

ACI Specification Manual

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SUMMARY OF CHANGES

The following changes have been made to the 2005 *ACI Specification Manual*:

1.1 The scope was revised to indicate procedures for material specifications, specifications for testing services, and specifications for inspection services.

1.2.2 Reference to ACI 116R was deleted and replaced with the ACI Cement and Concrete Terminology (CCT). Definitions of “quality assurance” and “quality control” from ACI 301 were added.

1.3 Various changes were made to clarify the procedure for development of ACI Specifications.

1.3.5 The requirements for units of measurement were revised to agree with the current ACI metrication policy.

2.3 A new paragraph was added to state that ACI Reference Specifications include nonmandatory notes to Specifier that follow the specification text.

2.3.1 and 2.3.2 The contents was revised to show that all non mandatory information follows the specification text.

2.3.3.4 A new section was added on cross-referencing in multi-item specifications.

Section 3 The Notes to Specifier and Preface were moved so they follow the specification text.

3.2 Revised the recommended wording for the statement on units of measurements. Clarified that only mandatory language standards are to be referenced in the ACI specifications.

3.3 This is a new section that includes the old Preface and the Foreword to Checklists.

3.4.6 Revised the Submittals Checklist by adding introductory text to clarify the content of this checklist.

4.2 Added a sentence to clarify that ACI Guide Specifications are written in the same style as ACI Reference Specifications.

4.3.1 The nomenclature for the advisory information in ACI Guide Specifications was changed from “Commentary” to “Notes to Specifier.”

4.3.2 Various revisions were made to clarify content of the Notes to Specifier.

4.3.3 A new section was added on listing references at the end of Notes to Specifier.

5.2.2 The option of writing ACI Reference Specifications with Commentary was deleted. The checklists provide the opportunity for limited explanations, if required.

Section 6 The examples were revised to be in agreement with the format described in the Manual.

SYNOPSIS

This Manual describes requirements and recommendations for development of ACI specifications, including required specification format, style, and language. It also addresses the special approval requirements to initiate development of a specification.

Keywords: checklist; Contract Documents; ACI Guide Specifications; Project Specifications; ACI specifications; specification format; ACI Reference Specifications.

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PREFACE

The *ACI Specification Manual* is prepared by the Technical Activities Committee's (TAC) Specifications Committee (TSC) to establish procedures for ACI technical committees in developing ACI Reference Specifications or ACI Guide Specifications. It also addresses the special approval requirements before an ACI committee begins to develop a specification.

ACI's specification format is based on the Construction Specifications Institute's (CSI) three-part Section format. For details on CSI's format, consult *SectionFormat*,TM available from CSI, 99 Canal Center Plaza, Suite 300, Alexandria, VA 22314, www.csinet.org.

For more information on ACI technical committees, documents, and style, consult the *ACI Technical Committee Manual (TCM)* and the *ACI Style Manual*. These manuals may be obtained at www.concrete.org.

CHAPTER 1—INTRODUCTION

1.1—Scope

1.1.1 ACI construction specifications

This *ACI Specification Manual* (hereinafter referred to as "Manual") provides requirements and recommendations for preparing ACI construction specifications. ACI construction specifications (hereinafter referred to as "ACI specifications") shall be prepared as either ACI Reference Specifications or ACI Guide Specifications as defined in 1.2.1. When incorporated into Project Specifications, ACI Reference Specifications become legally binding. The required format and style of

ACI specifications are unique and specifications are processed differently than other committee documents. Chapter 1 of this Manual defines relevant terminology and summarizes the process for developing specifications. Chapter 2 outlines the format of ACI specifications. Chapters 3 and 4 detail the contents of ACI Reference Specifications and ACI Guide Specifications, respectively. Chapter 5 details the writing style for ACI specifications. Examples are provided in Appendix A.

1.1.2 ACI material specifications

ACI committees may under certain conditions and with TAC approval develop material specifications (see Chapter 3 of the *TCM*). This Manual does not address the format of material specifications, which shall be written using the ASTM format given in the *Form and Style for ASTM Standards* (download available from the ASTM website at www.astm.org) with the exception that ACI format will be used for the title, roster, synopsis, and keywords. In ASTM standards, notes and appendices are permitted to provide nonmandatory information.

1.1.3 ACI specifications for testing services

ACI committees may with TAC approval develop specifications intended for contracts between an owner and a testing agency. This Manual only partially applies to specifications for testing services and some deviations in format are needed. Contact TSC for guidance in developing this type of specification.

1.1.4 ACI specifications for inspection services

ACI committees may with TAC approval develop specifications intended for contracts between an owner and an inspection agency. This Manual only partially applies to specifications for inspection services and some deviations in format are needed. Contact TSC for guidance in developing this type of specification.

1.2—Definitions

1.2.1 Terms used in this Manual

The following definitions are used in this Manual and shall be the basis for specification preparation.

ACI Guide Specification—a standardized document that provides guidance to the Specifier in preparing a particular portion of Contract Documents.

