Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Lab # \_\_\_ Thickness of Aluminum Foil

**Minutes:** 60

**Aim: Determine the thickness of a sample of aluminum foil to see whether it meets manufacturing specifications (+/- 10%).**

**Materials: (List *all* materials used). (3 pts)**

**Method:**

**1. Cut a piece of aluminum foil into a rectangle a minimum of 20cm x 30cm.**

**2. Measure the length and width of the foil in cm.**

**3. Measure the mass of the foil in g.**

**4. Obtain the density of aluminum from the Reference Table.**

**5. Calculate the volume of the foil (using data).**

**6. Using the formula for the volume of a rectangular prism (*v*=*l* x *w* x *h*) solve for the thickness (height) of the foil.**

**7. Record class data and calculate average thickness.**

**8. Determine the accuracy of the result (solve for percent error).**

**Data (in Table form): List each measurement taken and the result, to proper precision, with units. (12 pts)**

|  |  |
| --- | --- |
| **Measurement:** | **Value (w/ units):** |
| **Length** |  |
| **Width** |  |
| **Mass** |  |
| **Density** |  |

**Data Analysis: Use data recorded above to determine a final answer for the thickness of the sample of foil. Show all work, including formulas and numerical set ups. Box the final answer (with units). (7 pts each = 14 points)**

**Solve for volume:**

**Solve for thickness (height).**

**Convert answer to µm (see Table C): (5 pts)**

 **= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ µm**

**Class Data/Average: Record the results from each lab group below, then calculate the class average. (5 pts)**

|  |  |
| --- | --- |
| **Sample** | **Thickness ( µm )** |
| **Group 1** |  |
| **Group 2** |  |
| **Group 3** |  |
| **Group 4** |  |
| **Group 5** |  |
| **Group 6** |  |
| **Average** |  |

**Percent Error (Class Average):**

For accepted value, use the manufacturer specification of 10.000 µm (8 pts)

**Questions (18 pts)**

**1) (5 pts) In your calculations you used measurements of length, width, mass, and density. Of these, which one (or ones) was least precise? Explain why.**

**2) (8 pts) To increase the precision of the mass measurement, Irene suggests purchasing an electronic balance which can measure to the thousandths position. Stanley believes that all they need to do is cut a larger rectangle with a mass. Is Stanley correct? If so, how large a piece (in mass) do they need to get greater precision.**

 **3) (3 pts) What determines if the class average for the thickness of aluminum foil is within manufacturing specifications?**

**4) (2 pts) Is the class average within manufacturing specifications?**

**Lab #3: Thickness of Aluminum Foil (To be submitted via Google Classroom)**

**Conclusion (35 pts)**

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**Claim: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Evidence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Reasoning: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**CER Rubric**

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