

Chapter 11: Determining Drying Parameters for Unknown Samples

Optimal drying parameters for a sample can be easily obtained by performing trial-and-error analysis. The objective is to establish an ideal Drying Temperature for the sample, as well an optimal Drying Time, and Sample Size.

Drying Temperature - An ideal Drying Temperature is such that will allow the analyzers to completely dry the sample in a reasonable amount of time (with unnecessarily delaying the analysis), but won't burn the sample. Burring or introduction of combustion will always result if an inaccurate result. Even discoloration can be a sign of combustion.

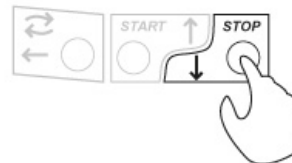
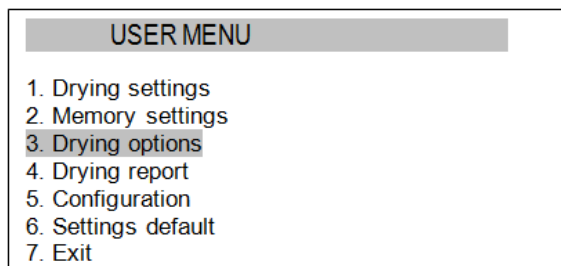
Drying Time – total drying time must be long enough to completely dry the sample. If drying time is too short, moisture will remain in the sample after the analysis is terminated therefore resulting in an incomplete result.

Sample Size – the size of sample must be an adequate statistical representation of the substance or matter which is analyzed. A sample should always be placed in uniform layers measuring 2 to 5mm in thickness and weighing 5 to 15g, depending on the substance. Large samples will require a longer drying time.

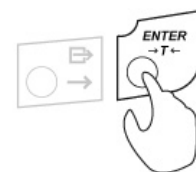
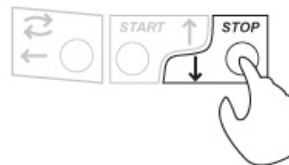
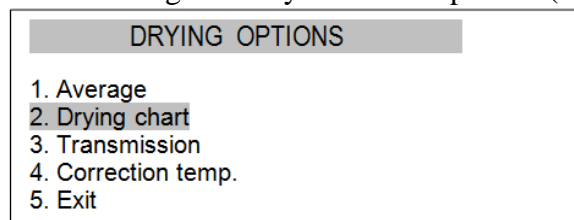
To perform trial-and-error analysis it is recommended to use the analyzer's graph plotting feature (Drying Chart). The graph will assist in determining optimal drying time.

Activating the Drying Chart

1. Press the Menu key and use the navigation keys to select option 3 (Drying Options).



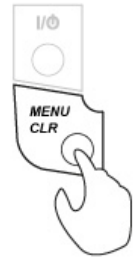
2. Use the navigation keys to select option 2 (Drying Chart)



3. Enable the Drying Chart by switching Status form OFF to ON.

Setting trial parameters and performing trial-and-error analysis

1. Press the MENU key, then use the arrow keys to select “Drying Settings” and press ENTER
2. Use the arrow keys to select parameters and input trial values based on the following recommendations.

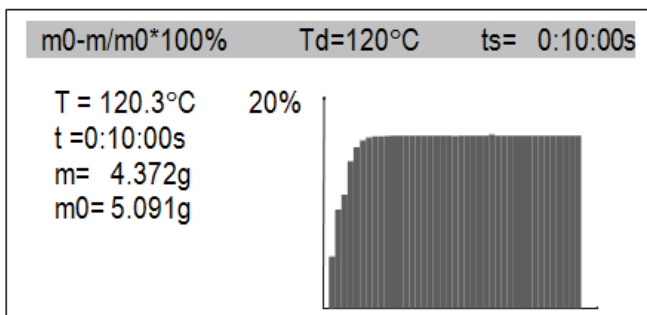


Drying Temperature:	<i>Organic substances:</i>	80 - 120 °C
	<i>Inorganic substances:</i>	140 - 160 °C
Mode:		Time Mode
Calculation:		$m0-m/m0*100\%$
Samples quantity:		0
Sampling Interval:		1sec
Drying Time:		Estimate based on physical properties of the sample i.e. 20 to 30min for substances high in moisture.

3. Perform a trial analysis with the above recommended settings as well the Drying Chart feature enabled.

Warning: *Never leave the analyzer unattended while performing trial analysis.*

11.3. Interpreting the Trial Analysis, making adjustments, and finalizing the settings



Drying Time can be derived by observing the Drying Chart on the analyzer’s display while the trial analysis is in progress. The sample is dried when the slope of the drying chart flattens. The actual drying time should be defined with a reserve, taking into consideration differences in the weight of successive samples.

Drying temperature can be derived by carefully observing the sample inside of the drying chamber while the trial analysis is in progress. Through the chamber peek glass observe the sample to make sure it is not burning or discoloring. If discoloration occurs or if the sample begins to produce smoke terminate the analysis by pressing STOP. Signs of combustion indicate that the current temperature is **too high**. Lower the temperature and perform the analysis again using a fresh sample.

If it is obvious that drying is taking too long and moisture is not evaporating quickly enough, terminate the drying, increase the temperature, and perform analysis again using a fresh sample.