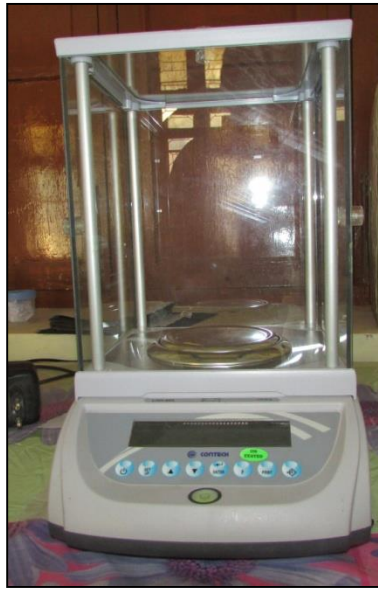


# Weight Balance

## Applications

A weight balance is a device used to find accurate measurements of weight.



## Technical Specifications

1. **Capacity:** Up to 1 kg
2. **Readability:** 0.0001g
3. **Pan Size:** 3.1 inch or 79 mm
4. **Housing H" x W" x D"(mm):** 8.4 x 13.5 x 13.4 (213 x 343 x340)
5. **Response Time:** 2.5 Sec.
6. **Tare Range (Subtractive):** Full of Capacity
7. **Power Supply:** Adaptor as well as Rechargeable Battery

## **Standard Operating Procedure**

1. Switch 'ON' the Main supply.
2. Switch on the machine followed by MCB.
3. Put the sample on the pan to measure.
4. Close the balance machine tightly each side.
5. Push the tare button and make it zero.
6. Then read the weight of the sample from the LCD display.

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# Bomb Calorimeter

## Applications

A device for determining heats of combustion by igniting a sample in a high pressure of oxygen in a sealed vessel and measuring the resulting rise in temperature: used for measuring the calorific value of different types of fuel



## Technical Specifications

1. Bomb calorimeter equipped with Digital Differential Temperature (DDT) / Firing Unit (FU) provides an accurate, simple & inexpensive method for determination yes
2. **Application:** (a) Heat of Combustion, (b) Calorific Values & (c) Sulphur contents of solid & liquid fuels
3. **Differential Temperature Range:** 0 - 10 °C
4. **Firing Voltage:** 12 V AC

**5. Operating Time:** per test 10 - 15 minutes (main testing period)

**6. Temperature Testing:** 5 - 50° C

**7. Temperature Resolution:** 0.01° C

### **Standard Operating Procedure**

1. Ensure that there is a convenient access to running water, a sink drain and electrical power.
2. To prepare the sample, take benzoic acid in magazine paper and tare the magazine paper on digital balance. Weigh out 1 gram of the benzoic acid powder.
3. Do not smell or inhale the benzoic acid powder.
4. Take 1 gram sample in the pellet press by forcing the sample powder down through an internal die.
5. Use the pair of forceps to bind the nickel alloy fuse wire to the two electrodes (looped and straight electrode) located on the inlet side of the bomb.
6. Add 1 ml of water in the bottom of the bomb, water will act as sequestering agent and an absorbent for gases in bomb.
7. Place the sample pan on the looped electrode on the inlet side of bomb head. The loop of fuse wire should be set slightly above the surface of benzoic acid or it can touch the sample itself to get better combustion rates.
8. Be careful not to disturb the sample when moving the bomb head to the bomb cylinder.
9. The bomb is then ready for the oxygen filling operation.
10. Before the oxygen filling, set the screw/knurled cap on bomb cylinder and turn it down firmly by hand.

11. Charge the bomb with oxygen. Press the fitting on the end of oxygen hose into the inlet valve socket of bomb. When the desired pressure is obtained in bomb, close the filling connection valve (turn in clockwise direction). Try to achieve as close to 30 atm as possible. Never pressurize the bomb with more than 40 atm pressure.
12. On closing the filling connection valve on the oxygen tank, the oxygen supply is shut off to the bomb and the bomb inlet check valve will close automatically. Shut off the main tank valve.
13. If the experiment is being carried out with a sample other than benzoic acid then the caloric value should be determined prior to the experiment. The proper mass used should not exceed 8000 cal.
14. Fill the calorimeter bucket with water.
15. Use the thermometer to stir and fill the beaker to the correct temperature (21°C).
16. Now the bucket is ready to be set in calorimeter jacket
17. Before placing the calorimeter cover on the jacket, check the stirrer shaft attached on the calorimeter cover to ensure that it turns freely.
18. Now the stirrer is ready to be used in the experiment. Do not place the cover on table top. Always set the cover in a position to protect the thermometer bulb and stirrer shaft of the calorimeter cover.
19. Turn the knob on top of stirrer drive motor until it clicks. The stirrer will start stirring the water in the bomb calorimeter assembly. Let the stirrer run for at least five minutes before performing the actual experiment so that the system attains equilibrium.
20. After running the stirrer for 5 minutes, start the timer and record the temperatures to one tenth of the smallest scale division

