# Checkpoint 1

Aim: Experimentally determine a numerical value for the absolute zero of temperature using the ideal gas law

Date: 29/09/2021

Title: Absolute Zero

# Diagram, engineering drawing Description automatically generatedCheckpoint 2

Chart

Description automatically generated

# Checkpoint 3

Run 1

|  |  |
| --- | --- |
| Temp. (°C) | Pressure (kPa) |
| 75 | 117 |
| 39 | 107 |
| 20 | 101 |
| 0 | 96 |
| -196 | 31 |

Run 2

|  |  |
| --- | --- |
| Temp. (°C) | Pressure (kPa) |
| 68 | 92 |
| 55 | 90 |
| 21 | 82 |
| 2 | 73 |
| -196 | 22 |

Run 3

|  |  |
| --- | --- |
| Temp. (°C) | Pressure (kPa) |
| 58 | 62 |
| 49 | 59 |
| 21 | 56 |
| 2 | 51 |
| -196 | 18 |

# Checkpoint 4

1. Y = 0.326x + 93.24
2. Y = 0.259x + 74.819
3. Y = 0.169x +51.266

Intersects at:

1) = 2)

0.326x + 93.240 = 0.259x + 74.819

0.326x – 0.259x = -93.240 + 74.819

0.067x = -18.421

-0.102x = 32.845

X= -274.940299 +- 0.0775 degrees celcius 0.326 – 0.169/2 = uncertanty

X = -274.94 +- 0.08

1. Y = 0.334x +93.141
2. Y = 0.288x + 73.791
3. Y = 0.188x + 50.551

Intersects at:

1. = 3)

0.334x + 93.141 = 0.188x + 50.551

0.156x = -42.59

X = -273.01 +- 0.08

1. = 3)

0.288x + 73.791 = 0.188x + 50.551

0.1x = -23.24

X = -232.400

Average of 2 intersections = -273.01 – 232.400/2

= -252.701 +- 0.08 degrees Celsius

-274.94 - -252.701/-274.94 = 8%

The value without nitrogen is 8% away from the value with nitrogen. The result without nitrogen is not accurate because there is 2 points of intersection on the graph, meaning the result had to be averaged between them, and the averaged result including the uncertainty was not near the real absolute zero

# Checkpoint 5

With ice and water, it would cool down the bulb faster as there is more surface area, if there was no water, the ice would melt before it cooled down the bulb

The aim was to experimentally determine a numerical value for the absolute zero of temperature using the ideal gas law. The results with nitrogen was -274.94 degrees Celsius which is very close to the accepted value of -273.15 degrees Celsius. The results without nitrogen was -252.701 degrees Celsius which is not close to the accepted answer.