



Nasdaq Dubai Derivatives Trading Manual

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For more
information

Nasdaq Dubai Ltd
Level 8 The Exchange (GV 11),
DIFC PO Box 53536 Dubai UAE
+971 4 305 5455

Concerned department:
Market Operations
For Trading related inquiries:
trading@nasdaqdubai.com
+971 4 305 5472/74/39

For clearing related queries:
clearing@nasdaqdubai.com
+971 4 305 5133 / 35/ 39

nasdaqdubai.com

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1. INTRODUCTION

This Nasdaq Dubai Trading Manual describes the model of trading Derivatives Contracts on Nasdaq Dubai and the functionality of the Derivatives trading platform. It addresses various Order types and the available execution conditions, the price determination rules for trading and the various trading phases on Nasdaq Dubai. It also includes cancellation procedures, trading safeguards and other trading conditions.

2. TRADING

2.1 Trading Platform Interface

DFM Matching Engine Trader Workstation: The DFM ME XW is a Windows based application that must be installed on a PC with connectivity access to one of the Trading Engine (located Dubai). The DFM ME XW gives full trading access to the DFM ME and is fully equipped to support Members.

Broadcast Datafeed Client Software Development Kit (SDK): The SDK contains the java client Application Programming Interface (API) to receive market data feed. The SDK is used by Members of the Exchange to develop software that will connect to the Trading Engine and receive feed. Members can use the SDK to develop their own in-house feed handler or alternatively can connect through one of our Independent Software Vendors.

FIX Gateway: FIX gateway for DFM Matching Engine trading platform supports FIX protocol version 5.0 SPI. The systems FIX Gateway allows the Members' order management system to connect and perform order management activity.

2.2 Trading Model

The Nasdaq Dubai trading model comprises of two Order Books: (1) the Central Order Book (COB) and (2) the Off Order Book (OOB). The COB is the main Order Book into which Orders are entered during the trading day. The OOB is a reporting service for reporting pre-negotiated deals and Block Trades between Nasdaq Dubai Members. Trades entered into the COB or OOB are considered as On Exchange Transactions (they affect the market statistics on the trading day that they are entered on).

2.3 Classifications of Contracts into Boards

All Derivatives Contracts will be tradable on the following Boards on DFM ME:

1. 300 (Single Stock Futures AED)
2. 301 (Single Stock Futures USD)
3. 302 (Index Futures AED)
4. 303 (Index Futures USD)
5. 304 (Single Stock Futures SAR)

2.4 Instruments

Each Derivatives Contract belongs to an 'Instrument' which represents the underlying of that contract and each Instrument belongs to a 'Board' on the trading system. Instrument names will begin with a short code denoting the underlying equity and an identifier like 'FUT' or 'OPT' to denote a Futures or Options contract etc.

For example, EMAAR futures contracts will belong to instrument code EMAARFUT while ADCB futures contracts will belong to instrument ADCBFUT.

2.5 Naming Convention – Futures Contract

The naming convention or Symbols for the Futures market is as follows:

Symbol (upto 6 characters) + Month char. (1 character) + Year char. (2 characters) + corporate action (1 character - X, Y or Z)

Example:

DP World Futures Contract with June 2017 expiry: DPWM17

EMAAR Futures Contract with July 2017 expiry: EMAARN17

ALDAR Futures Contract August 2017 expiry: ALDARQ17

Note: For corporate actions affecting contracts, a character 'X' 'Y' or 'Z' will be added at the end.

X: denotes first corporate action on a contract

Y: denotes second corporate action on a contract

Z: denotes third corporate action on a contract

Expiry Month Codes

Nasdaq Dubai has denominated expiry month codes for its Derivatives. The list of expiry month codes is as follows:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	F	G	H	J	K	M	N	Q	U	V	X	Z

2.6 Market Timings and Trading Phases

The Nasdaq Dubai Market is open for trading from Sunday to Thursday.
The Trading and Settlement Calendar is available on the Nasdaq Dubai website.

