

**Santa Clara University**  
**Department of Mechanical Engineering**

**Department Specific Formatting instruction for Senior  
Thesis**

Version, 1.0 Sept. 22<sup>nd</sup> 2014

See School of Engineering guidelines for all other Senior Thesis instructions.

**GENERAL INFORMATION**

In addition to the general formatting guideline provided by the School of Engineering, the Department of Mechanical Engineering requires students to follow the additional formatting instructions described in this document for reporting numbers, figures, references, and bibliography.

Reporting Numbers

Numbers should be reported in the standard unit system for the scope of work described. The ASME standard for journal publications is SI (International System). Although not standard, degrees Celsius can be used in place of Kelvin for temperature. If U.S. customary units are typically used then the equivalent SI units should also be included in parentheses. There should always be a space between the number and the units, and the units should appear on the same line as the number (use Ctrl+shift+space to insert a non-line breaking space).

Numbers should be reported in the standard scale that is appropriate, *e.g.*, meters, millimeters, or kilometers. Numbers may be reported in either engineering or scientific formats. The number of significant digits should be consistent with the understood accuracy of the number. In other words, the precision of the number indicates the precision of the specification or the measurement:

$$l = 10.000 \pm 0.001 \text{ in } (25.4 \pm 0.0254 \text{ cm})$$
$$T = 283.21 \pm 0.05 \text{ K}$$

Reporting Uncertainty

Although not necessary in all cases, key results should be reported with the appropriate uncertainty included. The uncertainty range should be presented with 95% confidence or a level of significance of 0.05. The thesis document should include a description of how this uncertainty was determined and a sample calculation can be included in an Appendix.

Figures

Every figure that is included in the thesis should be consecutively numbered and referred to in the text of the thesis. Charts, diagrams, and sketches are all to be

labeled figures. The following points need to be considered when figures are used in the thesis:

- Each figure should be followed by a descriptive caption, starting with the label Figure XX.
- Captions should be self-standing; they should contain enough information to explain the purpose of the figure. A short caption can be written as a fragment where the subject and verb are assumed, "This figure is...." Long captions should be written in full sentences. Stylistically, figure captions should not just repeat the axis labels.
- Axes should be labeled and include the units in parentheses.
- Figures should be readable, don't use font size smaller than the smallest text (i.e., 8 point). 10 point font or larger is preferred.
- The font used for the figures need not be the same font as the body of the thesis, but should be a consistent font for ALL figures.
- Do not put a title at the top of the figure.
- Include legends inside the graph, avoid placing legends under the figure where the caption also exist.
- Avoid unused range in the graph, adjust the range of the axes so that the data fills the range.
- Points are typically used to represent the experimental measurement data, while lines are used for fitting of the data or theoretical curves. Do not use lines to connect data points unless you believe precisely that the data should fall along that line. Typically if there are more than 20 data points then the individual points may be excluded and a line used to represent the data.
- Error bars and uncertainty ranges should be included when available and in a way that clearly describes to the reader the validity of the information.
- Symbols and line-types used should be clearly identifiable and still identifiable if the figure is printed in black and white. This is also useful for readers who are colorblind.
- Additional annotation may be included as necessary.

See figures below for examples of well formatted figures.

