COLORADO
Department of Transportation

Style Guide for Writing Specifications

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Introduction

"Specifications" is a general term applying to all written directions, provisions, and requirements pertaining to the performance of the work and payment for the work. The specifications in the *CDOT Standard Specifications for Road and Bridge Construction*, (commonly called the "Standard Specifications") convey CDOT needs to Contractors and Construction Managers, communicate a project's procedures and requirements, and define a project's quality, design, construction, and cost.

The intention of this manual to help people who create or edit specifications for the Department, whether these be the Standard Specifications, supplemental specifications, special provisions, or plan notes. The information contained in the manual does not replace, supersede, or otherwise modify any specification, plan or proposal provision, or other contract document or condition. This manual supplements all existing CDOT Manuals. Do not change anything based on a formatting rule without maintaining the accuracy of the technical content.

Following the recommendations and guidelines in this manual will result in specifications that are more Complete, Correct, Clear, Concise, and Consistent.

Essentially, the Style Guide is a standardization device designed to achieve uniform word and type treatment and aiming for economy of word use. For questions of style not addressed in this manual, refer to the United States Government Printing Office Style Manual (available at https://www.govinfo.gov/content/pkg/GPO-STYLEMANUAL-2016/pdf/GPO-STYLEMANUAL-2016.pdf) The electronic text of this publication is available for public use free of charge.

In case of discrepancy between contract documents, see 105.09, "Coordination of Plans, Specifications, Supplemental Specifications, and Special Provisions" for the order of precedence.

The responsibility of the Standards and Specifications Unit in the CDOT Engineering Services Branch is overseeing the development and implementation of construction specifications. This unit writes and revises the Standard Specifications and *CDOT Supplemental Specifications*, issues Standard Special Provisions, and prepares or reviews Project Special Provisions.

CDOT *Procedural Directive 513.1 - Construction Project Specifications*, states that the Standards and Specifications Unit is to review and approve all new Project Special Provisions and newly revised Project Special Provisions that contain significant changes and initiate a formal review process when necessary. Allow the Standards and Specifications Unit at least two weeks to review proposed Project Special Provisions before incorporating them into the construction project documents for advertisement.

The CDOT Specification Committee [described in *Procedural Directive 513.1*] assists the Standards and Specifications Unit with the review and development of formal specification changes that may be controversial or have a significant impact on the highway construction industry.

CDOT strives to achieve statewide uniformity in the use and application of specifications. Although the Contract stands on its own, frequent changes to specifications and differences in specifications from project to project and Region to Region may lead to misinterpretation, inconsistent enforcement, higher bid prices, and Contractor claims. Do not change the Standard Specifications, Standard Special Provisions, and formally issued sample Project Special Provisions and Special Provision Work Sheets, if possible.

Writing Specifications

Method versus End-Result

Method and End-Result are the two basic types of construction specifications. Method specifications describe in detail the materials, workmanship, and processes the Contractor is to use during construction. Method specifications restrain contractor innovation and obligate the owner to accept the work if the specified materials and processes are used. End-result specifications describe the desired result or quality of the final product. End-result specifications encourage contractor innovation and allow the owner to accept or reject the final product. Current CDOT specifications include both types and, in some cases, a combination thereof.

The preferred specification type is end-result. They promote innovation and place performance risk on the contractor. Consider an end-result specification if:

- It is possible to define "Success" in fulfilling the specification. If a Contractor is successful and eligible for payment for completing the task described, there should be no question as to whether they have met the requirements of the specification.

- It is possible to know and define design variables and clearly state expectations. We have to know what we must have and what we are willing to allow a contractor to innovate.

- It is possible to define an acceptance (not approval; these terms are defined) process, to be used before the contractor implementing a proposed solution. This should be early in the development process to ensure that the contractor has a solution that is appropriate and meets intentions (not just expectations) and allows for negotiation of the smaller issues.

- It is possible to complete performance audits to document the contractor's fulfillment of the technical requirements of the specification. These audits can also be a means to justify progress payments for this item. **As per CDOT Alternative Delivery**

In some situations, however, a method specification is more appropriate. Consider a method specification if:

- Any of the four basic components of an end-result specification is difficult to identify. (Attributes, Requirements, Criteria, or Tests)

- Certain state, county, or local requirements are involved.

- The desire is to have more control over the work.

- One cannot easily define or easily or economically measure and verify the result.

- Engineering judgment is required; for example, complying with a permit.

- It is in the interest of the agency to retain the performance risk.

*Conditions for Deciding between Types

Item	Method Specification	End-Result Specification
Performance Definitions	End product performance cannot be easily defined.	End product performance can be defined in terms of desired outcomes or user needs.
Performance Measurements	End Product performance cannot be easily or economically measured and verified.	Key performance parameters can be measured and tested, and the test methods are rapid, reliable and economical.
Key Performance Parameters	Key performance parameters cannot be identified.	Key performance parameters can be determined based on agency management system data and projected performance outcomes.
Performance Risk	The agency must retain performance risk because of permit requirements, maintenance considerations, and the need to tie into existing or adjacent construction or other external concerns.	Industry is willing to assume performance risk and sureties are willing to bond the risk.
Other Considerations	Removing and replacing defective work would be impractical.	Agency is willing to relinquish control over some aspects of the work.

*As per NHI Principles and Applications of Highway Construction Specifications class.

The CDOT Process Control/Owner Acceptance (PC/OA) is a type of end-result specification. PC/OA specifications require the Contractor to perform all testing necessary for control of production while the owner (CDOT) performs the testing necessary to determine acceptance, rejection, or price adjustment of the product. Statistical analysis of the test results allows a decision on acceptance, rejection, or price adjustment. CDOT currently uses PC/OA specifications for pavements.

Organization of Specifications
Voice and Mood

Voice

Voice is a characteristic of a verb. In passive voice, the subject receives the action. In active voice, the subject performs an action.

> Active voice: "The Contractor shall place the aggregate." Usually easier to read, shorter.
> Passive voice: "The aggregate shall be placed by the Contractor."

The Active Voice style of writing replaces the lengthy "the Contractor shall" sentences with short sentences giving direct instructions. Specifications written in Active Voice are less likely to be misinterpreted and use fewer words.

Passive voice is used in technical and scientific writing and is preferable because in those contexts it provides objectivity. In passive voice, who takes the action is not important. Specifications are technical in nature and, in the past, have been written as technical documents. Specifications are also contractual; who performs an action is important. Active voice clearly conveys who is responsible for taking an action.

Passive voice is sometimes useful when the agent is either obvious or secondary to the action (as in Method of Measurement or Basis of Payment; CDOT is the obvious agent and is secondary to the action or the object being acted upon).

- In a paragraph that starts out with "the contractor shall", further sentences into the paragraph do not need the words "the contractor shall", it applies to all directions within the paragraph, unless speaking of another party.
- Where a list is preceded by "the contractor shall", the list can be in Passive voice, as instructions to the contractor.
- The passive voice isn't a grammatical error; it is a style choice.
- Use the active voice for clarity and to sound more natural.
- Forming passive voice requires the verb "to be" *and* a past participle.

Mood

Mood is used to indicate whether a verb expresses a fact, indicative, or a command, imperative. Use indicative mood when defining or describing something, when minimal or no action is performed (stating an existing condition), to describe material or equipment attributes, or to communicate the obligations of CDOT. The "shall/will" convention distinguishes between the contractor's and the agency's responsibilities. (The contractor shall . . . The agency will . . .)