Boards: 300, 301, 302, 303

Market Timings	Trading Phases
09:30 – 09:55	Pre-opening Auction
09:55 – 10:00	Pre-opening Adjustment (No Cancellation Period)
10:00	Matching at TAP
10:00 – 14:00	Main Trading Session (Continuous Trading)
From 14:00	Post-Trading (Market Close)

Boards: 304

Market Timings	Trading Phases
10:30 – 10:55	Pre-opening Auction
10:55 – 11:00	Pre-opening Adjustment (No Cancellation Period)
11:00	Matching at TAP
11:00 – 16:10	Main Trading Session (Continuous Trading)
From 16:10	Post-Trading (Market Close)

Any changes in market timings or trading phases will be notified to the Members by way of a Notice.

Pre-opening Auction (09:30 – 09:55)

- The Pre-opening Auction is an Order accumulation period during which all orders entered by the Members are automatically recorded in the Central Order Book (COB) without being executed.
- Orders can be amended or cancelled during this session. Entry of new Limit Orders, Market Orders, Hidden orders (Iceberg) is permitted. No Minimum Execution, Minimum Fill, AON, FOK, FAK will be allowed during this session. If any order with Minimum Execution, Minimum Fill, AON is entered during previous trading session then those orders will be removed from the COB during this session.
- The Theoretical Auction Price (TAP) is calculated each time a new Order is entered or amended into the COB.

- The TAP is established using the rules detailed in Appendix 1.

Pre-opening Adjustment (No Cancellation Period) (09:55 – 10:00)

The Pre-opening Adjustment is a phase that occurs after the Pre-opening Auction where the Members can enter new Orders, however, modifying or withdrawing existing Orders which leads to decreasing the Order priority is not permitted.

- The Pre-opening Adjustment session is an Order accumulation period during which all Orders entered by the Members are recorded on the COB without being executed.
- Entry of new Limit orders, Market Orders, Hidden orders (Iceberg) is permitted. No Minimum Execution, Minimum Fill, AON, FOK, FAK will be allowed during this session.
- Members cannot cancel or deactivate their pending Orders or make the following amendments:
 - Decrease Order quantity
 - Decrease price for Buy Order
 - Increase price for Sell Order
- At the end of the Pre-opening Adjustment session, Order matching will happen at TAP.
- The TAP at which matching is done would be considered as the Opening Price.

Main Trading Session/ Continuous Trading (10:00 – 14:00)

If there are matching orders in the COB at the end of the Pre-opening Auction, trades will take place at the Theoretical Auction Price based on price/time priority. Once the Pre-opening Auction is completed, Continuous Trading in that security begins and orders can be entered, maintained, modified and deleted. All orders that are unexecuted at the Pre-opening Auction are forwarded into the Main Trading Session. The OOB will be available to report negotiated deals and block trades during the Main Trading Session.

2.7 Order Types

Market Orders

Market Orders can only be entered into the trading platform during the Main Trading Session, pre-opening and pre-closing session and do not stipulate a price. A Market Order will execute as much quantity as possible, up to the Trading Safeguard (defined below) until it is completely filled. If a Market Order is only partially filled, then it is converted into a Limit Order at the last trade price. Consequently, the existence of a matching Order is essential. If no matching Order is available, the Order is rejected by the trading platform.

If Market-At-Best option is selected for Market Orders, it will execute only the top of the book and then partially filled order will be converted to a limit order.

If there are no orders on the other side, then Market Order will be expired.

Limit Orders

Limit Orders stipulate a maximum purchase price or minimum selling price. Limit orders entered during the Main Trading Session are executed either fully or partially, as market conditions permit. If the execution of a limit order is not immediately possible it is logged in the Order Book in descending buy-price Order or ascending sell-price Order (the price priority principle) and joins the queue of Orders having the same price (the time priority principle).

Trigger Order

A Trigger Order (also sometimes referred as Stop Loss) is an order that is activated when the price of the security reaches specified price from a specific side, either declining or rising. Orders are activated and put into order book based on the price of the security reaching the trigger criteria.

Hidden Orders (Ice berg)

Hidden orders allow the submission of an order while only disclosing a portion of the entire quantity; the minimum exposed quantity is 10%; disclosed quantities are only refreshed from the hidden quantity after full execution of the previous disclosed one and it loses its priority in the order book.