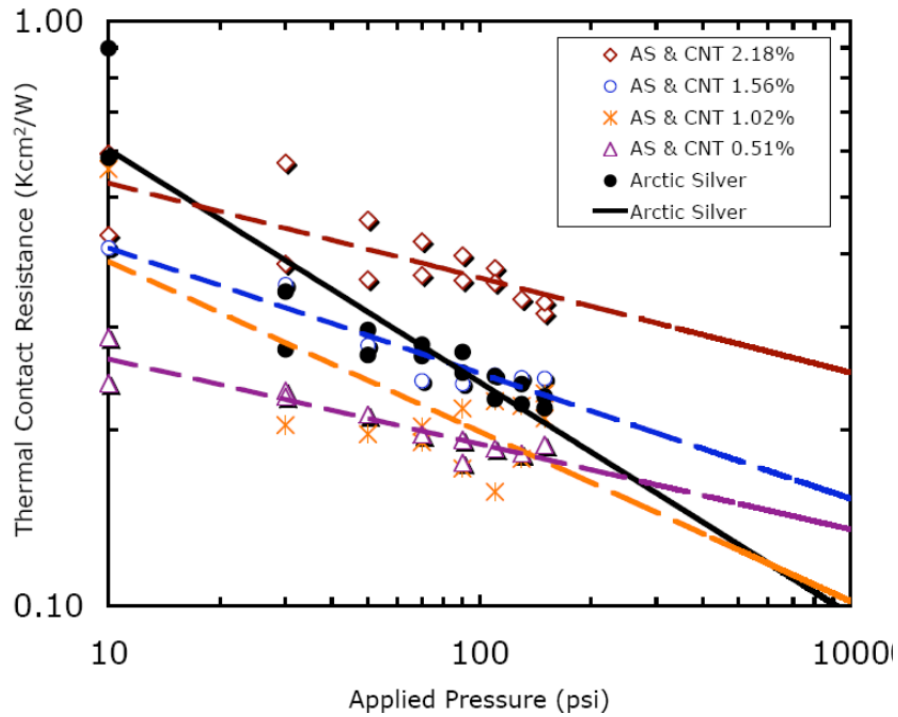


Figure 4 Thermal contact resistance of Arctic Silver®5 and CNT TIM mixture

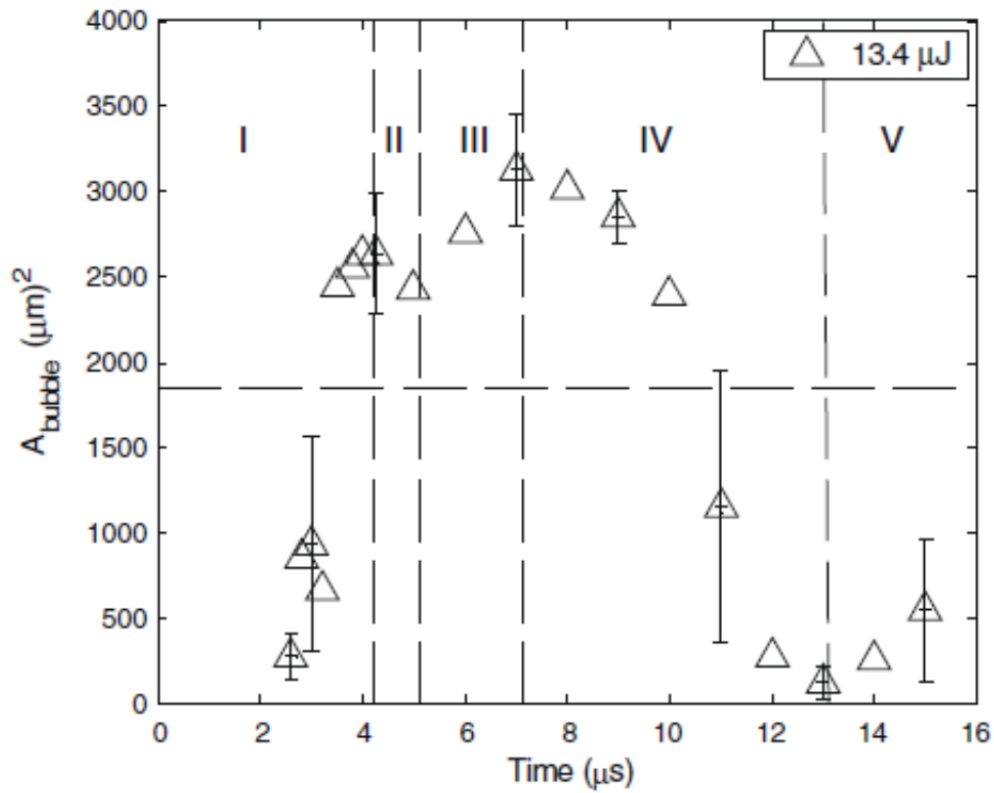


Fig. 6. Bubble area development. Bars indicate bounds for 95% data confidence. Horizontal dashed line indicates heater area  $1845 \mu\text{m}^2$ .

## References and Bibliography

All material and information in the thesis that comes from another source (i.e., not the team's own work), must be properly referenced and attributed. References should be consecutively numbered starting at the beginning of the thesis, using the same number for subsequent references to the same source. Place the numbers in square brackets in appropriate locations of the text. In the case of two reference citations, separate the numbers by a comma (e.g., [5, 6]). In case of more than two consecutive references use a dash to separate the numbers (e.g., [5-7] or [5-7, 10, 12]).

The section listing the references can be labeled References or Bibliography. This section is neither a chapter in the thesis nor an appendix and hence should not be labeled with either a number or a letter. In the bibliography section, all references cited in the text must be listed in numerical order according to their appearance in the text. There are different standard formats for writing a bibliography (e.g., ACS, AIP, AMS, ASME...). Consult with your advisor to choose one and use it for the entire bibliography section. Do not use under any circumstances the abbreviation *et al.* in this section! The main point is being consistent. Some examples are provided below:

### Reference to Books

Last name of the authors followed by their initials, year of publication, title of the book in bold, publisher, city of publication, pp. page numbers.

Example:

[1] Strunk, W., and White, E.B., 2000, **The Elements of Style**, Longman, New York, pp. 40-87.

### Reference to Journal articles

Last name of the authors followed by their initials, publication year, "article title," Journal name italicized, volume in bold (issue number) or use the abbreviations Vol. and No., pp. page numbers.

Example:

[2] Ning, X., and Lovell, M. R., 2002, "On the Sliding Friction Characteristics of Unidirectional Continuous FRP Composites," *ASME J. Tribol.*, **124**(1), pp. 5-13.

### Reference to Papers appearing in conference proceedings

Last name of each author followed by their initials, year of publication, "title of the cited paper," *title of the publication*, initials followed by last name of editors (if any), followed by the abbreviation, publisher, city of publication, Vol. volume number (if any), pp. page numbers.

Example:

[3] Lee, Y., Korpela, S. A., and Horne, R. N., 1982, "Structure of Multi-Cellular Natural Convection in a Tall Vertical Annulus," *Proc. 7th International Heat Transfer Conference*, U. Grigul et al., Hemisphere, Washington, DC, pp. 221–226.

Reference to website

Last name of each author followed by their initials or name of the Authoring Organization, cited year: Document name.

[Address from which available online.]

Example:

[4] American Society of Mechanical Engineers, cited 2014: Guide to Conference Publications.

[Available online at <https://www.asme.org/shop/proceedings/conference-publications/references>]