TA Instruments Q20 Differential Scanning Calorimeter (GERB 143)

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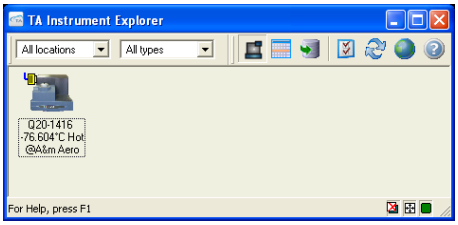
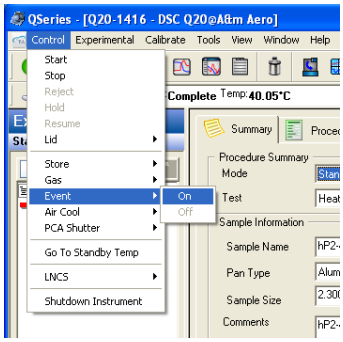
Turn on the RCS (chiller) before beginning your experiment:

1. In TA Instrument Explorer window, double-click Q20 icon





2. In QSeries window:
   Control → Event → On to turn on RCS (chiller)

   <u>Flange temperature needs to cool to < -70 °C before running experiment</u>

<u>CAUTION</u>: RCS 90 chiller cannot perform isothermal holds above 400 °C

CAUTION: We recommend that you do not use the RCS when running isothermal experiments above 400°C. Damage to the unit can occur if used at high temperatures for extended periods.

Prepare your sample

1. Samples should be dry; heat it overnight in a drying oven to vaporize any water/solvent

2. Perform a TGA measurement if necessary to make sure you do not heat the sample to decomposition in the DSC (this will damage the DSC sensors)

3. Place the sample in the pan and <u>take the mass</u>
   - 5-10 mg polymers
   - 10-15 mg crosslinked thermosets
   - 3-5 mg metals or chemical melting

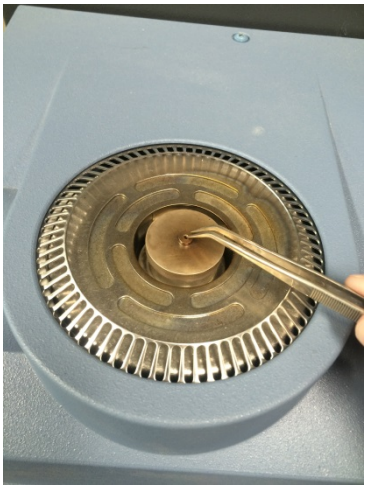
4. Place lid onto your pan and crimp lid down if necessary (MCF does not have a crimper)

Load your sample into the DSC

1. Remove outer lid and place onto metal tray
2. Carefully remove first inner lid with tweezers and place onto metal tray
3. Carefully remove second inner lid with tweezers and place onto metal tray

   Do not touch inner lids with bare hands! Use tweezers!