2.8 Execution Conditions

Execution conditions order can be placed only during continuous trading session. If there are any execution condition orders entered during previous trading session, it will be removed during transition of continuous trading session.

All Or None (AON)

Order will execute if the matching is for full quantity or it will remain in the order book

Minimum Execution (ME)

Contracts are traded in specific blocks (groups), provided the quantity is above the “Minimum Execution” quantity. If the balance quantity is less than the minimum requirement, the order is removed.

Minimum Fill (MF)

A minimum number of contracts must be executed before it is possible to trade the order. It is possible to have more than one corresponding-order for every partial trade. Following execution of the minimum fill or more, the minimum fill requirement is rescinded and the order is treated like other regular orders.

Fill and Kill Orders (FAK)

Fill and Kill (FAK) Orders can only be placed during the Main Trading Session. An FAK Order may be filled in full or in part, depending on the market conditions at the time it is entered and at the specified price or better (which could be a limit price or at market). The remaining part of any FAK Order that is not executed immediately and in full is cancelled.

Fill or Kill Orders (FOK)

Fill or Kill (FOK) Orders can only be placed during the Main Trading Session. An FOK Order can only be executed in full, depending on the market conditions at the time it is entered and at the specified price or better (which could be a limit price or at market). If an FOK cannot be immediately executed, the Order will immediately expire.

Special Order Types

- Private Order
Orders may be stored as private orders and selected for placement into the market at a later time
- Market Maker Order
Orders entered by Market Maker participant as identified is MM orders which is then used to check the MM obligations.

2.9 Order Validity

There are three (3) types of validity constraints for Orders entered on the Nasdaq Dubai trading platform.

Day: A Day Order is the default validity and is only good for the current trading day. All outstanding Orders with Day validity that have not been fully executed at the end of the trading day will automatically expire.

Good Till Cancelled (GTC): GTC Orders are Orders with a validity period of 365 days, these Orders remain in the Order Book for 365 days, unless they are fully executed or the user cancels the Order or the price at which these orders were placed is no longer within the daily price limits...

Good Till Date (GTD): GTD Orders are till a specified expiry date. The expiry date can be up to a maximum of 365 days in the future unless it's fully executed or the user cancels the order or the price at which these orders were placed is no longer within the daily price limits..

2.10 Order Book Matching

Matching is FIFO: 'first in first out' order allocation where each order is allocated as much volume as possible before any volume is allocated to the next order in the price/timestamp sequence.

2.11 Off-Order Book

The OOB is a reporting service for Block Trades, OTC Transactions and Cross Trades entered outside of the COB, but still on the Nasdaq Dubai Exchange which affect the market statistics on the day when entered.

Normal Block Amounts for the Derivatives listed on Nasdaq Dubai are as follows:

- Single Stock Futures: Lot size - 500 contracts
- Index Futures : Lot size - 100 contracts

Nasdaq Dubai offers its Members three (3) ways in which they can report OOB Transactions:

1. By sending the details of the trade in the prescribed form (Form T1 – Trade Reporting Form) available under Procedures on Nasdaq Dubai website, signed by an authorized signatory(ies) to trading@nasdaqdubai.com.
2. Through Bloomberg IB chat, provided the user is on our list of authorized traders. The Trade Reporting Form will still have to be filled in and signed off by authorized signatory(ies) and submitted later.

3. By calling the Nasdaq Dubai Trading Desk at +971 4 3055472/5474/5439, followed by an email confirmation or the Trade Reporting Form duly signed by authorized signatory(ies).
4. Executing through trading system interface provided for OOB trade execution.

Cross Trades

An automatic execution through the COB of a Buy and Sell Order from a single Member for its underlying clients is permitted by the trading platform during Continuous Trading. Cross Orders have to be limited at a price within the Best Bid Offer (BBO). A Cross Order at the BBO is only allowed at a volume higher than the volume available in the Order Book at the BBO price. In a situation where a Cross Trade is reported but between the time of reporting and registering of the trade on the market by the Nasdaq Dubai Trading team, if the trade no longer meets the Nasdaq Dubai crossing rules, Nasdaq Dubai may at its sole discretion allow for the Cross Trade to be executed.