With imperative mood, the subject "contractor" is understood; the verb clearly defining the action usually becomes the first word in the sentence. Only use imperative mood when the contractor is being give direction. The "shall" convention is not used.

Indicative mood: Speaker is stating a fact – "The Contractor shall place the aggregate to a depth of 6 inches."
Imperative mood: Speaker is issuing a command or instruction – "Place the HMA to a depth of 6 inches."

You can simplify long lists of instructions by writing them as a series of imperative commands, preceded by an introductory clause: "The Contractor shall perform the task as follows: 1, 2, 3." This mixes Indicative and imperative moods.

GENERAL GUIDELINES

If a provision . . .	**Then write the provision . . .**
Reflects an obligation or requirement of contractor	In active voice and imperative mood.
Reflects an option, choice, or right of contractor	In active voice and indicative mood.
Reflects on obligation, requirement, or choice of the agency	In active voice and indicative mood.
Reflects a statement of fact	In active voice and indicative mood.
Reflects an obligation, requirement, choice, or right of agency and contractor	In active voice and indicative mood.

FOR CDOT - Active voice and indicative mood are appropriate in most cases.

The Five Cs of spec writing - Clear, Concise, Correct, Complete, and Consistent

A **complete** Specification: Addresses the five headings defined in the Style Guide (in this order) –

- Description
- Materials
- Construction Requirements
- Method of Measurement
- Basis of Payment

A **correct** Specification:

- Accurately describes technical requirements
- Follows CDOT conventions for abbreviations, units of measure, and "will/shall" convention
- Contains correct grammar, spelling, and punctuation

A **clear** Specification:

- Avoids ambiguous words like "and/or" and "including"
- Uses measurable, definable standards

A **concise** Specification:

- Uses simple words and short sentences
- Avoids unnecessary adjectives, adverbs, and prepositional phrases
- Uses Active voice and Indicative mood to identify responsible parties

A **consistent** Specification:

- Uses consistent language when referring to pay items
- Matches pay items to the plans
- Does not repeat or contradict other requirements within the special provisions

The first two Cs (complete and correct) create the requirements. The subsequent three Cs (clear, concise, and consistent) help ensure efficiency and accurate interpretation.

The Five Headings of a Standard Specification

The Standard Specifications are organized into numbered Sections. Sections 101 through 109 contain General Provisions dealing with contracting procedures, general and legal responsibilities of the Contractor, prosecution of the work, control of work and materials, and measurement and payment for the work. Sections 201 through 641 contain construction details, and Sections 701 through 717 contain materials details.

Except for Divisions 100 and 700, specifications are organized into five parts: description, materials, construction, method of measurement and basis of payment.

The text of the Standard Specifications is organized into decimal subsections running consecutively through each Section. The first subsection is xxx.01, the second xxx.02, where xxx is the Section number.

Section XXX
Title of Section

XXX.01 DESCRIPTION
XXX.02 MATERIALS
XXX.03 CONSTRUCTION REQUIREMENTS
XXX.04 METHOD OF MEASUREMENT
XXX.05 BASIS OF PAYMENT

Each Section of the construction details, Sections 201 through 641, is organized into the following five parts, in the following order:

DESCRIPTION

This part consists of short, succinct statements summarizing the work covered by this Section of the Standard Specifications. The Description should not contain details, materials or construction requirements, or explanations of measurement and payment.
Checklist:

- State relationships to other work items that are necessary to perform the work.
- Avoid phrases such as “in accordance with . . .,” “as shown on the plans . . .,” or “as directed by the engineer . . .” that are covered in the general provisions and should not be repeated.
- Avoid materials, methods of construction, and measurement or payment descriptions here.
- Avoid repeating or elaborating on information already in the plans.

MATERIALS

This part either specifies the materials requirements of the work or refers to subsections in the Materials Details Sections (701 through 717) that contain those requirements.
Checklist:

- Cross-reference applicable CDOT standard materials sections.
- Cross-reference applicable national material specs where CDOT specifications do not apply or do not fully describe.
- If reference specifications are unavailable, establish detailed specifications of properties of each material and methods of testing.

CONSTRUCTION REQUIREMENTS

This part consists of the required construction procedures or results of the work performed under this Section of the Standard Specifications. Specify construction details in this part.
Checklist:

- Complement the plans. Do not repeat information from plans or other documents here.
- As applicable, identify and describe equipment to be used to perform the work.
- Provide detailed sequencing of construction operations OR, if using a performance standard, describe the required end product.
- Specify the type and frequency of the tests required during construction and the final testing results necessary for acceptance.
- Identify the minimum quality control activities if testing and measurement are the responsibility of the contractor.
- Specify the quality assurance methods that the agency will use.

METHOD OF MEASUREMENT

This part describes the methods and the units by which the work will be measured for payment.
Checklist. Use passive voice; CDOT is the obvious agent and is secondary to the action or the object being acted upon.

- Specify the components of interim or completed work to measure for payment.
- Include the units of measurement used for each bid item.
- Specify exactly how to determine the quantity, including what measurement to take and where or when to take the measurement. Specify all modifying measurement factors (disturbed or undisturbed, temperature, and waste and spillage)

BASIS OF PAYMENT

This part establishes the pay items for work accomplished under this Section of the Standard Specifications and, when necessary, explains what is included in the payment for those pay items.
Checklist. Use passive voice; CDOT is the obvious agent and is secondary to the action or the object being acted upon.

- Identify all work incidental to the payment. Use detailed description of the parts that are incidental, not a general statement of “all components or the work.”
- Ensure that the bid item reflects a discrete unit of work that includes the labor, materials equipment and other costs related to the bid items

Abbreviations and Symbols

Abbreviations in the Standard Specifications

Abbreviations in the strictest sense are shortened forms of a single word or phrase, usually followed by a period and often including lower case letters.

Shortened forms are useful when a particular phrase is used repeatedly within a specification. They result in a shorter, less repetitive, and more readable document. However, as with excessive capitalization, their overuse can reduce clarity and readability. A specification full of acronyms and abbreviations can be intimidating and difficult to comprehend, appearing to be little more than a jumbled alphabet soup. Writers should be judicious when deciding to use shortened forms.

Abbreviating "Colorado Department of Transportation" Always use "CDOT".

Do not abbreviate words unless they are contained in a technical term.

Unallowable Examples: "addl." for "additional," "amt." for "amount," "approx." for "approximately," "art." for "article," "avg." for "average," "ea." for "each," "incl." for "including" or "inclusive," "mfr." for "manufacturer," "qty." for "quantity," "pd." for "paid," "sec." for "section," "std." for "standard."

Do not use:

- Contractions: for example isn't, don't, or aren't.
- "a.k.a" in place of "also known as."
- "&" in place of "and."
- "e.g." (exempli gratia) in place of "for example."
- "etc." (et cetera) in place of "and other things" or "and so forth."
- "i.e." (id est) in place of "in other words" or "that is."

Do not use abbreviations except a.m., p.m., and No. (for number). Use min. and max. (short for minimum and maximum) only in tables, with a period.

