Uncross™</b> only’, with TIF of ‘GFA’ updated for when submitted between a <b>Turquoise Uncross™</b> and Call Market.</p>
22/09/2014	3.8.5	<p>Section 8.4 – Updated WFMC.</p> <p>Section 11.3 – Updated Trade Liquidity Indicators.</p>
20/10/2014	3.9	<p>Published version includes <b>Turquoise Block Discovery™</b> features.</p>
24/10/2014	3.10	<p>Updated all references of ITCH to MITCH following rebrand</p> <p>Section 9.9 – Removed GFA reference from Self Execution Prevention section</p>
25/11/2014	3.11	<p>Removed references to Off-Book Trade Reporting</p>
19/12/2014	3.12	<p>Section 12.2 updated (minor update).</p>
16/01/2015	3.13	<p>Updated the following sections to reflect to upgrade of Millennium Exchange. Changes include:</p> <p>Section 4.0 / 9.7 – Added <b>Turquoise Uncross™</b> then Continuous Execution Instruction</p> <p>Section 10.3 – Updated to reflect change in behaviour for Amendment of Execution Instruction and <b>Turquoise Uncross™</b> Only orders with a TIF of GFA, which can now <u>not</u> be amended or cancelled</p> <p>Section 9.7.1 updated to reflect a change in behaviour <b>Turquoise Uncross™</b> Only orders with a TIF of GFA and <b>Turquoise Uncross™</b> Only orders with a TIF of GTD/GTT (which are received between a Call Market and <b>Turquoise Uncross™</b>). Added behaviour of <b>Turquoise Uncross™</b> then Continuous orders with a TIF of GFA</p> <p>Section 1.0, 4.0, 5.0, 5.3, 5.8.1, 5.10, 6.1, 7.3, 8.4, 9.4, 9.6, 9.7, 9.9 updated (minor comments / formatting), removal or sections originally referenced 7.2 and 7.3.</p>
19/01/2015	3.14	<p>Updated Sections 5.8 and 5.8.1 to reflect how LIS are set for non-MiFID instruments (using ESMA methodology where possible).</p>



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Date	Version	Changes
21/04/2015	3.15	Section 4.0 added <b>Turquoise Block Discovery™</b> term. Section 5.3 and 11.1 updated and Section 9.10 added to introduce optional Member Priority Matching within the Turquoise Dark Midpoint Order Book.
28/05/2015	3.16	Sections 1.0 and 5.0 updated Instrument count. Section 4.0 updated non-Persistent and Persistent terms. Section 5.3 & 9.6 updated to add reference to and contact details to change Minimum Quantity default. Section 5.9 updated to reflect how LIS are set for non-MiFID instruments (using ESMA methodology where possible). Section 11.1 updated to add clarity regarding Minimum Quantity (MES).
08/09/2015	3.17	Section 5.10 updated to reflect Spanish securities can now be cleared via LCH Clearnet Limited (in addition to EuroCCP.NV). Section 9.9 updated to add clarity SEP does not apply during <b>Turquoise Block Discovery™</b> events. Add clarity around post trade internalisation.
05/10/2015	3.18	Sections 1.0, 5.0 and 5.1 updated to reflect Polish securities can be traded in the Turquoise Lit Book. Section 5.6 updated to add Polish Zloty (PLN) to currency list. Section 5.11 added to reflect the choice of CCP for Polish Securities. Section 8.3 updated to include Max Order values for Polish Securities.

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## 4.0 Terms and Acronyms

Term	Meaning
<b>Call Market</b>	Symbol Status Message sent via market data feeds to notify Participants of an impending <b>Turquoise Uncross™</b> within the Dark Midpoint Order Book.
<b>Continuous and Turquoise Uncross™</b> (previously known as <i>Periodic Uncrossing</i> )	means the execution instruction selected by the Participant on Order entry whereby its Order is open to matching during Continuous Trading and any unexecuted volume will rest in the Dark Midpoint Order Book open to 'Continuous' matching and matching during the randomised ' <b>Turquoise Uncross™</b> ' events.
<b>Continuous Only</b>	means the execution instruction selected by the Participant on order entry whereby its Order will only be open to matching against contra-side Orders resting during the Continuous trading sessions.
<b>Dark Midpoint Order Book</b>	The Turquoise MTF Order Book containing only Dark Orders pegged to the PMP.
<b>Dark Order</b>	An Order that is not displayed to the market.
<b>Fill and Kill (FAK)</b>	also referred to as Immediate or Cancel (IOC).
<b>Fill or Kill (FOK)</b>	An Order that is executed immediately in its entirety or expired.
<b>General Clearing Member (GCM)</b>	A General Clearing Member is an entity that has been approved by the clearing house for clearing of principal transactions and Participant transactions on behalf of GCM clients.
<b>Good for Auction (GFA)</b>	GFA orders only take part in the <b>Turquoise Uncross™</b> . They are expired either after attempting to match during the <b>Turquoise Uncross™</b> it is scheduled to participate in or at the time of the scheduled <b>Turquoise Uncross™</b> if the <b>Turquoise Uncross™</b> fails to happen due to a WFMC failure for example.  Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> GFA Orders' behaviour around the Call Market.
<b>Good Till Date (GTD)</b>	An Order with Expiry Time will be treated as a Day Order, expiring at the time specified that day or the close of the normal trading day on the day on which it was entered.  Applicable on the FIX Trading interface only.  Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> GTD Orders' behaviour around the Call Market.
<b>Good Till Time (GTT)</b>	An Order with an expiry time which will rest passively until executed or until the expiry time (or end of trading day) has been reached.  TIF of GTT is used with expiry time in the Native trading interface, whilst TIF of GTD is used with expiry time in the FIX trading interface.  Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> GTT Orders' behaviour around the Call Market.

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Term	Meaning
<b>Iceberg Limit Order</b>	<p>means an Order where only a portion of the total Order quantity of an Iceberg Order is visible in the Order Book at any one time. Once the designated display quantity is filled, then the display quantity is automatically and immediately refreshed reducing the quantity held in reserve.</p> <p>The display quantity can either be refreshed as an explicit quantity or where enabled, Participants can elect to have their refreshed peak size randomised for their Order. On each peak refresh, the randomised iceberg peak will be 1 share plus between 100% and 120% of initial peak size.</p> <p>The total quantity of the Order is always reflected in the matching engine and eligible for execution. The display quantity must be submitted as an explicit quantity and not a percentage of the total quantity.</p>
<b>Immediate or Cancel (IOC)</b>	also referred to as FAK (Fill And Kill). An Order that is executed as far as possible immediately with any remaining part of the Order expired.
<b>Integrated Order Book</b>	means the Order Book containing only visible Orders and Dark Orders meeting the Large in Scale requirement.
<b>Large in Scale (LIS)</b>	means a size of Order as compared to the normal market size for the share or type of share in question and as determined by MiFID.
<b>Limit Order</b>	means an Order to buy or sell Securities at a price equal to or better than a Limit Price specified by the Participant.
<b>Limit Price</b>	is specified on a Limit Order by the Participant to buy or sell a Security at a price equal to or better than the Limit Price.
<b>MiFID</b>	means the European Parliament and Council Directive on markets in financial instruments (No. 2004/39/EC) and Commission Regulation (EC) 1287/2006 implementing Directive 2004/39/EC of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive and Commission Directive No. 2006/73/EC implementing Directive 2004/39/EC of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive.
<b>Minimum Acceptable Quantity (MAQ)</b>	Minimum Acceptable Quantity (multiple fill match) sent on an Order by Participants as a minimum quantity that is to be matched for any non-persistent Lit Order in Turquoise's Integrated Order Book.
<b>Market Order</b>	means an Order to buy or sell Securities at the price available in the Order Book, subject to the Price Control Band.
<b>Market Order execution Limit (MOEL)</b>	the price beyond which the balance of a Market Order will be cancelled rather than executed
<b>Minimum Execution Size (MES)</b>	Minimum Execution Size (single fill match) sent on an Order by Participants as a minimum quantity that is to be matched for any Dark Order in Turquoise's Dark Midpoint Order Book.
<b>Minimum Quantity</b>	means the Order's MAQ or MES that is to be matched as a minimum during 'Continuous' trading or matched during 'Turquoise Uncross <sup>TM</sup> ' events.
<b>Multi-lateral Trading Facility (MTF)</b>	as defined in article 4(1)(15) of MiFID.

