Style Guide for IES Technical Documents

Purpose: Consistency in style, word usage, spelling, and appearance for IES technical documents. This will enhance readability, usability, clarity, and the appearance of professionalism.

Organization: For ease of use, this style guide is divided into several sections:

I. General
II. Words
III. Punctuation
IV. Numbers and Units
V. Abbreviations and Acronyms
VI. Figures and Tables
VII. References (Citations) and/or End Notes
VIII. Glossary

I. General

Audience
First, think of who your readers will be. Lighting professionals? The general public? Keep this group in mind as you write the document.

What to Include, What Not to Include
Information should be technical and practical. Include scientific and engineering facts. Support with references as appropriate.

Do not mention or promote products by product name, catalog number, or manufacturer name.

Referring to Other Documents
- Your document may refer to other documents for additional, non-critical information, but information that is critical to your document should be included in it.
- When referring to an IES document:
  - Use both its number and title.
  - The title is in italics; the number is not.
- The edition of a book, where appropriate, is given in abbreviated form, not capitalized, and not italicized.
- Examples:
  - For additional information, see IES RP-6-15, *Sports Lighting*. 
For additional information, refer to IES’s *The Lighting Handbook*, 10th ed. (Also acceptable: For additional information, refer to *The Lighting Handbook*, 10th ed. [IES 2011].)

**Document Format and Table of Contents**

- **Font**: Use one, simple font type and size for the entire document. Examples are 11-point Calibri, Arial, or Times New Roman.
- **Don’t use bold or underlining for emphasis; use italics instead.**
- **However, do use bold to refer to other sections by number and name.** Example: See Section 5.3 Crosswalks.
- Use the IES Technical Document Template.docx to begin a document. It has formatting styles for text and headings already set up, and a Table of Contents begun based on the temporary headings. You just need to replace the temporary content with your own.
- **Number the document sections and assign heading styles accordingly.** (See IES Technical Document_Working Example.docx.)
- **Don’t separate the text into columns (the way the documents are published.)** The publisher will do this.

**Document Organization**

The contents of RPs, DGs, Gs, and LEMs should follow this sequence:

- **Front matter**
  - Title page, Copyright page, ANSI statement (begun for you in the IES Technical Document Template.docx)
  - Dedication (if any)
  - Table of Contents
  - Foreword (if any)
- **Body of document**
  - Section 1: Introduction and/or Scope
  - Application information; that which is design specific and unique to the document
- **Back matter**
  - Informative Annex A: the general background information that is relevant to most if not all RPs, DGs and Gs; e.g., light, vision, optics, light sources
  - Other annexes, if any
  - Glossary, if any (avoid including terms that are in RP-16, as it is available for free viewing online)
  - Additional Reading (if any)
  - References or End Notes

The contents of LMs and TMs should follow this sequence:

- **Front matter**
II. Words

Spelling

- Some words and phrases commonly used in the lighting industry may have non-standard spelling in IES documents. Examples:
  - footcandle (not hyphenated)
  - high pressure sodium (not hyphenated)
  - interreflected, interreflectance (not hyphenated)
  - light emitting diode (not hyphenated)
  - solid state lighting (not hyphenated)
  - relamp, relamping, relamped (not hyphenated)
  - uplight, uplighting, downlight, downlighting (one word)
- Correct spellings for these two commonly used terms: streetlight (when meaning a luminaire), street lighting.
- Sky light, skylight:
  - *Sky light* is light from the sky
  - *Skylight* is fenestration, typically in a roof, to let in daylight.
- Commonly misspelled: Wi-Fi (not wifi)
- Use a spelling checker, but watch out for automatic corrections; it will usually change *luminaires* to *luminaries*. Add *luminaire* and *luminaires* to your Dictionary to avoid problems.
- Plurals: Don’t use an apostrophe to make a word, number, or acronym plural. Examples: LEDs, 1990s.
Voice
It is all right to use **active** or **passive** voice, according to the situation. Passive voice is sometimes described as “weak” but in fact does have its place and is sometimes preferred to active voice. Either of these examples would be acceptable:

- Passive voice: The first IES *Lighting Handbook* was published in 1947.