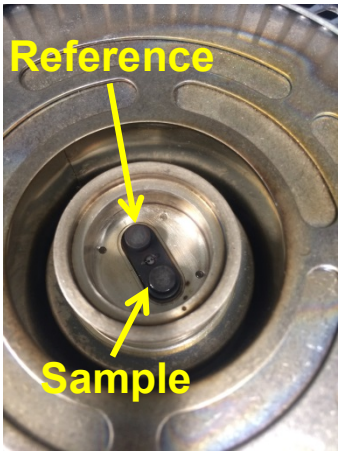
OUTER LID



FIRST INNER LID

SECOND INNER LID

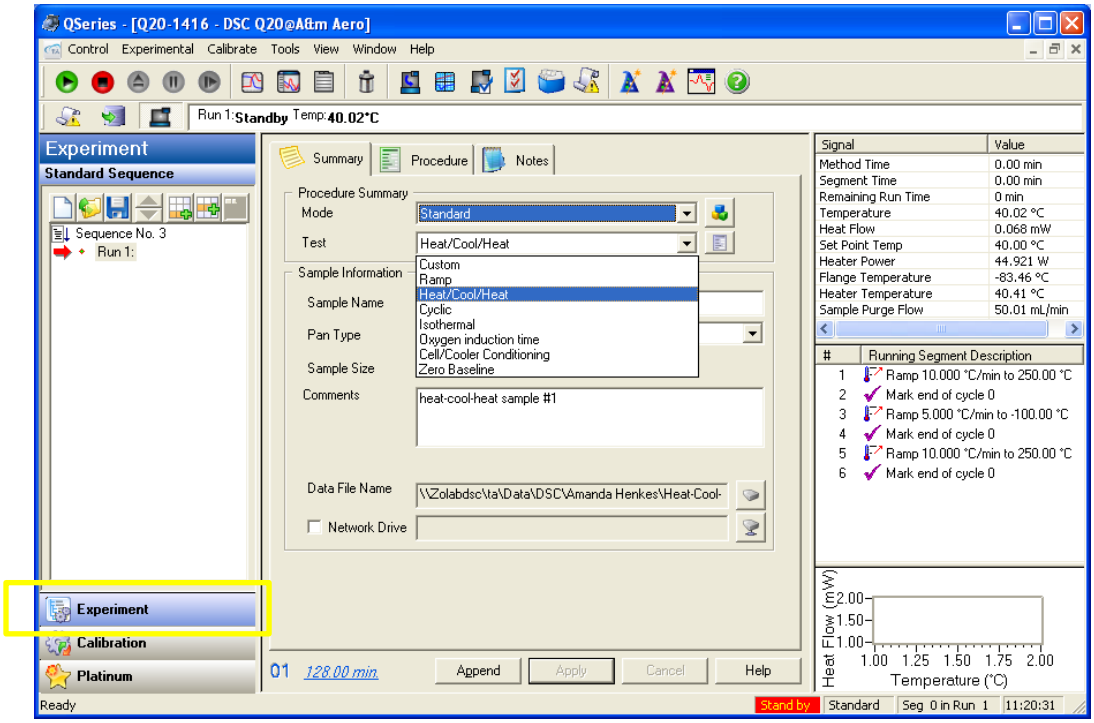
4. Carefully place empty reference pan with lid on rear left platform using tweezers
5. Carefully place sample pan with lid on front right platform using tweezers
6. Replace all three lids