Allowable Technical Term Examples: Bit Co. CSP for Bituminous Coated Corrugated Steel Pipe, A.F. Bo. CSP for Aramid Fiber Bonded Corrugated Steel Pipe and PCSP for Precoated Corrugated Steel Pipe

Allowable examples are:

- Use "No." for "number" in tables or when referring to a particular item label, for example "Gradation No. 32 in the Aggregate Gradation Table," No. 200 sieve, insulated No. 22 AWG wire, Regulation No. 8, No. 12 gauge, No. 3 bar, No. 8 mirror finish, or "Douglas Fir Larch, Grade No.1."
  - In names of business organizations "Inc." can be used for "Incorporated."

Initialisms and Acronyms

Subsection 101 lists definitions for several initialisms and acronyms used in the Standard Specifications.

Form initialisms and acronyms from the first letter of a string of words or an organization, for example Hot Mix Asphalt (HMA) or Equivalent Single Axel Load (ESAL).

Initialism: pronounce letters separately, for example American Public Works Association (APWA), where each letter is pronounced individually. Do not use periods in an initialism.

Acronym: pronounce letters as a word, for example Recycled Asphalt Pavement (RAP), where RAP is pronounced as the word "rap."

When introducing an initialism or acronym that is not in Subsection 101, spell it out first followed by the initialism or acronym in parentheses.

Example: When sawed material is treated with chromated copper arsenate (CCA), the moisture content before treatment

Use of a previously introduced short form in a new item or specification requires writing out the complete name or meaning at the first usage in the new section, then following with the short form in parentheses. After the initial introduction of a shortened form within a section, writers should consistently use the shortened form, rather than switching back and forth between the full phrase and the shortened form.

Always write acronyms and initialisms in all capitals. However, just because the acronym or initialism uses all capitals that does not mean that the words it represents should begin with capitals. When the words are common nouns and adjectives, the full words should still use lowercase letters, even though the shortened form will use all capitals. Capitalize only when the words are themselves proper nouns or part of an organization title.

Use the indefinite article "an" before acronyms and abbreviations pronounced as if they begin with a vowel. Precede it with an "a" if the acronym or abbreviation begins with or as if it were pronounced with a consonant.

Months and Days, Dates, and Time

Spell out months and days of the week. Write the day of the month and the year using numerals, not words. Write dates in the "Month day, year" format, and use all four digits of the year.

Use numbers for clock times and keep zeros when describing times "on the hour" (*Example:* 11:00 a.m. – not eleven o'clock and not 11 a.m.). Use the standard 12-hour system, with the time followed by either a.m. or p.m. However, use the words "noon" or "midnight" to indicate 12:00 p.m. and 12:00 a.m. (*Example:* Do not apply sealer between noon and midnight.)

Ordinals

Spell out ordinals: first, second, third, fourth; not 1^{st}, 2^{nd}, 3^{rd}, 4^{th}.

Symbols

- Use the word "percent" in the text after the number for a percentage. Use the percent symbol (%) only in tables, including table notes.
- Spell "degrees" out for an angle. Use "°F" for temperature.
- Use the words "plus or minus" in text. Use "±" on tables.
- When using mathematical and other signs and symbols, type a space before and after the sign or symbol. *Example:* 2 × 2 × 1 in.
- The symbol Ø means "diameter"; use it only in tables. Use the word or its abbreviation, "dia.," in text.
- The symbol / means "per" and should only be used in tables. Spell out "per" in text. *Examples:* 145 pounds per cubic foot (pcf), 0.12 gallon per square yard, 2300 kg/m^3, 0.5 L/m^2

- The symbol μ means "micro," 10^{-6}; use it in text and tables both.
- The symbol Ω means "Ohm"; use it only in tables.
- Use a colon is ratios and proportionality. *Example:* a 3:1 slope
- Format equations with the style *Equation Text*. Follow the equation with a descriptive list of variables used in the equation.
  - Use the words "plus," "minus," "multiply," or "divide by" in text but the symbols "+", "-", "X" or "÷" in tables and equations.
  - Use the words "less than," "greater than," "less (greater) than or equal to" instead of "<", ">"," ≤", or "≥" in text. Use the symbol in tables or equations, where allowed.

Use measurement symbols correctly. Standards for the use of SI (metric) symbols and symbols for units of U.S. customary measure appear in the *United States Government Printing Office Style Manual* (at https://www.govinfo.gov/content/pkg/GPO-STYLEMANUAL-2016/pdf/GPO-STYLEMANUAL-2016.pdf).

- Use a space before and after a symbol; do not precede symbols by a hyphen or follow by a period. Examples: lb (for pound), kg (kilogram), m^3 (cubic meter).
- Do not place a period after the symbol unless dictated by placement at the end of a sentence. Measurement symbols are not abbreviations.
- Do not add an *s* to form a plural. The symbol remains the same whether the quantity is one or many. *Examples:* 1 kg, 2 kg (*not* 2 kgs); 1 ft, 2 ft; 24 h (*not* 24 hrs).
- Type a space between the quantity and the symbol. *Examples:* 1 kg, 2 ft, 25 °C.
- Precede only with numerals, never words. *Example:* 2 ft; *not* two ft. However, there are three feet in one yard.
- Do not use symbols without accompanying numerals, except in tables. That is, never leave a symbol "naked." *Example:* Measurement is by the cubic yard; *not* Measurement is by the yd^3.
- Do not mix symbols and names in the same expression. Example: m/s *or* meters per second; *not* meters/second or meters/s.
- Print symbols and quantities in normal, upright (Roman) type regardless of surrounding text. *Example:* 2 ft, *not 2 ft*.
- Do not use alternate symbols for a unit of measurement when the symbol for the unit is shown in the table below. *Examples:* 2 ft, *not* 2'; 6 in, *not* 6"; 5 g, *not* 5 gm (for grams)
- Do not use symbols or abbreviations for ton and metric ton.
- Be aware of the correct use of the English unit terms MGal (thousand gallons, not million gallons), and MBF (thousand board feet).
- Do not use a space after μ (a 75 μm sieve) and $. Use a space before the degree symbol (180 °F), but do not put a space between the squared or cubed symbols (yd^2, m^3) and the percent symbol (25%).

Units

Specifications use United States Standard Measure (English units). Use the international System of Units (SI, Modernized Metric) only where standardized testing requires metric units. For clarity, aggregate sieve sizes appear in both SI and English Units. The dimensions, measurements, and requirements stated in English units are the specification requirements. All Contractor submittals shall be prepared in English Units. Measure all pay item quantities in English units.

Measurement	Unit	In the text use	In a table or equation, use
Length	inch or inches foot or feet yard or yards mile or miles station centimeter millimeter meter	inch or inches foot or feet yard or yards mile or miles Station cm mm m	in ft yd mi Station cm mm m
Area	square inches square feet square yards square meters	square inches square feet square yards m^2	sq in or in^2 sq ft or ft^2 sq yd or yd^2 m^2
Volume	cubic inches cubic feet cubic yards parts per million	cubic inches cubic feet cubic yards	cu in or in^3 cu ft or ft^3 cu yd or yd^3 ppm
Weight or Mass	pound or pounds gram ton	pound or pounds G ton	lb G ton
Light	Lux Candela Luminance	Lux Candela Luminance	Lx Cd L_v
Electricity	Ampere coulomb henry, henries farads volts Joule ohm watt	Ampere coulomb henry, henries farads volts Joule ohm watt	A C H F V J Ω W
Time	second(s) Minute(s)	seconds minutes	s min.
Sound	decibel	decibel	dB
Pressure	pounds per square inch pounds per square foot foot-pound pounds per cubic foot	psi pounds per square foot foot-pound(s) pcf	psi lb/sq ft OR psf ft-lb
Temperature	degrees Fahrenheit degrees Celsius	ºF ºC	ºF ºC

Capitalization

Use capitalization to indicate emphasis. Items to capitalize include:
Initialisms and Acronyms (capitalize all letters).
Proper nouns (the official name of a person, place, or thing).
Official titles.
Titles of sections, subsections and tables.
Contract or pay items. Capitalize pay item titles in the subsections for Method of Measurement and Basis of Payment. Do not capitalize pay item titles in other subsections.
Document titles.
Acts, laws, and bills. (see also CDOT specific Words and Terms)

Use lower case letters as much as possible. Too many capital letters reduce the effectiveness of using capital letters for emphasis.