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Term	Meaning
<b>Non-persistent Order</b>	An Order which may execute only against persistent Orders, but which will not itself rest on the Order Book. e.g. An Order with a TIF of IOC or FOK.
<b>Order</b>	means an MTF Order to buy or sell a Security specified by the Participant.
<b>Order Book</b>	Turquoise MTF provides trading facilities on 2 Order Books. These being: <ul style="list-style-type: none"> <li>• Integrated Order Book</li> <li>• Dark Midpoint Order Book</li> </ul>
<b>Order Submission Interval</b>	The Order Submission Interval is a period of time (after the Call Market has been sent), for Participants to send in their Orders to participate in the Turquoise Uncross™. The Order Submission Interval is set at 500ms (+/- 1ms) for all instruments.
<b>Order Type</b>	means the type of Order: Order Orders are received by Turquoise (MTF).
<b>Participant</b>	A Participant is a user who accesses Trading Services provided by Turquoise (MTF). A Participant may also be a Member of Turquoise (MTF).
<b>Persistent order</b>	An Order which will rest on the Order Book until execution, cancellation or expiry. e.g. An Order with a TIF of DAY, GTT/GTD or GFA.
<b>Price Control Band</b>	means the range of Prices within which aggressive Limit Orders will be accepted, and within which Market Orders will be executed.
<b>Primary market</b>	means the market on which Turquoise Management determines a Security has its primary listing.
<b>Primary market Best Bid and Offer (PBBO)</b>	the Primary market's Best Bid and Offer price for a Security.
<b>Primary market Closing Price</b>	is defined as being equal to the close price published by the Primary markets.
<b>Primary market Midpoint Price (PMP)</b>	is the Midpoint Price of the PBBO for a Security.
<b>Security</b>	means a Security eligible for trading on Turquoise. <i>A Security can also be referred to as an "Instrument".</i>
<b>Self Execution Prevention (SEP)</b>	This is optional functionality, which allows firms for most Order Types to prevent themselves matching against their own contra Orders, by either having their resting Order or incoming Order expired.
<b>Time in Force (TIF)</b>	defines how long an Order is valid for.
<b>Trade</b>	means an agreement between 2 counterparties to Buy/Sell shares in a Security at a specific Price.

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Term	Meaning
<b>Trade Liquidity Indicator</b>	identifies the trading session the Trade was executed in. i.e. <b>Turquoise Uncross™</b> or Continuous Trading.
<b>Turquoise Block Discovery™</b>	facilitates the trading of larger “Parent” or “Block” Orders by seeking and identifying block matching opportunities, between BIs (with a quantity above or equal to the MIS threshold) and BDNs. Where matches are identified, Participants are required to convert their BIs by submitting firm QBOs to the MTF, designated as eligible for existing <b>Turquoise Uncross™</b> events that already exist as part of the MTF Dark Midpoint Order Book to trade at the Midpoint of the PBBO. For further information, please see the <a href="#">Turquoise Block Discovery™ Trading Services Description</a> .
<b>Turquoise Dynamic Reference Price (TDRP)</b>	Prior to the first Trade of the day on Turquoise the TDRP will a Turquoise determined reference price (usually the closing price on the Primary market adjusted for corporate actions or other market activity). Thereafter, the TDRP will reflect the Turquoise Last Trade Price (TLTP).
<b>Turquoise Last Trade Price (TLTP)</b>	is the price of the last Trade on the Turquoise market. This is set by any Trade that occurs during the operation of the market. Prior to the first Trade of a trading day, the Last Trade Price is deemed to be undefined.
<b>Turquoise Static Reference Price (TSRP)</b>	Prior to the first Trade of the day on Turquoise the TSRP will be Turquoise determined reference price (usually the closing price on the Primary market, adjusted for corporate actions or other market activity). Thereafter, the TSRP will reflect the latest Primary market Auction uncrossing price.
<b>Turquoise Uncross™</b> <i>(previously known as Periodic Uncrossing)</i>	means the execution instruction selected by the Participant on Order entry whereby its Order will only be open to matching against contra-side Orders resting in the Dark Midpoint Order Book during the randomised <b>Turquoise Uncross™</b> events.
<b>Turquoise Uncross™ then Continuous</b>	means the execution instruction selected by the Participant on Order entry whereby its Order is not open to matching during continuous trading until it has participated in a <b>Turquoise Uncross™</b> event which has a valid PMP which has passed Turquoise’s WFMC. Any unexecuted volume will then rest in the Dark Midpoint Order Book open to ‘Continuous’ matching and matching during subsequent randomised ‘ <b>Turquoise Uncross™</b> ’ events.
<b>Visible Orders</b>	means displayed Orders contained in the Integrated Order Book.
<b>Volatility Band - Dynamic</b>	means the range of prices, as determined by Turquoise Market Operations, on each side of the TDRP by which the Price Control Band is established
<b>Volatility Band - Static</b>	means the range of prices, as determined by Turquoise Market Operations, on each side of the TSRP by which the Price Control Band is established
<b>Well Formed Market Checks (WFMC)</b>	are a series of checks performed to check the Primary market reference prices used within the Turquoise Dark Midpoint Order Book are well formed. For further information, please see section <a href="#">8.4</a> .

For Turquoise terms, as defined in the Turquoise Rulebook, please refer to <http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>.

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## 5.0 Market Structure, Products and Reference Data

Turquoise offers Pan-European and US trading in approximately 4,200 Securities and ETFs from the following Markets:

- Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States.

## 5.1 Turquoise Order Books

Turquoise operates two discrete Order Books:

- The Integrated Order Book – which is transparent on a pre-trade and post-trade basis
- The Dark Midpoint Order Book– which is transparent on a post-trade basis only

Most of the Securities are available for trading in both books, but US Securities, Czech, Hungarian, Poland and Luxembourg securities are available only in the Integrated Order Book.

## 5.2 Turquoise Integrated Order Book

The Integrated Order Book supports continuous trading and executes persistent Orders on a Price, Display type, Time priority basis.

The Integrated Order Book is transparent pre-trade and post-trade, and a full depth-of-book feed including all displayed persistent orders and all Trades are published to Participants and market data vendors.

Supported persistent Order types are Limit Orders (displayed), Iceberg Orders (partly displayed), LIS Hidden Orders (non-displayed). Supported non-persistent Order types, all of which are non-displayed, are IOC/FAK Orders, FOK Orders and Market Orders. Minimum Accepted Quantity (MAQ) is supported on non-persistent Order types only.

## 5.3 Turquoise Dark Midpoint Order Book

The Dark Midpoint Order Book is a 'Dark' Price-referencing Order Book:

- All Trades take place at a Security's Primary market Midpoint Price (PMP). When a well-formed PMP is not available (e.g. because a Security is in an auction phase on its Primary market, the PBBO is crossed/locked or because the Primary market fails the Well Formed Market Checks

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defined by Turquoise), no matching occurs. The Well Formed Market Checks are described in section [8.4](#).

- It executes persistent Orders on a Size, Time priority basis, and offers both Continuous and **Turquoise Uncross™** trading which helps achieve larger fill sizes. Optional Member Priority Matching\*\* is available upon request.

\*\* For further information on Member prioritisation and 'opting in', please see Section [9.10](#).