Person
Write in **third person**, not first or second. Examples:

- First person (I, we): I designed the project. I will ask the client about his or her wishes.
- Second person (you): You designed the project. Please ask the client about his or her wishes. (In the second sentence, “you” is understood to be subject, though not specifically stated.)
- Third person (he, she, it, they): The design team (“they”) should ask the client.

Contractions
Don’t use them. Spell out the words they represent.

Can, May, Shall, Should, Must
Use the following guidelines for these words:

- **Shall**: Used to convey a strict requirement, from which the reader or user may not deviate in order to be considered in conformance with the publication.
- **Should**: Used to convey a recommendation.
- **May**: Used to show that the publication gives the reader permission to follow a certain course of action. This term usually presents the reader with viable options and is a weaker form of a recommendation (should).
- **Can**: Used to convey possibility or capability, whether material, physical, or causal.
- **Must**: Used only for mandatory compliance with other, legally binding standards (such as U.L., or NFPA, for example) or where quoting or paraphrasing a legally binding standard.

The negative forms of the above verbs (shall not, should not, may not, and cannot) carry equal weight and meaning as the positive forms listed above.

- Do not use expressions such as “has to,” “have to,” or “needs to” to convey a requirement or recommendation.

Word Usage; examples of note, in no particular order

- **Assure**, **ensure**, **insure**. Follow the appropriate example:
  - I *assure* you, we will never go there again.
  - I need to *insure* my house against tornados.
  - Provide sufficient illumination to *ensure* that the occupants can see.
- **Efficiency** and **efficacy**
  - Efficiency is expressed as a percentage.
Efficacy is expressed as [something] per [something else]. Examples: miles per gallon, lumens per watt.

- Compose and comprise
  - Say composed of if that’s what you mean. Don’t say comprised of.
  - A way to remember:
    - The parts comprise the whole.
    - The whole is composed of the parts.
    - Also acceptable: The whole comprises multiple parts.
    - Also acceptable: Multiple parts constitute the whole.

- All right, alright, OK, okay
  - Use all right.
  - Do not use alright, OK, or okay.

- Criteria, phenomena, data
  - These are all plural.
  - The singular forms are criterion, phenomenon, and datum.
  - Examples: The criterion is 50 lux; the criteria are on page 10.
  - Exception: In common use, data is often used as a collective (singular) noun. This is sometimes acceptable. (Example: The original data was not easily interpreted.)

- Its and it’s
  - Its means belonging to it and has no apostrophe (same as with his and hers).
  - It’s is a contraction for it is.

- Less and fewer
  - Less is used when the quantity can’t be counted. Example: She has less money. There is less illuminance on the work plane.
  - Fewer is used when the quantity can be counted. Example: She has fewer dollars. There are fewer footcandles on the work plane.

- Irregardless
  - Don’t use it; if it were a word, it would mean not without regard to, which is probably the opposite of what you mean.
  - Use regardless or irrespective instead.

- Natural light and artificial light
  - If you mean electric light, use that term, not artificial light.
  - If you mean daylight, sunlight or sky light, use whichever is appropriate, not natural light.
  - Reason: Photons that are emitted when electrons in a semiconductor combine with lower-energy “holes” (as in an LED), or when a tungsten filament is heated to the point of glowing (incandescent lamp), are just as real and natural as those emitted as a result of nuclear fission millions of miles away (our sun).

- Reflective, specular, shiny
  - If you mean shiny, use that word, or specular, or glossy, or mirror-like.
  - The term highly reflective means reflecting a lot of light. Don’t use it to mean shiny.

- Candela and candelas
• Singular: candela
• Plural: candelas
• Reason: If candelas were plural, the singular would be candelum, which isn’t a word.
  The candela (not the candelum) is one of the seven SI base units (also meter, kilogram, second, ampere, kelvin, mole).
  • Man-made, mankind: These terms are antiquated and inaccurate unless you are referring specifically to men.
    o For man-made, use manufactured, human-made, constructed, built, or another appropriate term.
    o For mankind, use human-kind, humans, human beings, or another appropriate term.
  • Lighted, lit
    o Technically, they are equivalent. Use whichever sounds best in what you’re writing.

