

**ASTM Style Manual**  
Books and journals, ACEM, JTE, MPC, SSMS  
See separate guide for GTJ

ASTM publications will follow the editorial style according to the *Chicago Manual of Style (CMOS)*, Seventeenth Edition, as published by the University of Chicago Press. Please use this guide to for the basic formatting and information that should be included in your manuscript. Please consult the CMOS for information pertaining to grammatical issues not included here.

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## MANUSCRIPT PREPARATION

Follow the ASTM Style Manual and organize your paper to include:

- Title
- Abstract
- Key Words
- Introduction – Make clear the objective of the work.
  - Include discussion of prior literature on the topic; what research has been done (cite references) and what is the basis of the new techniques and/or standards under development?
  - The existing literature should be highlighted as a meaningful part of the discussion to show why the author's work is supported by, building on, or presenting new technical information in the context of existing literature.
- Materials and Methods – Why your is method better than current methods? What are the current methods?
- Results and Discussion – Results should be presented in a way that is clear and easily understood by the readers. When data is presented in graphs, it is recommended that they should typically contain error bars and/or some discussion as to the reproducibility and reliability of the results. Use appropriate statistical analysis methods where possible. There should be a detailed synthesis and analysis of the results presented. Testing reports are not appropriate for submission to ASTM.
- Conclusion – Provide a Conclusion section and clearly identify a novelty or unique approach.
- References – See Section 2 for full reference details and URL archiving.

### 1. EDITORIAL STYLE

#### 1.1 ASTM Committees

ASTM committees should be cited as ASTM Committee D02 on Petroleum Products and Lubricants. Subsequent references can be cited as Committee D02. No space or dashes should be included. The format is D02, C17, etc.

#### 1.2 Abbreviations and Unit Symbols

- In the text, use unit symbols after numbers denoting a definite quantity. Example: "The tensile strength is 45,000 psi (310 MPa)."
- Use unit symbols and abbreviations in the singular only. Thus "fifty kilograms" will be "50 kg," not "50 kgs." Exceptions: Figs., Nos., Refs., Vols.
- Write out long words or phrase for which there is no standard abbreviation at first mention. Examples: below top dead center (btdc), relative centrifugal force (rcf).
- Abbreviations for names of societies, associations, government agencies, etc., may be used, provided the name is spelled out the first time it is used. Examples: ASTM International, TAPPI, NASA, ARPA.

#### 1.3 Affiliations

Use superscript Arabic numerals to denote affiliations. Do not use professional titles, such as Director, Professor, Senior Scientist, etc. Include your professional affiliation (with department, if applicable), street address, city, state/province, postal code, and country. Use abbreviations for street names (Rd., Dr., Ave., Ln., Ct., Pkwy., Hwy.). Write out the country name with the exception of "USA" and "UK". Use the ISO format for country names, which is available in ScholarOne. If you are retired, you may use your former affiliations with (retired), or you may include only your city/state/country location. Do not include punctuation at the end of affiliations. Examples:

John Smith,<sup>1,2</sup> Sarah Adams,<sup>2,3,4</sup> Elizabeth Davis,<sup>5</sup> and Edward Jones<sup>6</sup>

<sup>1</sup>Department of Mechanical Engineering, United States Naval Academy, SE 590 Holloway Rd., Annapolis, MD 21402, USA

<sup>2</sup>CanmetMATERIALS, 183 N. Longwood Rd., Hamilton, ON L8P 0A5, Canada

<sup>3</sup>ASTM International, 100 Barr Harbor Dr., West Conshohocken, PA 19428, USA

<sup>4</sup>NIST, 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899, USA

<sup>5</sup>BSI Group (retired), London, W4 4AL, UK

<sup>6</sup>Retired, West Chester, PA, USA

#### 1.4 And/Or

Do not use this expression. For example, write "A or B, or both" or "A, B, or C, or combinations thereof."

#### 1.5 Appendixes

Place Appendixes after the end of the paper but before the references. Figures in the Appendix should be numbered as figure A.1, A.2, etc. Tables in the Appendix should be numbered as Table A.1, A.2, etc. Likewise, multiple appendixes in a single paper should be labeled Appendix A, Appendix B, etc. Appendixes can have titles, but they are not required. If your appendix has a title, format it as "Appendix: Title" or "Appendix A: Title".