Clauses and Phrases

Clauses

Clauses are groups of related words containing a subject (person, place, or thing about which something is said) and a predicate (what the subject does, what is done to the subject, or the state of being of the subject). An independent clause is a complete thought that can stand alone as a sentence. A dependent clause is an incomplete thought and cannot stand alone as a sentence.

Phrases

A phrase is a group of two or more words without a subject or predicate. Phrases and dependent clauses that are left to stand alone are called "fragments." Except in tables, do not use fragments.

Terms for Consistency

The following are guidelines for the use of words or terms commonly used (or not used) in writing Department specifications.

- When referencing a section or other document, such as the Plans or working drawings, use consistent words or phrases.
- The term "**working drawing**" is a generic term that includes all contractor prepared and submitted drawings. Generally, the term is only used in Section 100 of the Standard Specifications. In other sections of the specifications, use a more descriptive term, such as shop drawings, erection plans, falsework plans, installation plans, as applicable.
- **approve** versus **accept** – In a document with legal consequences, such as specifications, approve and accept have a difference in meaning. To "accept" is to recognize an obligation to pay, as in "The Department will pay for accepted quantities." In contrast, to "approve" is to confirm agreement with or to indicate satisfaction with a situation or circumstance. If the Engineer is doing the approving, the Contractor shall **obtain the Engineer's approval**.
  Example: Obtain the landowner's and the Engineer's written approval before using any pits as a pond.
- **option** - When something is as an option to the Contractor, use **the Contractor may**. For the most part, the word **option** is never used.

Example: **The Contractor may use** a heated enclosure or building.

- **expense** - When the sentence is in active voice-imperative mood, use **at no expense to the Department**. Do not use possessive forms of the *Contractor,* since the subject is understood.
  Example: In case of damage to the existing structure, repair or replace the structure **at no expense to the Department**.
- **be responsible** - Use consistent text as shown in the following examples.
  Examples:
  The Contractor **is** (is not) **responsible** for …
  The Department **is** (is not) **responsible** for …
  The Department will not relieve the Contractor of **the responsibility** for …
- **and/or** – This construction is awkward and confusing. Use "and" or "or" instead of "and/or" Otherwise, write "red, blue, or both" when possible instead of "red and/or blue."
- **that** versus **which** – "that" and "which" are often used as if they are interchangeable. They are not. "that" is correctly used to introduce information or a phrase that is essential to the meaning of a sentence (a restrictive clause). "Which" introduces information that is not essential to the meaning of a sentence (a nonrestrictive clause). If you can remove the phrase that begins with "that" or "which" and the meaning of the sentence is essentially the same, then the correct word is "which." If the meaning of the sentence is significantly different without the phrase, then the correct word is "that." Use commas to separate nonrestrictive clauses, which begin with "which," from the rest of the sentence. Additionally, use "who" instead of "that" or "which" when the restrictive clause refers to a person. When using "who" use commas to separate nonrestrictive clauses from the rest of the sentence.
  Example:
  Cooperate with the Engineer in protecting and preserving monuments, cornerstones and boundary survey markers **that** are affected by the Work.
  Place the curb with a hand-operated or self-propelled machine consisting of a hopper and power-driven screw, **which** forces the material through an extrusion tube.

Affect and Effect
https://www.grammarly.com/blog/affect-vs-effect/

R.A.V.E.N. – Remember, Affect is the Verb and Effect is the Noun.

Affect is usually a verb, and it means to impact or change. **Effect** is usually a noun, an effect is the result of a change. **Affect** means to influence or to produce a change in something. **Effect** is a noun, and it means the result of a change.
So, if A **affects** B, B experiences the **effect** of A's action.

Use "affect" as the verb in a sentence when you're talking about producing change or making a difference. For example, a new discovery can affect a scientific theory, and failing a test can affect someone's mood. Here are some synonyms of affect: alter, change, influence, modify, and impact (the verb version). That list should affect your understanding of the word. In this case, "affect" would mean "improve."

"Effect" is a noun, and it is the outcome of an event or situation that created a change. The effect of the change can be big or small, but the fact that something changed is what makes the noun form of effect so important. For example, you can feel the effects of a cold or an earthquake, and the sun coming out can have a positive effect on your mood.
Some synonyms of effect include words like result, repercussion, consequence, outcome, aftermath, and the noun version of impact.

Assure, Ensure, Insure

In specifications, the correct word is usually **ensure** which means to make sure or certain. Insure refers to financial protection provided by an insurance company. Assure is used in the sense that a person gives reassurance to another person or sets the mind at rest (ex. He assured the king of his loyalty). Where appropriate, use the word **ensure** (ensure is usually either followed by **that** or preceded by **to**).

Although these words can be used interchangeably to mean, "to make sure or certain," use "assure" (especially if implying the removal of doubt) or "ensure." Leave "insure" to the insurance business.

Examples:

Please assure me that the pipe will not fail. (Remove all doubt.)

Please ensure the pipe does not fail. (Take measures to make sure or certain.)

Please insure the pipe in case it fails. (Purchase some kind of insurance policy.)

Furnish, Provide, Supply

"Furnish" means to provide the essentials for performing an action. The use of the verb "furnish" implies that the provider of the materials will also do something with the materials.

Example: Furnish plants and planting materials for installation and incidental materials required for correct placement meeting the requirements of Section…

Furnish and install all components of the lighting system not furnished by the utility company serving the installation, including all incidental items appurtenant to the operation of the system.

Rigid pipe culverts shall consist of furnishing and installation of concrete pipe and shall include both roadway culverts and entrance culverts.

"Provide" means to take precautionary measures or to prepare to meet a need. The use of the verb "provide" implies that the provider gives the materials to someone else to use or makes materials available as a precautionary measure.

Example:

Provide the standard industry warranties for all equipment at the date of final acceptance of the work by the Engineer. (Meeting a need.)

The Engineer will provide monuments, similar to those used for Global Positioning System (GPS) control by the Department. (Meeting a need.)

The Engineer reserves the right to require the Contractor to provide cofferdams and tremie concrete seal courses if, during construction, the Engineer determines that the excavation

cannot be satisfactorily dewatered by the Contractor's recommended procedure. (Taking precautionary measures.)

"Supply" when used as a verb means to add as a supplement, to make available for use, or to satisfy needs or wishes. The use of the verb "supply" implies that the provider is making available additional materials to be used with those provided or furnished.

Example: Furnish the testing equipment for the field-testing laboratory. The Contractor shall retain ownership of the equipment after completion of the contract. The Engineer will supply a PDA for field data collection and analysis.

Shall, Will

"Shall" indicates responsibility of the Contractor.
"Will" indicates responsibility of the Engineer (CDOT).