1. If there is no tradable price within the market's BBO at the time of the entry, the trade can be crossed at either the Best Bid or Offer.
2. If there are no quotes in the COB at the time of the entry, the trade can be crossed at or around the previous Closing Price where the trade price will be subject to the Reference Safeguard limits.

2.12 Price Determination

Price determination in Continuous Trading is carried out according to the following rules, in addition to the price/time priority:

Opening Price

Opening Price is the TAP calculated in accordance with Appendix 1. If TAP cannot be determined for lack of activity in auction period, the first trade on a security determines the Opening Price of that security.

Closing Price

On each Business Day, Nasdaq Dubai will determine the Closing Price as follows:

- Closing Price will be the Last Traded Price (LTP) of the contract during the same Business Day.
- If there is no last traded price on the same Business Day, Nasdaq Dubai will determine the Closing Price based on quotes provided by its active market participants. Nasdaq Dubai will use midpoint of such bid and offer quotes provided by its active market participants. Nasdaq Dubai will have sole discretion to exclude any outliers at the time of such computation.
- If a price cannot be determined by the above methods on account of lack of quotes on market, then the previous day's Closing Price shall be the Closing Price.
- However, if the price so determined does not reflect the actual market conditions, Nasdaq Dubai may re-determine the daily settlement price at its sole discretion and may use theoretical fair value for the same.
- Closing prices will be published on the market within one hour from market close.

Reference Price

The Reference Price is used for ‘Order Reasonability’ checks, where there is no Bid/Offer. The Reference Price of a contract is the previous Close Price of the contract, unless explicitly set by Nasdaq Dubai.

Price during Continuous Trading

Each new incoming Order is immediately checked for execution against Orders on the other side of the Order Book. Orders can be executed in full, in part or not at all. Thus each new incoming Order may generate none, one or several executions. Orders in the Order Book will be executed according to the price/time priority principle. Orders or parts thereof which have not been executed are sorted in the Order Book according to price/time priority.

2.13 Tick Size

The tick size table for the equity Derivatives Contracts will follow the schedule below:

Price Range	Tick Size
AED Single stock futures (board 300)	0.001
USD Single Stock futures (board 301)	0.001
SAR Single Stock Futures (board 304)	0.01
AED Index futures (board 302)	1.00
USD Index Futures (board 303)	0.1

2.14 Safeguards

1. Reference Safeguard

In the following situation the Reference Safeguard will prevent the Order from being entered into the trading platform:

20% up from previous closing price and 15% down from previous closing price (rounded to nearest decimal)

Example:

Below < - 15%	-15 %	Previous Closing Price	+20 %	Above > +20%
Rejected	US\$ 0.638	US\$ 0.750	US\$ 0.900	Rejected

Nasdaq Dubai reserves the right to redefine and modify the safeguard ranges intraday depending on the market situations including but not exclusive to reinstatement of a contract following a halt or suspension of trading, acquisitions, significant corporate news or extraordinary corporate actions. Nasdaq Dubai will notify the market when any change to the threshold is made intraday.

2.15 Security State

Normally, the state of all contracts will be active and trading will occur as set out in the timetable of the Board to which they belong. In certain circumstances, however, contracts may be subject to other states. When changes occur in the status of a contract an information message is disseminated via the Nasdaq Dubai trading platform.

Contracts on Nasdaq Dubai can be in the following states:

- **Active:** Contracts in this state are available for trading. Members can enter new Orders, amend existing Orders and cancel Orders. Contracts in an Active state will be represented by the letter “A” in the status field indicated on the trading platform.
- **Suspended:** Contracts in a Suspended state are not available for trading. Members cannot enter new Orders or amend/cancel existing Orders. Contracts in a Suspended state will be represented by the letter “S” in the status field indicated on the trading platform.

2.16 Futures contracts Specifications

Contract specifications are published via Notice and are available on the Nasdaq Dubai website.