Discussion: ACI Guide Specifications do not contain default requirements and cannot be incorporated into Contract Documents by reference. They must be interpreted, choices made, and written into the Project Specification. The document is prepared in specification and notes to specifier format with recommended mandatory specification language delineated clearly from notes to specifier.

ACI Reference Specification—a standardized mandatory-language document prescribing materials, dimensions, and workmanship, incorporated by reference in Contract Documents, with information in the Mandatory Requirements Checklist required to be provided in the Project Specification.

ACI Specification Manual—a manual approved by TAC to establish a specific format and style for ACI Reference Specifications and ACI Guide Specifications, and to assist ACI committees in preparing specifications.

ACI Technical Committee Manual (TCM)—a manual approved by TAC to guide the operation of ACI technical committees and to provide procedures for developing ACI documents.

ACI Style Manual—a manual approved by TAC to establish a specific format and style for all ACI documents.

Article—a group of related Paragraphs within a Part of a specification Section addressing major subject. A group of Articles makes up a Part.

default requirement—a limiting requirement that has been selected and specified in an ACI Reference Specification that unless otherwise specified by the Specifier as recommended in the Optional Requirements Checklist, is a mandatory condition of the ACI specification. The Optional Requirements Checklist may provide guidelines to the Specifier in specifying alternative requirements.

metric conversion, hard—conversion to SI units by applying exact conversion factor from IEEE/ASTM SI 10 and rounding off to rational or standard dimension that would be used for design and construction in SI units (sometimes termed *practical* conversion). For example, the hard metric (or rationalized) equivalent of a 6 by 12 in. cylinder is a 150 by 300 mm cylinder.

metric conversion, soft—conversion to SI units by applying exact conversion factor from IEEE/ASTM SI 10 and rounding off to the number of significant figures that will give an equivalent accuracy (sometimes termed *theoretical* conversion). For example, the soft metric equivalent of a 6 by 12 in. cylinder is a 152 by 305 mm cylinder.

Paragraph—one or more sentences, addressing a particular item or point, separated from preceding text by beginning on a new line; groups of Paragraphs of related information constitute an Article.

Part—a group of related Articles used to divide a specification Section into distinct groupings of related information.

reference—directed to some other source of information.

Discussion: The modifier “reference” is used to denote ACI specifications that are incorporated by reference in Contract Documents. The word “reference” shall not appear in the specification title and the document shall be titled “Specification for....”

reference standards—standardized mandatory-language documents of a technical society, organization, or association, including codes of local or federal authorities, that are incorporated by reference in Contract Documents.

Section—a portion of the specification covering general requirements or an individual technical item of the total Work or requirements of the construction project; each technical item Section consists of three Parts in a three-part Section format specification.

specification—an explicit set of requirements to be satisfied by a material, product, system, or service.

specification checklist—a list of mandatory or optional items in an ACI Reference Specification that require clarification in

Project Specifications, indicating action that is needed for each item and may provide options and justification for different choices.

submittals checklist—a list of mandatory submittal items in an ACI Reference Specification.

specifications, prescriptive—specifications in which the properties of materials and methods of installation are defined.

Discussion: It is a detailed, written description of the required properties of a product, material, or piece of equipment and the workmanship required for its proper installation. No proprietary names are used. Also referred to as *descriptive specifications*.

specifications, performance—specifications that define required results, criteria by which performance will be judged, and methods of verification.

Discussion: Performance specifications are statements of required results and methods for verifying compliance.

specifications, proprietary—specifications in which brand names, model numbers, type designations, and manufacturers are specified.

Specifier—the person or entity preparing and organizing the Project Specification for a construction project.

standard—a document developed by an organization using an ANSI approved consensus process that includes a period of public discussion, a process known as standardization.

TAC—the Technical Activities Committee (TAC) of the American Concrete Institute (ACI).

three-part Section format—a CSI document format used to present information for construction in a formal manner.

TSC—the TAC Specifications Committee (TSC); appointed by and responsible to TAC for format, style, and quality of ACI specifications, reviewing proposed specifications to ensure conformance with established requirements, and for managing development of ACI specifications.

1.2.2 Terms used in specifications

The following terms are for use in ACI specifications. Use the definitions provided in the *ACI Cement and Concrete Terminology* (CCT) for other specialized terms included in ACI specifications. Do not refer to the CCT in ACI specifications. If new or different definitions than in the CCT are used, they shall be submitted to the Managing Director of Engineering for possible inclusion in the CCT.

accepted—determined to be satisfactory by Architect/Engineer.

Architect/Engineer—the architect, engineer, architectural firm, or engineering firm developing Contract Documents or administering the Work under Contract Documents, or both.

Bid Documents—set of documents supplied by Owner to bidders during bidding phase of a construction project. These documents include general requirements, contract forms, contract conditions, specifications, drawings, and addenda.

