



# Authors' Manual

---



This is a contextual document. It is not meant to be read straight from beginning to end. Instead, navigate the pages via the **blue** hyperlinks as you would a Web page.

Some pages include key words in **orange**. Mouse over these words to see additional information about a relevant topic.

---

**Start**

This manual should not be used when writing for *Science and Technology for the Built Environment*.

Please refer to the Authors' Manual for STBE for guidance when writing for that publication.

This manual should not be used when writing for *ASHRAE Journal*. Please contact the editor for guidance when writing for that publication.

## Before You Begin...

- o Agreement to Publish (papers only)
  - o Potential Sources of Bias Disclosure (papers only)
  - o Copyright Information
  - o Obtaining Permissions
  - o Commercialism
- 

## General Formatting Resources

- o Document Formatting
  - o Figures (sample)
  - o Tables (sample)
  - o Converting Graphics created in Excel or Word
  - o Equations
  - o Units of Measurement
  - o References and Citations (sample)
- 

## Papers Resources

- o Paper Organization
  - o Paper Publication Process
  - o Manuscript Central Upload Instructions
  - o Technical Papers Submission Requirements
  - o Conference Papers Submission Requirements
- 

## Books Resources

- o Book Organization
- o Book Publication Process
- o Book Submission Guidelines

## Obtaining Permissions

Back

Index

Print

Requesting permission to reproduce figures and tables from other sources is the responsibility of the author, as is payment of any fees the copyright holder may require before granting permission. Authors should never assume that material taken from software or downloaded from the Internet may be used without obtaining permission.

1. Permission to reproduce material **must be obtained** during the writing stage.
2. Classify all **information** from another source as either “in the public domain” or “requires copyright permission.”
  - Publications from **federal agencies** are all **in the public domain**, which means the information must be cited in your text and referenced at the end of your manuscript but you do *not* have to request permission to use it.
  - Material from **private publishers**—including publishers of **your own previously published work**—**requires copyright permission**. If permission is not granted, you cannot use the material in your manuscript.
    - » For all photos, figures, tables, and data from tables from other sources that require permission, you must cite the source in your text and **reference** it at the end of your manuscript in addition to crediting the copyright holder for permission to use the material.
  - **NOTE:** Table data do not require copyright permission *as long as the table is reformatted*. However, *the material must still be cited*, so reference information is required.
3. For those sources that are not in the public domain, request permission from the copyright holder to use/reproduce the information.
  - Submit a request letter or the completed [Permission Request Form](#) to the copyright holder and ask for a reply within 30 days. They should reply directly to you, not ASHRAE staff.
  - To request permission to use ASHRAE copyrighted content, visit [ASHRAE's website](#).
4. Be sure to **reference** all materials from other sources where they appear in your manuscript, including credit lines as designated by copyright holders.
5. Submit permission-granted letters with the **completed manuscript**. Material cannot be published without permission, and ***no editing or layout work will begin on the manuscript until all permissions have been received.***

Back

Index

Print

ASHRAE retains **exclusive copyright** of papers published as part of the ASHRAE Winter or Annual Conference Papers download and in *ASHRAE Transactions*. Works published by ASHRAE are full and complete works.

Under ASHRAE copyright policies, authors retain the right for certain **specific uses** of their paper without requesting ASHRAE's permission. Only the "as published" version of the paper may be used by the author. These uses are as follows:

- to make copies of the paper for their own **personal use**;
- to **make copies and distribute copies** of the paper to researchers or customers of the author's employer for the personal use by such researchers or customers;
- to post the paper as published by ASHRAE on the author's personal, institutional, or corporate website or server with a link to [ASHRAE's website](#);
- to present the paper (after ASHRAE publication) at a meeting or conference and to distribute copies of such paper to the delegates attending the meeting with written permission from ASHRAE;
- to allow use of the paper by the author's employer for posting on the employer's website, for use by the employer in training or educational courses offered by the employer, for internal research work that is conducted by the employer, and for internal publications published by the employer;
- to include the paper in full or in part in a thesis or dissertation;
- to include the paper in a printed compilation of works of the author, such as collected writings or lecture notes; and
- to prepare other derivative works, such as extending the paper into book-length form, or to otherwise re-use portions or excerpts in other works, providing there is acknowledgement of its publication by ASHRAE.

Other uses must be authorized by ASHRAE. Authors should contact [ASHRAE](#) explaining their specific need and identifying the paper and ASHRAE publication in which the paper appeared.

Others wishing to use ASHRAE copyrighted content should visit [ASHRAE's website](#) for more information and to make their request.

## Formatting Figures

Back

Index

Print

1. Original figures or other artwork should be submitted with the manuscript whenever possible. For information on reprinting a figure from another source, see [Obtaining Permissions](#).
2. Use only 1 point (0.014 in. [0.35 mm]) or thicker lines—smaller lines will not reproduce well.
3. Figures to be reproduced in black and white should use [patterns or shapes](#) to distinguish sections instead of coloring and shading. Figures to be reproduced in color should have [touching colors that differ significantly](#) so that there can be no confusion in understanding the data. (Note that papers are published in color as part of the ASHRAE Winter or Annual Conference Papers download and in black and white in *ASHRAE Transactions*.)
4. Each figure should have a brief legend or [descriptive labels](#), as appropriate. **Any text included in a figure (except the figure caption) should be embedded as part of the image file and not contained in a separate text box that is not part of the image file.**
5. Provide [dual units](#) for all [measurements](#), preferably as two fi
6. All figures must be provided to ASHRAE as individual TIF (preferred) or EPS files in either CMYK mode (for color) or Grayscale mode (for black and white) saved at high resolution (600 dpi or greater) and at least 4 in. (102 mm) size or greater. See [Converting Graphics Created in Excel or Word](#) for instructions on graphic conversion. Figure files should be clearly labeled (i.e., Figure1.tif, Fig2.tif, Fig3-2, etc.). Multiple-part fi such as a fi with [parts](#) (a) and (b), must be submitted as [one fi](#) with all parts included.
7. Every figure must be referenced in the text by name/number, where “Figure” is capitalized (e.g., “...as shown in Figure 2.”).
8. Figures must be numbered consecutively as they appear in the text.
9. Prepare a list of captions for figures and place it at the end of the manuscript (**this applies to papers only; it is not applicable for book projects**).