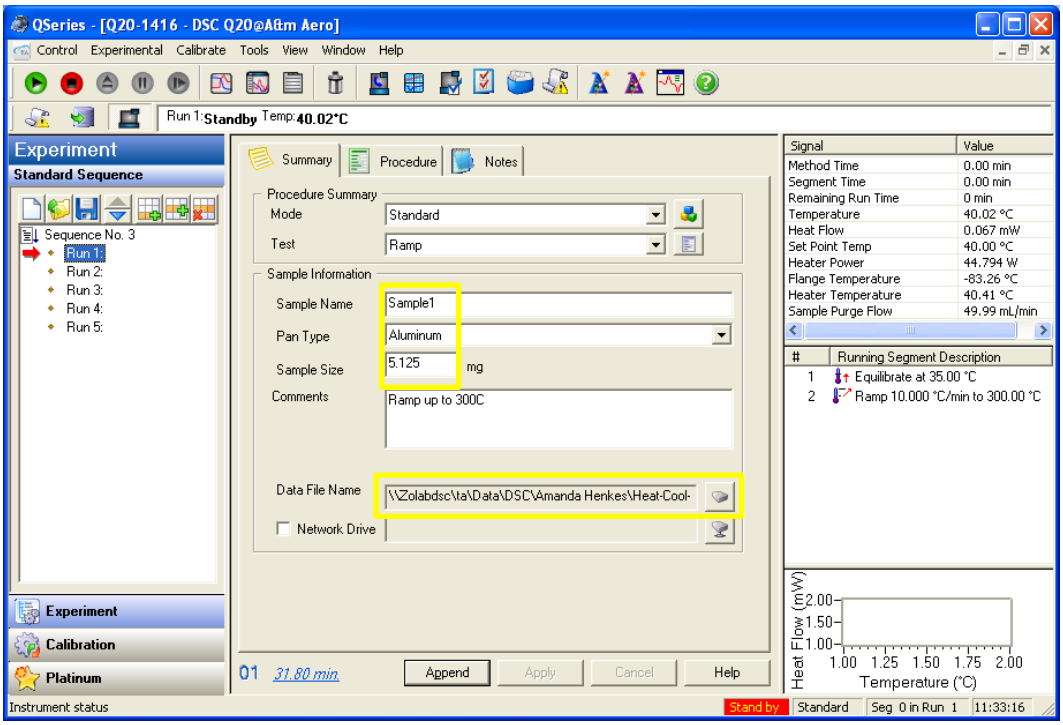
Set up your experiment

1. Click on “Experiment” on the left toolbar to display the last Experiment Sequence
2. In the Summary tab, choose “Standard” mode and select desired test format

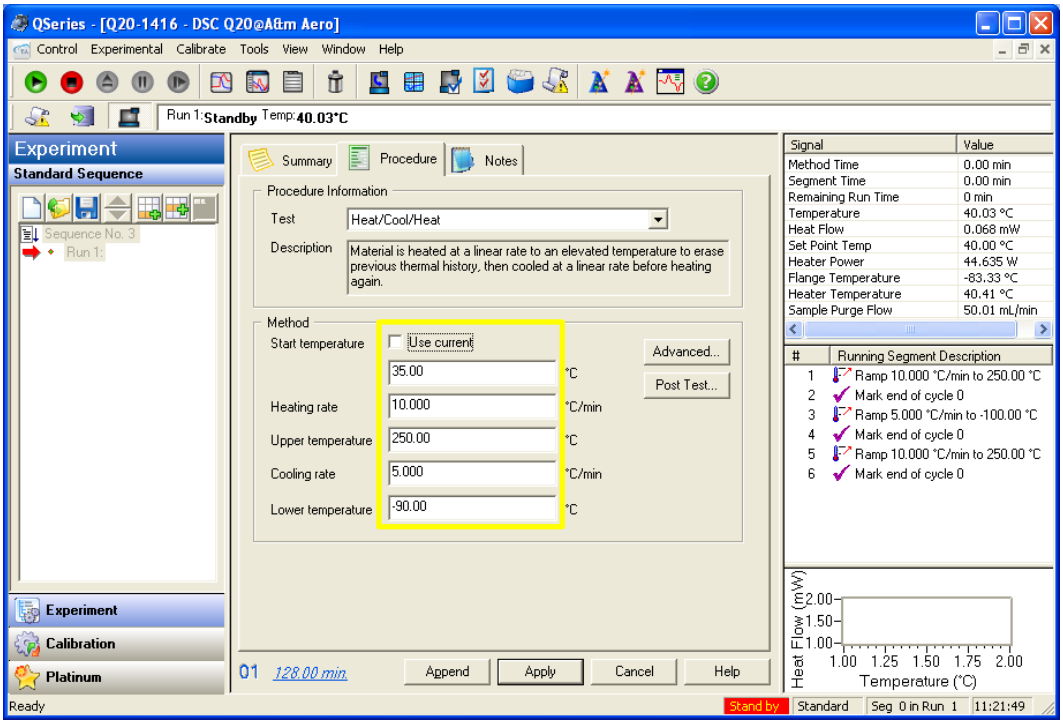
   If the window doesn’t look like this, click the “Experiment View” icon on the top toolbar 