Contract Documents—a set of documents supplied by Owner to Contractor as the basis for construction; these documents contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes.

Contractor—the person, firm, or entity under contract for construction of the Work.

Owner—the corporation, association, partnership, individual, public body, or authority for whom the Work is constructed.

permitted—accepted by or acceptable to Architect/Engineer, usually pertains to a request by Contractor, or when specified in Contract Documents.

Project Drawings—graphic presentation of project requirements.

Project Manual—a complete set of Bid and Contract Documents that includes the bidding requirements, contract forms, contract conditions, Project Specification, and may include drawings.

Project Specification—the written document that details requirements for the Work in accordance with service parameters and other specific criteria.

quality assurance—actions taken by Owner or Owner's Representative to ensure Work done and materials provided are in accordance with Contract Documents.

quality control—actions taken by Contractor to ensure that Work meets requirements of Contract Documents.

required—mandatory as prescribed in Project Specification or Contract Documents.

submittal—document or material provided to Architect/Engineer for review and acceptance.

submit—provide to Architect/Engineer for review.

testing agency—the person, firm, or entity under contract for providing testing services.

inspection agency—the person, firm, or entity under contract for providing inspection services.

Work—the entire construction or separately identifiable parts thereof required to be furnished under Contract Documents.

1.3—Development of ACI specifications

1.3.1 General

An ACI committee preparing specifications must comply with requirements of the *ACI Technical Committee Manual (TCM)*, the *ACI Style Manual*, and this Manual.

1.3.2 Request to develop an ACI specification

A technical committee considering development of a specification shall review the specification requirements published in the *TCM* and this Manual. If this review indicates that writing an ACI Reference Specification or ACI Guide Specification is appropriate, the committee shall submit a preliminary outline and objectives of the specification to the Managing Director of Engineering for TAC approval to start developing the specification.

1.3.3 Approval for developing an ACI specification

The request is forwarded to TSC for review and recommendation to TAC to continue development of the specification. TSC considers whether there are potential conflicts or overlaps with existing ACI specifications. After the specification outline and objectives are approved by TAC, a TSC member is assigned as a liaison member to the technical committee, and a voting member of the technical committee is recommended by

the chair to be appointed as an associate member of TSC. The TSC liaison member, with the support of other TSC members, assists the committee in developing the specification. To maintain communication with TSC, the committee provides specification drafts, ballots of draft specifications, meeting agendas, and meeting minutes to the TSC chair and the TSC liaison.

1.3.4 Review of proposed ACI specification

When the complete draft of the specification is submitted to the Managing Director of Engineering for TAC review as per the *Technical Committee Manual*, TSC will be asked to review the draft specification as part of TAC review. The TSC review will focus on format and style of the draft specification, but may address technical issues.

1.3.5 Units of measurement

ACI policy (see the *ACI Style Manual*) requires that ACI specifications are published in two separate versions, one using inch-pound units and one using hard converted SI units. ACI staff can assist the committees in making the hard conversions. Section 1 of ACI specifications shall include a statement on units of measurement used in the specification (see 3.2).

CHAPTER 2—FORMAT AND OUTLINE OF ACI SPECIFICATIONS

2.1—General

This Chapter discusses differences between ACI Reference Specifications and ACI Guide Specifications. Outlines of single-item and multiple-item ACI Reference Specifications are presented and the corresponding decimal numbering formats are explained.

2.2—Types of ACI specifications

2.2.1 ACI Reference Specifications

Because ACI Reference Specifications are included as part of Contract Documents by reference, they are legally binding. ACI Reference Specifications shall be developed with full understanding of their legal status.

ACI Reference Specifications are referenced in their entirety. Contract Documents that include ACI Reference Specifications must incorporate into the Project Specification the items in the Mandatory Requirements Checklist and may incorporate items from the Optional Requirements Checklist. Incorporation of these items does not change the ACI Reference Specification, but establishes criteria within which requirements will be administered.

If portions of an ACI Reference Specification are copied into the Project Specification or any other document, do not refer to it as an ACI specification, because the ACI specification has been altered.

2.2.2 ACI Guide Specifications

ACI Guide Specifications provide recommended specifications with suggested paragraphs in mandatory language that need to be selected, and specific criteria added to indicate required results and criteria for acceptance. The Specifier must select appropriate paragraphs for incorporation into the

Project Specification. An ACI Guide Specification does not include default requirements. The ACI Guide Specification must be edited and incorporated into the Project Specification, and shall not be referenced. An ACI Guide Specification is appropriate where numerous decisions are required or where emerging technology does not support a Reference Specification. ACI Guide Specifications should conform as much as possible to the outline of ACI Reference Specifications.

2.3—Format of ACI Reference Specifications

ACI Reference Specifications may be single or multiple-item specifications. Single-item specifications address a single product or process, and are analogous to CSI narrow scope specifications. Multiple-item specifications contain more than one technical section, and are similar to CSI broad scope specifications. The general outline of ACI Reference Specifications includes such topics as identified in Chapter 3. Not all topics listed in Chapter 3 are required for ACI Reference Specifications, but include applicable topics in the order shown in Chapter 3 and 2.3 of this Manual.