## Formatting Tables

Back

Index

Print

1. All **table** titles should be descriptive but concise.
2. Original tables should be submitted with the manuscript whenever possible. For information on reprinting a table from another source, see [Obtaining Permissions](#).
3. Titles appear above the tables, and every major word in the title is capitalized.
4. Number tables consecutively and in the order they are mentioned in the text.
5. Tables used in the manuscript should **not** be **image files** but should be *alterable* tables (such as those created in Word, Excel, Framemaker, InDesign, etc.).
6. Use only 1 point (0.014 in. [0.35 mm]) or thicker lines—smaller lines will not reproduce well.
7. Vertical and horizontal lines should be avoided except to delineate the top and bottom of a table and to separate the heading row from the data, unless lines are otherwise necessary for clarity or organization of the data.
8. Label each column with a heading and include units of measurement and other necessary qualifying information. Units should be set off with a comma (e.g., “Velocity, m/s”).
9. Provide **dual units** for all **measurements**.
10. Every table must be referenced in the text by name/number, where “Table” is capitalized (e.g., “as provided in Table 5”).

## Units of Measurement

Back

Index

Print

ASHRAE policy requires dual units of measurement—inch-pound (I-P) and International System of Units (SI). You are required to provide dual units when submitting manuscripts; ASHRAE staff will not convert units for you. Some **guidelines** are as follows:

1. The units used in calculating the work being reported shall be listed first with the alternate system of units **following in parentheses**.
2. Always spell out all units when they are used without a number.
3. Do not mix **symbols and names** in the same expression.
4. Do not express **plurals** by adding an “s”
5. Do not use **periods** with units of
  - **EXCEPTION:** in. for inch
6. Leave a **space** between the numerical value and the unit of measurement.
  - **EXCEPTION:** There is no space between number and degree of plane angle or degrees of temperature (45°, 62°F, 20°C) or the number and the percent symbol (5%)
7. “L” is the symbol for liter, not lowercase “ell” or script “ℓ.”
8. “Centi-” is not an acceptable SI prefix and the use of **cm** should be avoided.
9. For currency, include the monetary unit of the country where the research is based followed by the U.S. dollar conversion in parentheses.

Formatting  
Equations

Back

Index

Print

Each significant **equation or formula** should be displayed on a separate line. Center equations and place consecutive equation numbers flush right in parentheses.

**EXAMPLE:**

$$a^2 + b^2 = f^2 \quad (1)$$

where

$a^2$  = apples

$b^2$  = bananas

$f^2$  = fruit salad

If an equation requires more than one line, break it before an **operational sign**, and align the operational signs on the left.

**EXAMPLE:**

$$E = (a + b + c)/(m + n + o) \quad (2)$$
$$\times d + e + f)$$

If two or more displayed equations are grouped together, leave space between the individual equations:

$$a + b = c \quad (3)$$

$$D = f - ab^2 \quad (4)$$

$$mon + rst \quad (5)$$

Spell out the word “equation” and capitalize it in the text when **referring** to specific, numbered equations. In a highly mathematical or theoretical work, consider developing equations in appendices rather than in the body of the manuscript.

**Please note that all equations must be retyped in our pagemaking program—this is one reason we require a hard copy of the manuscript—and therefore should be checked thoroughly by the author at the proofreading stage.**

# ASHRAE Authors' Manual

## Book Publication Process

Back

Index

Print

Most books are the result of an [ASHRAE research project](#). A subcommittee may be designated to handle the review process of a [committee-sponsored](#) project, using committee members or other persons with expertise in the area of concern.

The ASHRAE submittal, review, and publication process proceeds as follows:

1. The author indicates intent to submit a manuscript to [Special Publications](#) and receives the [Authors' Manual](#).
2. The author prepares the manuscript, including artwork, according to this Authors' Manual and submits the manuscript to [Special Publications](#) (see [Book Submission Guidelines](#)).
3. The cognizant ASHRAE Technical Committee selects qualified reviewers.
4. Reviewers send [reviews and comments](#) to the author.
5. The author revises the manuscript and/or rebuts comments and provides a revised manuscript or rebuttal to the cognizant Technical Committee.
6. Reviewers complete an additional review.
7. The review process continues until the manuscript is accepted or rejected for publication by the cognizant Technical Committee.
8. After the manuscript is approved for publication, the author submits a final [Microsoft® Word](#) file and separate figure files [electronically](#) to Special Publications, and the author is informed of a tentative publication schedule.
9. Special Publications editors edit the manuscript for grammar, punctuation, clarity, and consistency with ASHRAE policies, as well as completeness of parts. It is then put into pages, with the figures and tables incorporated.
10. The editors send a PDF proof to the author, often including queries that require responses from the author. The author [proofreads](#) the manuscript and returns replies to the editors' queries within a mutually agreed upon (hopefully short) timeframe.
11. The book is published and offered for sale in the [ASHRAE Bookstore](#) as both the physical, printed book and a PDF available for download.
12. The author receives a complimentary copy of the published book.