2.17 Maturity cycle

All standardized future contracts on single stocks admitted to trade on Nasdaq Dubai will have 1, 2 and 3 month expiry terms. Expiry date for a contract is 3rd Thursday of its expiry month. A new 3 months contract is created a week before one month contract is expired (2nd Thursday of expiry month). After expiry of 1 month contract, 2 months contract becomes 1 month contract and 3 months contract becomes 2 months contract.

All standardized future contracts on equity index futures admitted to trade on Nasdaq Dubai will have 2 quarterly expiries. Expiry date for a contract is 3rd Thursday of its expiry month. A new contract with quarterly expiry is created a week before a contract is expired (2nd Thursday of expiry month).

Example:

On start of trading of index futures, say there will be June and September expiry contracts. A new quarterly expiry (for December) will be created on 2nd Thursday of June. The June contract will expire on 3rd Thursday. This process of addition and expiration will continue on each consecutive quarterly months.

Any change in maturity cycle on contracts will be published by way of notice.

For updated maturities please refer to the Notices published on the Nasdaq Dubai website.

2.18 Trade Cancellation

Members cannot cancel or modify any trades matched on Nasdaq Dubai. However, in the case of a material error by a Member which was notified to Nasdaq Dubai within **fifteen (15) minutes** of the Transaction being executed, Nasdaq Dubai may, but shall not be obliged to cancel all Transactions affected as a consequence of such error. Nasdaq Dubai may also cancel any and all Transactions, which in its reasonable judgment do not comply with its Procedures, Business Rules, DFSA Rules, applicable laws or regulations.

These cancellation rules do not apply if the following conditions are true:

Trader errors such as the following are not considered to be grounds for cancelling a trade unless a situation occurs where a cancellation would be in the best interest of maintaining a fair and orderly market:

- a. Entering a Sell Order instead of a Buy Order.
- b. Entering an incorrect price where the price that the trade occurred at is not significantly away from the current BBO or the LTP where no BBO exists.
- c. Entering a higher or lower quantity than intended where it can easily be reversed. (Bids and Offers are readily available at reasonable prices for that Contract).
- d. The reversal of the error would result in a total loss of less than USD 1,000 or equivalent.

If a request for cancellation was received within a reasonable time, Nasdaq Dubai will deal with such request on a case by case basis and apply the above guidelines as far as is practicable. Nasdaq Dubai at its sole discretion will decide if a trade cancellation is required.

Request for cancellation

A Trading Member wishing to cancel a Transaction shall submit the cancellation request via phone (+971 4 3055472/5474/5439) followed by an email to trading@nasdaqdubai.com no later than **fifteen (15) minutes** from the time the trade took place with details of the request.

Procedures:

When a Nasdaq Dubai Trading Member has submitted a request for cancellation, Nasdaq Dubai will assess whether the prerequisites for cancellation are present. If the prerequisites for the cancellation request are satisfied, Nasdaq Dubai shall advise the other Nasdaq Dubai Trading Members involved in the Transaction as soon as possible that the trade will be cancelled.

Trade Cancellations at the request of a Member will not be entitled to a reversal of trading fees.

Exchange initiated Trade Cancellations:

Nasdaq Dubai may, where required, cancel a trade to ensure the integrity of the market and that the market is operating in a fair and orderly manner.

Trade Cancellations initiated by Nasdaq Dubai may be the result of:

- a. An indisputable error or mistake which is caused by a technical or manual error entering an incorrect price where the price that the trade occurred is significantly away from the current BBO or the LTP where no BBO exists.
- b. Breach of a material provision of law, regulation or rule.
- c. Technical disruptions in the trading and/or clearing systems beyond the Trading Member's control.
- d. Trades that result in a misrepresentation of the market price.

Nasdaq Dubai will have the discretion to levy a trade cancellation fee on the party initiating the cancellation. If a trade cancellation is a result of an error on Nasdaq Dubai's part then the fees of the cancelled trade will be waived for the Members involved.