#### 1.6 Capitalization

- Use capitals sparingly, but when in doubt, capitalize.
- Use initial cap:
  - For "committee" where used in a title, as "Committee A01" or "Committee on Publications."
  - In such expressions as: Test 1, Specimen A, Cement B, Type 1, Class C, Grade B, etc.
  - For Society, Staff, and Headquarters when referring to ASTM International, its Staff, and its Headquarters.
- Use all caps in directions such as: "Turn the machine to OFF position" or "Turn the dial to TITRATE."
- In headings and titles, capitalize all nouns, pronouns, verbs, adjectives, adverbs, and all other words of five or more letters. Do not use initial caps on prepositions, abbreviations, or the phrase "et al.," or in the word "to" in the infinitive form of a verb.

#### 1.7 Chemical Formulas and Symbols

Chemical formulas should be used freely in tables and figures (example:  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ). In text in which chemical formulas are mentioned infrequently, spell out the names. Where they are mentioned frequently, spell out the name in the first reference to it, followed by the formula in parentheses. The formula alone may be used subsequently. Do not use chemical formulas for organic or complex inorganic compounds. Always spell out the word "water" and the name of the elements (use lead, not Pb). Isotopes may be written as carbon-14 or as 14C.

Spell out chemical compounds the first time they appear in the text and include the symbol in parentheses, e.g., hydrochloric acid (HCl); use only the symbol thereafter. Spell out individual chemical elements. In figures and tables, use symbols freely for compounds and elements.

#### 1.8 Commas

Use serial commas in lists with three or more items: Test 1, Specimen A, Cement B, and Type 1.

#### 1.9 Dates

Always write out the month.

#### 1.10 Dictionaries

For spelling, punctuation, capitalization, and foreign words, use *Merriam-Webster's Collegiate Dictionary*.

### 1.11 Figures

Figures, whether line drawings, photographs, or graphs, should be used to demonstrate some point or observation. It is the author's responsibility to provide original, reproducible figures of professional quality.

In-text references should appear as "figure 2A" in the text but "(figs. 2A and 2B)" in parentheses. Note the letter identifying the figure's panel is uppercase and italicized. In figure captions, use "(A)", "(B)", etc., to note parts of a figure. Example: Figure 2 shows (A) typical placement of text samples, (B) test specimens, and (C) the covered box.

### 1.12 Footnotes

Do not use footnotes in figure captions. For footnotes in tables, use superscript lowercase, roman letters, starting with "a" for each table. The footnotes should appear below the table following the term "Note:". Example:

*Note:* Mo = molybdenum; Al = aluminum; C = carbon; Cr = chromium; Cu = copper; Mn = manganese; N = nitrogen; Ni = nickel; P = phosphorus; S = sulfur; Si = silicon.

<sup>a</sup>Standard deviation of participants' measurements.

<sup>b</sup>Mean value of participants' measurements.

<sup>c</sup>Part-to-part (between samples) standard deviation from homogeneity test.

<sup>d</sup>Extended ( $k = 2$ ) uncertainty of reference value as reported by the German Federal Institute for Materials Research and Testing.

For all other footnotes appearing in the text of the paper, use the asterisk (\*), cross (†), then double cross (‡).

### 1.13 Hyphens

- Hyphenate compound adjectives, such as: "50-mm gage," "low-alloy steel," and "cold-drawn wire."
- Use a hyphen after the first word in expressions like the following: "high- and low-temperature tests." But where numerals are involved, omit all but the last hyphen, as in "50, 100, and 150-mm specimens."
- Omit hyphens in such expressions as "3 % nickel alloy" or "3°C rise in temperature."
- Do not hyphenate chemical compounds and the words "stainless steel" and "cast iron."
- Do not hyphenate an adverb–adjective compound when the adverb ends with "ly."
- Spelled-out fractions used as nouns are *not* hyphenated (one third of the load); however, when used as adjectives, they *are* hyphenated (a one-third share).

### 1.14 Italics

*Italicize:*

- All symbols for physical quantities that can have a numerical or physical value (quantity symbols).
- *Chemistry*—*N* (normal), *M* (molar), *c* (concentration). Do not italicize symbols for the elements (Fe, N, Na, etc.) Exception: italicize *N* for nitrogen when it is used to denote position, as in *N*-methylaniline. Italicize *o*, *m*, and *p* as ortho, meta, and para; for example, *p*-cresol. Italicize and abbreviate secondary and tertiary as *sec* and *tert*; for example, *tert*-butyl alcohol. Italicize *iso* when used in *isooctane*.
- *Foreign Words*—Use *Merriam-Webster's Collegiate Dictionary* as a guide to foreign words.