# ASHRAE Authors' Manual

## Paper Publication Process

Back

Index

Print

Technical Paper and Conference Paper submittal, review, and publication activity is coordinated by the [ASHRAE Conference Program Administrator](#). The papers publication process proceeds as follows:

1. The author indicates intent to submit a paper to the ASHRAE Conference Program Administrator and receives instructions and the [Authors' Manual](#).
2. The author [prepares](#) the paper, including artwork, according to the Authors' Manual and the [Author's Template for Technical Papers](#) or the [Author's Template Conference Papers](#).
3. The author uploads the paper through the applicable website as indicated in the [Technical Papers Submission Requirements](#) and [Conference Papers Submission Requirements](#).
4. The ASHRAE Conference Program Administrator selects qualified reviewers.
5. The reviewers carefully review the paper and submit reviews online.
6. The author receives [reviews and comments](#). The author revises the paper and/or rebuts the comments and uploads a revised paper or rebuttal.
7. The reviewers are notified that a revised paper requires additional review.
8. The review process continues until the paper is accepted or rejected for publication.
9. After the paper is accepted, the author uploads the final paper through the applicable website in the appropriate format as indicated in the [Technical Papers Submission Requirements](#) and [Conference Papers Submission Requirements](#).
10. The accepted paper is scheduled for presentation at an ASHRAE Winter or Annual Conference or a Specialty Conference.
11. ASHRAE staff editors edit and format the Technical Paper and send a PDF to the author, who [proofreads](#) the paper and returns responses to the editors' queries by the supplied deadline, or staff editors scan the Conference Paper for adherence to the [Author's Template for Conference Papers](#) and the author addresses any noted errors and provides a revised PDF by the supplied deadline.
12. After the conference editors may send the author of a Technical Paper [comments and questions](#) generated at an ASHRAE Winter or Annual Conference. The author returns responses to the editors.
13. Conference Papers are published as final PDFs on the ASHRAE Winter or Annual Conference Papers download, Technical Papers are available as preprint PDFs on the ASHRAE Winter or Annual Conference Papers download and published with the questions and comments and authors' responses in *ASHRAE Transactions*, and papers for Specialty Conferences are published as PDFs on flash drives or downloads for the individual conferences.

[Back](#)

[Index](#)

[Print](#)

The following materials are required for book manuscript **submission**:

1. The complete manuscript in **Microsoft® Word** and the **figures** provided as separate TIF or EPS files saved at **high resolution**. **Tables should be editable and NOT submitted as images**.
2. A laser printout of the complete manuscript including text, tables, and graphics. With the printout, include a cover sheet with the following information:
  - Proposed title of the book
  - Whether the book will include supplemental materials online (Excel spreadsheets, PDFs, Word files, etc.)
  - Sponsoring ASHRAE Technical Committee and/or ASHRAE research project number, as applicable
  - Author names in desired order with (if applicable) ASHRAE membership grade, academic degrees at the **doctoral level**, and professional **certifi** for each author
  - An “About the Authors” **paragraph**
  - Complete contact information for the corresponding author, including mailing address, phone and fax numbers, and email address
  - A paragraph describing the book (to be used on the back of the book, in the bookstore, and in marketing materials)
3. Electronic or printed copies of any permissions granted for reproducing material from other sources (see [Obtaining Permissions](#))
4. The completed [Marketing Questionnaire](#)

See [Document Formatting](#) and [Book Organization](#) for additional requirements.

Manuscripts should be submitted to:

Mark Owen

Editor/Group Manager, ASHRAE Handbook and Special Publications  
1791 Tullie Circle NE, Atlanta, GA 30329 USA

[mowen@ashrae.org](mailto:mowen@ashrae.org)

Telephone: 678-539-1187

[Book Publication Process](#) provides information on how the process will proceed after submission of the manuscript to Special Publications.

Back

Index

Print

Technical Papers most often report on ASHRAE-sponsored research and unsolicited research in HVAC&R technical areas.

All Technical Papers undergo critical, **double-blind** peer review by three or more competent **specialists** to ensure high quality of content. A paper must be accepted by three reviewers to be approved for an **ASHRAE Winter or Annual Conference**. The Technical Paper review activity is coordinated by the **ASHRAE Conference Program Administrator**, who can be contacted if you have any questions during the paper submission and review process. **File submission is done online via Manuscript Central**. Instructions for uploading files to Manuscript Central are available in the “Instructions & Forms” section of that website.

The Technical Paper submission requirements are as follows:

1. Upload an **Agreement to Publish** form that is signed by every author.
2. Download the **Authors' Template for Technical Papers** for a Microsoft® Word file to use when writing the paper; also see an **example paper**.
3. Typed manuscripts for Technical Papers **must not** exceed 30 double-spaced pages (including references and tables) and can contain a **maximum** of 12 figures. **Dual units of measurement** should be included in the text, tables, and figures. See **Document Formatting** for additional requirements. Upload the paper as a **Microsoft® Word** file for review. Authors should NOT identify themselves in manuscript file to enable reviewers to maintain a blind review.
4. Upload an author's list as a separate Word file that includes the following:
  - The **title** of the paper
  - Author names in desired order, principal author file with (if applicable) ASHRAE membership grade, academic degrees at the **doctoral level**, and professional **certification** for all authors.
  - An **author note** with job title, affiliation, and **address** for each author.
  - Complete **contact information** for the corresponding author.

Reviews will be done using ASHRAE's online review process, and ASHRAE staff editors will edit and lay out the accepted Technical Paper. (See **Paper Publication Process** for more information.) The corresponding author of the paper will receive a complimentary print copy of the published paper for distribution to all authors.

# ASHRAE Authors' Manual

## Conference Papers Submission Requirements

Back

Index

Print

Conference Papers presented at [ASHRAE Winter or Annual Conferences](#) report on research in progress, applications, case studies, and other topics in HVAC&R technical areas. Conference Papers presented at [Specialty Conferences](#) report on specific technical areas within HVAC&R, depending on the conference.