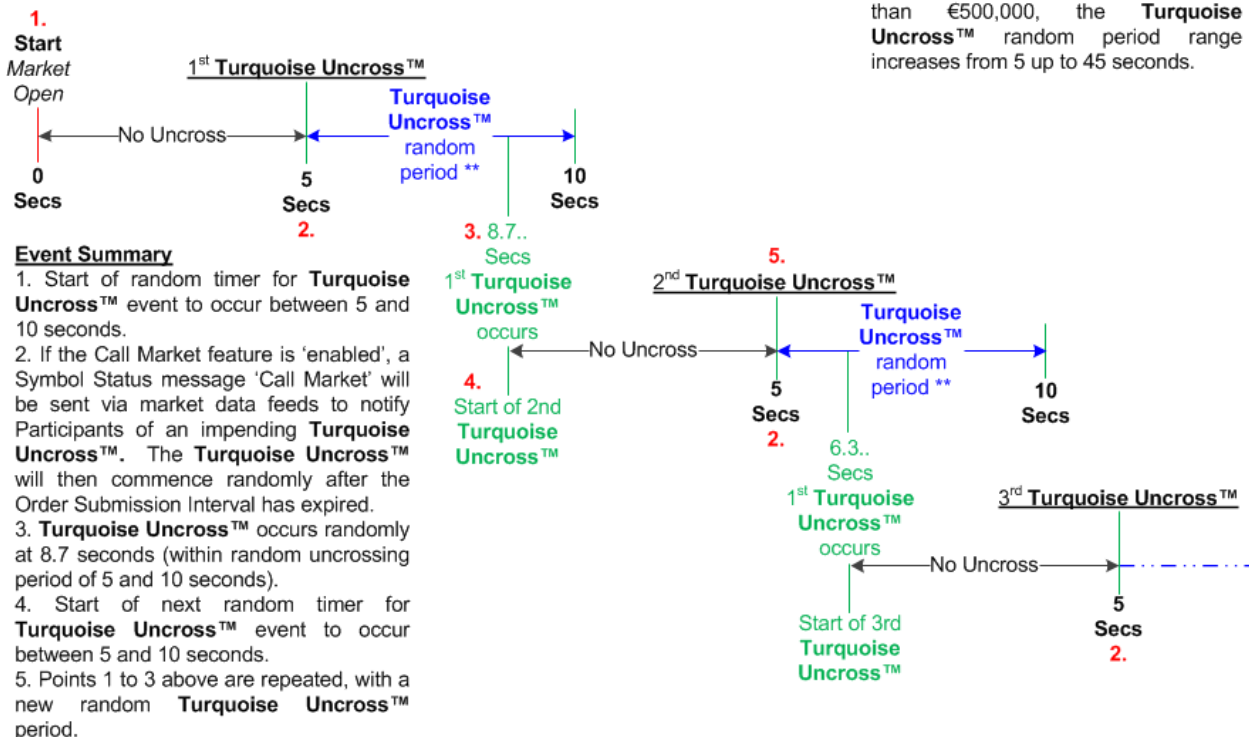
The Dark Midpoint Order Book is transparent post-trade but not pre-trade, and hence only trades are published. All Orders are non-displayed.

The Dark Midpoint Order Book will operate with two matching modes:

- Continuous – allowing the submission and matching of both persistent and non-persistent Order types
- Turquoise Uncross™** – allowing the submission and matching of persistent Order types only during **Turquoise Uncross™** events, which occur repeatedly intraday

Example: **Turquoise Uncross™** occurs randomly every 5-10 seconds for Sanofi (SANp)

\*\* Note: For less liquid securities which have an average daily turnover of less than €500,000, the **Turquoise Uncross™** random period range increases from 5 up to 45 seconds.



Persistent Orders can be designated to Trade in one or both of Continuous trading and in the **Turquoise Uncross™**, and by default will be eligible for both.

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Orders designated for **Turquoise Uncross**<sup>™</sup> Only will not interact with non-persistent (immediacy demanding) Orders. This provides Participants with discretion over whether to interact with immediacy demanding flow, or to constrain interaction to patient flow.

Non-persistent Orders are only accepted for Continuous trading.

Supported persistent Order types are Midpoint Pegged Orders (with or without a Peg Cap/Floor), Limit Orders (which are interpreted as Midpoint Peg Orders with a Peg Cap/Floor), and Market Orders (which are interpreted as Midpoint Peg Orders without a Peg Cap/Floor). Supported non-persistent Order types are IOC/FAK Orders and FOK Orders. For all Order types a Limit Price or Peg Cap/Floor determines an Order's eligibility to be matched at the prevailing PMP, and will not otherwise influence the execution price.

MES is supported on both persistent and non-persistent Order types. Participants can specify (per User) whether MES will apply to the first execution only (default for non-persistent Orders) or to persist for the lifetime of the Order (default for persistent Orders). For more details, please refer to [Section 9.6](#).

Please see section [9.7.1](#) for details of **Turquoise Uncross**<sup>™</sup> Orders' behaviour around the Call Market.

## 5.4 Lot Size

A lot size of one (1) is used for all the Securities in both Order Books.

## 5.5 Tick Sizes

The Turquoise Integrated Order Book typically follows the tick size structure as defined by the Primary market for the Security.

The Turquoise Dark Midpoint Order Book normally follows a tick structure that is half of the tick sizes defined by the Primary market for the Security.

Management of changes to tick size regimes at the Primary markets is handled by Turquoise Market Operations. Changes made by Market Operations are subsequently communicated to Participants.

Whilst Turquoise follows the tick size structure of the underlying Primary market, it retains the ability to amend tick sizes to a Turquoise-specific value as appropriate. These tick sizes are in line with other existing tick size tables and in common with the European initiative to implement a uniform tick size structure. Turquoise advises the specific tick size table via a daily reference file and on the Turquoise website. Turquoise endeavours to provide a reasonable period of notice prior to implementing any change.



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## 5.6 Currencies and Lines Traded

Trading is supported for the following currencies:

- GBX (for clarification, this acronym refers to GBP in pence), EUR, CHF, DKK, NOK, PLN, SEK, USD, CZK and HUF.

Turquoise only supports billing in GBP and EUR, not in local currencies.

## 5.7 Reference Data / Security Identification

All messages use the common symbology naming scheme; a string that consists of the Primary market symbol, plus an identifier for the Primary market e.g. "RDSA1" and "RDSAa". Additionally, Orders submitted via the FIX Trading gateway can use a combination of ISIN, Currency and Primary market MIC to specify the Security.

For further information on Reference Data see Turquoise Market Data specification document "[TQ501 – Guide to Reference Data Services](#)".

For further information on the FIX Trading Gateway refer to the specification document "[TQ201 – FIX 5.0 Trading Gateway](#)".

## 5.8 Large in Scale (LIS) Thresholds

For MiFID instruments, the European Securities and Markets Authority (ESMA) defines a LIS quantity threshold above which Limit Orders may be hidden in the Integrated Order Book.

### 5.8.1 Eligibility to qualify as LIS under MiFID MAR 5.7.10

"An Order shall be considered to be large in scale compared with **normal market size** if it is equal to or larger than the minimum size of Order specified in Table 2 in Annex II [of the *MiFID Regulation*]. For the purposes of determining whether an Order is large in scale compared to **normal market size**, all shares admitted to trading on a regulated market shall be classified in accordance with their average daily turnover, which shall be calculated in accordance with the procedure set out in Article 33 of the *MiFID Regulation*".

The European Securities and Markets Authority (ESMA) website maintains the reference values and FX rates used for determining the LIS criteria which are currently as follows:

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Class in terms of Average Daily Turnover	ADT < €500K	€500K < ADT < €1M	€1M ≤ ADT < €25M	€25M ≤ ADT < €50M	ADT ≥ €50M
Min Size of Order qualifying as LIS compared with normal market size	€50K	€100K	€250K	€400K	€500K

For non-MiFID instruments (including ETFs and US Securities), Turquoise establishes an ADT from alternative sources and sets the LIS value using the same bandings as for MiFID instruments.

## 5.9 US Securities

The following applies for US Securities

- Market hours for US Securities trading remain in line with the present Turquoise trading cycle.
- Trading is restricted to the Integrated Order Book (i.e. Participants are not allowed to submit to the Dark Midpoint Order Book).
- LIS – See [Section 5.8.1](#) as US securities are deemed non-MiFID instruments.
- Turquoise uses the previous day's US closing price as its opening price for US Securities
- EuroCCP.NV (formerly EMCF) clears all US Securities for Turquoise. Firms are required to have a settlement account with Euroclear Bank, either directly or indirectly via a GCM.

## 5.10 Spanish Securities

The following applies for Spanish Securities.

- EuroCCP.NV and LCH Clearnet Limited clear all Spanish Securities for Turquoise.

## 5.11 Polish Securities

The following applies for Polish Securities.

- EuroCCP.NV and LCH Clearnet Limited clear all Polish Securities for Turquoise.

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## 6.0 Membership and Sponsored Access

### 6.1 Eligibility for Membership

Applicants are eligible to apply to become Members of Turquoise provided they meet the following criteria:

- (i) The applicant must be an EEA regulated investment firm or credit institution (as defined under MiFID)  
Or
- (ii) The applicant must show that it is fit and proper and that it has a sufficient level of ability and experience in trading cash equities and has adequate risk management and other relevant system and controls; Where an applicant has already been admitted as a Participant by another regulated trading venue (RIE, MTF, etc) in the EEA, a simplified due diligence will take place.

The applicant will also have to complete conformance testing prior to conducting any business on Turquoise.

In addition, members must have clearing arrangements in place with a Central Counterparty connected to Turquoise, which include LCH Clearnet Limited, X-Clear and EuroCCP.NV, as either an independent clearing member of the central clearing party or by having an arrangement with a General Clearing Member (GCM).