ACI Reference Specifications include Notes to Specifier that are not part of the specification. The Notes to Specifier begin on a separate odd-numbered page, so they can be physically separated from the mandatory text.

Items in ACI Reference Specifications shall be arranged in the following order:

2.3.1 Outline format of single-item ACI specifications

- Title page
- Contents
- (Mandatory portion follows)
- **Part 1—GENERAL**
- **Part 2—PRODUCTS**
- **Part 3—EXECUTION**
- (Nonmandatory portion follows)
- **Notes to Specifier**
 - General notes
 - Foreword to Checklists
 - Mandatory Requirements Checklist
 - Optional Requirements Checklist
 - Submittals Checklist

2.3.2 Outline format of multiple-item ACI specifications

- Title page
- Contents
- (Mandatory portion follows)
- **Section 1—GENERAL REQUIREMENTS**
- **Section 2—(First Item Technical Section)**
 - Part 2.1—GENERAL
 - Part 2.2—PRODUCTS
 - Part 2.3—EXECUTION
- **Section 3—(Second Item Technical Section)**
 - Part 3.1—GENERAL
 - Part 3.2—PRODUCTS
 - Part 3.3—EXECUTION
- **Section 4—(Third Item Technical Section)**
 - Part 4.1—GENERAL
 - Part 4.2—PRODUCTS

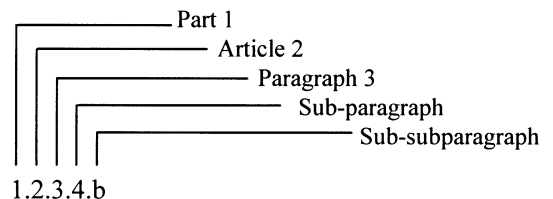
- Part 4.3—EXECUTION
- **Section 5—(Fourth Item Technical Section)**
 - Part 5.1—GENERAL
 - Part 5.2—PRODUCTS
 - Part 5.3—EXECUTION
- **Section 6 and beyond (as needed)**
(Nonmandatory portion follows)
- **Notes to Specifier**
 - General notes
 - Foreword to Checklists
 - Mandatory Requirements Checklist
 - Optional Requirements Checklist
 - Submittals Checklist

2.3.3 Numbering format of ACI specifications

A decimal numbering format adopted by ACI allows section contents to be referenced.

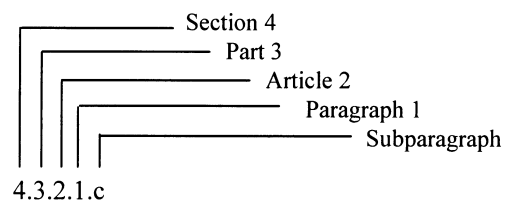
2.3.3.1 Single-item ACI specifications

Provisions in the specification are numbered sequentially. For example, a set of numbers for a provision might be 1.2.3.b. In such case, “1” denotes Part 1 (of the only technical section), “2” denotes Article 2, “3” denotes Paragraph 3, and “b” denotes Subparagraph b. An excerpt from ACI 330.1-03 is included in the Appendix to illustrate this format. The numbering system for single-item ACI specifications shall be as follows.



2.3.3.2 Multiple-item ACI specifications

The general requirements override the body of the specification and subsequent technical Sections are numbered sequentially. For example, a set of a numbers for a provision in the specification might be 4.3.2.1.c. In such case, “4” denotes Section 4 (the third technical section), “3” denotes Part 3, “2” denotes Article 2, “1” denotes Paragraph 1, and “c” denotes Subparagraph c. An excerpt from ACI 301-05 is included in the Appendix to illustrate this format. The numbering system for multiple-item ACI specifications shall be as follows.



2.3.3.3 *Format example*

The following excerpt from Section 1—General Requirements of ACI 301-05 illustrates the numbering system for ACI specifications.

1.6—Quality assurance

1.6.1 *General*—Concrete materials and operations may be tested and inspected by Owner as work progresses. Failure to detect defective work or material will not prevent rejection if a defect is discovered later nor shall it obligate Architect/Engineer for final acceptance.

1.6.2 *Testing agencies*—Agencies that test concrete materials shall meet the requirements of ASTM C1077. Testing agencies that test reinforcing steel shall meet the requirements of ASTM E329. Testing agencies shall be accepted by Architect/Engineer before performing any work. Field tests of concrete required in 1.6.3 and 1.6.4 shall be made by an ACI Concrete Field Testing Technician Grade 1 certified in accordance with ACI CP1 or equivalent. Equivalent certification programs shall include requirements for written and performance examinations as stipulated in ACI publication CP1.