All Conference Papers undergo [single-blind](#) review by two or more reviewers to ensure high quality of content. A paper must be accepted by two reviewers to be approved for a conference. The Conference Paper review activity is coordinated by the [ASHRAE Conference Program Administrator](#), who can be contacted if you have any questions during the paper submission and review process. **File submission is done online via Conference Exchange using the link provided for each individual conference.**

The Conference Paper submission requirements are as follows:

1. Upload an [abstract](#) for review. The abstract must be accepted before the paper can be submitted. When you upload your abstract you will be assigned an ID# for your submission (one ID# for both the abstract and the paper).
2. Upon acceptance of the abstract, submit the paper based off of the accepted abstract.
  - Download the [Authors' Template for Conference Papers](#) for a Microsoft® Word file to use when writing the paper; also see an [example paper](#).
  - Conference Papers must not exceed eight single-spaced pages in length (including references, tables, and figures) and must include an [author note](#) at the bottom of page 1. [Dual units of measurement](#) should be included in the text, tables, and figures. See [Document Formatting](#) for additional requirements. Conference Papers being submitted should be considered “**Final**” by the author. Upload the Conference Paper as a [PDF](#) with your assigned ID# as the file name.
  - **Please note that adherence to the Author's Template and to the requirements set forth in this Authors' Manual are significant factors in determining the acceptance of your Conference Paper.**
3. Upload an [Agreement to Publish](#) form signed by the presenting author.

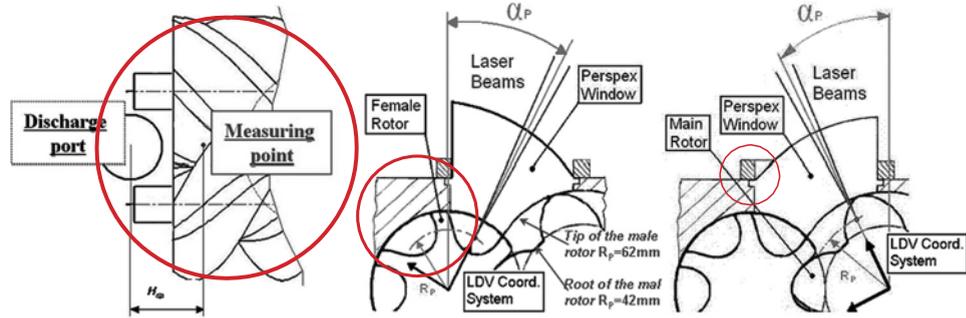
Reviews will be done using ASHRAE's online review process. (See [Paper Publication Process](#) for more information.)

# ASHRAE Authors' Manual

“Figures to be reproduced in black and white should use **patterns** or **shapes** to distinguish sections instead of coloring and shading.”

## Sample Figures

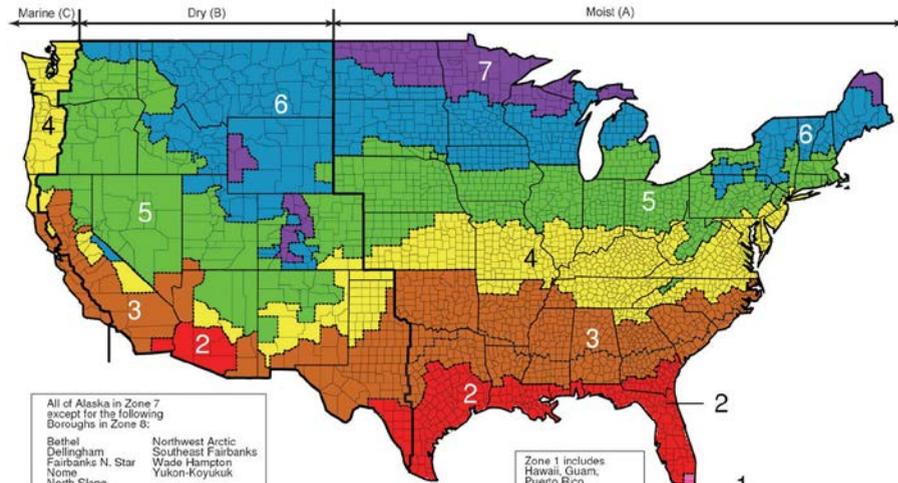
Back



Index

“Figures to be reproduced in color should have **touching colors that differ signifi** y so that there can be no confusion in understanding the data.”

Print



Sample Table

Back

Index

Print

**Table 1. Review of the Research on the Two-Phase Heat Transfer at Micro Scale**

Researcher	Working Liquid	Dimension of the Channel	Single/Array of Microchannel(s)	Heat Transfer Coefficient, $W/(cm^2/K)$
Munkejord et al. (2002)	Peopane	63–155 $\mu m$	Array of microchannels	7.1 ~ 8.4
Cuta et al. (1996)	Water	Width: 100~300 $\mu m$ Depth: 1 mm	Array of microchannels	1 ~ 2
Darabi and Ekula (2003)	HFE-7100		Single channel	1.8
Qu and Ma (2002)	Water	About 10 $\mu m$	Single channel	25
Brooks et al. (1999)	Water	Width: 50~200 $\mu m$ Depth: 0.5~3 mm	Array of microchannels	25 $W/cm^2$ (heat flux)
Park and Lee (2003)	Water	150 $\mu m$	Single channel	1.4
Tran et al. (1996)	R-12	2.46 mm	Single channel	0.2 ~ 1
Bao et al. (2000)	R-11	1.95 mm	Single channel	0.7~1.4
Bao et al. (2000)	R-123	1.95 mm	Single channel	0.5~1.4
Lin et al. (2001)	R-141b	1.1 mm	Single channel	0.2~0.6
Lazarek and Black (1982)	R-113	3.1 mm	Single channel	0.7-1.1
Wambsganss et al. (1993)	R-113	2.92 mm	Single channel	0.1~0.5

