



Parr Instrument Company

**1341 Calorimeter
Operation**

Goal

- Learn how to run a test on a Parr 1341 Plain Jacket Calorimeter with standard 1108 Oxygen Combustion Vessel.





Warning!

It is important that all Operating Instruction Manuals be read and understood **(especially the safety instructions)** before using the calorimeter. Failure to do so could result in catastrophic failure.

Step 1

- Prepare a Sample
 - Tare a sample cup.
 - Weigh a sample to the nearest .0001 g



Step 2

- Put the sample on the head
 - Attach a fuse wire.
 - The fuse wire should touch or be just above the top of a solid pellet.
 - The fuse wire should not be buried in a powder or granulated sample.
 - The fuse wire should be positioned just above the surface of a liquid sample.



Step 3

- Load the head into the bomb cylinder
 - Place the head into the cylinder.
 - Screw on the cap as far as it will go. Do not over-tighten.



Step 4

- Place the Oxygen Fill Connection on to the 1108.
- Carefully open the valve on the 1825 Oxygen Fill Connection.
 - Watch the output gage until the gage reads 30 atm.
 - Close the valve on the 1825 when the gage reads 30 atm.
 - Release the residual pressure in the gas line by opening the A140VB toggle relief valve.



Step 5

- Fill the bucket with 2 liters (2000 \pm .5 g) of water.
 - Using the same amount of water each time is critical.
- Place the bucket inside the calorimeter.
 - Note: There are three plastic stand offs in the bottom of the air can that line up with the depressions in the bottom of the bucket.



Step 6

- Using the bomb lifter position the bomb part way into the bucket.
- Attach the ignition wires to the terminals on the 1108 bomb head.
 - Try to avoid getting your fingers wet.



Step 7

- Lower the bomb the rest of the way into the bucket.
 - Note that the bomb will sit on the embossed circle on the bottom of the bucket.
- Observe the bomb to make sure that there are no oxygen leaks.
 - Do NOT continue if there are bubbles coming from the bomb!



Step 8

- Close the lid making sure that neither the stirrer or the bucket thermistor are touching the 1108 bomb or bucket. The pulley will be closest to the motor.

Step 9

- Install the drive belt.
- Turn on the motor.
 - Make sure that the belt and pulley are turning smoothly and at a constant speed.



Step 10


- Turn on the 6775 Digital Thermometer.
- Let the stirrer run for 5 minutes to reach equilibrium.
 - At the end of this period record the time on the timer of the 6775 and read the temperature.



Step 11

- Read and record the temperatures at one minute intervals for 5 minutes after the initial 5 minute equilibrium in step 10.

Step 12

- At the beginning of the 6th minute:
 - Stand back from the calorimeter and fire the bomb by pressing the ignition button for 5 seconds. Normally the light will glow for approximately $\frac{1}{2}$ second.
-  **CAUTION:** Do NOT have the head, hands or any parts of the body over the calorimeter when firing the bomb; and continue to stand clear for 30 seconds after firing.

Step 13

- Measure the time to reach 60 percent of the total temperature rise.
 - Measure and record the temperature at 45, 60, 75, 90 and 105 seconds after firing and interpolate between these readings to identify the 60% point after the total rise has been measured.
 - Continue measuring and recording the temperature at 1 minute intervals until the difference between successive readings has been constant for 5 minutes.

Step 14

- After the last temperature reading, stop the motor, remove the belt, and lift the cover from the calorimeter.
- Wipe the thermistor shaft and stirrer with a clean cloth and set the cover on the A37A Support Stand.



Step 15

- Remove the ignition leads and lift the bucket with the bomb out of the calorimeter.
 - If another bomb and bucket combination is ready it may be put in at this time and go to step 8.
- Remove the 1108 bomb from the bucket and release the pressure by loosening the valve knob.
 - If you are analyzing the bomb rinse water then release the pressure slowly (over not less than one minute) to avoid entrainment losses.

Step 16

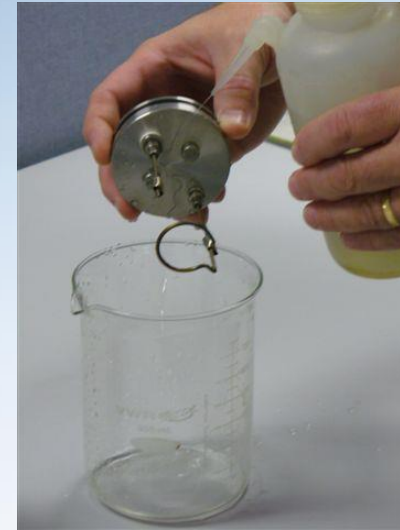
- Fuse correction determination.*
 - Remove the unburned remains of the fuse wire.
 - Measure the unburned length and subtract from 10 cm. Multiply this by 2.3 cal/cm to get the result.
 - The 45C10 Fuse Wire card may be used to directly measure how many calories the fuse wire contributed.



*This step can be skipped if you are using a fixed fuse correction.

Step 17

- Rinse the bomb head and cylinder.
 - Use distilled water and rinse thoroughly.
 - Save the rinse water for further tests as required.
- Dry the bomb head, cylinder and screw cap.
- The bomb is now ready to prepare for the next test.



Where to get more Information

- Please refer to the 204M Operating Manual for the 1341 Plain Jacket Calorimeter and 205M Operating Instructions for the 1108 Oxygen Combustion Vessel for additional diagrams and information. (You must [register/log in](#) on our website to access instruction manuals.)
- Operating Manuals can be downloaded from the Parr Instrument Company website (www.parrinst.com), from your local Parr dealer, or by contacting Parr customer service directly at parr@parrinst.com.



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