1.6.3 *Testing responsibilities of Contractor*

1.6.3.1 Submit data on qualifications of proposed testing agency for acceptance. Use of testing services will not relieve Contractor of the responsibility to furnish materials and construction in compliance with Contract Documents

1.6.3.2 *Duties and responsibilities*—Unless otherwise specified in Contract Documents, Contractor shall assume the duties and responsibilities given in 1.6.3.2.a through 1.6.3.2.d:

1.6.3.2.a Qualify proposed materials and establish mixture proportions.

1.6.3.2.b Allow access to the project site or to the source of materials and assist Owner's testing agency in obtaining and handling samples at the project site or at the source of materials.

1.6.3.2.c Advise Owner's testing agency at least 24 hours in advance of operations to allow for completion of quality tests and for assignment of personnel.

1.6.3.2.d Provide and maintain adequate facilities on the project site for safe storage and initial curing of concrete test specimens as required by ASTM C31/C31M for the sole use of testing agency.

2.3.3.4 *Cross-referencing*

Use care when cross-referencing sections in multi-item specifications to prevent invoking unintended requirements. The cross-reference should be to the specific Paragraph or Subparagraph that is being invoked.

2.4—Format of ACI Guide Specifications

ACI Guide Specifications must not be referenced by Contract Documents; therefore, their format and content differ from that of ACI Reference Specifications. ACI Guide Specifications may be used for a single item or multiple items with the same outline as for ACI Reference Specifications in 2.3.

ACI Guide Specifications are written in a two-column format to separate the specification language from the Notes to Specifier. The left column provides the recommended specification language and the right column are Notes to Specifier that provide explanatory material to assist the Specifier in making decisions to complete the relevant portion of the Project Specification. The recommended specification text in an ACI Guide Specification is written in the same style as for an ACI Reference Specification, which is described in Chapter 5 of this Manual. The Notes to Specifier identify information that needs to be included in the Project Specification.

CHAPTER 3—CONTENTS OF ACI REFERENCE SPECIFICATIONS

3.1—General

This chapter describes the contents of ACI Reference Specifications. Requirements for title, roster, synopsis, and keywords are found in the *ACI Style Manual*.

3.2—Parts and Articles of ACI Reference Specifications

A modified CSI three-part Section format is the basis for ACI Reference Specifications.

PART 1—GENERAL

This Part includes requirements related to procedures and administration of this Section. Allowances and unit prices are not included in ACI Reference Specifications.

Scope—A short statement permitting the reader to assess the contents and to determine certain relationships. This Article can include statements relating to:

- Products furnished but not installed;
- Products installed but not furnished;
- Related sections; and
- Alternatives.

ACI publishes specifications that support construction of projects. Some ACI specifications specifically cover structures designed in accordance with ACI codes. The following ACI specifications have been developed specifically to cover structures that have been designed in accordance with the indicated ACI code:

Specification	Code
ACI 301	ACI 318
ACI 350.5	ACI 350
ACI 530.1	ACI 530

To avoid conflicting requirements in a Project Specification that refers to ACI specifications, the following statement shall be included in the scope of an ACI Reference Specification whose content overlaps that of a specification intended to support an ACI code:

“This specification shall not be used in conjunction with (insert code-supporting specification that is overlapped by this specification).”

Units of measurement—Include a statement on which units of measurement are used in the particular version of the ACI specification.

(a) Inch-pound units—For ACI specifications in which inch-pound units are used, include the following paragraph:

Units—Values in this specification are stated in inch-pound units. A companion specification in SI units is also available.

(b) **SI units**—For ACI specifications in which SI-units are used, include the following paragraph:

Units—Values in this specification are stated in SI units. A companion specification in inch-pound units is also available.

See the *ACI Style Manual* for guidance on metrication.

Reference standards—Include a list of referenced standards, complete with designations, dates, and titles. Full names and addresses of organizations whose standards are referenced shall be given (see the *ACI Style Manual*). When referencing standards in the text of the specification, titles are omitted and only serial designations without dates appear (see the *ACI Style Manual*). Reference standards are part of the specification, as if included physically. Items referenced are legal and binding within the specification and must be fully understood and accounted for so as not to involve contradictory requirements. Only standards written in mandatory language and developed by an ANSI approved standards development organization are to be referenced in ACI specifications. Other types of documents may be referenced in the checklists for guidance to the Specifier (see 3.3).

Definitions—Define technical terms used in an ACI specification in this Section. Because the *Cement and Concrete Terminology* (CCT) is not a standardized document and cannot be referenced in an ACI specification, even the terms defined in the CCT must be included in the specification.

Systems descriptions—This Article is restricted to statements describing performance or design requirements and tolerances of a complete system. Performance requirements used in conjunction with quality-control tests for verification can be included here.

Submittals—List relevant data to be furnished by Contractor before, during, or after construction. Administrative requirements for general submittals are given in other parts of the Contract Documents. This Article lists submittals such as product data, shop drawings, samples, quality-control data, design data, and test reports.