### 6.2 Sponsored Access

Non-members may access Turquoise through the infrastructure of a member (Direct Market Access) or as a Sponsored Participant trading under the membership of a Sponsoring Member and subject to pre-trade risk controls developed by Turquoise.

Further information on Sponsored Access can be found on the Turquoise website at <http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library> under 'Sponsored Access'.

### 6.3 Nodes and Users

Trading Participants can organise their Turquoise activity into Nodes, Trader Groups and Users (Traders/Sessions). Nodes can be used by a Firm to align its marketplace activity along certain defined organisational units, or to achieve flexibility in clearing.

A Firm must have at least one Node, and each User must belong to a single Node.

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Each Node can have its own permissions with respect to Instrument Groups that can be traded, and its own clearing arrangements per Instrument Group. Permissions can also be set at a User level, should such degree of flexibility be required.

Further information on setting up Nodes is included in the Turquoise Technical Specifications found on the Turquoise website at <http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>.

## 6.4 Trading

Turquoise supports the following trading capacities modelled after the standard market implementation. These are merged to Agency and Principal (covering all Principal trading capacities) for all engaged CCPs:

- Principal
- Riskless Principal
- Agency
- CFD 'Give Up' – Please refer to the [Sponsored Access Service Description](#) for more details on use of this capacity.

A trading Participant is required to flag each Order with the relevant trading capacity. If this information is not included, the Order will be rejected by Turquoise.

## 6.5 Clearing and Settlement

It is necessary to specify Clearing Instructions (the Clearing Member and Account) for each Node and Instrument Group combination. Without appropriate clearing instructions, a User associated with a Node will not be permitted to submit Orders.

For the avoidance of doubt, membership with Turquoise as a Trading Member is entirely separate from clearing membership with the CCP, although a clearing and settlement relationship must exist for each and every Trading Member.

## 6.6 Fungibility

From a clearing perspective, Securities traded in Turquoise are fungible only with those that belong to the same line. Any cross-border clearing arrangements are to be arranged separately.

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## 6.7 Settlement Instructions

All Trades executed by Turquoise are settled according to the default settlement practices of the Primary Exchange of the line that is being traded.

Non-standard settlement instructions are not supported.

## 6.8 Choice of Sending Trades to Clearing

Trades that are executed with the same Member Firm on both sides are by default sent to the relevant CCP.

A Member can optionally sign up for the service of not passing self matched Trades to clearing.

This can be done on the basis of a group of Users within a Member. Where both sides of the Trade belong to a User within the specified group, with the same trading capacity, the Trade will not be sent to Clearing.

## 6.9 Risk Management and Exposure Monitoring

Trading Participants' exposure is monitored by the CCP or GCM.

Turquoise has a mechanism to suspend Order entry for a Trading Participant should this be required by any CCP, GCM or regulator, or required by Turquoise to preserve the orderliness of its marketplace.

## 6.10 Hosting and Network Connectivity

Turquoise Hosting is available at the London Stock Exchange Primary Data Centre. Details of the Hosting service and Network Connectivity options can be found on the London Stock Exchange website at

[www.londonstockexchange.com/products-and-services/connectivity/hosting](http://www.londonstockexchange.com/products-and-services/connectivity/hosting)

Please also refer to the Turquoise Guide to Connectivity found on the Turquoise website at

[http://www.lseg.com/sites/default/files/content/documents/TQ102\\_Connectivity\\_Guide.pdf](http://www.lseg.com/sites/default/files/content/documents/TQ102_Connectivity_Guide.pdf) Should a Firm only wish to connect to Turquoise but not connect to other LSEG Markets, then alternative arrangements can be made.

Please contact [connectivity@lseg.com](mailto:connectivity@lseg.com) for more information.

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## 7.0 Reference Prices

Turquoise relies on a number of reference prices to control market behaviour and determining execution prices. These reference prices are derived from external and Turquoise Best Bid and Offer prices, the previous day's Primary market Closing Price, Turquoise Last Traded Price etc.

### 7.1 Turquoise Last Trade Price (TLTP)

The TLTP is defined as the price of the last Trade on the Turquoise market. This is set by any trade that occurs during continuous trading. Prior to the first Trade of a trading day, the Last Trade Price is deemed to be undefined.

### 7.2 Turquoise Dynamic Reference Price (TDRP)

The Turquoise Dynamic Reference Price is a Turquoise determined reference price (usually the closing price on the Primary market, adjusted for corporate actions or other market activity) at start of day. During trading hours the TDRP will be updated to be the TLTP. Where there is no TLTP it remains unchanged. Turquoise Market Operations can override the TDRP if appropriate.

### 7.3 Turquoise Static Reference Price (TSRP)

The Turquoise Static Reference Price is a Turquoise determined reference price (usually the closing price on the Primary market, adjusted for corporate actions or other market activity) at start of Day. During trading hours the TSRP will be updated to be the last Auction-uncrossing price disseminated by the Primary market for the Security. Where there is no TLTP it remains unchanged. Turquoise Market Operations can override the TSRP if appropriate.

### 7.4 Primary market Best Bid and Offer (PBBO)

The PBBO is defined as the Best Bid and Offer prices as represented by visible Orders in the Primary market Order Book when that market is in Continuous Trading.

If there are no Orders in the relevant Primary market Order Book, or if the Primary market is not in continuous trading the PBBO is deemed to be undefined.

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## 7.5 Primary market Midpoint Price (PMP)

The PMP is defined as the average of the two PBBO prices. When the Primary market is locked/crossed the PMP is undefined.

The PMP can have values with half-tick increments where there are an odd number of ticks between the PBBO prices. When the PBBO is undefined the PMP is also deemed to be undefined.

## 7.6 Price Control Band

For each Security, Turquoise also defines two Volatility Band parameters, a Volatility Band - Static (applied to the Static Reference Price) and a Volatility Band – Dynamic (applied to the Dynamic Reference Price). Each Volatility Band is applied to the applicable Reference Price to generate a Price Control Band for the Security. The ceiling of the Price Control Band is the more conservative (lower) of the values generated by the Static and Dynamic calculations. The floor of the Price Control Band is the more conservative (higher) of the values generated by the Static and Dynamic calculations.

### Example of Calculations

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	Reference Price	Volatility Bands	Floor	Ceiling
Static	77.80	25%	58.35	97.25
Dynamic	93.00	5%	88.35	97.65
Price Control Band Floor			88.35	
Price Control Band Ceiling				97.25

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## 8.0 Price, Value and Market Checks

### 8.1 Price Control Band Validation for Limit Orders

Price Control Band Validation prevents Orders with an overly aggressive limit price from entering the Integrated Order Book and trading. This also helps to protect the trader from executing at an unexpected price due to a 'fat finger' error.

Limit Orders with a price to buy greater than the ceiling of the Price Control Band, and Limit Orders with a price to sell less than the floor of the Price Control Band, will be rejected.

### 8.2 Market Order Execution Limit (MOEL)

An 'Execution Limit' is applied to ensure that the Market Orders entering the Integrated Order Book do not execute beyond a certain price point.

If persistent Orders exist on the sell side, a Buy Market Order will only execute up to the ceiling of the Price Control Band, with the unexecuted balance of the Order being cancelled.

If persistent Orders exist on the buy side, a Sell Market Order will only execute down to the floor of the Price Control Band, with the unexecuted balance of the Order being cancelled.



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## 8.3 Maximum Order Value (for Market and Limit Orders)

A 'Maximum Order Value' will be specified by Turquoise to ensure that a trader does not commit to an excessively large execution erroneously. Orders in excess of the specified Maximum Order Value will be rejected.

CCY	Max Order Value (Local Currency)			Approx Max Order Value in Euro (€)	
	Integrated Book	Dark Book	Mid-Point	Integrated Book	Dark Mid-Point Book
CHF	25,000,000	60,000,000		20,000,000	49,000,000
CZK	200,000,000	500,000,000		8,000,000	20,000,000
DKK	150,000,000	400,000,000		20,000,000	54,000,000
EUR	20,000,000	50,000,000		20,000,000	50,000,000
GBX	2,000,000,000	5,000,000,000		23,000,000	58,000,000
HUF	2,000,000,000	5,000,000,000		6,000,000	16,000,000
NOK	150,000,000	400,000,000		19,000,000	52,000,000
PLN	75,000,000	200,000,000		18,000,000	47,000,000
SEK	200,000,000	500,000,000		22,000,000	56,000,000
USD	25,000,000	60,000,000		18,000,000	43,000,000

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## 8.4 Well Formed Market Checks

The Turquoise platform will carry out Well Formed Market Check (WFMC) validation upon receipt of PBBO updates and Primary market status updates to determine if the PMP is valid.