2.19 Adjustment to Single Stock Futures contracts due to corporate actions

- 1) If Nasdaq Dubai considers an adjustment should be made to a Contract Series as a result of a pro-rata corporate event, it may, without limitation and by Notice:
 - (i) make an adjustment to the Contract Series or to a related CCP Transaction, in order to ensure that the value of the CCP Transaction is as far as practicable the same as it would have been had the event not occurred; and
 - (ii) unless it considers it inappropriate to do so in the circumstances, round the adjustment of any term to the nearest cent or unit of the Underlying Instrument under Rule 7.3.10.
- 2) Nasdaq Dubai may by Notice determine when an adjustment is to be effective.
- 3) If Nasdaq Dubai considers that it is not reasonably practicable to make an adjustment for an event pursuant to this Rule 7.3.10, Nasdaq Dubai may decide not to make an adjustment and may instead terminate or close-out CCP Transactions.

An adjustment is when, as a result of a corporate action, the exchange makes changes to one or more contract Specifications. For an Options Contract this is usually to both the strike price and the contract size and for a single stock Futures Contract it is usually only to the contract size.

Please refer to 'The Nasdaq Dubai Contract Adjustment Guidelines' for further details on the procedures followed by Nasdaq Dubai when a Corporate Action is applied to the underlying security and how adjustments are made to Futures Contracts. This document is available on Nasdaq Dubai website.

Market announcement

Nasdaq Dubai will advise the market by Notice and by a message displayed on the Nasdaq Dubai Trader workstation of its decisions regarding adjustments, terminations and suspensions.

2.20 Clearing

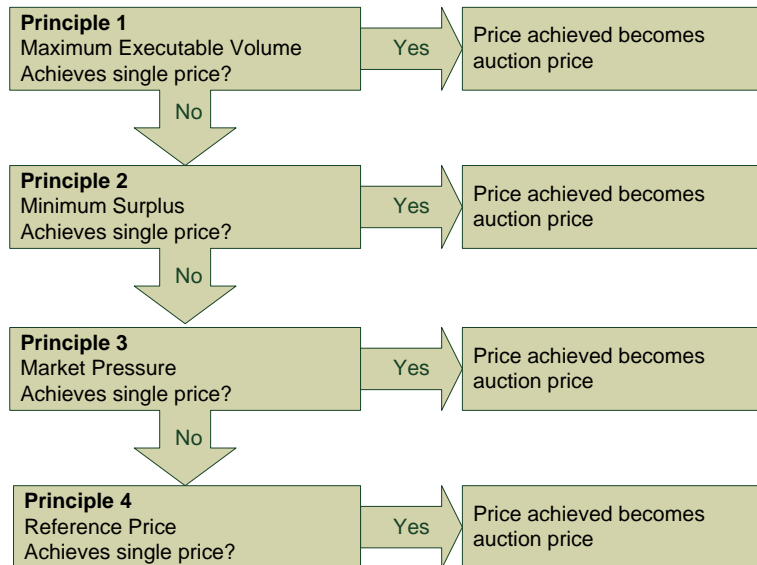
Please refer to 'Clearing, Settlement and Risk Management Procedures for Derivatives' available on Nasdaq Dubai website.

Appendix 1: Calculation of Theoretical Auction Price (TAP)

Calculation Steps:

There are four Principles in determining the TAP. If a price cannot be determined after the first principle, the model progresses to the second principle, and if a price cannot be determined after the second principle, the model progresses to the third principle, and if necessary, to the fourth.

These principles are applied in the following order:



Principle 1: Maximum Executable Volume (MEV)

This principle establishes the price(s) at which the maximum number of securities will be executed. There are two stages involved in applying this rule.

1. The first stage adds together all the bids (Cumulative Bid) and all the asks (Cumulative Ask). The Cumulative Bid is calculated by taking the quantity of securities from the highest bid price and adding to this the quantity of securities from the second highest bid price and then the third highest bid and so on. The Cumulative Ask is calculated by taking the quantity of securities to from the lowest ask price and adding to this the quantity of securities from the second lowest ask price, then the third lowest and so on.
2. The second stage establishes the Maximum executable volume based on the Cumulative Bid and Cumulative Ask at each price level.

In **Example 1** below there is a Cumulative Bid of 180 securities at a price of \$0.81 that match with a Cumulative Ask of 180 securities at the same price of \$0.81. In this example, the purchase orders of 50 at \$0.83 and 70 at \$0.82 were also executed at the lower price of \$0.81. On the other side, the sale orders of 100 at \$0.79 and 60 and \$0.80 were also executed at the higher price of \$0.81.