Do not italicize:

- Symbols representing units or labels; symbols for elements in the periodic table; and symbols for mathematical operators.
- Letters used to subdivide a categorical classification, such as Method A, Class C, Grade D, Sample F.
- Note: when the symbol  $\mu$  is used to denote a physical quantity (such as mass or reduced mass) it should be italic, but when it is used in a unit such as the microgram,  $\mu\text{g}$ , or when it is used as the symbol for the muon,  $\mu$  (see 5 below), it should be roman.
- Mathematical functions: log (lg, ln or lb), exp, sin, cos, tan, erf, div, grad, pH, d (for derivative)

### 1.15 Mathematical Material

Equations should be numbered throughout the text with the number appearing on the right of the equation in italic font. All equations and mathematical material should be formatted in MathType. The format for a numbered equation is:

$$L_p = C_t / R \quad (1)$$

where:

$S$  = stress, psi or Pa,

$I$  = second moment of area, in<sup>4</sup> or m<sup>4</sup>.

*Exp versus e*—If the exponent is relatively short and on one line, without superscripts or subscripts, use  $e$ :

$e^{(a-b)cx}$

If it is relatively long or has superscripts or subscripts, use  $\exp$ :

$\exp[x^2/2 - 1n(x/a)]$

*Fractions*—Use the solidus (diagonal line) in the text, e.g., 1/4. Use the built-up fraction (with a horizontal line) in an equation. If you use a built-up fraction on one side of an equation, use it on the other side:

$$\frac{dp}{dy} = \frac{k_z}{b} - fp \quad (2)$$

Use parentheses liberally to clearly show the complete numerator or denominator. For example, does  $\log a/b$  mean  $\log (a/b)$  or  $(\log a)/b$ ? Use the parentheses to clarify. If you write  $a/b + c$  but mean  $a/(b + c)$ , use parentheses.

For in-text callouts, use “equation (1)” or “equations (2)–(5)”.

### 1.16 Nomenclature

if included, place the nomenclature after the keywords and before the Introduction.

### 1.17 Numerals and Numbering

- Use Arabic numbers. Spell out all numbers from one through nine, with the following exceptions:
  - Use numerals when the quantity is partly fractional, as: 1.15, 1½.
  - Use numerals when followed by an expression having a standard unit symbol, as: 5 mm, 9 %.
- Spell out the number for multiple-number expressions, e.g., fifteen 2-cm rods. Place a zero before a decimal point, e.g., 0.65. Use commas for numbers containing more than three digits, e.g., 12,365.
- If for any reason the standard abbreviation or unit symbol of the expression following the number is not used, or if the expression does not admit of abbreviation (as *year*, *ton*, etc.), the use of numerals is optional, unless covered in the following paragraphs:
  - In statements containing two or more numbers, one of which is greater than nine, as "2 tests and 16 weighings."
  - In a series of connected numerical statements implying precision, as "5 months, 3 days."
- Use numerals after abbreviations, as: Vol. 26, No. 2.
- Use numerals for all numbers ten and above, with the following exceptions:
  - Do not begin a sentence with a numeral. When the numeral is spelled out, also spell out the unit following, as "One gram is usually sufficient."
  - Spell out round numbers used in an indefinite sense, such as, "a hundred meters or so."
- Currency should be in US dollars (USD). If using a foreign currency, include the USD conversion in parentheses. Example: Commercially activated charcoal is available at Rs. 2720 (42.65 USD) per kg.

### 1.18 SI Units

SI units shall be included in all ASTM publications in accordance with the latest edition of SI-10.

### 1.19 Subheads

Subheads should not be numbered.

### 1.20 Tables

- Number each table with an Arabic numeral and give it a title that is complete and descriptive. Example: Microindentation hardness before and after EBH (note no terminal period in table title)
- In column headings, first include the quantity being tabulated, then a comma, then the units, for example: "Tensile Strength, min, psi."
- Footnotes—See info under **Footnotes** section.
- Use leaders (...) for cells with no data. Cells for which data are not available should be left blank.
- When two (or more) separate systems of units are both listed in one table (for example, inch-pound and SI units), provide SI units in separate columns or in parentheses or brackets.
- When it is impractical to include two or more units of measurement in the column heading because of the size and the number of tables, include the pertinent conversion factors as footnotes under each table instead of attempting to include the actual converted values within the tables.

### 1.21 Trademarks

Avoid the use of trademarks whenever possible. Use generic terms where available; the symbols ® and ™ should be omitted where possible.

## 2. REFERENCES

### Preparing In-Text Citations

- Cite the references in the text in numeric order, using superscript numerals that are closed up to the text/punctuation: according to Smith<sup>6</sup> and Davis et al.<sup>7</sup>
- References should be listed in the order of their citation at the end of the paper.
- If mentioning author names in the text, use “et al.” for four or more authors. Examples: Smith,<sup>1</sup> Smith and Jones,<sup>6</sup> Smith, Jones, and Adams,<sup>11</sup> Richards et al.<sup>24</sup>
- When quoted material is more than 5 lines of text, indent the entire block quote on the left-hand side.