Quality assurance—Provide criteria that establish an overall level of quality for products and workmanship, such as qualifications, certifications, and field samples.

Delivery, storage, and handling—Specify special packaging and shipping requirements, acceptance at the site, and specific storage and protection requirements.

Project conditions—Indicate conditions that impact execution of the Work, such as environmental conditions and existing field conditions.

Sequencing and scheduling—Provide requirements for coordinating the Work that must be done in a special sequence with, or at the same time as, Work in another Section.

Maintenance—List provisions for maintenance service as applicable, or required extra or stockpiled materials.

PART 2—PRODUCTS

This Part includes information about systems, materials, manufactured units, components, accessories, mixtures, fabrication, and finishing before installation or incorporation into the Work. This Part may also include products furnished for incorporation under other Sections.

Materials—Provide statements describing major component materials to be furnished. Include separate Paragraphs for each item specified.

Components—Provide statements describing components of a system. Include separate Paragraphs for each specified component.

Accessories—Provide requirements for subordinate or secondary items that aid and assist primary products or are necessary for preparation or installation of those items.

Mixtures—Provide proportions and procedures for mixing materials. Mixing is preparation of materials for use and is considered to be part of the manufacturing process, and is unique to cementitious mixtures such as concrete, mortar, and grout.

Fabrication—Describe details for items that must be shop manufactured, fabricated, or assembled before they are delivered to the site, such as shop assembly, shop or factory finish, and tolerances.

Source quality control—If tests and inspections are required at the source, they shall be listed here. Include statements for procedures and methods of verification of performance or compliance.

PART 3—EXECUTION

This Part involves on-site labor and shall include provisions for incorporating products into the Work. Products incorporated may be specified in Part 2, or may be furnished under other Sections.

Examination—Provide requirements that determine if site conditions are acceptable.

Preparation—State actions required to prepare the surface, area, or site to receive primary products, including protection of surrounding areas.

Erection, installation, or application—State actions required to accomplish a unit of Work, including requirements necessary for installation of products furnished under other Sections. Include separate Paragraphs for each specified item. Statements on specific techniques, interface with other products, and tolerances can be included.

Field quality control—Define tests and inspections for installed or completed Work. These are separate from tests and inspections required for materials and products before installation or application.

Adjusting or cleaning—Outline final actions to prepare installed products and completed Work for final acceptance.

Demonstration—State the requirements of the installer or manufacturer that demonstrate suitability of the Work for final acceptance. This can include liquid or gas tightness tests.

Protection—List provisions for protecting installed Work before acceptance by Owner.

Schedules—Include schedules that indicate when and where to place items, and provide other coordinating data.

3.3—Notes to Specifier

3.3.1 Purpose of Notes to Specifier

ACI Reference Specifications include Notes to Specifier that are not part of the mandatory portion of ACI specifications. These notes include general guidance on how to incorporate the ACI Reference Specification into Contract Documents and guidance on how to use the Checklists. The Notes to Specifier begin on a separate odd-numbered page so that they are physically separate from the mandatory text of the specification.

3.3.2 General notes

The wording in items G1 through G5 shall be included without modification except for insertion of the title and number of the ACI specification.

NOTES TO SPECIFIER

General notes

G1. ACI Specification ____ is to be used by reference or incorporation in its entirety in the Project Specification. Do not copy individual Sections, Parts, Articles, or Paragraphs into the Project Specification, because taking them out of context may change their meaning.

G2. If Sections or Parts of ACI Specification ____ are copied into the Project Specification or any other document, do not refer to them as an ACI specification, because the specification has been altered.

G3. A statement such as the following will serve to make ACI Specification ____ a part of the Project Specification:

“Work on (Project Title) shall conform to all requirements of ACI (Specification number with date suffix and title) published by the American Concrete Institute, Farmington Hills, Michigan, except as modified by these Contract Documents.”

G4. Each technical Section of ACI Specification ____ is written in the three-part Section format of the Construction Specifications Institute, as adapted for ACI requirements. The language is imperative and terse.

G5. ACI Specification ____ is written to the Contractor. When a provision of this Specification requires action by the Contractor, the verb “shall” is used. If the Contractor is allowed to exercise an option when limited alternatives are available, the phrasing “either...or...” is used. Statements provided in the specification as information to the Contractor use the verbs “may” or “will.” Informational statements typically identify activities or options that “will be taken” or “may be taken” by the Owner or Architect/Engineer.

3.3.3 Foreword to Checklists

Foreword to Checklists must use the wording in items F1 through F7. Do not modify this wording except by insertion of the number of the ACI Reference Specification. Any of paragraphs F4 through F7 may be omitted if they do not apply to the ACI specification.

Foreword to Checklists

F1. This foreword is included for explanatory purposes only; it is not a part of ACI Specification ____.

F2. ACI Specification ____ may be referenced by the Specifier in the Project Specification for any building project, together with supplementary requirements for the specific project. Responsibilities for project participants must be defined in the Project Specification. ACI Specification ____ cannot and does not address responsibilities for any project participant other than the Contractor.