If the WFMC fails for a particular Security, the market for that Security is deemed not well formed, resulting in matches in the Dark Midpoint Order Book not being permitted.

The WFMC will fail if anyone of the following is true:

- The Market Feed for the Primary market data is flagged as 'stale'
- If the Primary market data is not available
- The Primary market symbol does not have a valid PBBO spread; i.e.
  - If either or both the Primary market Bid and/or Offer don't exist, or
  - Either or both the Primary market Bid and/or Offer is equal to 0
- The PBBO spread is greater than a defined Maximum Spread threshold or lesser than the Minimum Spread threshold for the specific Security as defined by Turquoise Operations

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## 9.0 Turquoise Order Types

This section defines the various types of Orders (including Market, Limit and Pegged) that are supported by Turquoise in terms of the key attributes that determines their behaviour and handling:

- Order Type
- Target Book
- Display Quantity
- Duration (Time in Force)
- Price
- Size (including Minimum Quantity)
- Execution Instruction
- Passive Only and Distance from BBO
- Self-Execution Prevention

### 9.1 Order Type

On Order entry a trader can specify the type of Order which is received by Turquoise (MTF).

- Order

### 9.2 Target Book

On Order entry a trader can specify the Target Book, indicating whether the Order should be routed to the Integrated Order Book, or the Dark Midpoint Order Book. This is mandatory for Orders submitted via the Native Gateway but is optional for Orders submitted via FIX.

If the Target Book is not specified, the Order will be routed as summarised below.

Where an Order Book is not explicitly specified, the following Orders will be routed to the Integrated Order Book:

- All visible Limit Orders (with Display Quantity > 0 or not specified);
- All Iceberg (partially visible) Limit Orders.
- All Dark Limit Orders that meet the MiFID Large in Scale (LIS) criteria and for which Minimum Quantity is not specified or is specified as 0.
- All IOC/FAK, FOK and Market Orders where Display Quantity <> 0;

Where an Order Book is not explicitly specified, the following Orders will be routed to the Dark Midpoint Order Book:

- All orders with a valid Midpoint Peg instruction
- All Limit or Peg Orders with Display Quantity = 0 (with the exception of above LIS Limit Orders with no minimum quantity);
- All IOC/FAK, FOK and Market Orders with Display Quantity = 0.

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## 9.3 Display Quantity

Orders can either be Displayed or Dark (also referred to as Hidden), qualified by Displayed Quantity (0=Dark). A Display Quantity greater than zero but less than the total Order Quantity implies an Iceberg Order.

Where a target Order Book is not explicitly specified, Display Quantity is one factor that determines the Order Book that Orders are routed to.

## 9.4 Duration (Time in Force)

Below is a list of the durations that Turquoise supports based on their maximum life expectancy in the Order Book (from shorter to longer).

<b>Fill or Kill (FOK)</b>	Must either be executed <i>immediately and in full</i> against one or more eligible (in price and size) persistent, opposite side Orders, or cancelled.
<b>IOC (Immediate or Cancel) / Fill and Kill (FAK)</b>	Will be executed <i>immediately, either partially or in full</i> against one or more eligible (in price) persistent, opposite side Orders, with any unexecuted balance immediately cancelled.
<b>Good for Auction (GFA)</b>	<p>GFA orders only take part in the <b>Turquoise Uncross™</b>. They are expired either after attempting to match during the <b>Turquoise Uncross™</b> they are scheduled to participate in or at the time of the scheduled <b>Turquoise Uncross™</b> if the <b>Turquoise Uncross™</b> fails to happen due to a WFMC failure for example.</p> <p>Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> GFA Orders' behaviour around the Call Market.</p>
<b>Good Till Time (GTT)</b>	<p>An Order with an Expiry Time which will rest passively until executed, or until the specified time or the close of the normal trading day on the day on which it was entered.</p> <p>Applicable on the Native Trading interface only.</p> <p>Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> GTT Orders' behaviour around the Call Market.</p>
<b>Good Till Date (GTD) + Expiry Time</b>	<p>A GTD Order with Expiry Time will be treated as a Day Order, expiring at the time specified that day or the close of the normal trading day on the day on which it was entered.</p> <p>Applicable on the FIX Trading interface only.</p> <p>Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> GTD Orders' behaviour around the Call Market.</p>
<b>Day</b>	The Order is valid until close of the normal trading day on the day on which it was entered. The close of the normal trading day is 16:30 UK Time 17:30 CET.

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## 9.5 Price

<b>Market</b>	<p>The Order does not have a specified price.</p> <p>All Market Orders are non-displayed (i.e. never pre-trade transparent), regardless of which Order Book they are routed to.</p> <p>In the Integrated Order Book, a Market Order will be executed according to the priority of contra-side Orders up/down to the MOEL. An incoming Market Order can potentially Trade through one or more price levels. Market Orders are non-persistent (unexecuted balances will be cancelled immediately).</p> <p>In the Dark Midpoint Order Book, a Market Order can be persistent or non-persistent, depending on the Order duration qualifier (Day, GFD, GTT, GTD (with expiry time) and GFA 'Time In Force' qualifiers will persist in the book, while IOC/FAK and FOK qualifiers will not). Market Orders are interpreted as Midpoint Pegged Orders without a Peg Cap.</p>
<b>Limit</b>	<p>The Order will be executed against any Order(s) in the opposite side of the book at a price that will never be worse than its Limit. Depending on the duration qualifier, a Limit Order can be persistent on non-persistent.</p> <p>Limit Prices must be set in whole ticks for all Orders.</p>
<b>Pegged</b>	<p>Turquoise only supports Pegged Orders that are pegged to the PMP, and these are routed to the Dark Order Book. Orders with other Peg instructions will be rejected. Pegged Orders may have a Limit Price (aka Peg Cap). Whilst the PMP is worse than the Limit Price, the Order will be excluded from matching.</p>

## 9.6 Size

<b>Dark LIS (Large In Scale)</b>	<p>An Order is Large in Scale (LIS) if it meets the requirements described in <a href="#">Section 5.8</a>.</p> <p>Orders that meet the LIS criteria can be Dark (Hidden) and accepted in the Integrated Order Book as persistent (passive) Limit Orders. Orders that meet the LIS criteria can also be routed to the Dark Midpoint Order Book by explicitly specifying the target book.</p> <p>The evaluation as to whether an Order qualifies as LIS will take place at the time the Order is submitted or its quantity or price is amended. A partial fill of an Order that is LIS will not change its qualification for being a Dark Order.</p>
<b>Dark Non-LIS</b>	<p>Dark persistent (passive) Orders that are smaller than LIS will only be accepted into the Dark Midpoint Order Book.</p>
<b>MAQ (Minimum Acceptable Quantity)</b>	<p>Turquoise supports MAQ on non-persistent Order types in the Integrated Order Book.</p> <p>An Order with MAQ will only be matched subject to, at minimum, fulfilling its MAQ. The match quantity may be formed by multiple fills.</p>

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<b>MES (Minimum Execution Size)</b>	<p>Turquoise supports MES on all Order types in the Dark Midpoint Order Book.</p> <p>Each individual fill will be equal to or greater than the specified MES.</p> <p>Participants can specify (per User) whether MES will apply to the first execution only (default for non-persistent Orders) or to persist for the lifetime of the Order (default for persistent Orders). To change your Minimum Quantity default a member firm should contact Turquoise Market Operations at London Stock Exchange:</p> <ul style="list-style-type: none"><li>• <a href="mailto:market.operations@tradeturquoise.com">market.operations@tradeturquoise.com</a></li><li>• +44 (0) 20 7382 7676</li></ul> <p>When a MES Order is partially filled, if the remaining quantity is below the MES initially set then the MES value is set to the remaining Order quantity.</p>
<b>Iceberg</b>	<p>Turquoise supports Iceberg Orders on the Integrated Order Book only.</p> <p>Iceberg Orders display only a portion of their total interest, with the remaining being hidden. The displayed quantity is replenished to its original size or a randomized value only when it is fully matched, at which point the time priority of the Order is re-set.</p> <p>Participants can elect to have their refreshed peak size randomised for their Order. On each peak refresh, the randomised iceberg peak will be 1 share plus between 100% and 120% of initial peak size.</p> <p>The display quantity is always defined as an explicit quantity.</p> <p>If the remaining quantity is less than the original display quantity, the new display quantity will be set to the remaining quantity.</p>

