



December 20, 2018

Corrections Relating to Pro-Rata Methodology

Effective today, MATCHNow received approval from the Ontario Securities Commission to correct certain clerical errors in MATCHNow's *In Detail* document concerning our proprietary pro-rata-based methodology for trade matching. Specifically, the revisions relate to the description and examples of (1) the way in which the pro-rata methodology allocates residual board lots, and (2) how the rounding functionality operates within the pro-rata methodology. The approved corrections are incorporated into a newly revised *In Detail*, which was published on our website today.

The corrections appear in the text under the heading "MATCHNow Pro-Rata" on page 12 of the *In Detail*, as well as in the contents of the new version of its Appendix B.

Analysis

Since its inception, MATCHNow has utilized a proprietary pro-rata-based methodology for executing multi-party matches where the amount of shares on one side is sufficient to fill some portion of the contra side orders, but not all of them. Our documentation was originally silent on the details of that methodology, but starting in 2013, with the goal of providing greater transparency to our Subscribers, our *In Detail* has included a brief description of how the methodology functions; eventually, we also added certain examples (the "Test Cases" set forth in Appendix B) to illustrate the methodology.

Due to a coding change implemented in July 2015, however, a modification was made to the functionality of MATCHNow's pro-rata methodology. Prior to this change, if the methodology calculated a pro-rata value below 50 shares for a particular order, that order would have been allocated a single board-lot sized residual, if available; after the change, the residual board-lot allocation is assigned to the largest order, and in the case where there are multiple largest orders of equal size, the residual is randomly assigned. In the event that the residual amount is of a significant size, an additional round of pro-rata allocation is conducted. This is in the spirit of true pro-rata allocation and rewarding larger-sized orders. The sections of the *In Detail* relating to MATCHNow's pro-rata methodology should have been revised in July 2015 to reflect this modification, but due to an unintended oversight, they were not. As a result, the document contained certain errors beginning in July 2015, which were uncovered earlier this year.

Two additional clerical errors (which date back to 2013 and are unrelated to the coding change) were also discovered. First, our *In Detail* incorrectly stated that our pro-rata methodology always rounded amounts down. In fact, MATCHNow's logic has always been to round 50+ shares up to 100 shares, and to round 49 or fewer shares down to 0 shares. In short, MATCHNow rounds up

or down, based on conventional, pure mathematics, to the closest board lot. This is a practical approach to rounding, consistent with the goal of size priority. Second, certain explanatory notes in Appendix B of the *In Detail* incorrectly stated that MATCHNow builds a list of orders based on size; in reality, the list for allocation is built in a random manner. This has been corrected in Appendix B, and is consistent with the revisions made on page 12 of the *In Detail*. As is now clear, allocation to each of the orders on the list is executed sequentially; thus, as a result of the rounding process, in some rare cases, an order assigned a lower position on the list might get a smaller allocation than that given to an equal-sized order higher on the list. (See Appendix B, Example 4.) Due to the random nature of the list generation, the potential outcomes are not always the same. This random nature of allocations is consistent with MATCHNow's overall approach to trade matching, including the deterrence of potential gaming.

Moreover, we are confident that the errors in the *In Detail* relating to the pro-rata methodology did not allow any Subscribers to intentionally "game" the pro-rata methodology or derive any undue advantage for the following reasons:

1. The random nature of matches: MATCHNow's trading engine is based on a call auction that matches trades every 1 to 3 seconds, on a randomized basis. This deliberate randomness helps to deter any possible gaming of auction outcomes.
2. The unpredictability of whether matches will be multi-party and whether there will be residuals to re-allocate or fractional shares or Odd lots to round up or down: MATCHNow operates a continuous market to match incoming active "Market Flow" orders with resting passive "Liquidity Provider" orders. Both call auction matches and continuous market matches may involve pro-rata allocation, but no Subscriber can know in advance whether such an allocation will occur because no Subscriber has information regarding other Subscribers' orders in advance of a match. In particular, nobody knows in advance: (a) whether there are multiple parties in the match; (b) the size of other orders; (c) the number of other orders; or (d) whether there will be residuals to allocate.

All of the aforementioned errors have now been corrected.

If you have any questions, please email support@matchnow.ca or call 416.861.1010 ext. 0 to speak to a MATCHNow representative.

Best regards,

The MATCHNow Team

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