Instructions for Collecting Data Sets for Determining Moisture Content by Water Activity

To collect data needed to create a DUO model for moisture content by water activity measurements for 1 product, follow these 12 Steps:

1.   To develop an AquaLab DUO model for a given product, water activity and moisture content data is needed for a set of samples. A minimum of 20 readings is needed to construct a good model and more may be needed depending on the natural variation of the product. The idea for these samples is to represent the variation natural to the product due to production, so the samples selected for analysis should be taken randomly over time from production runs. Twenty samples is the minimum, but more samples are better and in this case, the more variation in the samples the better. The moisture content method used to generate moisture content data should be the method the DUO is supposed to match.

   i.   The best method to collect water activity and moisture content data would be to take a random sample from production and make at least 3 subsamples (more can be used if more duplication is desired).

      1. 1 subsample should be analyzed for water activity using a AquaLab DUO at 25C (An AquaLab Series 4TE will work as well if an AquaLab DUO has not yet been purchased).

         a. A free version of the AquaLink RG software will be included with the purchase of an AquaLab DUO or a trial version will be included with the purchase of an AquaLab Series 4TE without the DUO functionality (if it is a demo instrument, should still have a trial version of AquaLink RG). This software program will facilitate data collection and should be loaded on a computer that can be connected to the water activity instrument.

         b. If the instrument is connected to a computer while running the water activity tests, the results will automatically be entered into the software program in the water activity column.

         c. If AquaLink RG cannot be used, water activity data should be manually entered into Excel.

      2. The other 2 subsamples should be used to do duplicate moisture content analyses using the company's reference method. Examples of reference methods include oven loss-on-drying, Karl Fischer titration, vacuum oven, or even moisture balances (although not technically a reference method). The average moisture content should then be entered into AquaLink RG in the Reference Moisture column next to its corresponding water activity (or into the excel sheet).

   ii.   Repeat step i for each of the minimum 20 samples (or more if desired) at 25C recording the results for each sample in AquaLink RG (or excel sheet).

2.   If model data is being collected prior to purchasing either an AquaLab DUO or an AquaLab Series 4TE and a water activity instrument isn't available, it may be necessary to demo a water activity instrument from Decagon to collect the needed water activity data.

3.   Once the data has been collected, it should be saved as an Excel or text file and emailed to Decagon at brady@decagon.com. If the data was collected in AquaLink RG, it can be highlighted and either saved as an Excel file, csv file, or copied and

pasted into Excel and saved. All 3 options will work. If the data was collected directly into Excel, then it can just saved as an Excel file.

4.   Decagon will analyze the data and create an appropriate model that will determine moisture content using the water activity.

Note: An AquaLab DUO will be needed for the rest of the steps

5.   Decagon will email back a model file with a .mdl extension, which can then be opened in AquaLink RG using the DUO Model Manager.

6.   Upon receiving the email, the model file should be saved locally to the computer hard drive.

7.   Load the AquaLink RG software, connect to the AquaLab DUO instrument, and open the DUO Model Manager either be selecting the DUO icon in the toolbar or by navigating to Device>Duo (Model Manager) in the menu bar at the top.

8.   The Model Manger has two windows, one on the left showing the models currently loaded on the instrument and one on the right showing all the models available. Models can be added or removed by highlighting them in the appropriate window and then pressing add or remove.

9.   To load a new model(s) just received by email, press the import button at the top right of the Model Manger window. Then browse to find the file saved from the email in step 6 and press OK. All models contained in the .mdl file will now appear in the available models window and can be loaded onto the device.

10.   Once a model file has been imported, the models it contained will always appear either in the right or left window depending on if they are or are not currently loaded onto the instrument. A model can be completely removed from the list of models by choosing the model and then pressing the remove button at the top of the Model Manager window. Any removed file can be reloaded by re-importing the .mdl file.

11.   Once all models have been loaded onto the AquaLab DUO, it should be possible to scroll to each model on the main screen of the AquaLab DUO using the up and down arrows.

12.   Water activity and moisture content testing can now be done simultaneously. The testing procedure is the same as a water activity analysis as detailed in the AquaLab Series 4 manual.

These steps are repeated for each product to be analyzed for moisture content by water activity. In addition, these steps can be repeated for any product to update an existing DUO model if the moisture content values being generated by the AquaLab DUO do not adequately agree with reference method results.