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## 9.7 Execution Instruction

This attribute is relevant to the Dark Midpoint Order Book only. The Execution Instruction of an Order should be selected on Order entry from one of the options below:

Execution Instruction	Description
<b>Turquoise Uncross™ Only</b>	<p>Persistent Orders can be submitted at any time during Normal Trading but will only be open to matching against contra-side persistent Orders in the Order Book during the randomised <b>Turquoise Uncross™</b> events.</p> <p>Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> Orders' behaviour around the Call Market.</p>
<b>Turquoise Uncross™ then Continuous</b>	<p>Orders submitted are not open to matching during continuous Trading until it has participated in a <b>Turquoise Uncross™</b> event which has a valid PMP which has passed Turquoise's WFMC. Any unexecuted volume will then rest in the Dark Midpoint Order Book open to 'Continuous' matching and matching during subsequent randomised '<b>Turquoise Uncross™</b>' events.</p> <p>Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> Orders' behaviour around the Call Market.</p>
<b>Continuous and Turquoise Uncross™ (default if omitted)*</b>	<p>Orders submitted will be open to immediate execution against contra persistent Orders during Normal Trading and any unexecuted volume and will rest on the Order Book, open to Continuous matching and matching during the randomised <b>Turquoise Uncross™</b> events.</p> <p>Please see section <a href="#">9.7.1</a> for details of <b>Turquoise Uncross™</b> Orders' behaviour around the Call Market.</p>
<b>Continuous Only</b>	<p>Orders submitted as Continuous only will only execute during Continuous trading and will not match during randomised <b>Turquoise Uncross™</b> events.</p>

The Execution Instruction attribute is only applicable to Day, GFA, GTT and GTD Orders. FOK and IOC Orders will only ever execute against Orders resting on the Order Book (persistent Orders) during Continuous trading (i.e. persistent Orders with Execution Instructions set to 'Continuous and **Turquoise Uncross™**' or '**Turquoise Uncross™** then Continuous' after the Order has participated in a **Turquoise Uncross™** event.

\* Member Firms can elect on a per user basis to change the default Execution Instruction applied to their Order when omitted to either **Turquoise Uncross™** Only or Continuous Only. To change your Execution Instruction default a member firm should contact Turquoise Market Operations at London Stock Exchange:

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- [market.operations@tradeturquoise.com](mailto:market.operations@tradeturquoise.com)
- +44 (0) 20 7382 7676

## 9.7.1. Behaviour of an Orders TIF and Execution Instruction around the Call Market

A Call Market is sent by Turquoise in the Dark Midpoint Order Book, to indicate to Participants that there is an impending **Turquoise Uncross™** in the Dark Midpoint Order Book. Orders with the following Execution Instructions and TIF behave differently if submitted after a **Turquoise Uncross™** but before the next Call Market and when submitted after a Call Market and before the next **Turquoise Uncross™**:

Order Details (Combination of TIF and Execution Instructions)	Behaviour if the Order is submitted between a Turquoise Uncross™ and the next Call Market	Behaviour if the Order is submitted between a Call Market and its Turquoise Uncross™
GFA – Continuous and <b>Turquoise Uncross™</b>	<p>Acts as an IOC Order in Continuous trading with any remainder expired.</p> <p>Orders are not amendable and cannot be cancelled.</p>	<p>The Order will not participate during Continuous trading and will wait to take part in the next <b>Turquoise Uncross™</b>.</p> <p>Any remainder will be expired after the <b>Turquoise Uncross™</b>.</p> <p>Orders are not amendable and cannot be cancelled.</p>
GFA – <b>Turquoise Uncross™</b> Only	<p>The Order will be immediately expired.</p> <p>Orders are not amendable and cannot be cancelled.</p>	<p>The Order will take part in the next <b>Turquoise Uncross™</b>.</p> <p>Any remainder will be expired after the <b>Turquoise Uncross™</b>.</p> <p>Orders are not amendable and cannot be cancelled.</p>
GFA – <b>Turquoise Uncross™</b> then Continuous	<p>The Order will not participate during Continuous trading and will wait to take part in the next <b>Turquoise Uncross™</b>.</p> <p>Any remainder will be expired after the <b>Turquoise Uncross™</b>.</p> <p>Orders are amendable and can be cancelled.</p>	
GTT or GTD + Expiry Time – <b>Turquoise Uncross™</b> Only	<p>The Order will take part in the next <b>Turquoise Uncross™</b>.</p> <p>If the Order's expiry time elapses before participation in any <b>Turquoise Uncross™</b> it will be expired <b>immediately</b>.</p> <p><b>Any remainder will persist, participating</b> in subsequent <b>Turquoise Uncross™</b> events until the Order's expiry time is reached.</p> <p>Orders are amendable and can be cancelled.</p>	



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## 9.8 Passive-Only and Distance from BBO

This attribute is relevant to the Lit Order Book only.

During Continuous Trading Participants are able to specify a visible price point below which they would not like the instruction to add the Order to be completed. Available options are:

Value	Description
0 or Null	No constraint. The Order will <u>not</u> be treated as Passive-Only.
99	Balance of Order will be expired rather than execute against a displayed Limit Order.
100	Balance of Order will be expired rather than execute against a displayed Limit Order, and Order will only be posted on the Order Book if it sets a new BBO
1	Balance of Order will be expired rather than execute against a displayed Limit Order, and Order will only be posted on the Order Book if it sets a new BBO or joins the existing BBO
2	Balance of Order will be expired rather than execute against a displayed Limit Order, and Order will only be posted on the Order Book if it sets a new BBO, joins the existing BBO, or joins/sets the next visible price point behind the BBO
3	Balance of Order will be expired rather than execute against a displayed Limit Order, and Order will only be posted on the Order Book if it sets a new BBO, joins the existing BBO, or joins/sets one of the next two visible price points behind the BBO

On submission of a Passive Only Order, it will match with any contra Hidden Order at a price better than the visible Turquoise BBO. If the quantity remaining would have otherwise matched with a visible Order, the remainder will be expired. If the remainder can rest on the Order Book it will follow the instruction laid down above. Where the instruction above can not be followed the remainder of the Order will be expired.

Where the Passive Order indicator is selected for a Hidden Order, only the adding as a new Turquoise BBO may be selected otherwise the Order will be rejected on submission.

Passive Only Order indicators are ignored on Market Orders.

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## 9.9 Self Execution Prevention (Optional)

Member firms that wish to avoid self-execution can register one or more of their own Native UserIDs or FIX CompIDs as a single Self Execution Prevention ("SEP") group. Where 2 Orders from the same SEP group would otherwise execute against each other, one of the Orders will instead be expired:

- Cancel Incoming Order (CIO), leaves the resting Order intact; or
- Cancel Resting Order (CRO), allows the incoming Order to execute / rest.

Member firms can either opt for all its Native UserIDs / FIX CompIDs in a SEP group to have the same standing instruction or alternatively can specify an individual instruction for each constituent of the SEP group, in which case the standing instruction attached to the aggressing (non-resting) constituent will be applied.

A SEP group can only consist of a single member firm's Native UserIDs / FIX CompIDs. Each individual Native UserIDs / FIX CompIDs can only be applied to a single SEP group. An individual member firm may have more than one SEP group.

SEP can be applied to all supported Order types. SEP will only prevent executions during Continuous Trading. It does not function during **Turquoise Uncross™** events (or during **Turquoise Block Discovery™** events) or for any of the following Time in Forces: FOK. Post trade internalisation is still available where SEP does not function.

SEP can be used in tandem with Sponsored Access functionality. Maximum Gross Consideration validation will be applied prior to SEP, whilst the Current Gross Consideration will exclude anything captured by SEP.

To opt into Self Execution Prevention a member firm should contact the Technical Account Management team at London Stock Exchange:

- [londontam@lseg.com](mailto:londontam@lseg.com)
- +44 (0)20 7797 3939

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## 9.10 Member Priority Matching within Dark Midpoint Order Book (Optional)

Member Firms that wish to increase the probability of matching with themselves within Turquoise's Dark Midpoint Order Book are now able to do so by registering their firm for Member Priority Matching. Should a Member Firm 'opt in' to Member Priority Matching, this functionality will apply to all of its Native UserIDs and FIX ComplIDs once enabled.