CDOT specific words and terms

This is an effort to standardize the usage of words and phrases commonly encountered in the Standards and Specifications Unit of the Colorado Department of Transportation. This presents the preferred usage in spelling, capitalization, and hyphenation. Members of the Standards and Specifications Unit review and modify it. Some entries are neither "right" nor "wrong" but a preferred convention in an effort to provide consistency.

3D	No space, no hyphen. (Note: Most dictionaries have the hyphenated version as the preferred spelling, but CDOT has standardized on no hyphen.) (See three-dimensional.)
3DECS	Abbreviation for "Three-Dimensional Engineered Construction Surveying"
air-cooled	Use hyphen, no capitalization
air-entraining	Use hyphen, no capitalization
as-constructed	Use hyphen, no capitalization, except where used as a label, "As Constructed"
biosolids	Write as one word, no space or hyphen
centerline	Write as one word, no space or hyphen (when referring to a line that divides into two equal parts)
center line	Write as two words (when referring to a pavement marking)
checklist	Write as one word, no space or hyphen
chip seal	Write as two words
cloverleaf	Write as one word, no space or hyphen
CMGC	Abbreviation for Construction Manager/General Contractor. Capitalize all letters, no spaces, hyphens or slashes. (The use with a slash, CM/CG, is still common, but CDOT has standardized on the newer version.)
Construction Manager/General Contractor	Use a slash with no spaces. Capitalize all words.

Contractor	Capitalize for emphasis. “Contractor” is not a word that would commonly be capitalized; however, because the contractor plays an important role in the life of a construction project, when referenced in our bulletins and manuals, initial capitalization is preferred.
control measure	Write as two words (Replaces "Best Management Practices (BMP)")
crosslinked	Write as one word, no space or hyphen
cross-median	Use hyphen, no capitalization
crossover	Write as one word, no space or hyphen
Design-Bid-Build	Use initial capitalization and hyphens
Design-Build	Use initial capitalization and hyphens
digital signature	A specific type of electronic signature that uses a mathematical algorithm to ensure that the signer can be legally verified. A digital signature is legally binding. (See electronic signature.)
drawdown	Write as one word, no space or hyphen
drip line	Write as two words
edge line	Write as two words (when referring to a pavement marking)
electronic signature	An electronic sign, symbol, or process attached to a contract or other record, which was executed or adopted by a person with the intent to sign the record. An electronic signature is not legally binding. (See digital signature.)
e-signature	Use hyphen, no capitalization
email	Write as one word, no space or hyphen
falsework	Write as one word, no space or hyphen, no capitalization
federal aid	Write as two words, no capitalization
flow chart	Write as two words
four-lane, two-lane	Use hyphen, no capitalization, spell out number
Genus and species	Genus is capitalized and species is lowercase. Both are italicized. Example: *Thermopsis montana*. Common plant or animal names are not italicized or capitalized, unless it is someone’s name.
hard copy	Write as two words
heavyweight	Write as one word, no space or hyphen.
hot mix asphalt	Do not hyphen or capitalize, can be abbreviated HMA
Hydromulch	Write as one word, no space or hyphen.
lightweight	Write as one word, no space or hyphen.
mile point	Write as two words
multi-lane	Use hyphen, no capitalization (See two-lane, four-lane)
nonreflective	Write as one word, no space or hyphen.
nonshrink	Write as one word, no space or hyphen.
on-site	Use hyphen, no capitalization
On-the-Job Training	Use initial capitalization except on "the" and hyphens, can abbreviate to OJT, all capitals, no spaces or hyphens

override	Write as one word, no space or hyphen (See under-ride)
overrun	Write as one word, no space or hyphen (See underrun)
park and ride	Generic description, no capitalization, no hyphens
Park-n-Ride	Use only for specific Regional Transportation District (RTD) service and facilities. (See "park and ride")
PDF	Abbreviation for portable document format. Capitalize all three letters
pre-construction	Use hyphen, no capitalization, when used as a common adjective, such as pre-construction activities. Can be abbreviated to pre-con, use hyphen
Pre-construction Agenda	
Pre-construction Conference	
Pre-erection Conference	
Pre-paving Conference	
Pre-survey Conference	When used as the proper title for an agenda or conference, use all initial caps except right after the hyphen; do not use an initial cap immediately after the hyphen
prefabricated	Write as one word, no space or hyphen, can be abbreviated as prefab, no hyphen
pre-molded, pre-tested	
prestress	Write as one word, no space or hyphen
prewetting	Write as one word, no space or hyphen.
Project Special Provision	This is the title of a specific type of special provision, use initial caps. (See Standard Special Provision and special provision.)
regionwide	Write as one word, no space or hyphen (See statewide)
retroreflectometer	Write as one word, no space or hyphen
Right of Way	Department title, no hyphens, capitalize R and W
right of way	No capitalization, no hyphens when used as a noun
right-of-way	Hyphenated when used as an adjective (ex. right-of-way fence)
rootballs	Write as one word, no space or hyphen
roundabout	Write as one word, no space or hyphen
ROW	Abbreviation for right of way. Capitalize all three letters, no spaces, periods or hyphens
SEP-14	FHWA term for "Special Experimental Projects No. 14 – Alternative Contracting" (formerly Innovative Contracting). Use hyphen.
special provision	Considered generic, do not capitalize. (See Project Special Provision and Standard Special Provision.)
Standard Special Provision	Title of a specific type of special provision, use initial caps. (See Project Special Provision and special provision.)
statewide	Write as one word, no space or hyphen (See regionwide)
stormwater	Write as one word, no space or hyphen

subbase	Write as one word, no space or hyphen
Super Circular	Two words, initial caps. Although the FHWA uses "Supercircular" as one word, OMB that originated the term uses it as two words "Super Circular"
Superpave	Write as one word, no space or hyphen.
SWMP	Capitalize all letters, no spaces, periods or hyphens. SWMP is the abbreviation for Stormwater Management Plan
SWMP Site Map	Capitalize Site and Map
SWMP Administrator for Design	Capitalize as shown, can be abbreviated SWMPD, capitalize all letters, no spaces, periods or hyphens.
SWMP Administrator for Construction	Capitalize as shown, can be abbreviated SWMPC, capitalize all letters, no spaces, periods or hyphens.
three-dimensional	Use hyphen, no capitalization See 3D)
under-ride	Use hyphen, no capitalization (See override)
underrun	Write as one word, no space or hyphen (See overrun)
[typeface]	The standard, universal typeface as presented by the CDOT Corporate Communications Department is Trebuchet MS.
W-beam	Use hyphen, "W" capitalized
website	Write as one word, no space or hyphen
work sheet	Write as two words

Formatting, Fonts, and Styles

The Standard Specifications uses font Times New Roman, 12 font headers and 10 font for body. Use the same for Standard Special Provisions and Project Special Provisions. Use 0.75 inch for left and right and 0.5 for top and bottom margins. CDOT uses MicroSoft Word 2016 or later.

Text

Do not use **bold** and *italicized* characters in the body of the text to emphasize or draw attention to a particular requirement. Do not use <u>underlining</u> in the Standard Specifications and it should not be used in Special Provisions. Italicize only titles preceded by (a), (b), (see CDOT Outline Levels). Text should be bold where it would be in the Standard Specifications. Such locations include section headings, subsection numbers, subsection titles, and table headings. See CDOT Outline Levels. Only use as many sublevels as necessary to organize and convey the specification requirements.

