

TGA Standard Operating Procedures

(Do Not Forget to Login to FOM)

Warning: The thermo-couple and drop down wire are very fragile. Please try not to handle them.

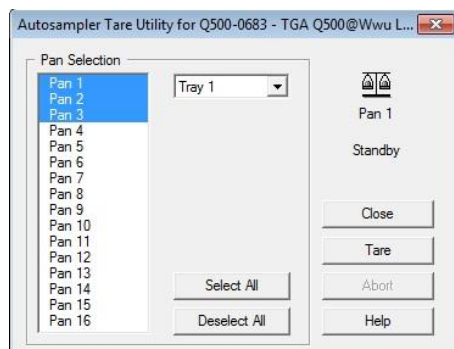
1) Open TA Instrument Explorer



Select Q500-You may have to hit refresh several times until it is available.

2) Tare pans

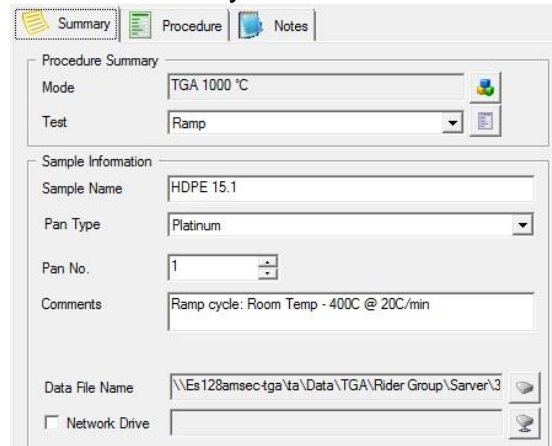
- Load desired number of **clean** pans onto sample tray using clean tweezers.
- Select tare icon (Also found under Calibrate>tare; or simply ctrl-t)
- Select number of pans from menu and press tare. Wait for pans to unload before proceeding



- Load 10-15 mg of sample into pan. (Avoid overflow by placing sample in center of pan)

3) Set-up Experiment

a. Summary Tab



- Select test mode: Typically ramp
- Enter sample name
- Pan type = Platinum
- Select proper pan #
- Enter comments (optional)
- Enter file name and select save location. **Files must be saved within C:/TA or they won't be saved.**



- Select/Create folder in network drive in TGA folder

c. Procedure Tab

The screenshot shows a software interface with three tabs: Summary, Procedure (selected), and Notes. The Procedure Information section includes a dropdown menu for 'Test' set to 'Ramp' and a text box for 'Description' containing the text: 'This experiment is designed to heat the sample at a constant rate. Ideal for determining thermal stability and composition over a broad temperature range.' The Method section contains input fields for 'Heating rate' (25.00 °C/min), 'Final temperature' (600.00 °C), and a checkbox for 'Switch to gas 2 at' (600.00 °C). There are also buttons for 'Advanced...', 'Post Test...', and 'Advanced...'. The 'Switch to gas 2 at' checkbox is currently unchecked.

- i. Review test type (Ramp)
- ii. Set appropriate parameters

d. Comments Tab (optional)

- i. Enter operator details
- ii. Enter extended comments
- iii. **Never change flow rates!**

e. Append Runs

- i. Click append near bottom of instrument panel to add a run
- ii. Add one run per sample pan (New runs inherit old settings)
- iii. Change relevant settings for each run (i.e. sample and file names)

4) Press play to start



- 5) Clean-Up
- 6) Close software.
- 7) Save data files onto thumb drive and/or import files into TA Universal Analysis.

Log off FOM when finished!

For help or concerns contact the lab manager:

Kyle.Mikkelsen@wwu.edu
(360) 650-4280

Instrument Hazards and Best Practices: TGA

This document will cover the inherent hazards when utilizing this piece of equipment as well as the best practices and procedures to avoid danger. These hazards will not include basic things that may be included in the basic safety training document that each user has attested to have reviewed at fom.wvu.edu/documents

Lab coats are to be provided by the user unless special hazards exist in which case they are located at the PPE station.

Hazards:

- Chemical exposure
- Extreme Temperatures (Up to 1000 C)
- Hot Flames (propane torch)

1. Required PPE

Appropriate laboratory attire is required at all times in the AMSEC laboratories. Whenever chemicals are being used, an additional requirement of a lab coat is required. Lab coats are to be provided by the user.

Whenever a user is in the AMSEC labs, the minimum requirement for eye protection is wrap around impact glasses. Anytime liquid chemicals are present in the same room as the user without a direct barrier, all users in the lab must wear chemical splash goggles. Splash goggles must be approved by State of Washington Administrative Code (WAC 296-155-215).

If chemicals being used are considered toxic, caustic, corrosive, flammable solvents, carcinogenic, mutagenic, or teratogenic, a minimum of disposable nitrile gloves is required. Avoid chemical transfer by taking off gloves when using anything other than the chemical(s).

2. Extreme Temperatures

The TGA operates from room temperature up to 1000 C. When the furnace is in the operating position of up, it is very safe and not harmful to the touch. When the furnace is brought down after a run completes, it will be very hot. Avoid contact with the furnace during this period of cooling after a run. Also avoid coming into contact with the cooling air stream exiting the top of the furnace as this may be hot as well. If no air cool executed after a run, it may remain hot for up to an hour. When an air cool is used after a run, it should be cool after 10 to 15 minutes. As a common practice, users should never touch the furnace. This is due to not only the temperature risks, but to keep the furnace from becoming contaminated.

3. Hot Flames

The procedure for cleaning the TGA pans includes the use of a propane torch to heat the samples pans up. The torch flame reaches temperatures over 1200 C and will rapidly heat or set aflame anything it comes in contact with.

Standard laboratory clothing is required, including a lab coat. A minimum of impact glasses are required for this procedure unless liquid chemicals are present. It is recommended to wear flame resistant gloves and a flame resistant lab coat that are provided in the PPE station. Please put them back after use.

Torch operation is straightforward. Avoid using the torch anywhere except near the TGA as care has been taken to prevent anything flammable or combustible from being located in that vicinity. If you notice anything flammable or combustible near the TGA, please contact the lab manager immediately. To use the torch, turn the brass knob on the back counterclockwise until it stops. Then turn the yellow knob on the front to the on position. Then pull the yellow knob and hold it down. If the torch does not ignite at first click, try again until it does. Avoid pointing the torch in the direction of any persons or equipment or furnishings. Use the torch at least two feet from anything.

Standard practice should be to use the long tweezers provided near the instrument to hold the pans during torching. The tweezers should be over 8" and made from steel to prevent rapid heat transfer and temperature resistance. If these tweezers cannot be located, do not perform this procedure until they have been acquired. Contact the lab manager for assistance. To torch the pans, grab them with the long tweezers. Keep your hand being used to grip the tweezers as far from the

flame source as possible. Grab the pan with the long tweezers by the corner of the wire. Avoid grabbing it by the top of the wire. Use the propane torch to heat the sample pan to red hot for at least 5 seconds or until no further change is observed. Let the pan cool down for 3 seconds before setting down. **Caution:** the tweezers will remain hot for several minutes after torching. Take care to avoid coming into contact with the tweezers or letting the tweezers encounter anything they may damage due to high temperatures.