Once enabled, aggressive Orders submitted by Member Firms that have 'opted in' to Member Priority Matching in Continuous Trading in the Turquoise Dark Midpoint Order Book, will first attempt to match against their Member Firm's own Orders before attempting to match any remaining quantity with Orders from other Firms on a Size/Time priority basis. Self Execution Prevention will remain enforced where the two users of the Member Firm are part of the same Self Execution Prevention group.

During Continuous trading where Orders on both sides of the Dark Midpoint Order Book are passively resting when matching occurs due to a change in the PMP or a relevant change to the WFMC, or during **Turquoise Uncross™** events, the following matching logic applies:

1. The largest order on the BUY side of the Dark Midpoint Order Book is always selected first for matching.
  - a. If the Member that has input the largest order on the BUY side of the order book has 'opted in' to Member Priority Matching, the matching engine first looks to match against SELL orders from that Member on a Size / Time priority basis. If there is any remaining quantity unexecuted from this BUY order, the matching engine will attempt to complete the order by matching against any remaining SELL orders on a Size / Time priority basis.
  - b. If the Member that has input the largest order on the BUY side of the order book has not 'opted in' to Member Priority Matching, the matching engine looks to match against SELL orders on a Size / Time priority basis, irrespective of which Members have submitted these orders.
2. Once the largest order on the BUY side has been completely assessed for matching with corresponding SELL orders, the matching engine will select the next largest BUY order and repeat the process outlined in 1a or 1b as appropriate.

When a Member Firm opts in, should the firm also be permissioned for **Turquoise Block Discovery™**, Member Priority Matching will equally apply to **Turquoise Block Discovery™** events in the same way it does for **Turquoise Uncross™** events. For more details on Member Priority Matching within **Turquoise Block Discovery™**, see Section 9.8 of the [Turquoise Block Discovery™ Trading Service Description](#).

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To 'opt in' to Member Priority Matching a member firm should contact the Technical Account Management team:

- [londontam@lseg.com](mailto:londontam@lseg.com)
- +44 (0)20 7797 3939

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## 10.0 Trading at Turquoise

### 10.1 Trading Calendar

Turquoise typically observes the domestic market practice for open business days. Therefore, where the Primary market of a Security is closed on a business day, Turquoise will also be closed for that Market (for example, OMX Oslo is closed on the 24<sup>th</sup> December so Turquoise is also closed for the Norwegian Market). This applies to Turquoise Trading services.

Where there is cause for doubt a Market Notice is sent out to Participants for clarification. The up-to-date Turquoise Trading Calendar can also found on the [Turquoise website](#).

### 10.2 Trading Sessions and Support

Each of the trading days within Turquoise is divided into the sessions shown in the following table and diagram.

#### **Daily Trading Schedule**

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Time	Session Name	Order Book Type	Summary
04:31 – 07:59:59	System Start-up	Integrated, Midpoint	System connectivity allowed. No Order entry allowed.
08:00-16:30	Normal Trading	Integrated, Midpoint	Order Entry allowed for all Securities. All Order constraints enforced. Price and Value Checks enforced. Price Band Validation and Execution Limit Enforced. Continuous Matching in the Integrated Order Book. Continuous and random <b>Turquoise Uncross™</b> matching in the Dark Midpoint Order Book.
Ad-Hoc	Trading Halt	Integrated, Midpoint	No Matching allowed. No Order Entry allowed. Cancellation of Orders is permitted but amendments are not.
16:30	Close	Integrated, Midpoint	No Order management. Persistent Orders are cancelled. No matching.
17:00	End Of Day	Integrated, Midpoint	Capture of Closing Price. End Of Day Syncing with all CCPs.

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Time	Session Name	Order Book Type	Summary
17:05	System shutdown Start of end-of-day processes	Integrated, Midpoint	No access for market Participants. The Closing Price will be calculated.

## **Support Schedule**

Market Operations

Hours: 7:15 – 17:15

Number: +44 (0)20 7382 7676

Email: [market.operations@tradeturquoise.com](mailto:market.operations@tradeturquoise.com)

Technical Account Management

Hours: 7:30 – 18:00

Number: +44 (0)20 7797 3939

Email: [londontam@lseg.com](mailto:londontam@lseg.com)

Client Support Team

Hours: 7:00 – 18:00

Number: +44 (0)20 7797 3939

Email: [support@lseg.com](mailto:support@lseg.com)

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## 10.3 Order Amendment and Cancellation during Trading Sessions

Amendments to Orders are allowed at any time that the system accepts Orders.

Not all fields are amendable by Participants, and some amendments may cause the time priority of an Order to be re-set. As a general rule, if the amendment makes the Order more executable the time priority will not be re-set.

For example, reducing the Quantity of an Order in the Integrated Order Book will not re-set the time priority.

Below is a summary of the main Order attributes and their amendment capabilities.

Book	Buy/Sell	Target Book	Symbol	(Price) Type	Price	Qty		Displayed Qty		MinQty MAQ/MES		Valid Till	Exec Inst	Client Ref
						+	-	+	-	+	-			
Integrated	×	×	×	↓	↓	↓	✓	✓	✓	n/a	n/a	✓	n/a	✓
Midpoint *	×	×	×	↓	↓	↑	↓	n/a	n/a	↓	↓	✓	↓	✓

✓ Change allowed without affecting Time (Integrated) or Size/Time (Dark) priority

↑ Change allowed, increases priority based on amended Order quantity (Dark only)

↓ Change allowed, affecting Time priority (Integrated) or Size/Time priority (Dark – where Orders are of the same Size)

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\* Orders which have a TIF of GFA with an Execution Instruction of “Continuous and **Turquoise Uncross™**” or “**Turquoise Uncross™** Only” are not amendable and cannot be cancelled. Any unfilled Quantity will automatically expire at the end of the **Turquoise Uncross™** for which the Order was intended to participate (or will act as an IOC ‘match and expire if not fully filled’ in Continuous Trading if submitted between a **Turquoise Uncross™** and Call Market message).

With the exception of the above scenario, Order Cancellations by Participants can be made at any time, including during Trade Halts.

Additionally, Orders are cancelled by the system in the following circumstances:

- An Order has reached its expiration as set by the Participant.
- At market close (including Day and GTD/GTT with Time Expiry Order), specific to the Primary market.
- A Participant disconnects from the trading gateway, if the Cancel-on-Disconnect feature is specified by the Participant or is mandatory as part of the interface being used.
- Eligible Orders may execute partially up to the MOEL, with the remainder of the Order being cancelled.
- Turquoise Market Operations (MOPS) may in certain circumstances, including if requested by a Participant, intervene and cancel an Order.

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- If a user enters a Mass Cancellation, all Orders within the same Trader Group are cancelled from a single FIX session (FIX specific).

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## 11.0 Normal Trading

### 11.1 Execution Priority

The system determines execution priority based on the following hierarchy.

#### Integrated Order Book:

- i) Price: Orders that are priced more aggressively have priority
- ii) Visibility: Within a price point, Visible quantities of all Orders, will have priority over Hidden quantities. Hidden quantities of Iceberg Orders have priority over Hidden LIS order quantities
- iii) Time: Within a price point and visibility category, earlier time priority has preference.

Time priority is assigned:

- when an Order is received during Normal Trading
- when an Order is modified (only for certain modification types)
- when an Iceberg Order's Visible display size is replenished after depletion.

Size constraints (MAQ): Applies only to Orders with IOC, FOK time qualifiers and Market Orders with MAQ specified.

#### Dark Midpoint Order Book:

Orders with larger sizes will be given higher priority than Orders of smaller sizes. Partial filling of an Order will not result in an Order losing its priority.

Where two Orders share the same Size priority, Time priority will then apply. Time priority is assigned at the point of Order entry and may be updated when the Order is modified (only for certain modification types).

If the Limit Price precludes an Order matching at the prevailing PMP, the Limit Order will retain its queue priority, but will be prevented from matching whilst the prevailing PMP is beyond the specified Limit.

For Firms that opt into Member Priority Matching, upon aggression or once their Order has been selected for matching within the Turquoise Dark Midpoint Order Book, an attempt to match against their own Orders first will be made, before attempting to match any remaining quantity with Orders from other Firms on a Size/Time priority basis. See [Section 9.10](#) for details of Member Priority Matching, during Continuous Trading, **Turquoise Uncross™** events and **Turquoise Block Discovery™**.

Size constraints (MES): Applies to all Orders with Minimum Quantity specified.



