

Question:

The users manual shows the didymium tolerance to one decimal point and the EasyMatch QC Diagnostics program shows to two decimal points. For example

@430nm the manual says by no more than 1.2 %T and the QC Diagnostics shows +/- 1.25 %T These values are not equivalent, which is correct.

Answer:

significant digits have significance. The USPro has a fixed reporting using double precision floating point. Meaning every measurement is calculated to 64 decimal points. EZMQC then rounds those readings to report from 0 to 4 decimals places based on user preference.

The manual states the acceptance tolerance with the words "by no more than" which is equivalent to saying "less than or equal to". Taking the 430nm tolerance as an example we specify 1.2 %T as the tolerance. Mathematically this means all of the following possibly results from EZMQC would produce a Pass +/- 1.2, +/- 1.24, +/- 1.249, +/- 1.2499

The author of the report form felt that aesthetically a tolerance of 1.24 was not as pleasing as 1.25, so approximately three thousandths of a nanometer acceptance to the tolerance at each test point was added when the Didymium Filter report was modified. For an average filter curve, remember the tolerance width does vary slightly by the actual filter being used since there is a nominal thickness variation from filter to filter, a 1.249 %T shift equates to a 0.898 nm shift and a 1.254 %T shift equates to a 0.901 nm shift. I would humbly suggest that this difference is quite a bit less than the measurement to measurement variance, so this change isn't causing any significant change in determining the wavelength performance of the instrument.

My guess is that we may need at some point in the future to either make a change to EZMQC or to the Users Manual if the explanation above does not satisfy the customer.