F3. Checklists do not form a part of ACI Specification _____. Checklists assist the Specifier in selecting and specifying project requirements in the Project Specification.

F4. The Mandatory Requirements Checklist indicates work requirements regarding specific qualities, procedures, materials, and performance criteria that are not defined in ACI Specification _____. The Specifier must include these requirements in the Project Specification.

F5. The Optional Requirements Checklist identifies Specifier choices and alternatives. The Checklist identifies the Sections, Parts, and Articles of the ACI Reference Specification ____ and the action required or available to the Specifier. The Specifier should review each of the items in the Checklist and make adjustments to the needs of a particular project by including those selected alternatives as mandatory requirements in the Project Specification.

F6. The Submittals Checklist identifies information or data to be provided by the Contractor before, during, or after construction.

F7. Recommended References—Documents and publications that are referenced in the Checklists of ACI Specification _____ are listed below. These references provide guidance to the Specifier and are not considered to be part of ACI Specification _____.

(Provide a list of the applicable references using the format in the *ACI Style Manual* for citing references in non-mandatory language documents.)

3.4—Checklists

Checklists are to assist the Specifier to incorporate into the Project Specification those items that require decision or action and that are not mandated in the ACI Reference Specification. The Specifier shall make adjustments to the needs of a particular project by reviewing each of the items in the checklists and including in the Project Specification those items the Specifier selects as mandatory requirements.

3.4.2 Mandatory Requirements Checklist

This checklist includes those items the Specifier must address when referencing the ACI Reference Specification in the Project Specification. There are no default values given to these items in the ACI Reference Specification, as these items are job-specific. Minimize the number of items in the Mandatory Requirements Checklist; however, include all items that Specifier must include in the Project Specification. The Mandatory Requirements Checklist instructions shall be short and self-explanatory (such as “Specify concrete compressive strength.”).

3.4.3 Optional Requirements Checklist

This checklist includes those items the Specifier may address when referencing the ACI Reference Specification in the Project Specification. The body of the ACI Reference Specification provides a default for all Optional Requirements Checklist items. The Optional Requirements Checklist shall identify items that the Specifier can use in place of default requirements for specific project conditions. Limited discussion, such as why a change should be made, or text that can be used for an option may be included. Reference to documents or publications that are not standards can be made in the checklist to provide information.

3.4.4 Submittals Checklist

This checklist includes those submittals that are required for the Work specified in each Section of the ACI Reference Specification.

3.4.5 Format of checklist items

Use the following format for each item in the Mandatory and Optional Requirements Checklists. In the left column provide the numbering of the referenced Article and provide a brief description of the subject. In the right column include the following:

- Concise statement of the requirement;
- Concise guidance to Specifier (optional); and
- References for additional guidance (optional).

The format of the Submittals Checklist is similar to the ones for the Mandatory and Optional Requirements Checklists except that only submittal items are listed and notes are typically not used. The Submittals Checklist is preceded with explanatory text as shown in the example in 3.4.6.

3.4.6 Examples of checklists

The following are examples to illustrate format and content of the three types of checklists:

Mandatory Requirements Checklist

Section/Part/ Article	Notes to Specifier
2.2.1 Concrete compressive strength	Indicate specified compressive strength of concrete, f'_c , for various portions of the Work. For most structural members, requirements of the design will dictate specified strength. For floors, specified compressive strength generally depends upon intended use and expected wear. See ACI 302.1R for guidance on compressive strength to specify for various classes of floors.

Optional Requirements Checklist

Section/Part/ Article	Notes to Specifier
1.6.5 In-place testing	Specify if in-place tests will be permitted to evaluate uniformity or relative in-place strength of concrete. Refer to ACI 228.1R for guidance on in-place testing of concrete.

Submittals Checklist

The items listed will be submitted by Contractor to Architect/Engineer for review.

All submittals and responses should be retained in files for future reference during the Work. Some submittal requirements shown will apply only when optional requirements are selected and written into the Project Specification. Once optional requirements have been selected, review the Section/Part/Article indicated for the submittal item to see if it applies.

Section/Part/ Article	Submittal Items and Notes to Specifier
1.5.4 Prestressing steel	Data on: <ul style="list-style-type: none"> • Typical stress-strain curve; • Test results of tensile strength and elongation; and • Composition of steel not produced in accordance with ASTM specifications

CHAPTER 4—CONTENTS OF ACI GUIDE SPECIFICATIONS

4.1—General

This chapter describes contents of ACI Guide Specifications.