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## 11.2 Price Differential

The Price Differential is an indicator that advises Participants where their Order entered Turquoise's Integrated Order Book and at which price point it joined (subject to the Order not aggressing the Order Book).

Value	Description
A	Aggressive (an Order (visible or hidden/dark) which executes immediately; any residual if visible is then stamped based on its deviation from the current BBO or P if hidden/dark)
B	New visible BBO
1	Join visible BBO
2	Joining/setting 2 <sup>nd</sup> best visible price
3	Joining/setting 3 <sup>rd</sup> best visible price
4	Joining/setting 4 <sup>th</sup> best visible price
5	Joining/setting 5 <sup>th</sup> best visible price
6	Joining/setting 6 <sup>th</sup> best visible price
7	Joining/setting 7 <sup>th</sup> best visible price
8	Joining/setting 8 <sup>th</sup> best visible price
9	Joining/setting 9 <sup>th</sup> best visible price or joining/ setting worse price point
P	Passive (a Hidden >LIS or Dark Order that rests i.e. do not execute. This is not valid for visible Orders)

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## 11.3 Trade Liquidity Indication

The Trade Liquidity Indicator advises Participants how their Order impacted liquidity on Turquoise's Integrated and Dark Midpoint Order Books.

Value	Description
A	Added Liquidity – An Order which upon receipt rests passively adding liquidity
R	Removed Liquidity – An Order which upon receipt aggressively executes against a passive Order, therefore removing liquidity
C	<b>Turquoise Uncross™</b> Execution – An Order which executes during a <b>Turquoise Uncross™</b> event
S	Block Discovery Execution - <b>Turquoise Uncross™</b> - An Order which executes during a <b>Turquoise Uncross™</b> event, which has a valid Client Order Link ID linking it back to an Order Submission Request from <b>Turquoise Block Discovery™</b> .
T	Block Discovery Execution – Continuous Trading - An Order which was received after a <b>Turquoise Uncross™</b> event, but before a Call Market, which has a valid Client Order Link ID linking it back to an Order Submission Request from <b>Turquoise Block Discovery™</b> . As the Order was late for the <b>Turquoise Uncross™</b> , it was treated as an IOC removing any available liquidity during Continuous Trading.

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## 12.0 Trading Halts

Trading Halts are controlled by Turquoise Market Operations. A Trading Halt may be followed by resumption of the Normal Trading session if the market is not closed before Market Operations deems a Security tradable.

### 12.1 Within Turquoise

In response to information within Turquoise, Market Operations can halt Securities immediately via an ad-hoc change to a Securities Trading Status.

### 12.2 Within Primary markets

Turquoise will ascertain from a Primary market's feed or a regulatory request whether a Trading Suspension/Halt was based on regulatory reasons, a volatility break or a technical fault and may halt a security if it considers there may be a dis-orderly market.

### 12.3 Impact of a Trading Halt

If a Trading Halt is enforced by Turquoise Market Operations, the trading on the Integrated Order Book, Dark Midpoint Order Book for the Security halted will be affected as follows:

- Existing Orders will remain in the Order Book.
- New Orders will be rejected, with appropriate error message.
- Participants will be able to cancel their Orders, but no Order amendment will be permitted.
- No matching will occur (updates to the PMP affecting the set of Orders available for matching in the Dark Midpoint Order Book will not result in any matches).

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## 13.0 Test Securities

### 13.1 Within Production

Turquoise offers Pan-European and US test Securities for testing of Turquoise functionality. These Test Securities:

- Cover all the tradable currencies at Turquoise.
- Cover full functionality offered by Turquoise.
- Market Operations may arbitrarily suspend the Test Securities from time to time for the purpose of system stability and performance.
- Test Securities are not passed to clearing and are not included in Trade Statistics or sent to Surveillance.

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## 14.0 Trading Tariff Model

Turquoise uses a Passive/Aggressive (Maker/Taker) tariff model for its Integrated Order Book, a flat tariff model for its Dark Midpoint Order Book. Pricing promotions including volume discounts are sometimes offered.

All tariff information is publically available. Please refer to the Tariff Schedule document located on the Turquoise website for up-to-date information: [www.tradeturquoise.com/tq\\_tariff\\_download](http://www.tradeturquoise.com/tq_tariff_download)

## 14.1 Categorisation of Trades

### Dark Midpoint Order Book

All Trades on the Dark Midpoint Order Book are considered as Hidden for the purposes of billing.

### Integrated Order Book

Executed orders will be categorised as Passive or Aggressive.

- Orders that 'rest' on the book prior to execution are Passive
- Orders (or portions of Orders) that execute without resting are Aggressive.

Executed Orders will additionally be categorised as Displayed or Hidden.

- Executed visible Passive Orders (including the visible portion of iceberg orders) disseminated in market data before execution are Displayed.
- LIS Hidden Orders and the non-displayed portion of iceberg Orders are Hidden
- Non-persistent Orders and LIS Hidden will be designated as Hidden

Note: Only the Passive Order will receive this categorisation. The Aggressive Order will always be "Not Specified".

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## 14.2 Types of Trade for Billing

Turquoise currently charges differently for the following categories:

- Dark – including Midpoint Order Book executions and Hidden Passive executions on the Integrated Book
- Passive – Displayed Passive executions on the Integrated Book
- Aggressive – all Aggressive executions on the Integrated Book

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## 15.0 Interfaces and Information Dissemination

Turquoise provides gateways to enter Orders into the trading system, receive market data, download own Order and Trade information.

### 15.1 Native Trading Gateway

The Native trading gateway provides a low latency trading interface which allows Participants to send and manage Orders on the trading system. The interface enables Participants to perform the following activities:

- i) Submit an Order
- ii) Cancel an Order
- iii) Mass Cancel Orders
- iv) Cancel/Replace an Order

The Native Trading Gateway uses a proprietary interface referred to as the Native interface. The Native interface consists of two channels. A Real-Time channel that provides the main Order management functionality and a Recovery channel that allows Participants to subscribe to missed messages due to a disconnection from the Real-Time channel.

### 15.2 FIX Trading Gateway

The FIX trading gateway allows Participants to send and manage Orders on the trading system. The interface enables Participants to perform the activities outlined below.

- i) Submit an Order
- ii) Cancel an Order
- iii) Mass Cancel Orders
- iv) Cancel/Replace an Order

### 15.3 FIX Drop Copy Gateway

Turquoise provides a gateway to receive additional copies of Execution Reports generated by the trading system. This gateway may also be used by Participants to download the current status of all their active Orders in the event of a failure. The drop copy service cannot be used to submit Orders or receive market data. The Drop Copy Gateway uses the FIX 5.0 SP2 protocol.

### 15.4 FIX Post Trade Gateway

Turquoise provides a FIX Post Trade Gateway that permits Participants to perform the activities outlined below:

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- i) Receive real-time updates on executed Trades
- ii) Receive information on executed Trades via a query-based service to facilitate a recovery after a failure.

The entry of Orders (or Quotes) is not supported by the Post Trade Gateway. The Post Trade Gateway uses the FIX 5.0 SP2 protocol.

## 15.5 Market Data Gateway

The Market Data gateway provides a stream of fixed width binary messages which provides the following real-time information:

- i) Order depth for the entire Integrated Order Book.
- ii) Price and volume for each executed on-book Trade for both the Integrated Order Book and Dark Midpoint Order Book.
- iii) All Market message to notify Participants of a **Turquoise Uncross™** event in the Dark Midpoint Order Book.
- iv) Trading status of each Security

The feed also includes a daily download of the Security list of Turquoise (Symbol Directory). The Market Data gateway uses a proprietary interface based on the MITCH protocol via UDP multicast.



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## 15.6 Detailed information regarding interfacing and information dissemination

For further information regarding interfacing with Turquoise please refer to the following documentation which can be found on the Turquoise website at the [Document Library](#):

- TQ102 – Turquoise Equities Connectivity Guide
- TQ201 – Trading Gateway (FIX 5.0)
- TQ202 – Post Trade Gateway (FIX 5.0)
- TQ203 – Drop Copy Gateway (FIX 5.0)
- TQ301 – Trading Gateway (Native)
- TQ401 – Level 2 MITCH Market Data
- TQ501 – Guide to Reference Data Services
- TQ601 – Guide to Certification

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**Turquoise Global Holdings Limited is an authorised investment firm by the Financial Conduct Authority.**

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## Contact Details

Turquoise Global Holdings Limited  
10 Paternoster square, London EC4M 7LS  
E:sales@tradeturquoise.com  
T: +44 20 7382 7600