Back

Index

Print

### PERFORMANCE EVALUATION FUNCTION

First Level

The performance of any air-conditioning system depends on two factors:

- a. thermal comfort
- b. energy consumption

Second Level

#### Thermal Comfort

The most important variables that influence the condition of thermal comfort are air temperature, water vapor pressure in ambient air, relative air velocity, mean radiant temperature, activity level (heat production in the body), thermal resistance of the clothing, and purity of the air. Fanger (1970) defined a thermal sensation index by considering air temperature, water vapor pressure in ambient air, relative air velocity, mean radiant temperature, activity level, and thermal resistance of the clothing. PMV is the thermal sensation index given by Fanger (1970) and is internationally standardized. It is easy to use PMV when controlling an air-conditioning system because PMV is an index of human thermal sensation with one value for all seasons and is effective for all temperatures that are neither extremely high nor extremely low. PMV ranges from  $-3$  (cold) to  $+3$  (hot). When PMV is zero, then thermal sensation will be neutral, i.e., neither cold nor hot. Broadly speaking, when PMV approaches zero then thermal comfort increases.

The first term on the right-hand side of Equation 14 indicates the mass of moisture in the incoming air, which comes in contact with the evaporator wall, and the mass of moisture in the outgoing air. The humidity of the incoming air is calculated from a psychrometric chart with the help of the second-order curve-fitting method. The multiplying factor,  $(1 - b)$ , corresponds to the bypass factor of the evaporator. The second term amounts to mass of moisture in the incoming air bypassed through the evaporator and the mass of moisture in the outgoing air. The multiplying factor  $b$  corresponds to the bypass factor of the evaporator. The rate of change of specific humidity of supply air when the evaporator wall temperature is more than the dew-point temperature is given by

$$(\rho_a V_d) dW_s / dt = v \rho_a ((1 - \xi) W_3 + \xi W_0 - W_s) . \quad (1)$$

The first two terms on the right-hand side of Equation 15 correspond to absolute or specific humidity of incoming air, and the third term corresponds to outgoing supply air humidity.

**Specific Humidity of Thermal Space.** The rate of change of the specific humidity of the thermal space is given by

Third Level

# ASHRAE Authors' Manual

## Agreement to Publish Notice

Back

Index

Print

ASHRAE requires that prospective authors sign an Agreement to Publish form that gives ASHRAE the copyright and permits ASHRAE to publish the manuscript, to reprint it, and to offer it in whole or in part for reproduction or translation. ASHRAE must have the author's written permission and assignment of [copyright](#) (for papers) before a manuscript can be processed for publication. For books this is likely covered by a publications contract or a research project agreement; **for papers, authors must complete the [Agreement to Publish form](#) and either mail it to the address or fax it to the number provided on the form or upload it to [Manuscript Central](#) (preferred)**. Authors shall not submit manuscripts that are or will be considered for publication by other organizations or publishers.

It is the author's responsibility to secure and transmit to ASHRAE written permissions for use of proprietary information and/or copyrighted materials appearing in the manuscript prior to its submission. (See [Obtaining Permissions](#).)

ASHRAE requires previously [unpublished papers](#) in all its publications. Prior publication of papers in publications that are indexed or widely available from retrievable sources (including *ASHRAE Journal* and *Science and Technology for the Built Environment*) usually precludes consideration for presentation at Society conferences or for publication in *ASHRAE Transactions*.

Back

Index

Print

Below are steps for converting files created in Microsoft® Excel or Microsoft® Word into .TIF files. For additional information see [Formatting Figures](#).

1. In Excel, select the chart or graph to be converted. In Word, select the image to be converted. (Please be sure all elements are grouped together before copying.)

*If using Excel 2010 or Word 2010 or newer:*

- From the Home tab, select “Copy.”

*If using Excel 2007 or Word 2007:*

- From the menu options select “Copy.”

*If using an older version of Excel:*

- Hold down the Shift key and from the menu options select “Edit.”
- Choose “Copy Picture” from the drop-down Edit menu.
- Select “As shown when printed,” then “OK.”

*If using an older version of Word:*

- From Word’s menu options, choose “Edit” then “Copy.”

2. Minimize Excel or Word (don’t close it).

3. Open Microsoft® PowerPoint.

*If using PowerPoint 2007 or 2010 or 2013:*

- Delete the two boxes showing on the blank page that opens.
- From the PowerPoint menu options, under the Design tab, for 2007 select “Page Setup” and for 2010 or 2013 select “Slide Size” then “Custom Slide Size.”
- Set the width for 24 in. and the height for 24 in. and choose “OK.”
- From the PowerPoint menu options (under the Home tab for 2010 and 2013), select the drop-down arrow below the “Paste” button and select “Paste Special” then “Picture (Enhanced Metafile).” Please make sure all elements were copied over into PowerPoint.

*If using an older version of PowerPoint:*

- Choose “Blank Presentation,” then “OK.”
- Choose the icon showing a completely blank slide (or page); choose “OK.”
- Under the File menu options, choose “Page Setup.”
- In Page Setup, set width at 36 in. and height at 24 in. for landscape layout and set width at 24 in. and height at 36 in. for portrait layout. Choose “OK.”
- From the PowerPoint menu options, choose “Edit, Paste Special.”
- Choose “Picture (Enhanced Metafile).”

4. Select the image you pasted into PowerPoint. Small squares will appear on all four corners. These are handles. Use one of the corner handles to stretch the image to fill the page, but **be sure to hold down the shift key as you stretch the handle so that the image proportions will remain intact**. Do not stretch the image off the page.