CDOT Outline Levels

DIVISION (first level)

SECTION (second level)

Subsection number + Name, if any. (no indent, left margin) This is where subsection text goes. (third level)

This is where subsection text goes. This is where subsection text goes. This is where subsection text goes.

(a) N*ame if any* - ((a) at left, indent at 0.25 from left) This is where text goes (fourth level)

This is where text goes. This is where text goes. This is where text goes. This is where text goes. This is where text goes. This is where text goes.

(1) List **(when a list, numbers in parentheses, indent same level, otherwise use sample under (b))**

(2) List

(3) List

(b) *Name if any* - ((b) at left, indent at 0.25 from left) This is where subsection text goes. This is where text goes. This is where text goes. This is where text goes.

1. (1. indent 0.25 from left, text indent 0.5from left) This is where text goes (fifth level)
2. This is where subsection text goes

A. (A. indent at 0.5, text at 0.75 indent - from left) This is where text goes (sixth level)

B. This is where subsection text goes

(1) ((1) indent at 0.75, text at 1.0 indent - from left) Text **(seventh level, 1, 2, 3, in parentheses)**

i. (i. indent at 1.0 from left, text at 1.25 indent - from left) This is where text (eighth level)

ii.

(2) This is where text goes. This is where text goes.

i. This is where text goes

ii.

All **red text** are directions only, do not leave them in the final draft.

The next page lays out a "Revision of Section XXX" with the five parts of a specification. Use any of the subsection portions shown under "Description" for all of the other parts, as necessary.

Revision of Section

REVISION OF SECTION XXX (bold, centered, Times New Roman, Header 12 font)

NAME (bold, centered, TNR, Header 12 font)

DESCRIPTION (bold, centered, TNR, Header 12 font)

Subsection number + Name, if any (bold, TNR, body 10 font)**.** This is where subsection text goes. This is where subsection text goes. This is where subsection text goes. This is where subsection text goes.

(a) *Name if any* (Italics, TNR, body 10 font) - text goes

(1) ***LIST** has numbers w/ parentheses, **lines up under level** it follows, can be in any outline level.

(2) List

(3) List

(b) *Name if any* - Texts (indent lines up under its upper level)

1. This is where subsection text goes
2. This is where subsection text goes

Second and all following paragraphs dealing with 2. Indented to same level

A. This is where subsection text goes.

Second and all following paragraphs dealing with A. Indented to same level

B. This is where subsection text goes

(1) This is where subsection text goes ***5x Subsection**, numbers w/ parentheses **indented**

i. This is where subsection text goes

ii.

Second and all following paragraphs dealing with ii. Indented to same level

(c) *Name if any* - This is where subsection text goes

MATERIALS (bold, centered, TNR, Header 12 font)

Subsection number + Name, if any (no indent, left margin, bold**,** TNR, body 10 font)**.** This is where subsection text goes. Outline levels as needed.

CONSTRUCTION REQUIREMENTS (bold, centered, TNR, Header 12 font)

Subsection number + Name, if any (no indent, left margin, bold**,** TNR, body 10 font)**.** This is where subsection text goes. Outline levels as needed.

METHOD OF MEASUREMENT (bold, centered, TNR, Header 12 font)

Subsection number + Name, if any (no indent, left margin, bold**,** TNR, body 10 font)**.** This is where subsection text goes. Outline levels as needed.

BASIS OF PAYMENT (bold, centered, TNR, Header 12 font)

Subsection number + Name, if any (no indent, left margin, bold**,** TNR, body 10 font)**.** This is where subsection text goes. Outline levels as needed.

Payment will be made under:

Pay Item (bold)	**Pay Unit** (bold)
Name of Pay Item	Unit of measure

Notes: details of what is included in each Pay Item, as needed.

Lists

Alphabetized or Numerical list

Use an alphabetized or numerical list if items are being referred to in other subsections or if there is an order or priority to the items in the list.

Bulleted list

Use a bulleted list if items are not being referred to in other subsections and if there is no importance to the order of the items.

Convert important or complicated series to itemized lists. Capitalize the beginning of each item, even when the item is a word, phrase, or sentence fragment. If an **"and"** situation applies, end each item with a period. If an **"or"** situation applies, end the items with a comma or semicolon. The second to last item should have an **"or"** following the punctuation and the last item should end with a period. Use introductory phrases that identify whether one, more than one, or all items apply.

Use semicolons to separate items in a list if some or all of the items consist of a list of items.

Example: For hazardous paint removal, payment shall be full compensation for furnishing all materials, labor, and equipment to perform all work necessary for containment enclosures; air monitoring, sampling, and testing; decontamination; handling, sampling and testing, containerizing, and storage of paint waste; and installation, maintenance, and removal of the waste accumulation points.

Use a colon before a list if the list is preceded by a clause that contains an anticipatory expression ("the following," "as follows," "includes," or "including").

Example: Payment shall include the following: surface preparation, mixing, placing the mixture, and furnishing all equipment, tools, and labor.

Use a colon if the list starts on a new line (vertical list).

Example: Payment shall include:

- Surface preparation.
- Mixing.
- Placing the mixture.
- Furnishing all equipment, tools, and labor.

Exception: Do not use a colon before the list, if the sentence that contains the anticipatory expression is followed by another sentence.

Example: The following items may be used for protective material. Planks or other material with suitable stakes that can be used as forms shall also be available.

- Burlap.
- Paper.
- Plastic film.

Numbers

Numbers 1 to 10

Use numbers before a unit or technical measurement, including days and calendar days.

> Example: 3 inches, 5 gallons, 2 business days, 7 calendar days.

Spell out when using to describe a quantity.

> Example: six copies of falsework plans, two passes of a pneumatic tired roller.

Numbers greater than 10

Use numbers. The exceptions are:

- When quantity and size are expressed together, for example twenty-four 2 1/2 inch bolts.
- When a sentence starts with a number, in which case the number is spelled out.
- Use words for numbers at the beginning of a sentence. If a number greater than ten appears at the beginning of a sentence, reorder the sentence if possible. *Example:* Thirty minutes before installation, begin preparing the material. **Preferred:** Begin preparing the material 30 minutes before installation.
- Be consistent. With series of numbers in the same context, treat similarly all numbers that refer to the same category of things. *Examples:* Hold the vibrator 5 to 15 seconds. Thirty minutes before starting, and again sixty minutes later, …

Fractions, Decimals, and Compound Numbers

Use fractions with English units, unless the number indicated has tolerances associated with it, then use decimals, per industry standard. Verify with the technical expert. Always use decimals with SI (metric) units.

> Example: a 1/4 inch ~~(6 mm)~~ bolt, a 1 1/2 inch ~~(40 mm)~~ nominal diameter pipe.

When specifying a fraction, do not use the fraction characters (½, ¼, or ¾). Use standard typed fractions, for example: **1/2**, **1/3**, **5/6**. Take care when typing fractions, because Microsoft Word will automatically convert fractions to fraction characters. Type one space (no dash) between the whole number and the fraction, if a fraction is used with whole numbers, such as **1 1/3**.

Use words for simple fractions that do not describe a measurement or a precise quantity, that stand alone, or that come before the words “of a” or “of an.” Use a hyphen to connect the numerator and denominator.

> Example: Overlap by at least **one-half** the width of the previous pass.
>
> If the stream crossing fills more than **one-third** the width of the stream, then use pipes to allow the movement of aquatic life.