### Preparing the Reference List

- All references must contain complete information to allow a reader to find the cited materials and indexing services to include our publications in their indexes.
- Use of a high percent of references that were published in languages other than English may limit the peer reviewer pool and may delay publication.
- Use complete last (family) names for authors, but use initials for first and middle names.
- Web references must contain the title of the site and the URL. Also include the author, the date the information on the site was written or posted, and any other information that will help the reader find the reference. (See “Using Websites as References/Archiving Websites” for instructions on web archiving.)
- To add DOIs to any reference type, insert a comma at the end of the reference instead of a period, and insert the DOI as “<http://doi.org/XXX>” without a period at the end.

### 2.1 Book Reference

#### For book chapters:

1. C. P. Oden, C. L. Ho, and H. F. Kashani, “Man-Portable Real-Time Ballast Inspection Device Using Ground-Penetrating Radar,” in *Railroad Ballast Testing and Properties*, ed. T. Stark, R. Swan, and R. Szecsy (West Conshohocken, PA: ASTM International, 2018), 77–104, <http://doi.org/10.1520/STP160520170023>

2. R. J. Falkiner, “Liquefied Petroleum Gas,” in *Fuels and Lubricants Handbook: Technology, Properties, Performance, and Testing* (West Conshohocken, PA: ASTM International, 2003), 31–32, <http://doi.org/10.1520/MNL10717M>

3. J. Estaire and M. Santana, “Large Direct Shear Tests Performed with Fresh Ballast,” in *Railroad Ballast Testing and Properties*, ed. T. Stark, R. Swan, and R. Szecsy (West Conshohocken, PA: ASTM International, 2018), 144–161, <https://doi.org/10.1520/STP160520170137>

#### For whole books:

1. J. F. Nye, *Physical Properties of Crystals* (Oxford: Clarendon Press, 1972).

2. National Stone, Sand, and Gravel Association (NSSGA), *The Aggregates Handbook*, 2nd ed. (Englewood, CO: Society of Mining, Metallurgy, and Exploration, 2013).

3. T. Stark, R. Swan, and R. Szecsy, eds., *Railroad Ballast Testing and Properties* (West Conshohocken, PA: ASTM International, 2018), <https://doi.org/10.1520/STP1605-EB>

### 2.2 Proceedings Reference, unpublished

1. C. M. Davies, F. Mueller, K. Nikbin, N. P. O’Dowd, and G. A. Webster, “Analysis of Creep Crack Initiation and Growth in Different Geometries for 316H and Carbon Manganese Steels” (paper presentation, Fifth International ASTM/ESIS Symposium on Fatigue and Fracture Mechanics, Reno, NV, October 15, 2005).

2. A. Trkov, "The GRUPINT Neutron Spectrum Adjustment Code – General Features and Characterization of the Spectra in Three Irradiation Channels of the JSI TRIGA Reactor" (paper presentation, Sixteenth International Symposium on Reactor Dosimetry, Santa Fe, NM, May 7–12, 2017).

### 2.3 Journal References

#### Published:

1. M. McQuerry, "Validation of a Clothing Heat Transfer Model in Nonisothermal Test Conditions," *Journal of Testing and Evaluation* 46, no. 1 (January/February 2018): 1–7, <https://doi.org/10.1520/JTE20170073>

**In Peer Review or Accepted, not Posted Online:** Use "in review" in place of the year for a journal article that is in peer review or accepted but not yet posted online.

1. M. McQuerry, "Validation of a Clothing Heat Transfer Model in Nonisothermal Test Conditions," *Journal of Testing and Evaluation* (in review), <https://doi.org/10.1520/JTE20170073>

**First Look Paper/Posted Online But Not Finalized In Issue:** Use the following format for papers posted online ahead of their issue publication date:

1. M. McQuerry, "Validation of a Clothing Heat Transfer Model in Nonisothermal Test Conditions," *Journal of Testing and Evaluation*. Published ahead of print, December 11, 2019, <https://doi.org/10.1520/JTE20170073>

### 2.4 Patent Reference

1. D. Williams. Screw less clip mounted computer drive. U.S. Patent 6,885,550, filed August 24, 2000, and issued April 26, 2005.

### 2.5 Standards Reference

NOTE: In the e-publication, mentions of ASTM standards in the correct format (ASTM A252-XXXX) will be linked to the latest version of the standard in the ASTM Digital Library so the readers can view the Significance, Use, and Scope sections and purchase the standard if they wish. ASTM subscribers will be linked to the complete standard.