5. Under the File menu option, choose “Save As.” If using PowerPoint 2013, choose “Browse” and navigate to the desired location for saving the file.

6. In the Save As dialog window, choose “TIFF Tag Image File Format (\*.tif)” from the Save As Type drop-down list. Give the file a name and click “Save.” PowerPoint will ask which slides you want to export; choose “Just This One.”

Back

Index

Print

**Manuscripts** should be double-spaced and in a single-column **format** on 8 1/2 by 11 in. (126 by 279 mm) or A4 sheets, with 1 in. (25 mm) margins.

Authors may submit artwork or suggestions for cover design, but final cover designs are at the discretion of ASHRAE.

**Title Page.** Includes the proposed **title** of the book, the research project number if applicable, the number of the cognizant ASHRAE Technical Committee if applicable, and the author names in desired order.

**Table of Contents (TOC).** Lists any **front matter** and each chapter in order.

**Foreword.** Optional; usually written by someone other than the author.

**Preface.** The preface is the author's statement about the work. It may include general background information, such as reasons for undertaking the work, the **origins** of the book (not the subject matter), and the method of research (if it has some bearing on readers' understanding).

**Acknowledgments.** The section may **acknowledge** special assistance, including sources of financial aid, as well as the help of ASHRAE Technical Committees, individuals, or other groups.

**Introduction.** This section should contain an overview of the book. The definition of the problem should be set in the appropriate framework for the solution that will follow in the main body of the text.

**Chapters.** Most books are organized in chapters, which should have short, descriptive titles. The **material** should be presented in a logical order that is easy to follow, keeping the prospective audience in mind. Authors may use sections with appropriate **subheadings** within chapters.

Reports of experiments should include an estimate of uncertainty and an error analysis. Any **results** described should include qualified limits to the accuracy of tests and calculations, and other problems.

There should be a **conclusion** to the book, which should list conclusions and summarize the significance of the work as clearly and concisely as possible.

**Nomenclature.** When equations are used extensively, the author should consider having a special **nomenclature** section.

**References and Bibliography.** ASHRAE's preferred method of **citation**, widely used in scientific texts, is the **author-date method**.

**Appendices.** **Appendices** may include supporting data, sample calculations, derivations of complicated mathematical equations, detailed descriptions of apparatus, and a glossary of terms.

**Index.** Authors are asked to submit a list of words that will be compiled to create an index. (The author need not supply page numbers—only the words they want indexed.)

Back

Index

Print

For **formatting guidance**, authors may use the [Author's Template for Technical Papers](#) or the [Author's Template for Conference Papers](#) as applicable.

**Title.** **Titles** must be concise but descriptive. Multipart papers must be labeled as Part I, Part II, etc. in the title.

**Abstract.** **Abstracts** should be between 100 and 200 words and concisely state the nature of the research, methods, major findings, and conclusions. *For Technical Papers, the abstract must be included in the body of the paper **and** uploaded to Manuscript Central in the "Abstract" section.*

**Introduction.** Introductions should contain general background **information**, literature review, and/or events that led to the work reported.

**Body.** The body should include, in order, experimental designs, test procedures, theoretical consideration, and results. Sections with appropriate **subheadings** should describe the test equipment, measurements, observations, and mathematics needed to perform the **experiments**.

**Discussion.** **Results** described in the preceding section should be discussed here, including qualifications, limits to the accuracy of tests and calculations, and other problems.

**Conclusion.** This section should list **conclusions** and **summarize** the significance of the paper as clearly and concisely as possible.

**Acknowledgments.** Acknowledges **special assistance**. Persons mentioned should be identified with their affiliations.

**Nomenclature.** Use a special **nomenclature** section when equations are used **extensively**.

**Appendices.** **Appendices** may include supporting data, sample calculations, derivations of complicated mathematical equations, and detailed descriptions of apparatus. Material in the appendices count in the page and figure limitations.

**Computer Programs.** Lengthy **programs** or printouts are approved only under exceptional circumstances.

**References and Citations.** ASHRAE's preferred method of **citation**, widely used in scientific texts, is the **author-date method**.

**Figures and Tables.** **Figures and tables duplicated for units purposes count as a single figure when determining the maximum number of figures for Technical Papers.** Figures may be inserted into the Microsoft® Word text file for the review process and for final submission; for final submission please also insert them at the end of the document or in a separate Word file.

For the final stage of a manuscript, only a **Microsoft® Word file free of conditional text, line numbers, track changes, and cross-references** should be submitted. Pages should be numbered consecutively.

See [References and Citations](#)

See [Formatting Figures](#)

See [Formatting Tables](#)

See [Formatting Equations](#)

## Text

Manuscripts should be double-spaced and in a single-column format on 8 1/2 by 11 in. (216 by 279 mm) or A4 sheets, with 1 in. (25 mm) margins.

## Headings

ASHRAE publications provide for three levels of [headings](#). If a fourth level is [needed](#), use the third-level heading with only the first word capitalized.

## Lists

Indent [items in a list](#), preceded by a number and period. Introduce all lists.

*EXAMPLE:*

The HVAC system was designed to accommodate the following:

1. Placement of research equipment and walls anywhere in the laboratory without major modification
2. Minimal energy consumption

Short listed items may be indented and preceded by a bullet.

*EXAMPLE:*

... are the following:

- relative equipment first cost,
- relative future cost of gas and electric energy, and
- relative amounts of heating and cooling loads.

Separate items in a list within text using numbers in parentheses.

*EXAMPLE:*

... the following: (1) relative equipment first cost, (2) relative future cost of gas and electric energy, and (3) relative amounts of heating and cooling loads.