Do not follow a decimal point with a zero unless you need an exact unit or dimension with no tolerance. **Correct:** 3 ft, 15 lb **Incorrect:** 3.0 ft, 15.0 lb unless there can be no tolerance under any circumstance.

If it isn't a number plus units (1.5 times versus 1 3/8 feet) keep it decimal.

Decimals in numbers depend on what they are showing. For instance: pH should stay 5.0 to 7.0 (decimals) because this is standard to the pH measurement. The technical expert needs to decide how precise to be, according to the object being measured. If a mat can be (minimally) 16 x 3 (feet), it shouldn't be shown as 16.2 x 3.2. If this precision is needed, keep it in. But decide whether it is 16 ft 2 in (= 16.17 ft) OR 16 ft 3 in (= 16.25 ft) and state it with feet and inches, not as a decimal of feet. Decimals of English units don't translate well and make it difficult to construct, inspect, and measure. When in doubt, ask the technical expert of the item.

Numbers in tables that have a decimal point + number do not have a space but numbers without a decimal point + number do: 1 - 3 (1 space dash space 3) as opposed to 1.5-3.5(1.5 nospace dash nospace 3.5).

When a range is shown in the text, do not use a dash, use "to": 1 to 3.

Commas in Numbers

For dollar figures, use commas in figures of four or more digits, for example $200, $1,500, $25,000. Use numbers for monetary amounts. Do not include the decimal and zeros for the cents when amounts are in whole dollars. Do not leave a space between the dollar sign ($) and numeric value.

Example: Bill at the rate of $1,500 per mix.

Use commas in numerical values of four or more digits, except in tables and table notes. Show numerical values of four digits in tables without a comma. When a range goes from four digit to five digit, include the comma on both, even in a table.

Example: 1,500 feet, 12,000 gallons (in text)
Elevations 6000 feet, 7000 feet (in a table)
Range 9,001 - 10,000 lb overweight

Tolerances

A tolerance is the allowable variation from a specified standard. Measurements can either have symmetrical tolerances, where the positive and negative tolerances are the same or asymmetric tolerances, where they are different.

Write both symmetric and asymmetric tolerances in parentheses immediately following the specified standard measurement. Symmetric tolerances should be shown using the plus/minus sign (±). Write asymmetric tolerances with the positive tolerance, if any, first, followed by the negative tolerance, if any. Show the positive tolerance using a plus sign (+) and show the negative tolerance with an "en" dash (–).

Provide the unit of measurement with both the specified standard and with each tolerance. The tolerance does not have to, and frequently will not, use the same unit of measurement as the standard.

Correct	Incorrect
All grooves shall be cut leaving a rectangular cross-section that is 3/32 inch (+ 1/32 inch, – 0 inches) wide and 1/4 inch (± 1/16 inch) deep.	All grooves shall be cut leaving a rectangular cross-section that is 3/32 inch + 1/32 inch, – 0 inches wide and 1/4 inch ± 1/16 inch deep.
The percentage of air entrainment shall be 7% (± 2%) as tested per the requirements of *AASHTO T152*.	The percentage of air entrainment shall be 7% with a tolerance of ± 2% as tested per the requirements of *AASHTO T152*.
A dashed line shall consist of 10-foot (± 6 inch) line segments and 30-foot (± 6 inch) spaces.	A dashed line shall consist of 10-foot ± 6-inch line segments, and 30-foot ± 6-inch spaces.

Punctuation

The Period

Use a period after the subsection title, but not after the subsection number.

> Example: **701.01 Hydraulic Cement.** (2 spaces after the subsection title) Hydraulic Cement shall conform to . . .

Use a single space after a period. The rule applies to all end punctuation except after the subsection title.

The Comma

Place a comma after the last item in the list, before the "and x". This is an "Oxford" comma. It is a comma used before the final conjunction in a list of three or more items. Here in the specifications, we will include it, as it enhances clarity. When writing a list, you naturally include commas to separate each item, but an Oxford comma is when you also put a comma before the "and [Final Item]". Technically, it is grammatically optional in American English. However, depending on the list you are writing out, omitting it can lead to some confusion.

Non-essential expressions are words, phrases, or clauses that add additional information, but are not essential to the meaning or structure of a sentence. Use commas to set off non-essential expressions. Consider the example below. Notice how using commas to set off the italicized words in the second sentence changes the meaning of the sentence.

> Example:
> A tremie *used to deposit concrete under water* shall be constructed to be watertight and readily discharge concrete.
>
> A tremie, *used to deposit concrete under water*, shall be constructed to be watertight and readily discharge concrete.

In the first sentence, the italicized words are being used to describe which tremie shall be constructed to be watertight. In this case, they serve as an essential expression. In the second sentence, the italicized words simply describe what a tremie is. They serve as a non-essential expression. When words, phrases, or clauses are intended to serve as essential expressions, they are not set off with commas.

Introductory elements are words, phrases, and clauses at the start of a sentence before the subject and predicate of the main clause. Use a comma to set of introductory elements.

> Example*:*
>
> *When resurfacing is part of the contract*, all scarified surfaces shall be covered with at least one full lift of HMA before winter shutdown.
>
> *If form removal interrupts the moist cure process*, form removal must be accomplished without delay and the moist cure process reapplied immediately.

The italicized words in the example sentences above are introductory clauses and phrases. Follow them by a comma.
When two independent clauses are put together with a coordinating conjunction (and, but, or), they form a compound sentence. Place a comma before the coordinating conjunction.

> Example*:* Tiedowns, which may cause chipping or breakage, shall not be in direct contact with concrete surfaces, *and* units should not be subjected to excessive impact.
>
> Air quality sampling and testing will not be required for small-localized containments when blasting operations have an expected duration of less than approximately 3 hours, *or* the expected duration of the total amount of blasting on the project is less than approximately 8 hours.

Compound sentences cannot be joined together with just a comma. A comma either with a coordinating conjunction or with another form of punctuation (period, semicolon, or colon) must be used.

The Semicolon

Use semicolons in place of a comma with a coordinating conjunction.

> Example*:* Tiedowns, which may cause chipping or breakage, shall not be in direct contact with concrete surfaces; units should not be subjected to excessive impact.

Use a semicolon with transitional expression such as “however” and “therefore”.

> Example*:* Some delays for weather have been included in the number of closure days allowed; therefore, additional closure days for adverse weather will not be allowed for the first five consecutive closure days of each delay.

The Colon

Use a colon after a short introductory word such as "Note" or "Caution."

Example: Note: This protection shall remain until the pavement is five calendar days old or until opening strength is attained.

The Apostrophe

Use an apostrophe to indicate possession. For singular nouns, the apostrophe precedes the *s*. For plural nouns, the apostrophe comes after the *s*.

Singular	Possessive	Plural	Possessive
Contractor	Contractor's	Contractors	Contractors'
patch	patch's	patches	patches'
company	company's	companies	companies'
glass	glass's	glasses	glasses'

The apostrophe is also used to form contractions. Do not use contractions in specifications.

Note: *it's* is the contraction for *it is*. The possessive form for *it* is *its*, not *it's* or *its'*.

Hyphens and Dashes

Hyphens are used to form compound words. Hyphens are also used when expressing the numbers 21 to 99 in words.

When a number and word (usually a unit name) work together to describe something else (usually an object or material, like a pipe, bolt, or board), they are acting as a single word, or adjective, called a *unit modifier*. Use a hyphen between the number and the word. Use the word to describe the unit, not the unit symbol in unit modifiers.