**References to ASTM Work Items are never acceptable.** The WKXXXX will be changed to a standard designation when or if the standard passes the balloting stage. If the standard is published the title may change and the temporary Work Item page will be removed from the ASTM website, making any reference invalid.

In the reference list, be sure to include the complete title of the standard (this will often start with Standard Specification, Standard Test, Standard Practice, Standard Test Method, etc. Example:

1. *Standard Specification for Steel Joint Bars, Low, Medium, and High Carbon (Non-Heat-Treated)*, ASTM A3-01(2012) (West Conshohocken, PA: ASTM International, approved March 1, 2012). <http://doi.org/10.1520/A0003-01R12>

**Citing Standards in Text:** When referencing an ASTM or other SDO standard for the first time, include the standard number and title, with the title in italics. Example: "This was the case according to ASTM A252-10 or ASTM A252, *Standard Specification for Welded and Seamless Steel Pipe Piles.*" Subsequent references to the same standard would be "ASTM A252".

If the year date is important, please include it (e.g., ASTM A252-10); the copyeditors will not research the latest year or include it if you have not done so. Note: If the dated standard that you included has been withdrawn or superseded, the copyeditor will note this in the text of the paper. Example: "As noted in ASTM A252 - 98(2007) (superseded), the test ..."

Standards are frequently updated so be sure to check the ASTM website to cite the latest version. For example:

- a. ASTM A36/A36M-12



- b. ASTM A3456-13a(2014)
- c. ASTM A3-07a(2013)e1

## 2.6 Thesis Reference

37. M. I. Falconi, "An Investigation of the Scaling Resistance and other Properties of Slag-Cement Concrete" (master's thesis, Cornell University, 1996).

14. H. Moosavi, "Optimization of Spur Gear Systems by Tooth Profile and Face Width Modification" (PhD diss., Wichita State University, 1990).

## 2.7 Discussion

23. A. Mehdizadeh, M. M. Disfani, R. Evans, A. Arulrajah, and D. E. L. Ong, "Discussion of 'Development of an Internal Camera-Based Volume Determination System for Triaxial Testing' by Salazar, S. E., A. Barnes, and R. A. Coffman, Published in *Geotechnical Testing Journal* 38, no. 4 (July/August 2015), DOI: 10.1520/GTJ20140249," *Geotechnical Testing Journal* 39, no. 1 (January/February 2016): 165–168, <http://doi.org/10.1520/GTJ20150153>

## 2.8 Translated Reference

There are three appropriate ways to format references originally published in a language other than English:

1. If the article can be easily found by searching its translated (English) title:

S. Laustsen and A. M. Møller, "Engineered Air-Entrainment of Concrete" (in Danish) (master's thesis, Technical University of Denmark, 2007).

2. If the article cannot be easily found by searching its translated (English) title:

J. Hundt and H. Kantelberg, "Sorptionsuntersuchungen am Zementstein, Zementmörtel und Beton [Sorption Behavior of Concrete Blocks, Mortar and Concrete]," *Dtsch Ausschuss Stahlbeton*. 297 (1978): 25–39.

3. If the article does not have a translated English title but can be easily found using the title written in the original language:

G. Raimbault, "Diffusivite et Conductivite Hydrauliques de Materiaux ou Sols non Satures en Eau—Mesure en Laboratoire," *Bull Liaison Lab Ponts Chauss* 145 (1986): 61–68.

## 2.9 Using Websites as References/Archiving Websites

Archiving websites enables researchers to view the website that authors viewed as it was on the day and at the time that they viewed it. This is especially helpful for mitigating the effects of "link rot", or websites that have become permanently unavailable. All URLs that appear in the reference list should be archived on or as close to the day that the author viewed it.

To archive a website, copy the URL, go to [www.web.archive.org](http://www.web.archive.org), and paste the URL into the box in the lower right corner that says "Save Page Now". You will then receive a new URL that includes the archive (date of access) information; for example: <http://web.archive.org/web/20161012191111/http://apps.npr.org/best-books-2015/>. This is the URL that must be included in the reference list, along with the authors, webpage title, name of publisher or sponsoring organization, and publication/posting date.

For this website, the reference that would be included in the reference list is:

2. N. Cohen, R. Friedman, P. Mayer, and B. Novey, "NPR's Book Concierge: Our Guide To 2015's Great Reads," NPR, 2015, <http://web.archive.org/web/20161012191111/http://apps.npr.org/best-books-2015/>