III. Punctuation

Comma
• The serial comma is fine if you prefer it. (This is the last comma before “and” in a list.) Note that there are times when it is necessary for clarity and will be added by the editor if needed.
• Use a comma after e.g. and i.e.
• Do not use a comma to join two independent clauses. In other words, if you have two phrases that could each stand alone as a sentence, do not join them with just a comma. Use “,” and” or “, but”, or use a semicolon (;), or make them two sentences. Examples:
  o Incorrect: The project was expensive, however the designer stayed within budget. [As written, this sentence actually means that no matter how the designer stayed in budget, the project was expensive. This is probably not the intended meaning.]
  o Correct: The project was expensive; however, the designer stayed within budget.
  o Also correct: The project was expensive. However, the designer stayed within budget.
  o Also correct: The project was expensive, but the designer stayed within budget.

Slash (/)
Don’t use it between words. Use “and” or “or” instead of the slash, or reword the sentence.
Exception: It is all right to use “and/or” when applicable.

IV. Numbers and Units

Numerals and words
• In text, spell out the word when the number is zero through nine, and use a numeral for 10 and higher. Examples: Two people, three lanes, 10 organizations.
• In a table, use numerals only.
• If it’s a measurement, use a numeral. Examples: 5 lux, 110 LPW.
• Exception to all of the above: Don’t begin a sentence with a numeral. Either write the number out or reword the sentence.

• For numbers greater than 999, use a comma every three digits. Examples: 1,500 and 2,130,000 (not 1500 or 1 500 or 2 130 000). Exception: Do not use a comma in CCT values, e.g., 3000 K. (See below for more on CCTs.)

Units

• SI and USCS: IES technical documents use Système International (SI) units. United States Customary System (USCS) units—if used at all—should follow in parentheses. (Note that the system used in the US is no longer officially called the British, Imperial, or foot-pound system.)

• Speed: Use km/h (mi/h), or spell it out. (Don’t use KPH or MPH.)

• Abbreviating units:
  o Spell it out the first time; thereafter, it is all right to use the abbreviation.
  o Examples: lumens (lm); lux (lx); meters (m); candelas per square meter (cd/m²).

• Spaces: Put a space between the numerical value and the units, whether abbreviated or written out. Examples: 500 lux, 20 footcandles, 100 W, 1000 cd/m².

• Degrees:
  o Temperature in Celsius or Fahrenheit: Use a space between the value and the units, which may be written out or abbreviated. Examples: 212 degrees Celsius, 212 °C, 120 °F.
  o Angles: Use a space if writing out degrees. Do not use a space between the value and the degree symbol. Examples: 45° above nadir, 45 degrees above nadir.

• Correlated Color Temperature:
  o CCT is measured in kelvins, the SI unit of thermodynamic temperature. Note that it is lowercase when written out. The abbreviation is K. (The term “degrees Kelvin” and its abbreviation "K were abandoned in 1967 by the International Committee for Weights and Measures.*)
  o When referring to the CCT of a light source, do not use a comma in the value.
  o As with other units, there should be a space between the numerical value and the units. Examples:
    ▪ As a noun: The CCT of the lamp is 3000 K. (This would be read aloud as The CCT of the lamp is 3000 kelvins.)
    ▪ As an adjective: The 5000 K lamp is slightly “cool” in appearance. (This is preferred to the correct but awkward looking “5000-K lamp” and would be read aloud as The 5000-kelvin lamp is slightly cool in appearance.)

• Watts and volts:

* http://www.us-metric.org/metric-system-temperature-kelvin-and-degree-celsius/
In text, spell out watts and volts when not associated with a value.

