# How to Write Specifications

**Design Manual**
**Chapter 1**
**General Information**
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There may be times when a designer must write their own specifications, either for use on an individual project, or as a proposed revision to the Standard Specifications. Specifications can be very difficult to write, as there is a very particular style and format that they should follow. However, by observing the guidance in this section, writing specifications can be made much easier.

One convenient resource for writing specifications is the Standard Specifications book. Reading the spec book can provide an insight into the preferred formatting and wording of specifications used at the Iowa DOT. It is also helpful to consider the Five C's:

### Concise

Use simple words and try to keep sentences to 25 words or less. Try to limit paragraphs to five sentences or less. Limit each sentence to one thought and each paragraph to one topic.

### Clear

Avoid words or sentences that can be interpreted in more than one way. For example, words like "accurate," "clean," "reasonable," and "sufficient" can mean different things to different people.

Avoid using "and/or." Instead of "A and/or B," use "either A or B, or both."

Avoid repeating requirements or providing reasons to back up a requirement.

Do not restate any information found in the plans.

### Complete

Use the five part format:

DESCRIPTION

A short and concise statement of the work required.

MATERIALS

A list of the materials required to complete the work.

CONSTRUCTION

A description of the requirements for completion and acceptance of the work.

METHOD OF MEASUREMENT

A description of the procedures used to measure the pay items. Include units of measurement, how items will be measured (plan quantity, placed, etc.), and measurement factors such as temperature, waste, spillage, etc.

BASIS OF PAYMENT

A definition of pay items needed to complete the work. Include incidental items.

### Correct

Thoroughly research information to be sure that it is correct. Make sure references are correct and up-to-date.

Make sure spelling, grammar and punctuation are correct.

### Consistent

Be consistent with punctuation, grammar, word usage, format, referencing, and the use of abbreviations and numbers.

## Abbreviations and Symbols

- When abbreviating "Iowa Department of Transportation," always use "Iowa DOT" instead of "IDOT."
- Spell out all months and days of the week.
- Do not use contractions, for example isn't, don't, or aren't.

Article 1101.02 lists definitions for several abbreviations used in the Standard Specifications. When introducing an abbreviation that is not in Article 1101.02, spell it out first followed by the abbreviation in parentheses.

*Example:* When sawed material is treated with chromated copper arsenate (CCA), the moisture content prior to treatment shall not be more than 20%.

### Abbreviations to avoid:

- Use "also known as" instead of "a.k.a."
- Use "for example" instead of "e.g."
- Use "and other things" or "and so forth" instead of "etc."
- Use "in other words" or "that is" instead of "i.e."
- Use "and" instead of "&"
- Use "additional" instead of "addl."
- Use "amount" instead of "amt."
- Use "approximately" instead of "approx."
- Use "average" instead of "avg."
- Use "each" instead of "ea."
- Use "including" instead of "incl."
- Use "manufacturer" instead of "mfr."
- Use "quantity" instead of "qty."
- Use "section" instead of "sec."
- Use "standard" instead of "std."

### Allowable abbreviations:

- "No." for "number" when referring to a particular item, for example Gradation No. 32 in the Aggregate Gradation Table, or the No. 200 sieve, or insulated No. 22 AWG wire.
- In the names of businesses:
  - Use "Co." for "Company."
  - Use "Corp." for "Corporation."
  - Use "Inc." for "Incorporated."
  - Use "Ltd." for "Limited."

### Symbols

- Use "%" after a number. Spell out "percent" in other situations.
- Use "°" for temperature. Spell "degrees" out for an angle.
- Use "±" instead of "plus or minus."
- Use "less than" instead of "<"

## Numbers

- Spell out ordinals: first, second, third, fourth; not $1^{st}$, $2^{nd}$, $3^{rd}$, $4^{th}$.
- Use commas in numerical values of five or more digits.

  *Examples:* 1500 feet, 12,000 gallons.
- Always use numerals when designating a technical measurement, including hours and days.