## Numbers

Always use numeric figures with scientific and mathematical abbreviations:

- 4 ft, 12 in., 2 m, 3 m<sup>2</sup>
- Use only Arabic numbers.
- Spell out the numbers one to ten in the text; use the numeral for any number over ten.
- Four-digit numbers need no comma (1200).

## Acronyms

[Acronyms](#) should not be used without first giving the full expanded name.

*EXAMPLE:*

“...measurement of the entering water temperature (EWT). Record the EWT for each...”

Back

Index

Print

## References

A **reference list** is composed only of works cited in the text, and a **bibliography** is a general reading **list**—**the two should not be combined**.

- Do not write titles from memory.
- Verify all references against the source and be sure that the authors' names are spelled correctly, that the title is written as it appears in print, and that correct volume, issue, and page numbers and dates are listed.
- Use the most current edition of a **reprinted book** whenever possible.
- The reference list at the end of the manuscript should not be numbered.
- Entries are arranged in alphabetical order, **chronologically** for a particular author or group of authors.
- All authors are **listed** in a reference list entry. Any “a” or “b” designations that were used in the text to differentiate references to more than one publication by the same author with the same date should also be included in the reference list entries.

## Citations

ASHRAE's preferred method of citation, widely used in scientific texts, is the **author-date method**.

- In the text, cite a source by enclosing the author's name and the date (year) of publication in parentheses.  
*EXAMPLE:* “... of such flow were clearly defined (**Bailey 1951**); however, ...”
- Two authors' names may be included; for three or more, use “et al.” after the first author's name.  
*EXAMPLE:* “... a feeling of thermal comfort may be associated with phenomena other than thermal conditions alone (Winakor and Foster 1978; Woods et al. 1982).”
- In situations where there are references to more than one publication by the same author or group of authors with the same date, differentiate between the works by adding “a”, “b”, etc. after the date.  
*EXAMPLE:* “as cited in previous studies (Carey et al. 2001a, 2001b).”
- If the author's name has just been mentioned, only the date need be inserted in parentheses.  
*EXAMPLE:* “... were clearly defined by Bailey (1951); however, ...”
- If the “author” is an organization, use its acronym.  
*EXAMPLE:* (**ASHRAE 2005**)

Back

Index

Print

#### Journal

Veronica, D.A. 2010. Detecting cooling coil fouling automatically—Part 2: Results using a multilayer perceptron. *HVAC&R Research* 16(5):599–616.

#### Standard

ASHRAE. 2001. ANSI/ASHRAE Standard 52.2-2001, *Method of testing general ventilation air-cleaning devices for removal efficiency by particle size*. Atlanta: ASHRAE.

#### ASHRAE Handbook

ASHRAE. 2005. Chapter 5, Two-phase flow. In *ASHRAE Handbook—Fundamentals*. Atlanta: ASHRAE.

#### Book

Axley, J. 2006. *Ventilation systems: Design and performance*, 2nd ed. Chapter 4.3, Macroscopic methods. H.B. Awbi, ed. London: Taylor & Francis Books, Ltd.

#### Report

Emmerich, S. 1997. *Use of computational fluid dynamics to analyze indoor air quality issues*. Report NISTIR 5997. Gaithersburg, MD: National Institute of Standards and Technology.

#### ASHRAE Transactions

Chen, Q., and Z. Jiang. 1992. Significant questions in predicting room air motion. *ASHRAE Transactions* 98(1):929–39.

#### Conference Proceedings

Dhinsa, K., C. Bailey, and K. Pericleous. 2005. Turbulence modelling for electronic cooling: A review. *Proceedings of the 7th International Conference on Electronics Materials and Packaging, Tokyo, Japan*, 5:275–81.

#### Software

LBL. 1993. *DOE-2*, Version 2.1E. Berkeley, CA: Lawrence Berkeley National Laboratory.

#### Seminar or Presentation at a Conference

Lu, D.W., X.N. Xu, H.B. Wu, and X. Jin. 2005. A permanent magnet magnetorefrigerator study on using Gd/Gd-Si-Ge alloys. Presented at the First International Conference on Magnetic Refrigeration at Room Temperature, Montreux, Switzerland, September 27–30.

#### Website

Rice, K. 2006. DOE/ORNL heat pump design model, Mark VI Version. Heat Pumps. [www.ornl.gov/~wlj/hpdm/MarkVI.shtml](http://www.ornl.gov/~wlj/hpdm/MarkVI.shtml).

#### Personal Communication

Zimm, C.B., V.K. Pecharsky, K.A. Gschneidner, Jr., S.A. Nikitin, and A.M. Tishin, with Astronautics Inc., Madison, WI. Telephone conversation with the author, April 17, 2006.



**Complete and sign form, save and upload (preferably) with your paper in Manuscript Central or fax to 678-539-2191, Editorial Coordinator, Special Publications.**

To attach to your manuscript the recognized value of peer review by ASHRAE and to acknowledge its addition to ASHRAE literature, the industry's and profession's most widely known and respected source of knowledge gained through research and practice, ASHRAE requires authors of ASHRAE-published manuscripts to sign Agreements to Publish. This requires that authors direct to ASHRAE all requests to use and make available in print and all forms of digital media ASHRAE-published manuscripts. Thank you for enabling ASHRAE to further advance and improve understanding of environmental technology.

W. Stephen Comstock, Publisher

**Agreement to Publish**

**Publication:**  ASHRAE Transactions  ASHRAE Journal

**Manuscript Title:**

**Author(s):**

The author represents and warrants that he/she (with the co-authors listed above) is the author of the manuscript named above and that the manuscript is an original work. In consideration of ASHRAE's publication of the manuscript, the author assigns to ASHRAE any claim of copyright in and to the manuscript and agrees and acknowledges that ASHRAE, as the sole owner of such rights to the manuscript, has the right to publish, reproduce, sell, reprint, and translate the manuscript, in whole or in part, in this and other publications. ASHRAE reserves these rights in print, digital, and all forms of electronic media, whether now known or hereafter invented. The author also acknowledges that ASHRAE has the right to abstract or index the manuscript and the right to offer the manuscript to abstracting or indexing services.