Example 1 – TAP identified as Single Price:

Bid Quantity (limit orders)	Cumulative buy quantity	Surplus	Price	Surplus	Cumulative sell quantity	Ask Quantity (limit orders)
50	50		0.83	130	180	
70	120		0.82	60	180	
60	180	0	0.81	0	180	20
	180	20	0.80		160	60
	180	80	0.79		100	100

In the order book situation displayed above, the TAP will be **\$0.81** according to the Maximum executable Volume.

Example 2 – TAP multiple prices identified: Establish Maximum Executable Volume (MEV) at each eligible price.

In this example, the maximum quantity of contracts that will be traded is 180. Hence, had it been only one price at which the maximum quantity of contracts that may be traded, that price would be the official auction price.

Bid Quantity (limit orders)	Cumulative buy quantity	Price	Cumulative Sell quantity	Ask Quantity (limit orders)	Maximum Executable Vol. (MEV)
50	50	0.83	300	50	50
130	180	0.82	250	40	180
0	180	0.81	210	30	180
30	210	0.80	180	0	180
0	210	0.79	180	0	180
40	250	0.78	180	60	180
40	290	0.77	120	50	120
40	330	0.76	70	70	70

The Maximum Executable Volume (MEV) is minimum of the Cumulative Buy and Cumulative Sell quantities at that price.

The MEV occurred at prices 0.78, 0.79, 0.80, 0.81 and 0.82. Therefore, at the completion of Principle 1, the potential auction price would be any of these prices.

The algorithm has eliminated prices 0.83, 0.77 and 0.76 to further narrow the choices for an auction price. Hence, System moves to Principle 2 to determine the Minimum Surplus level.

Principle 2: Minimum Surplus

If there is more than one price at which there is a Maximum Executable Volume (MEV), the price with the minimum surplus (the fewest unexecuted securities) will be chosen as the TAP.

Example 1: The Maximum Executable Volume (MEV) is 80 being the total number of securities that make up the Cumulative Ask which can be executed at three prices of \$0.80, \$0.81 and \$0.82. In this example the TAP

is \$0.82 because the Maximum Executable Volume (MEV) of 80 can be executed against a Cumulative Bid of 90 securities at a price of \$0.82 with a Minimum Surplus (MS) of 10; i.e. leaving just 10 securities unexecuted.

Example 1 TAP identified as Single Price:

Bid Quantity (limit orders)	Cumulative buy quantity	Price	Cumulative Sell quantity	Ask Quantity (limit orders)	Maximum Executable Vol. (MEV)	Minimum Surplus (MS)
50	50	0.83	80		50	30
40	90	0.82	80		80	10
10	100	0.81	80		80	20
	100	0.80	80	30	80	20
	100	0.79	50	50	50	50

The Minimum Surplus (MS) at each price level is equal to the Cumulative Buy Quantity less the Cumulative Sell Quantity.

Example 2 – TAP multiple price identified: Establish Minimum Surplus (MS) at each eligible price.

Bid Quantity (limit orders)	Cumulative buy quantity	Price	Cumulative Sell quantity	Ask Quantity (limit orders)	Maximum Executable Vol. (MEV)	Minimum Surplus (MS)
50	50	0.83	300	50	50	*
130	180	0.82	250	40	180	70
0	180	0.81	210	30	180	30
30	210	0.80	180	0	180	30
0	210	0.79	180	0	180	30
40	250	0.78	180	60	180	70
40	290	0.77	120	50	120	*
40	330	0.76	70	70	70	*

*Price eliminated by Principle 1.

Ignoring the positive and negative signs, the lowest number in the MS column is 30. Had it been only one price at which this occurs, that price would be the official auction price.

In this example, the MS occurs at prices 0.79, 0.80 and 0.81. Therefore, at the completion of Principle 2, the potential auction price would be any of these prices.

The algorithm has further eliminated 0.82 and 0.78 as auction price to further narrow the choices for an auction price. Hence the system moves to Principle 3 to determine Market Pressure.

