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Serrata Absolute Zero Demonstrator

Instructions for Cat. No: 1014028 - Absolute Zero Demonstrator

Absolute zero is the lowest theoretical temperature it is possible to achieve and on the Celsius scale is – 273.16°C degrees (or 0°K – Kelvin Scale).

At this temperature, in theory, at least, all molecular motion ceases and for all practical purposes absolute zero is the lowest limit of coldness.



Operation

Obtain four clean Pyrex beakers of 1500 ml capacity..... check that the bulb or sphere of your Zero demonstrator fits easily into these containers.....if not, select a larger size that will suffice.

Fill the first beaker 75% full of water and heat to boiling point.

Fill the second beaker with cold water at ambient temperature.

Fill the third beaker 75% full with a mixture of cold water (ambient) ice and 50 grams or so of Calcium Chloride (plain salt will do).

Leave the fourth beaker empty as a vessel into which you can dispose of water not required during the course of the experimental process.

Remove the beaker of boiling water from the heat source and have the other beakers neatly arranged nearby.

Immerse the sphere of the Zero apparatus into the hot water and record the pressure at its peak.....simultaneously record the temperatureso you have peak pressure/

Cat no. 1014028 - AU\$120.00

temperature reading

Next decant about 100 ml of hot water and dispose into the empty beaker and replace the hot water (100 ml) with 100 ml of plain cold water....immerse the sphere into this and record peak temperature/pressure.

As time permits repeat this process as many times as possible, each time removing 100 ml of hot water and replacing it with plain cold water and record the pressure/temperature at its peak reading.

Finally, immerse the sphere into the water/ice/salt mixture and record the peak pressure/temperature.

To analyse your experimental results plot the data on an xy graph (pressure in PSI or Kpa) versus temperature in degrees Celsius.

Note: Draw the graph so that one fourth of the x axis (temperature) is positive and three fourths is negative.....the x axis is then scaled from –300C at the origin to +100C.

The y axis is scaled from zero at the origin to +24.7 PSI or the equivalent in Kpa.

Plot the temperature-pressure points and connect with a straight line.

Then extrapolate that line until it intersects the x axis (that is the point where the pressure on the y axis equals zero).

The resultant intersection of the line and the x axis should be within +/- 25c of the accepted value of absolute zero –273°C (0°K).

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