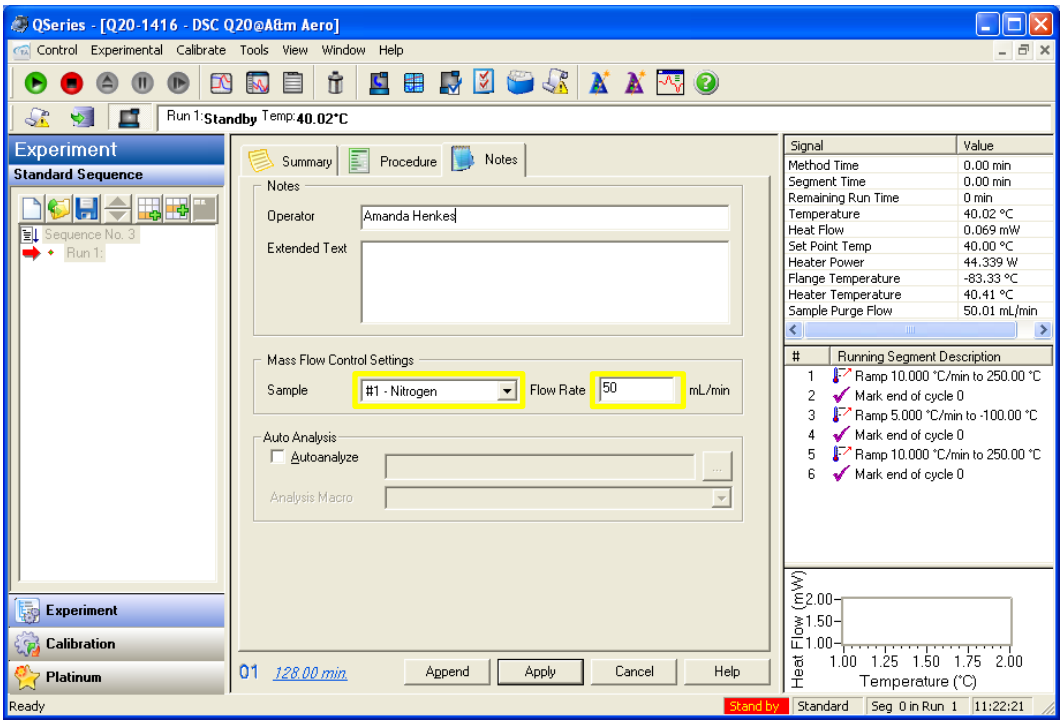
3. Input Sample Name, Pan Type, Sample Size, any comments, and choose a location to save your data.



4. In the Procedure tab, input the temperature and heating rate parameters that are appropriate for your run. ***Do not exceed 400 C.***

