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Affiliation

ABSTRACT

Beginning August 2012 the SAE Paper template is a two-column format. This is due to requests from authors to aid in keeping their figures, tables and equations to 3 ½ inches which is recommended. The author may have figures and tables which span both columns (maximum size 7 inches wide x 7 inches in length) but equations MUST be no larger than 3 ½ inches.

Abstract MUST be no more than 250 words. The paper is the authoritative source for the abstract. Footnotes should not be included in the title or abstract.

This template is merely a guide to aid the author in submitting the text of their paper. The final published paper will NOT look exactly as the author submitted.

The manuscript elements have been formatted to the SAE Technical Paper Style Guide which can be used as an additional resource and can be found on the SAE website where this template is located.

Remember to use the Technical Paper Checklist also found on the SAE website where this template is located before submitting your paper. This will ensure that all steps have been completed and are correct.

This template should be printed as a reference and all text deleted before beginning use.

INTRODUCTION

The [Head1] style is a Level 1 heading. It has been applied to the heading above, “INTRODUCTION”. A [Head1] is TimesNewRoman, 14 point, Caps, bold, underline. [Normal] style text and other levels of headings [Head2], [Head3], and [Head4] should be used to structure the content within any given section.

first heading of Body

The body of the paper should include detailed and structured description of the work performed, including (as appropriate) methodology, assumptions, hardware, observations, analysis, and a comparison of results with prior work. The information presented must be self-contained (in the sense that the reader is not assumed to have read prior papers) and provide an appropriate level of detail for the intended audience. Define all terms at first usage and apply them consistently.

The body section is not entitled *Body*. Rather it comprises multiple sections and subsections titled using topical headings in a four-level structure. Template styles [Head1] through [Head4] are used to tag and format titles of the different levels. No specific heading titles are mandated, but common examples include Methods, Results, and Discussion. The [Normal] style tag is used for paragraph text. Figures, tables, and equations fall under the body section. Found in this template are examples of a figure, a table, and an equation (which must be kept to 3.5” wide).

Head 2 Example

A [Head 2] style tag applied to the heading above is TimesNewRoman, 14 point, initial caps, bold. The [Normal] style tag should be used for paragraph text which is TimesNewRoman, 10 point.

Head 3 Example

A [Head3] style tag applied to the heading above is TimesNewRoman, 12 point, initial caps, bold, underline. The [Normal] style tag should be used for paragraph text which is TimesNewRoman, 10 point.

Head 4 Example

A [Head4] style tag applied to the heading above is TimesNewRoman, 12 point, initial caps, bold, italic. The [Normal] style tag should be used for paragraph text which is TimesNewRoman, 10 point.



Figure 1. Example of a figure and figure caption. The sample figure has been sized to 3.5 inches wide, which is the recommended size. Captions for figures are 10 pt. TimesNewRoman Bold Italic and are placed below the figure.

Table 1. This is an example of a table and table title. For tables, the recommended size is 3.5 inches. Table titles are 10 pt. TimesNewRoman Bold Italic and are placed above the table.

|  |  |
| --- | --- |
| Displaced volume | 1966 cc |
| Stroke | 154 mm  |
| Bore | 127.5 mm  |
| Connecting Rod | 255 mm  |
| Compression ratio | 14.3:1 |
| Number of Valves | 4 |
| Exhaust Valve Open | 34° BBDC @ 0.15 mm lift |
| Exhaust Valve Close | 6° BTDC @ 0.15 mm lift |
| Inlet Valve Open | 2° BTDC @ 0.15 mm lift |

Text within the tables should be no larger than 10 pt. TimesNew Roman.

1. This is an example of an ordered list. When creating this type of list do not enclose number or letter in parenthesis i.e. (1) or (a). Instead number as shown in this list.

Shown are examples of equations. All equations wider than 3.5 inches must be wrapped to the next line as shown in these equations.

$$\frac{dλ}{dt}=\left[\frac{\sqrt{1+161\left(\frac{x}{x^{+}}\right)^{2}}-12}{2\left({A}/{F}\right)\_{st}}-\frac{\sqrt{1+161\left(\frac{x\_{prev}}{x^{+}}\right)^{2}}-1}{2\left({A}/{F}\right)\_{st}}\right]$$

$ \left(1-BGF\_{st}\right)∙ \frac{12}{\left(t-t\_{prev}\right)}$ (1)



 (2)

SUMMARY/ConclusionS

References

1. SAE uses the [Chicago Manual of Style](http://www.chicagomanualofstyle.org/home.html) in formatting references. In the text of the paper the citations are numerically identified using square brackets [1]. Up to four authors should be listed; more than four, et al. should be used after the fourth author is listed. Refer to the SAE Technical Paper Style Guide for formatting of different types of references. Below are some examples.
2. Guo, Q. and Liu, B., "Simulation and Physical Measurement of Seamless Passenger Airbag Door Deployment," SAE Technical Paper 2012-01-0082, 2012, doi:10.4271/2012-01-0082.
3. Kunkel, S., Zimmer, T., and Wachtmeister, G., "Friction Analysis of Oil Control Rings during Running-In," SAE Technical Paper 2011-01-2428, 2012, doi:10.4271/2011-01-2428.
4. Morgan, R., Scullion, P., Nix, L., Kan, C. et al., "Injury Risk Investigation of the Small, Rear-seat Occupant in Side Impact," SAE Technical Paper 2012-01-0092, 2012, doi:10.4271/2012-01-0092.
5. Kimura, Y. and Murakami, M., "Analysis of Piston Friction - Effects of Cylinder Bore Temperature Distribution and Oil Temperature," *SAE Int. J. Fuels Lubr.* 5(1):1-6, 2012, doi:10.4271/2011-01-1746.
6. SAE International Surface Vehicle Recommended Practice, “Laboratory Measurement of the Composite Vibration Damping Properties of Material on a Supporting Steel Bar,” SAE Standard J1637, Rev. Aug. 2007.

CONTACT INFORMATION

If a Contact Information section is not wanted, delete this heading and text.

Acknowledgments

If the Acknowledgments section is not wanted, delete this heading and text.

DefinitionS/AbbreviationS

|  |  |
| --- | --- |
| SA | sample abbreviations |
| UBT | use borderless table ≤ 3.5 inches wide |
| test vector | do not capitalize term unless an acronym or proper noun |

APPENDIX

The Appendix is one-column. If you have an appendix in your document, you will need to insert a continuous page break and set the columns to one. If you do not have an appendix in your document, this paragraph can be ignored and the heading and section break deleted.