The author warrants that he/she has neither granted nor purported to grant to any person any rights to the manuscript. The author further warrants that he/she shall ensure that no person directly or indirectly assisting him/her whether as employee or subcontractor shall have or expect to have any claim to any rights in or to the copyright to the manuscript.

It is understood by the author that ASHRAE, in accepting the manuscript for publication, does not accept any responsibility for the manuscript's content and accuracy nor for the manuscript containing matter that is libelous or otherwise unlawful, that invades individual privacy, or that infringes on proprietary rights, such as trademarks. In addition, the author warrants that the manuscript has not been previously published or made otherwise freely or commercially available in print, digitally or electronically, and that it is not currently under consideration for publication by any other (ASHRAE or non-ASHRAE) publication.

ASHRAE allows authors to post their ASHRAE-published articles or papers on their personal and institutional/corporate websites if done so as published by ASHRAE and with credit. Authors also can extract information from articles for subsequent or new works. The following is ASHRAE's copyright notice for author use in such cases: "This article or paper was published in <ASHRAE publication>, <edition/month/volume> <year>. Copyright <year> ASHRAE. Reprinted by permission at <website>. This article may not be copied and/or distributed electronically or in paper form without permission of ASHRAE. For more information about <ASHRAE publication>, visit www.ashrae.org." Requests from third parties for use of ASHRAE published content should be directed to www.ashrae.org/permissions.

ASHRAE agrees that if it should not publish the manuscript within one year from the date of this agreement, all rights to the manuscript revert to the author.

**Author's Signature**  **Date**

If you typed your name instead of inserting an electronic signature, check this box to indicate that your typed name above is acceptable as your signature.

<b>Exemptions for Works of the U.S. Government</b>	
If one of the following conditions is met, certify below by checking the appropriate box and ASHRAE will consider the manuscript a Work of the U.S. Government, not subject to copyright:	
<input type="checkbox"/>	ALL authors of the manuscript were bona fide officers or employees of the U.S. Government at the time the work was prepared.
<input type="checkbox"/>	ALL authors were contracted by the U.S. Government to prepare the work.
<b>Signature</b> <input type="text"/>	<b>Date</b> <input type="text"/>



**ASHRAE**

1791 Tullie Circle, NE, Atlanta, Georgia 30329-2305

Tel: 404-636-8400 · Fax: 404-321-5478 · www.ashrae.org

**Complete disclosure, save, and upload (preferably) with your paper in Manuscript Central or fax to 678-539-2137, Assistant Manager, Conference Programs.**

## Potential Sources of Bias Disclosure

In accordance with the ASHRAE Code of Ethics (<https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>), potential sources of bias for all Papers and Programs presented at ASHRAE Conferences should be disclosed. Use this form to disclose potential sources of bias for any or all authors of a presentation as applicable.

In the area below, provide the title of the presentation/paper and list the authors and state any affiliations with or involvement in any organization or entity with any commercial or financial interest (such as honoraria, educational grants, research grants, external funding source, membership, employment, stock ownership or other equity interest, expert testimony or patent-licensing agreement) in the specific subject matter or materials to be discussed.

**Presentation/Manuscript Title:**

**Name of Author**

**Disclosure**



**Note:** All biases disclosed shall be listed on the third slide in ASHRAE presentations (Acknowledgement Slide) and in the Acknowledgments section of the final approved Conference Paper or Technical Paper.

## Permission Request Form

Date:

To: (Name) From: (Name)  
(Address) (Address)  
(Email) (Email)

Hello. I am preparing a manuscript to be published by ASHRAE (www.ashrae.org), a nonprofit organization. The tentative title of the ASHRAE publication is:

I am requesting your permission to reproduce the following material in this and in all subsequent editions of the above-referenced work, in all media of expression now known or later developed and in all foreign language translations and other derivative works published or prepared by ASHRAE or its licensees, for worldwide distribution. I  am  am not requesting to use this material on the cover of the ASHRAE publication.

Title of publication/website from which material comes:

Author(s) of work from which material comes, if applicable:

Copyright date of work from which material comes:

Volume/issue/page nos. of publication from which material comes, as applicable:

Title of figure or other item requested to be used from this publication/website:

I am also requesting a high-resolution version of this item suitable for print publication (at least 300 ppi in tiff or jpg format). This material is to appear  as originally published or  with changes or deletions as noted here:

The usual form of acknowledgement for material reproduced within the text is to credit the copyright holder beneath the material with the phrase "Reprinted with permission of <Name of Copyright Holder>" or "Courtesy of <Name of Copyright Holder>." The usual form of acknowledgement for material reproduced on the cover of the work is to credit the author or copyright holder on the copyright page of the book with the phrase "Cover image by <Name of Author or Copyright Holder>, used by permission."

Please indicate your permission by signing this form and returning it to me at the above email or mailing address. **By signing, you warrant that you are the sole owner of the rights granted or that you have the authority to grant the permission requested herein and that the material does not infringe upon the copyright or other rights of anyone.** Note that an electronic signature is acceptable if this form is returned via email. Please maintain a copy for your files. If you do not control the rights to this material, please let me know to whom I should apply.

Thank you in advance for your attention to this request.

---

I hereby grant permission for the material requested above to be reproduced as indicated above.

Signature:

Date:

Title:

Company:

Name of copyright holder *exactly as you wish it to appear in the ASHRAE publication:*