  *Examples:* 3 inches, 12 feet, 5 gallons, 2 hours, 7 calendar days.
- Spell out the number when designating a quantity, unless the number is greater than ten.

  *Examples:* six copies of the shop drawings, two passes with a roller, 50 repetitions.

### Fractions and Decimals

- Fractions may be used with English units, but never with metric units.

  *Examples:* a 1/4 inch bolt, a 1/2 mile detour.
- When using a whole number with a fraction, place a space between the number and the fraction.

  *Examples:* 1 1/4 inches, 3 1/2 working days.
- Decimals may be used with English or metric units. For decimal values between 0 and 1, place a 0 before the decimal point.

  *Examples:* 0.8 kg, 0.15 inches, 0.12 gallons.

## Referencing

Do not use gender references.

- Instead of “his” or “he” use “they,” “their,” “the Contractor,” or reword the sentence.
- Use “quality” instead of “workmanship.”
- Use “utility access” instead of “manhole.”
- Use “flaggers” instead of “flagmen.”

### Documents

- The Standard Specifications are referenced in the following manner:
  - Section 2602 of the Standard Specifications
  - Article 2602.07 of the Standard Specifications
  - Article 2602.07, F, of the Standard Specifications
  - Article 2602.07, F, 1, of the Standard Specifications
- When referencing a Developmental Specification, Special Provision, or Supplemental Specification, use only the title. Do not include the number.
- When referencing a Materials I.M., use only the number. Do not include the title.
- ASTM references are shown in this format: ASTM C 103.

### Entities

The following items are defined in the Standard Specifications and must be capitalized as shown:

- Contracting Authority (not Owner).
- Engineer (not Owner or Inspector).
- Contractor (not Prime or subcontractor).
- Professional Engineer licensed in the State of Iowa (when referencing a licensed engineer).
- plans (not drawings, unless referring to shop drawings).
- contract documents.

## Wording

Method specifications describe, step-by-step, exactly how to fabricate, erect, and install materials to construct an end product. (tell them how to build it)

End-result specifications, which are preferred, describe the requirements for an end product. It is left up to the contractor to devise the steps needed to construct a product that complies with stated requirements. (tell them what you want and they’ll figure out how to build it)

### Stating a Contractor’s Responsibility

A Contractor’s responsibilities are described using the active voice and imperative mood. The subject is understood to be the contractor, so the subject does not need to be stated.

*Examples:* **Mark** subdrain outlets with steel posts. **Use** steel posts meeting the requirements of Article 4154.09. **Drive** the posts 3 feet into the ground.

### Stating a Contracting Authority or Engineer's Responsibility

A Contracting Authority or Engineer's responsibilities are described using the indicative mood with either an active or passive voice. Use the active voice if the subject is doing the action. Use the passive voice if the subject is the receiver of the action.

*Examples:*

*Active:* The Contracting Authority **will supply** all permanent signs on the project.

The Engineer **will compute** the volume of flowable mortar furnished and placed.

*Passive:* Backfilling for construction of the shoulder area **will be paid for** separately.

These items **will be included** in the quantities of other similar work on the project.

### Stating the Method of Measurement

- When payment is by plan quantity, state the following: "The quantity of *bid item description*, in units, will be the quantity shown in the contract documents."
- When payment is by measured quantity, state the following: "The quantity of *bid item description* will be measured in *units*, to the nearest *unit*.
- Do not include the phrase "in accordance with the contract documents."

### Stating the Basis of Payment

- When payment is by plan quantity, state the following: "The Contractor will be paid the contract unit price for *bid item description* per *unit*."
- When payment is by measured quantity, state the following: "The Contractor will be paid the contract unit price for *bid item description* per *unit* of *material* used measured as provided above."
- Do not include the phrase "in accordance with the contract documents."
- Do not include the sentence, "This payment shall be full compensation for all materials, labor, and equipment necessary to complete the work," or anything similar.