- 6-inch hyphenated when "6" is a descriptor – as in 6-inch layer, not 6 inches of depth
- Topsoil shall consist of the upper 6-inch layer of the A horizon
- Steel rod with a minimum diameter of ½ inch with graduations (tick marks) every 6 inches.
- end of the rod shall have a 30-degree cone tip
- profile change on the blade with a 40 to 60-degree (with hyphen)

Do not use hyphens to indicate ranges. Avoid using dashes in specifications. They can be mistaken for a minus sign.

Quotation Marks

Use quotation marks with phrases introduced by expressions such as "marked," "labeled," "titled," or "include the notation."

Example: The Final Erection Plan shall be signed and sealed by the Contractor's Engineer and marked "Approved for Construction."

Do not use quotation marks as a symbol for inch, inches, foot, or feet.

Incorrect: 3/4", 36", 5'. *Correct:* 3/4 inch, 36 inches, 5 feet.

Place periods and commas inside of closing quotation marks. Place semicolons and colons outside of closing quotation marks. If the opening quotation mark is outside of an opening parenthesis, then the closing quotation mark is outside of the closing parenthesis. If the opening quotation mark is inside of an opening parenthesis, then the closing quotation mark is inside of the closing parenthesis.

References

References are critical components of specifications. By referring to information that is provided elsewhere, unnecessary duplication and potential errors of interpretation are avoided. In order to be useful, however, references must be accurate, understandable, and consistent.

When writing or updating a specification, verify all references and citations that they are accurate and up to date. Failure to do so can result in reliance on obsolete or canceled standards.

To reduce repetition and decrease the risk of mistakes, reference documents or sections that have both a name and a number only by number, never by name, and definitely never by both number and a name. The names change more frequently than the numerical designation, add unnecessary length, duplicate information, and increase the risk of making an error.

When documents only have a title, reference them using that title. Write the title exactly as given by the issuing organization. Do not substitute or add words to the title. If the title is particularly long, it is acceptable to abbreviate it, however, give the full title on first use and the abbreviation clearly identified. If a reference is not used again, do not provide an abbreviation or common name for it.

References must be consistent. Once a reference is given, all references to that document or section must be identical.

When multiple references are used consecutively from the same source, include the source name or descriptor (ex. Section, Subsection, AASHTO, or ASTM) with each reference. Do not omit the source name after the first reference.

Titles used in CDOT Standard Specifications having a masculine gender, such as "workmen" and the pronouns "he" or "his", are for the sake of brevity and are intended to refer to persons of either sex.

Unless otherwise identified, forms referred to as Form 605 are CDOT forms. Forms from other organizations or agencies are clearly identified (FHWA Form 1273).

ASTM references should be in this format: ASTM C103. (no space between letter and number)
AASHTO references should be in this format: AASHTO T99, AASHTO M147 (no space between letter and number). As shown in section 101, CP-L stands for Colorado Procedure - Laboratory

Example: For polymerized emulsions the distillation and evaporation tests will be performed per AASHTO T59 or CP-L 2212 respectively with modifications to include 205 ± 5 ºC (400 ± 10 ºF) maximum temperature to be held for 15 minutes.

The following items are defined in the Specifications and must be referenced as shown. Always capitalize as shown.

- Engineer
- Contractor
- Project Engineer
- Plans (not drawings, unless referring to shop drawings).

Reference sections and subsections in the following manner:

Section 602
Subsection 602.07
Subsection 602.07, F
Subsection 602.07, F, 1
Subsection 602.07, F, 1, a

Tables
Include a number and a title. Use boldface type. Center the title and number with respect to the table. Use a double line for the outside border of the table. Use the subsection number to number tables. In subsection 203, the first table to appear in would be Table 203-1, the second table would be Table 203-2, and the third table would be Table 203-3, and so on. The format is:

Table XXX-XX
TITLE (TNR 11 pt.)

Example:

Table 203-2
RESISTIVITY AND PH OF IMPORTED MATERIAL

SOIL SIDE (centered)	
Resistivity, R (Ohm – cm) **Left align**	pH **(center)**
≥ 1,500	5.0-9.0
≥ 250	3.0-12.0

Reference tables by the table number and do not include the title in the reference.

Example: … and resistivity is not greater than the limits corresponding to the Pipe Class in Table 203-1 or 203-2 for the pipe class specified in the Contract. No single test shall have a result more than 20 percent greater than that corresponding to the limit in Table 203-1 or Table 203-2 for sulfates…

Construction Specifications Website

The Standards and Specifications Unit maintains the specifications of the Standard Specifications, the Standard Special Provisions and Project Special Provision worksheets on the CDOT website.

Accessing the Website

The CDOT website address is https://www.codot.gov. The Specifications page on the CDOT website is located at https://www.codot.gov/business/designsupport/cdot-construction-specifications .

Contents of the Website

The Specifications page on the CDOT website contains

- Standard Specifications Text
- Current Standard Special Provisions
- Project Special Provision Work Sheets
- Sample Project Special Provisions
- Materials Specifications Check List
- Design/Build Special Provisions
- Fuel Cost Adjustment
- Asphalt Cement Cost Adjustment
- Past Davis-Bacon Minimum Wage Decisions
- Innovative Contract Provisions
- Phased Funding Special Provisions
- Warranted HBP Special Provisions
- Significant Changes found in the Standard Specifications

The following information is also available:

- Creating a Special Provision Package for a CDOT Project
- Guidelines for Writing Construction Specifications (this document)
- Specification Changes Under Consideration

Project Special Provision Work Sheets

Work sheets available on the website include those for frequently used Project Special Provisions and instructions for index pages, Notice to Bidders, Commencement and Completion of Work, and Traffic Control Plan - General.

Updates

The Standards and Specifications Unit notifies users of updates to the website by e-mail.

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1. CDOT. *Standard Specifications for Road and Bridge Construction*, Colorado State Department of Transportation.
2. CDOT. Procedural Directive 513.1, *Construction Project Specifications*, Colorado State Department of Transportation, 2016. [https://www.codot.gov/business/designsupport/cdot-construction-specifications/2017-construction-standard-specs/specs-changes-under-consideration/pd-513-1-review/view]
3. Design Guide 18 Chapter 16 Construction Specifications
4. Various other state style guides, especially Iowa, Ohio, Utah and Vermont
5. FHWA. *Code of Federal Regulations*, Title 23, Part 635, 2018. [https://www.fhwa.dot.gov/legsregs/directives/cfr23toc.htm]
6. CDOT. *Project Development Manual*. [https://www.codot.gov/business/designsupport/bulletins_manuals/project-development-manual/revs-to-project-manual]

(1) USC. *United States Code*, Title 23, Chapter 1, Section 112. [https://www.gpo.gov/fdsys/browse/collectionUScode.action?collectionCode=USCODE]

7. CDOT. *Innovative Contracting (Design-Build and CM/GC)*, Colorado State Department of Transportation. [https://www.codot.gov/business/designsupport/innovative-contracting-and-design-build]
8. CDOT. *Innovative Contract Provisions*, Colorado State Department of Transportation. [https://www.codot.gov/business/designsupport/cdot-construction-specifications/2017-construction-standard-specs/innovative-specs]
9. CDOT. Form 1215 - *Submittal of New Specification or Specification Change*. [https://www.codot.gov/library/forms/cdot1215.pdf]