21. Read and record the temperatures at a one minute interval for next five minutes. • At the start of 6th minute, stand back from the bomb calorimeter and fire the bomb by pressing the ignition button and holding it down until the indicator light goes out.
22. After firing the bomb the bucket temperature will rise.
23. This rise will be rapid at the start and will decrease after a few seconds. Read and record temperatures from the thermometer at a 15 second interval for the next 3 minutes.
24. Once the temperature is constant then shut off the stirrer drive.
25. After releasing all the pressure and gases out of the bomb, remove the bomb head and place it in upright position.
26. Measure the unconsumed fuse wire length if any is found.
27. Wash and clean the bomb, the washers and the bucket.

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# Drying Oven

## **Applications**

A heated chamber for drying; *specifically*: one for drying clay ware or glazed ware before firing.



## **Technical Specifications**

1. Top: Table top
2. Temperature (max): 300 ° C
4. Fresh air damper: Manually controlled
5. Multi-purpose ovens perform economical drying, curing, baking, and sterilizing of high-volume samples
6. Chamber Volume: 215 liters

## **Standard Operating Procedure**

1. Switch 'ON' the Main supply.
2. Switch on the machine followed by MCB.
3. Push the MENU key
4. Push the enter key after making a sub-display an arbitrary set temperature by pushing the  $\Delta$ (up) and  $\nabla$ (down) keys.
5. Press either the  $\Delta$ (up) key or the  $\nabla$  (down) key several times. Then, the desired set temperature will appear on the main display.
6. Then press the enter key.
7. After completion of the crushing operation, Switch 'OFF' the machine along with MCB connection, then cut the main supply.
8. Before leaving, clean the equipment properly.





# Digital Electronic Balance

## **Applications**

An electronic balance is a device used to find accurate measurements of weight. It is used very commonly in laboratories for weighing chemicals to ensure a precise measurement of those chemicals for use in various experiments.



## **Technical Specifications**

- 1. Capacity:** Up to 500 gm
- 2. Readability:** 0.0001g
- 3. Pan Size:** 3.1 inch or 79 mm
- 4. Response Time:** 2.5 Sec.
- 5. Tare Range (Subtractive):** Full of Capacity
- 6. Power Supply:** Adaptor as well as Rechargeable Battery

## **Standard Operating Procedure**

1. Switch 'ON' the Main supply.
2. Switch on the machine followed by MCB.
3. Put the sample on the pan to measure.
4. Close the balance machine tightly each side to enter the air.
5. Push the tare button and make it zero.
6. Then read the weight of the sample from the LCD display.

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# Density Meter

## Applications

Tapped density is obtained by mechanically tapping a graduated measuring cylinder or vessel containing a powder sample. After observing the initial powder volume or weight, the apparatus measuring cylinder or vessel is mechanically tapped, and volume or weight readings are taken until little further volume or weight change is observed.

## Technical Specifications



- 1. Tap Density Apparatus:** settling/tapping apparatus, graduated cylinders
- 2. Operation:** LED and membrane panel
- 3. Number of strokes:** Selectable from 1-99999
- 4. Speed(Variable):**  $300 \pm 1$  tap/min
- 5. Graduated Cylinder:** Glass(calibrated)

## **Standard Operating Procedure**

1. Switch 'ON' the Main supply.
2. Switch on the machine followed by MCB.
3. Put the sample on the pan to measure.
4. After observing the initial powder volume or weight, the apparatus measuring cylinder or vessel is mechanically tapped, and volume or weight readings are taken until little further volume or weight change is observed.
5. The mechanical tapping is achieved by raising the cylinder or vessel and allowing it to drop under its own weight.