When used with a value:

- As a noun, spell it out or use the abbreviation. Examples: The power required is 60 watts. The luminaire operates at 120 V.
- As an adjective, spell it out and use a hyphen. Examples: The 60-watt incandescent lamp is dimmable but has low efficacy. The requirement of 347-volt equipment created problems for the designer.

**Conversion Factors**

When it is important to convert with precision between SI and USCS units (e.g., in G-1-16, *Security Lighting Guidelines for People, Property, and Critical Infrastructure*), use four significant figures in the conversion factor (e.g., 10.76). Exception: It is all right to use 10 or 0.1 to convert between lux and footcandles as long as precision is not critical. The method used should be explained at an appropriate place in the document; e.g., in the Introduction.

**Significant Figures**

Use two significant figures in displayed values. However, do not use fractions of a lux. Examples:

- Write 56 lux (5.6 fc), not 56.2 lux (5.62 fc). At this light level, a fraction of a lux is not discernible.
- Use 120 lux (12 fc), not 123.8 lux (12.38 fc). At this light level, a difference of a few lux is not discernible.
- If the last digit is a 5, it is permissible to use three significant figures rather than rounding up. Example: 125 lux (12.5 fc).

**Percent**

- Use “percent” or “%” in text.
- Use “%” in tables.
- When describing a range:
  - Use “percent” (or “%”) after both numbers.
  - In text, use “to” rather than a dash.
  - In tables, a dash with spaces is acceptable.
  - Examples:
    - In text: 10 percent to 20 percent, or 10% to 20% (no dash)
    - In a table: 10% - 20% (not 10-20%)

**Equations**

MS Word has a special tool for creating mathematical expressions. To write an equation this way:

1. Make sure your cursor is in the location where you want to insert the equation.
2. On the Insert tab, click the down-arrow next to Equation.
3. Select from an equation that is similar, or select New Equation.
4. Build the equation by selecting symbols from the Equation toolbar and by typing the numbers and variables.
V. Abbreviations, Acronyms, Symbols

When to Use Abbreviations or Acronyms
With very few exceptions, the name or term should be spelled out first, followed by the abbreviation in parentheses. Examples: United States Green Buildings Council (USGBC), lumens per watt (LPW).

Periods in Acronyms
Sometimes periods are used in acronyms, but usually they are not. Examples: IES, NASA, USA, LEED.

Distance Abbreviations
Meters, feet, inches:
- Meter or meters: m
- Foot or feet: ft (no period; do not use an apostrophe [‘])
- Inch or inches: in. (use a period; do not use a quotation mark [“])

IES, IESNA
Use IES as the abbreviation for Illuminating Engineering Society. (We have dropped “of North America” from our official name.)

i.e. and e.g.
These two are sometimes confused.
- Use *i.e.* to mean “in other words.” (A way to remember: Both begin with *i.*)
- Use *e.g.* to mean “for example.” (A way to remember: Think of it as *for eg-zample.*)
- Follow *i.e.* and *e.g.* with a comma.
- Don’t begin a sentence with *i.e.* or *e.g.*

Time of Day
Use AM and PM rather than the 24-hour system. For example, use 6:00 AM and 2:30 PM, rather than 0600 and 1430.

etc.
- Don’t use it.
- Give the examples you mean. If there are too many to list, use “for example,” or “e.g.,” followed by one or two examples.
- Reason: When you say “for example,” you don’t need to use “etc.” to indicate that there are others.

Symbols
- %: See IV Numbers and Units – Percent.
- π, Θ, and other Greek letters: When used in the text, use the same font type and size as for the rest of the text. *Tip:* Look for them in Character Map, a built-in tool in Windows.
VI. Figures and Tables

Placement in Text
- All figures and tables must be referred to in the text.
- They should follow soon after their reference in the text (but not in the midst of a paragraph).

