

## AUTOMATED QUANTITY-DISTANCE (QD) SPREADSHEET

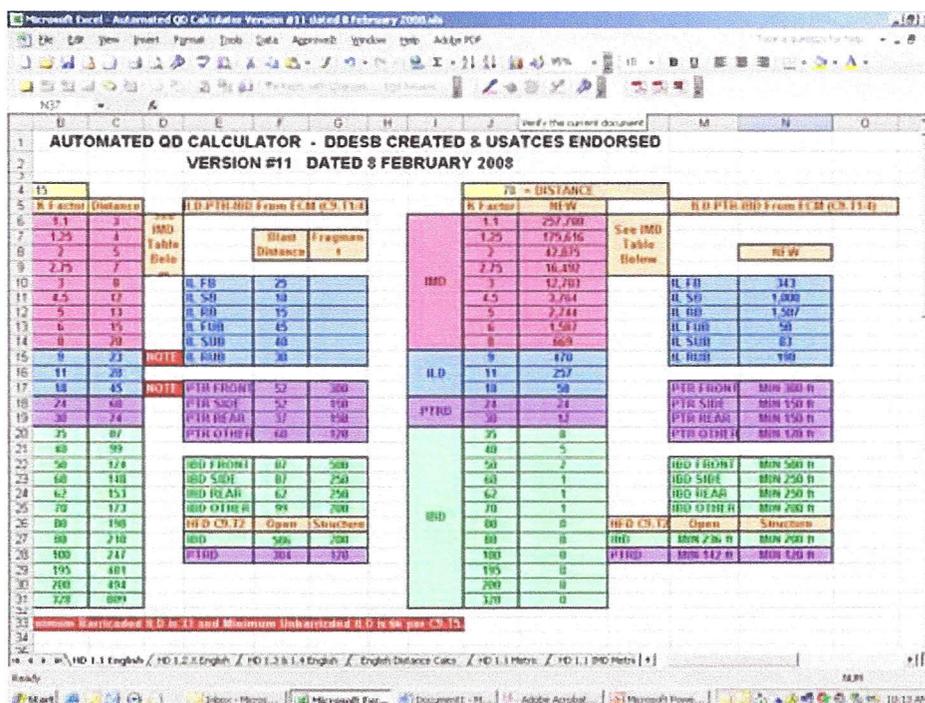
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Due to more complex site planning issues and use of automation over the past several years, the Army and DOD have been slowly moving away from quantity distance (QD) tables provided in the explosives regulations. We are migrating towards the use of the formulas that derived these tables in determining separation distance and/or allowable Net Explosives Weight (NEW). These formulas can be complicated to use. This led people to develop their own spreadsheets assisting them with their QD calculations. Many of these have been passed down from individual to individual and modified by successive users to meet their own needs. This has perpetuated built-in formula errors.

The Department of Defense Explosives Safety Board (DDESB) recognized the need for a singly managed automated tool that was user friendly. It needed to provide more reliable and consistent answers. DDESB developed an Excel spreadsheet that will calculate either allowable NEWs based upon a given separation distance, or the required separation distance for a given NEW. The spreadsheet is designed for either English or metric calculations.

It is designed to assist personnel from all the Services who are responsible for developing or reviewing explosives licenses, developing or reviewing explosives safety site plans, or those with other duties involving QD calculations. Army personnel may see K-Factors that they are unfamiliar with and which appear to make the various worksheets look cluttered. These might be necessary for other users, since this is a general tool for all Services.

The spreadsheet consists of several worksheets. Each worksheet provides the user with specific formulas for all the Hazard Divisions (HD). Personnel should first click on the HD worksheet they might be interested in using. The picture below depicts a view of the HD 1.1 page. Users need to only input the desired NEW or distance in the appropriate yellow cell and hit "Enter" on their keyboard. This will then populate the worksheet. The spreadsheet has built-in warnings to alert users if a given answer is outside regulatory limits or if a distance is below minimum values. Generally, red shaded areas are calculations in the Intermagazine K-Factor ranges, blue shaded areas are calculations in the Intraline K-Factor ranges, purple shaded areas are calculations in the Public Traffic Route K-Factor ranges, and green shaded areas are calculations in the Inhabited Building Distance K-Factor ranges. Orange shaded areas are column labels or are provided for information purposes.



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The DDESB Staff has shared this tool and allowed distribution to personnel in the field. The US Army Technical Center for Explosives Safety (USATCES), in an effort to assist our Army customers and the ammunition and explosives community in general, places the latest version of the Automated QD Calculator available on two websites; on AKO on the DAC Explosives Safety Ammunition Toolbox at <https://www.us.army.mil/suite/page/218481> under *Tools*, and on the DAC-USATCES website at <https://www3.dac.army.mil/es/documents/QDCalculatorVersion12.xls>.

Each web version is identified by a sequential version number and the date of the version. At the time of this bulletin's publication the current version is Version #11 dated 8 February 2008. As improvements or modifications are made based on changes to the regulation, user comments, or errors identified and corrected, the most up-to-date version will be placed on both websites and the old version removed. We encourage users to check either of the above websites often to ensure they are working with the latest version of the calculator.

During the past several months users have identified several improvements, one which created a separate distance tab that allow users to input a specific distance in one location and provides the allowable NEWs for all HDs. Because this tool is available for use by all the Services, some suggested changes that are user specific cannot be accommodated. The DDESB and USATCES have made every attempt to identify errors within the program and correct them. However, as with any automated program, errors may still exist. Therefore, we encourage users to identify errors, or make suggestions for improvements, and forward them to [MCAL.DAC.EST.TOOLBOX@conus.army.mil](mailto:MCAL.DAC.EST.TOOLBOX@conus.army.mil). We will then forward them to the program's originator for correction and/or consideration to be included.

The screenshot shows a Microsoft Excel spreadsheet titled "Automated QD Calculator Version #10 dated 1 February 2008.xls". The spreadsheet is organized into several columns and rows, with data tables for different hazard distances (HDs). The tables include:

- HD 1.1:** A table with columns for "R Factor" and "NEW". Values range from 1.1 to 328.
- HD PTR IBD From ECM (C9-T14):** A table with columns for "NEW" and "IBD". Values range from 62,099 to 10,640.
- HD 1.2.1:** A table with columns for "NEW" and "MCE". Values range from 10,624 to 192.
- HD 1.2.2:** A table with columns for "NEW" and "IBD". Values range from 5,406,002 to 10,207.
- HD 1.2.3:** A table with columns for "NEW" and "MCE". Values range from 2,599,609 to 51.
- HD 1.3:** A table with columns for "NEW" and "IBD". Values range from 500,610 to 214,716.
- IBD CS 12:** A table with columns for "Opns" and "Structure". Values range from 3 to 51.
- Hazardous Fragment Distance:** A table with columns for "IBD" and "NEW". Values range from 11 to 3.

**Co-Author:**  
**Mr. Mark Petersen**  
**Program and Evaluation Division**  
**Department of Defense Explosives Safety Board**

**USATCES**  
**Risk Management Division**  
**DSN 956-8804**  
**Comm (918) 420-8804**

Questions/Comments