Lab Report Writing

For Materials Science

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The University of Iowa
Hanson Center for Technical Communication
Teaching Engineers to Express Their Expertise

Purpose of Lab Reports

- Explain the intention of conducting these experiments.
- Lead readers step-by-step through your methods.
- Display and discuss the results.
- Provide plausible reasons for readers to accept your conclusions.
- Narrate the story of the experiments.

Section Style Overview

- The **Abstract** could be reviewed quickly and acted upon by a top executive.
- The **Introduction and Background** and **Conclusion** sections provide non-technical detail and narrative for a general audience.
- Professionals in your field will understand and could duplicate the experiment from your **Experimental Methods, Results and Discussion**, and **Appendices** sections.

Avoid Plagiarism

- Write your report on your own
- Do not copy others' work
- Do not write collaboratively
- Cite all sources
- Apply quotation marks when using sources verbatim

For more information on avoiding plagiarism, see also:

- Understanding and Avoiding Plagiarism (HCTC).
- Source Use and Plagiarism Policy (HCTC).
- Student Academic Handbook (University of Iowa).

Writing Guidelines

- Use complete sentences.
- Pay attention to verb tense.
  - What was done in the lab: past tense
  - The purpose of the lab and your conclusions: present tense
- Avoid "I" or "we" statements. Use passive voice when needed.
  - Example: "The experiment was conducted under these circumstances."

    NOT: "We conducted the experiment under these circumstances."
- Do not make bulleted lists within the body of report.

Word Choice

Avoid these words/phrases:	Substitute these:
Did, made, saw, etc. (weak verbs)	Collected, reported, determined, created (strong verbs)
Results were found	Results were observed, measured, obtained, calculated
A study/experiment was done	A study/experiment was conducted, performed
Weigh / weight was taken	Weight was measured
Possible	Feasible
Experiment (verb)	Investigate

Abstract

The Abstract should address these five issues:

1. Who requires these lab tests and why (present tense)
2. Purpose and scope of tests (past tense)
3. How the tests were conducted (past tense)
4. Results (past tense)
5. Conclusion/Recommendation (present tense)

Introduction & Background

Introduction

- Introduce subject of the lab
- Describe the problem that the experiment attempts to solve
- Include definitions of terminology
- Include who, where, and when

Background

- Include theoretical values for material properties (tensile strength, hardness, coefficient of expansion, etc.)
- Specify the materials to be tested
- Introduce equations

Experimental Methods

- Describe:
  - test(s) that you conducted
  - methods that you used
- Include relevant photos or illustrations of equipment used

Results & Discussion

- Summarize major findings
- Include values calculated and/or measured
- Indicate additional analyses or experiments needed
- Describe assumptions made
- Represent data in a table or a graph (if needed)
- Typically write in past tense

Guidelines for Tables and Figures

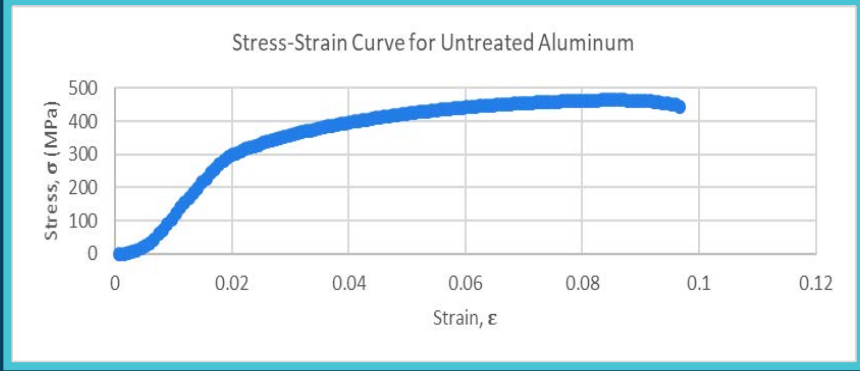
- Place titles above tables

Title

Table II: Hardness test results of 1018 steel before and after water quench

Hardness before Treatment (HB)	Hardness after Treatment (HB)	% change
45	60	+33.3%
45	42	-6.7%

- Place captions below figures



Caption

Fig. 4: Stress-strain curve illustrating the elastic and plastic deformation of the untreated aluminum bolt before failure. *(Credit: Allison Rowe)*

Other Guidelines for Tables and Figures

- Labels:
  - Graphs, figures: "Fig. [#]"
  - Tables: "Table [#]"
  - Note that graphs are not labeled "Graph."
- Include critical tables and figures in the body of the report.
  - Less important figures and tables can go in the appendix.
- Always introduce your figures or tables in writing prior to their inclusion in your report.
- Keep all parts of a table or figure on the same page.

Conclusion

- Include a two- to three-sentence summary of the report
- Tell a brief story of the experiment
- Make a recommendation or discuss future implications

References

- In-text citations should be (author, year)
- Reference list should be in APA style
- Use the APA Documentation Guide from Purdue University's Online Writing Lab.

In-text:

The aluminum alloy 2024-T3 has a hardness of 120 using the standard Brinell hardness method (MatWeb, 2007).

References:

Callister, William D. and Rethwisch, David G., (2008). Fundamentals of Materials Science and Engineering (3rd ed.). New York: John Wiley & Sons, Inc.

Appendices

- Include materials that may not fit into the body of the report, but contribute value or add clarity
- Do not include raw data
- Title each appendix (e.g., “Appendix A: Tables” or “Appendix C: Example Calculations”)

Visit the Hanson Center

- You will receive extra credit for one HCTC visit for one lab report this semester.
- You may return as many times as you would like!
- Sign up for an appointment online by clicking “Schedule Now” on our website.

Hours	
Mon-Thurs	**1:00-4:30p.m.**
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Fri	**1:00-4:00p.m.**
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Location
3307 SC

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Questions?