Captions and Titles
- Authors should always provide suggested captions for all figures and titles for all tables.
  - The caption of a figure goes below the figure and includes the figure number.
  - The title of a table goes above the table and includes the table number.
  - Figures and tables are numbered separately.
- Captions and titles should be brief. A good rule of thumb is one phrase or sentence that summarizes what the figure or table is about, but without stating the obvious. If you need to say more about it, include that information in the text instead of in the caption.
- The credit, or source (indicating the source of a figure or table), should be provided at the end of the caption or title. (Important: Permission is always required when the figure or table is from a source outside the IES.)
- The credit line for a figure should read *(Image courtesy of …)* or *(Photo courtesy of …)*.
- The credit line in a table should take one of these forms:
  - *(Reprinted from …)* Use for an exact reproduction.
  - *(Adapted from …)* Use where either the information or the form of the table has been changed from the original.
  - *(Based on …)* Use where the information comes from a particular source, but the table is not reproduced or adapted.

Permissions and Attributions
It is important that contributing authors start gathering art elements early since IES must obtain permission from the original publisher before any "borrowed" items are used in IES documents. This permission-granting process, while often a formality, cannot be avoided and is sometimes very time consuming. Consult the IES Resource Manager for the process for obtaining and documenting permission.

Format for Tables
Tables in the document should be in an editable format. Do not provide the table as an image.

VII. References (Citations) and/or End Notes

What to Include, What Not to Include
Most IES documents include a list of references. These will be the sources that the authors have tapped while creating the document. Sources may include (but are not limited to) books, trade
magazine articles, product catalogs, industry application notes, journal articles, and student theses or dissertations.

**Important:** “An author should never place in a reference list a document that he or she has not seen. The practice of citing documents only on the basis of information from other documents has led to the perpetuation of many erroneous references in the literature.”

**Format**


The references should appear in a numbered list at the end of the document in what is called “citation-sequence” format, meaning that the references (citations) are listed in the order in which they appear in the document. Small superscripted numbers placed within the text direct the reader to the source of a particular fact or statement. Additional information can be found here: [http://www.scientificstyleandformat.org/Tools/SSF-Citation-Quick-Guide.html](http://www.scientificstyleandformat.org/Tools/SSF-Citation-Quick-Guide.html)

Refer to the IES Technical Document_Working Example.docx for information regarding creating references in Word.

Some specifics:

- When listing authors, list each author’s last name followed by a space (no comma) and then the first, or first and middle, initials. No period or space between first and middle initials. Authors’ names are separated by commas. The last author’s name is followed by a period.
- Omit degrees, titles, and honors, such as Dr., PhD, and LC.
- Organizations as authors: Cite the organization first, followed by (if relevant) a comma and the name of the authoring subdivision, such as a committee.
- Note that quotation marks are not used.

Examples:

Note that each listed reference contains the title of its source material exactly as it was originally printed. This title should not be modified to conform to spelling or abbreviation styles otherwise in force within the IES document where it is referenced.

**Additional Reading**
References that are not cited within the text may be included in a separate section titled Additional Reading and listed alphabetically by author.

**VIII. Glossary**

The glossary defines all the technical terms used in the document's main text that the author believes many readers won't immediately understand, that involve particularly complex (and/or often misunderstood) concepts, or that are lighting industry jargon or acronyms.

The glossary should *not* include words or terms that:

- Are not used in the text
- Are defined in RP-16, as it is available for free viewing online

Because italics are used for emphasis in IES documents, terms that are found in the glossary are *not* put into italics in the text of the document.

The following sample entries are examples of the style to use for the glossary (not necessarily what should be included):

**BUG rating**  The IES system for categorizing outdoor luminaires by the light they emit into defined Backlight, Uplight, and Glare zones.

**color-corrected light meter**  A light meter designed to respond to the various wavelengths in the same manner as the human eye.

**correlated color temperature (CCT)**  The absolute temperature of a blackbody whose chromaticity most nearly resembles that of the light source.

**dichroic filter**  A filter that transmits certain wavelengths and reflects those not transmitted; the absorption is small.

In the above examples, notice that:

- Capitalization of glossary entries is appropriate only for proper nouns, consistent with the style found in dictionaries.
- The glossary entry is bold and followed by no punctuation.
- The glossary entry is followed by two spaces and then the definition, the first word of which is capitalized.
- There is a period at the end of the definition.