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| Full Name: |  |

Ideal Gas Constant

Lab Report

## **LibreTexts page:** [**8: Gases**](https://chem.libretexts.org/Courses/University_of_Arkansas_Little_Rock/Chem_1402%3A_General_Chemistry_1_(Belford)/Laboratory/08%3A_Experiment_8_-_Gases)

## **(**<https://chem.libretexts.org/link?214685>)

**Please don’t edit, rearrange or delete anything that is already in this document. Just add your answers inside the boxes.**

**You can use shortcuts for superscripts and subscripts when needed:**

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**IMPORTANT:**

**Graphs have to include all titles (graph title and axis titles), units, equations and trendlines.**

**Show calculations for partial credit.**

**Use units in your calculations.**

**Remember, slope has units too!**

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| **Vread** - Volume according to the syringe markings.  **Vactual** - Volume accounting for any air in the syringe when Vread is zero ml.  **Troom and Proom** - Temperature and pressure in the room during the experiment. |

**Overview:**

1. **Obtain Experimental Data**
2. **Plot P vs Vread**
3. **Plot P vs 1/Vread**
4. **Calculate Vactual**
5. **Plot P vs. 1/Vactual**
6. **Using 2-State approach calculate n using initial Vactual, when Vread =0, Proom and Troom compared to STP values.**
7. **Calculate R using slope from P vs. 1/Vactual.**
8. Open this [Google Sheet](https://docs.google.com/spreadsheets/d/1DHfr_b6gZPgbJN3GOUrcbZR8Xo4kWkcJrdGQRhmtk-8/edit?usp=sharing) and observe the data stream. When the stream is over, copy the data to your own Google Sheet.
9. Pressure data streams in kPa by default. Convert it to atm (make a new column). Watch the following YouTube on how to use a formula on a column of data. It is also posted in Google Classroom.  
   https://youtu.be/RgB7CoVCxMQ
10. GRAPH 1. Make a plot of P vs Vread. Give it a title Graph 1. Take a snapshot of your graph and the data you used to plot it and insert below.

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1. GRAPH 2. Make a plot of P vs 1/Vread. Give it a title Graph 2. Take a snapshot of your graph and the data you used to plot it and insert below.

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1. Using Graph 2, find Vactual, when Vread =0.

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| Vactual (at Vread=0) = |

1. In your Google sheet Convert all Vread values to Vactual (make a new column).
2. Convert all Vactual values to 1/Vactual (copy to a new dataset along with the P values).
3. GRAPH 3. Use the new dataset to make a plot of P vs 1/Vactual. Give it a title Graph 3. Take a snapshot of your graph and the data you used to plot it and insert below.

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1. Fill out the table below for all values except n1. For State 1 use values of Troom, Vactual, Proom. State 2 is STP for one mole of a gas.

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| **State 1 (Room)** | | **State 2 (STP)** | |
| **T1** |  | **T2** |  |
| **V1** |  | **V2** |  |
| **P1** |  | **P2** |  |
| **n1** | *Calculate below* | **n2** |  |

1. Using 2-State approach calculate n using initial Vactual, when Vread =0, Proom and Troom compared to STP values.

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| n1= |

1. Calculate R using slope from Graph 3.

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| R= |