DMA Excel Analysis - How it works (Rev 3 - 13/10/05)

Import Data

Operate the Import Data button
The log file name is selected by the user and then read.
The following fields are populated

Time	Time stamp entry from the log file
Elapsed	Minutes since start of log (10 sec entries assumed)
Fan	Fan speed from log file
Heat	Inlet temperature from log file
Temp	Outlet temperature from log file
RelHdty	Relative humidity from log file
AbsHdty	Calculated as (RelHdy / 100) * (5.2072 + 0.22242 * Temp + 0.018231 * Temp ^ 2 - 0.000050098 * Temp ^ 3 + 0.0000043785 * Temp ^ 4)

The display switches to the Method sheet which contains a plot of Absolute Humidity v Time for the whole log.
Select the required method for determining the start and end points for the analysis.
Click the Proceed button.

The analysis Start and Stop times (Elapsed) are deduced using the selected Method

Method 1

The AbsHdty value for the first entry is taken as the Ambient Humidity
The last +ve transition through Ambient Humidity preceding an AbsHdty value of Ambient Humidity * 1.5 is recorded as the Start point.
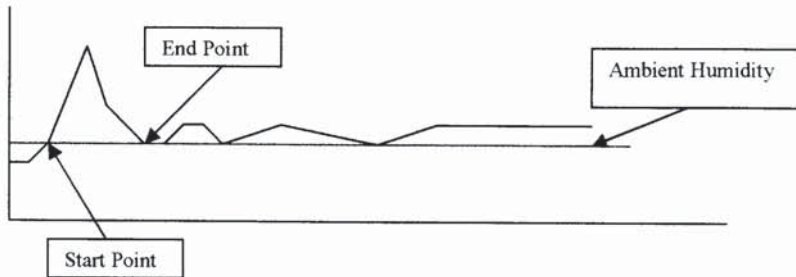The next AbsHdty value less than Ambient Humidity is recorded as the Stop point.
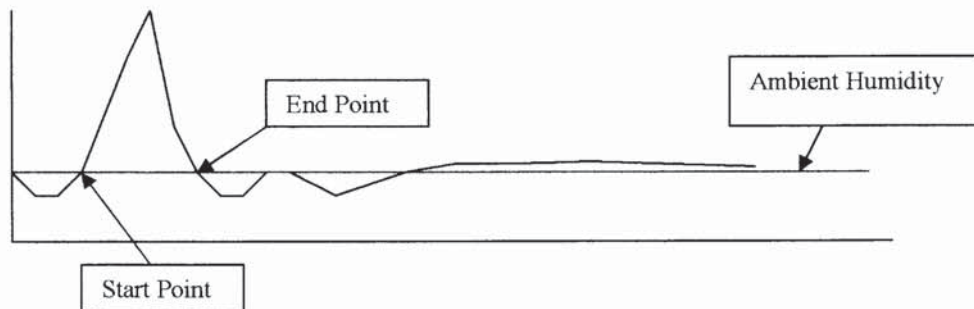
Method 2

The first minimum AbsHdty following an AbsHdty value of 50% of the peak value is recorded as the Ambient Humidity and the preceding point is recorded as the Stop point.
The most recent preceding AbsHdty value less than the Ambient Humidity is recorded as the Start point.
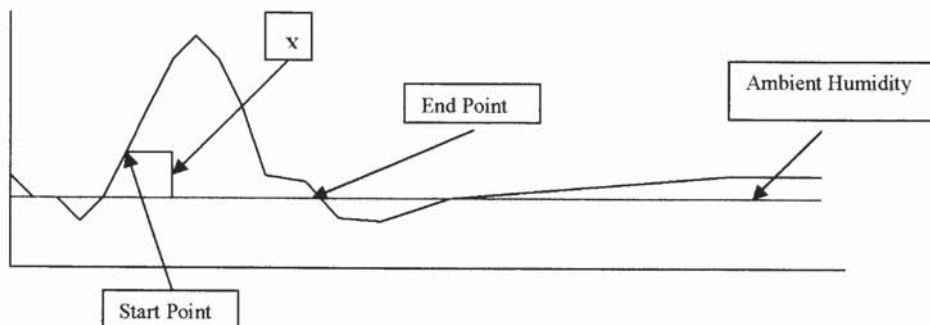

Method 3

The parameter Step is set to value x
The first AbsHdty increase of x is recorded as the Start point (the higher point) and the lower point is recorded as the Ambient Humidity.
The next point at which AbsHdty is equal to or falls below the Ambient Humidity is recorded as the End point.
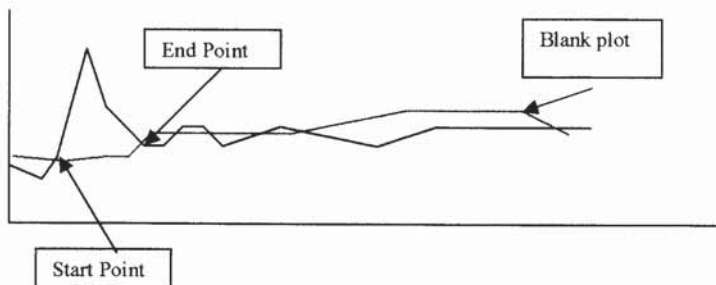
Method 4

You are prompted for the name of a Blank log file which is read and displayed as a second plot on the chart. The position of the Blank plot can be adjusted using the Up, Down, Left and Right buttons. The Restore button will move the Blank plot back to its original position.

The first intersection of the two plots following an AbsHdty value of 50% of the peak value is recorded is recorded as the Stop point. The preceding intersection is recorded as the Start point. In order to automatically deduce the Start and End points it is necessary to adjust the Blank plot to create the two intersections as indicated below.

Click the Process button when the Blank plot has been adjusted.

Following selection of the required method

Note that the methods may not be able to deduce the Start and/or End points.

The Start and End points are offered to the user for editing/acceptance.
Selecting Cancel to either prompt will abandon the analysis.

The user is then prompted for the Wet Sample Weight and the Added Water Weight (the previously used values are offered as defaults). These values are added to the control sheet.

The analysis is performed between the specified Start and Stop points and the various plots created. The display reverts to the Control sheet

The FilterFactor is initially set to 1
The plotted values are added to the control sheet as follows

AdiHdty	AbsHdty - Ambient Humidity (Methods 1 to 3)
AdiHdty	AbsHdty - Blank Humidity (Methods 4)
H2O Loss	AdjHdty * (0.13 + Fan * 0.0187) * FilterFactor
ACC H2O	ACC H2O + H2O Loss * (10 / 60)
Elapsed	Minutes since Start point (10 sec entries assumed)

Total Moisture (gm)	ACC H2O value at Stop point
Calc Moisture %	Total Moisture (gm) / Wet Sample Weight

The following calculated value is added to the control sheet (from Start to Stop point).

H2O %	(Total Moisture (gm) - ACC H2O) / Wet Sample Weight * 100

The various plots are then created and enabled for viewing.