**CHEM101 Report for Laboratory Exercise #1**

# Measurement of Volumes and Weights: Accuracy and Precision1

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**Abstract**

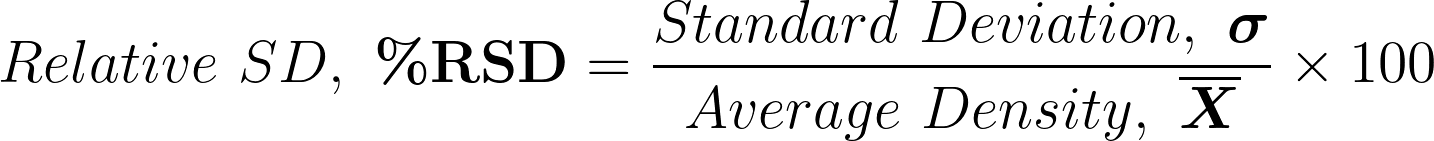
By measuring the volume and weight of samples the density of a solution of NaCl (concentration **2.676** *mol/L*) was determined to be **1.05** *g/mL*.

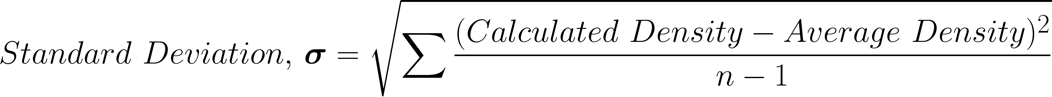
**Data/Results**

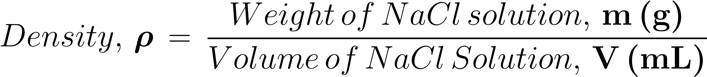
**Table 1.** Experimental data and calculated values

|  |  |  |  |
| --- | --- | --- | --- |
| **10.00 mL of NaCl solution** | # 1 | # 2 | # 3 |
| Weight of sample from Volumetric pipette (g) | 11.132 | 10.150 | 10.133 |
| Calculated density (g/mL) | 1.1132 | 1.0150 | 1.0133 |
| Concentration (mol/L) | 2.676 | | |
| Average calculated density of NaCl solution (g/mL) | 1.047166667 ≅ 1.05 | | |
| Standard Deviation, σ | 0.46697775345537 ≅ 0.05 | | |
| %RSD for the density of NaCl solution | 5.462% | | |

**Algebraic Equations**

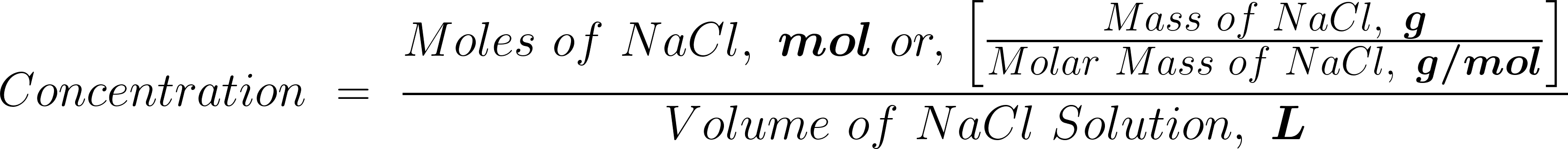






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**Discussion**

The density of the prepared NaCl solution **2.676 *mol/L*** was determined to be **1.05 *g/ml*** by measuring 3 samples of 10.00 mL of the NaCl solution. The %RSD calculated for these measurements was **5.462%**. The accuracy of the measurement required the use of a pipette and not a graduated cylinder because **pipettes are designed to deliver precise volumes, ensuring that each 10.00 *mL* sample is consistent in volume**.

**Conclusions**

The measured density of the NaCl solution with concentration **2.676** ***mol/L*** using a volumetric pipette is **1.05 *g/ml*** with a % relative standard deviation of **5.462%**.

**References**

1. Reimer, M. et al, *Laboratory Manual, Chemistry 101*, pp. 13-18. (University of Victoria: Victoria, B.C.). **Summer 2024**.

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