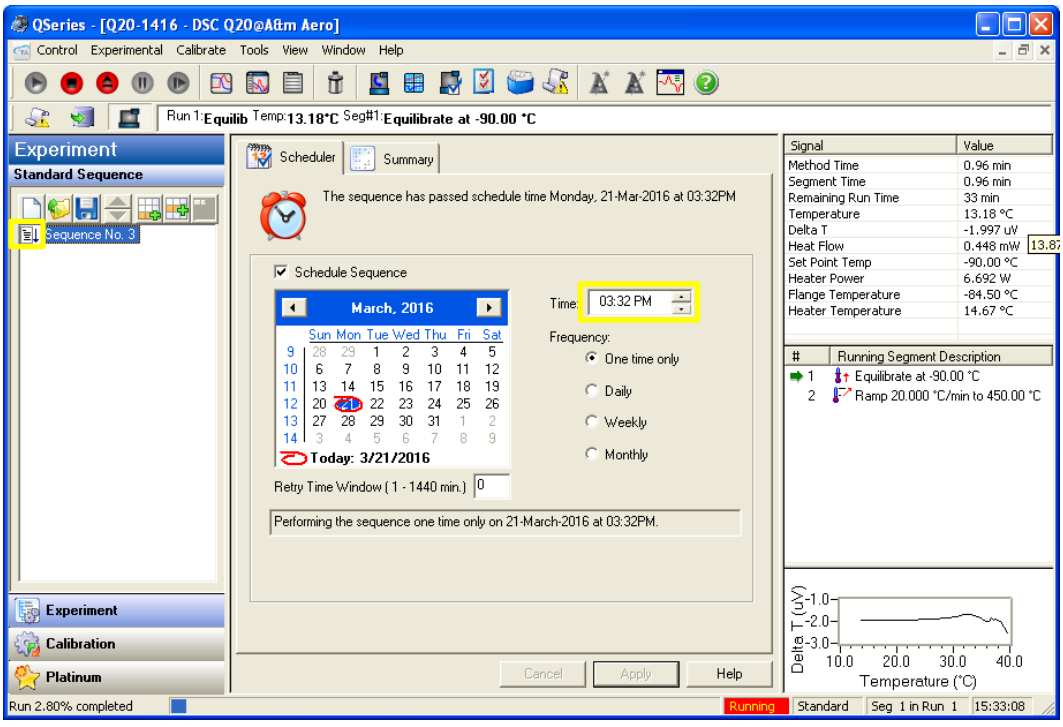


5. In the “Notes” tab, ensure that nitrogen is selected as the purge gas and the flow rate is set to 50 mL/min



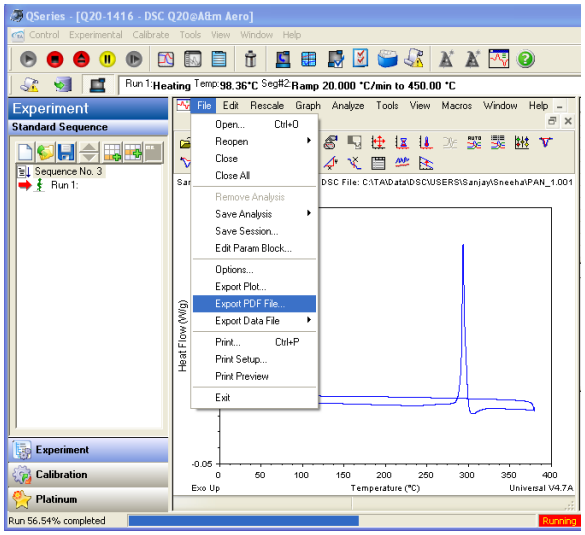
6. Click “Apply” button to update the Experiment Sequence in the left toolbar.

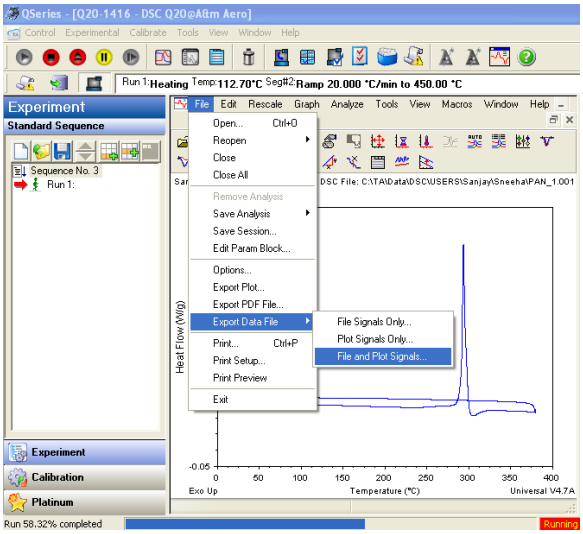
7. Double click your Run or press the green start button to begin your experiment or “Schedule” your experiment



Analyze your data

1. Click “Plot View” or “Full Size Plot View” icon on top toolbar to display the plot window in the center.
2. Open your DSC curve
3. Use the top toolbar to label transitions, etc.
4. Choose File → Export PDF
5. Also export the XY coordinates of your plot; File → Export Data File → File and Plot Signals





Shutdown

1. After experiment ends, temperature should return to standby (40 °C)
2. Turn off RCS: Control → Event → Off
3. Close Q20 software
4. DSC remains on