Principle 3: Market Pressure

This principle determines where the Market Pressure of the potential auction prices exists – on the buy or the sell side. A positive sign (+) indicates a surplus will remain on the buy side, demonstrating buy side pressure at the conclusion of the auction. A negative sign (-) indicates a surplus will remain on the sell side, demonstrating sell side pressure at the conclusion of the auction

If the Market pressure is on the buy side (positive sign of unmatched quantity) then the highest of the potential auction prices is used.

If the Market pressure is on the sell side (negative sign of unmatched quantity) then the lowest of the potential auction prices is used.

If Market pressure exists on both the buy side and the sell side, or the MS is “0” the algorithm will proceed to Principle 4.

Bid Quantity (limit orders)	Cumulative buy quantity	Price	Cumulative Sell quantity	Ask Quantity (limit orders)	Maximum Executable Vol. (MEV)	Minimum Surplus (MS)
50	50	0.83	300	50	50	*
130	180	0.82	250	40	180	*
0	180	0.81	210	30	180	-30
30	210	0.80	180	0	180	30
0	210	0.79	180	0	180	30
40	250	0.78	180	60	180	*
40	290	0.77	120	50	120	*
40	330	0.76	70	70	70	*

*Price eliminated by Principle 1 and Principle 2

In the above example it is not yet possible to calculate an auction price, since the surpluses at 0.79, 0.80 and 0.81 are identical in magnitude but different in sign

At the potential auction prices of 0.79 and 0.80, the surplus is positive (+30), indicating that Market Pressure is on the buy side. At 0.81 the surplus is negative, indicating that Market Pressure is on the sell side. If the market opens at 0.79 or 0.80, a surplus of +30 signifies that after the market opens 30 contracts will remain unfilled on the buy side at 0.79 or 0.80, while if the market opens at 0.81 a surplus of -30 indicates that 30 contracts will remain unfilled on the sell side at 0.81.

Buy pressure is likely to cause the price to rise after the opening. If surpluses are all positive, the algorithm chooses the highest of the potential prices and this becomes the official auction price.

Sell pressure is likely to cause the price to fall after the opening. If the surpluses are all negative then the algorithm will opt for the lowest of the potential prices as the official auction price.

As the surpluses at 0.79, 0.80 and 0.81 are equal in size but opposite in direction, the algorithm continues to the fourth and final principle to establish an auction price.

Principle 4: Consulting Reference Price

This principle determines an auction price from the range of prices, established in Principle 3, on the basis of their proximity to a reference price.

Generally, the reference price is the last automatically matched traded price. Where an automatically matched trade has occurred on the current trading day, the reference price will be the price of the latest trade executed on that day. If, during the current trading day, an automatically matched trade has not occurred, the reference price will be carried over from the previous trading day (adjusted for corporate actions, if any).

This principle follows two steps to get the auction price depending upon the condition of the reference price.

Step 1: Narrowing the options of potential auction prices to two within the entire range of possible auction prices.

- a. If the result of Principle 3 is a combination of positive and negative MS, then the algorithm marks the two prices where the sign changes,
- b. i.e. in the table above, the MS sign for prices 0.79 and 0.80 is positive (30,30) and changes to negative (-30) at price 0.81; hence, the algorithm chooses 0.80 and 0.81 as potential auction prices to be applied.
- c. If the Minimum Surplus for all possible auction prices is zero, and then the algorithm marks the highest and lowest prices within that range as the potential auction prices to be applied i.e. 0.79 and 0.81.

Step 2: Determine the relationship between the reference price and the final auction price.

- a. If reference price is equal to or greater than the higher of the two possible prices established in Step 1, then the higher price becomes the auction price.
- b. If reference price is equal to or less than the lower of the two possible prices established in Step 1, then the lower price becomes the auction price.
- c. If reference price lies between the two possible prices established in Step 1, then the price closest to the reference price itself becomes the auction price. If the reference price is equally distant from these two possible prices, then the higher of the two prices becomes the auction price.
- d. If reference price does not exist, for example, in the cases of an Initial Public Offering, new listing or the first day of trading a security on a reconstructed basis, the auction price becomes the lower of the two possible prices established in step 1.