4.2—Preface

Include the following preface verbatim in ACI Guide Specifications:

PREFACE
<p>This document is an ACI Guide Specification. It shall not be referenced by a Project Specification. This ACI Guide Specification provides alternatives that are to be selected by the Specifier and then incorporated into the Project Specification. Guidance on selecting alternatives is provided in the Notes to Specifier.</p> <p>This document is presented in two-column format, with recommended specification text in the left column and Notes to Specifier in the right column. To distinguish the Specifications from Notes to Specifier, different typefaces are used. The Specification text is printed in Arial (or Helvetica), which is this typeface. The Notes to Specifier text is printed in Times Roman, which is this typeface. Section numbers in the Notes to Specifier are preceded by the letter “R” to distinguish them from specification section numbers.</p>

4.3—Contents of ACI Guide Specifications and Notes to Specifier

4.3.1 Organization

ACI Guide Specifications have the same organization and contents as single-item or multiple-item ACI Reference Specifications, as presented in Chapter 3. ACI Guide Specifications consist of recommended specification text in mandatory language that may require the addition of project-specific values, accompanied by Notes to Specifier in nonmandatory language that provide guidance on what values or alternatives to specify. There are no default requirements or values provided in an ACI Guide Specification.

4.3.2 Notes to Specifier

The Notes to Specifier list job specific information to be supplied by the Specifier. The Notes to Specifier also provide relevant options recommended by the ACI technical committee that prepares the ACI Guide Specifications.

4.3.3 Example—The following illustrates the two-column format of an ACI Guide Specification. The left column contains the recommended Specification with the value of in-place strength omitted. The Notes to Specifier provide guidance to the Specifier on selecting the appropriate value of in-place strength.

Specification	Notes to Specifier
3.1.1 The concrete shall be cured until the in-place compressive strength is at least ____ psi.	R3.1.1. The required minimum in-place strength will depend on the ambient conditions expected after ceasing curing operations and the degree of hydration desired in the cover concrete. A higher fraction of the specified strength is required when the ambient relative humidity is low and a higher degree of hydration is desired at the level of reinforcement. Refer to ACI 308 for guidance on selecting an appropriate fraction of the specified strength for termination of curing.

4.3.4 Recommended references—At the end of the Notes to Specifier, list references cited in the Notes to Specifier. Use the format in the *ACI Style Manual* for nonmandatory language documents references. Referenced standards used in the recommended specification text are listed as explained in 3.2.

CHAPTER 5—STYLE OF ACI SPECIFICATIONS

5.1—General

This chapter describes elements of style unique to ACI Reference Specifications and the specification portion of ACI Guide Specifications. See the *ACI Style Manual* for additional guidance on language, sentence structure, and writing conventions including punctuation, capitalization, and abbreviations.

Specification style is characterized by restrictions and requirements of phrasing, grammatical construction, and vocabulary. ACI Reference Specifications are written clearly and concisely so that no statement can be misinterpreted. ACI specification language must be terse, detailed, and exact statements about the subject.

5.2—ACI specification language and phrasing

5.2.1 Verb tense

Write ACI specifications in mandatory language. Refer to the *ACI Style Manual* on the use of mandatory language. Where possible, use terse imperative language. Avoid the passive tense.

Example:

Use: “Cure concrete.”

Do not use: “The concrete shall be cured.”

5.2.2 Concise Notes to Specifier

Do not give reasons for requirements in ACI specifications. If some clarification is necessary for the Specifier on mandatory requirements, optional requirements, or submittals, use the specification checklists. Keep in mind, however, that the checklists are written to the Specifier not to the Contractor. If clarification appears necessary, it is an indication that the specification wording needs to be improved. Do not include commentary in ACI specifications.

5.2.3 Responsibilities

ACI construction specifications provide requirements that are to be performed by Contractor. Therefore, it is not necessary to begin provisions with the wording “The Contractor shall...” Refer to the Contractor only if necessary to avoid misinterpretation of responsibility.

5.2.4 Tolerances

Refer to ACI Specification 117 unless it does not cover a required tolerance. Specify tolerances not covered and notify ACI Committee 117 of the need for additional tolerances.

5.2.5 Time requirements

Specify ending points for time-related requirements.

Example:

Use: “Keep forms wet until concrete is placed.”

Do not use: “Keep forms wet.”

5.2.6 Qualitative requirements

Avoid qualitative requirements and refer to measurable parameters.

Example:

Use: “Masonry units shall have a surface temperature 36 °F or greater when placed in the structure.”

Do not use: “Keep masonry units warm.”

5.2.7 Level of detail

Use judgment when specifying the level of detail needed for the complexity of the Work.

5.2.8 Checklist coordination

Carefully coordinate checklists with numbering in final approved ACI Reference Specification.

5.2.9 Reference standards

Update reference standards and include current year designations. If reference standards are used, provisions of those standards must be suitable for the proposed ACI specification. Reference standards from other organizations may contain products, performance, testing, and other characteristics that may be too broad or narrow for the Work, unnecessarily inflate the cost of the Work, or not deal with the specified Work at all.

5.2.10 Graphics

Do not include graphics in ACI specifications unless they are needed to facilitate compliance with the specifications.

5.2.11 Repetition of items

Specify an item one time only. If needed again, refer to the item by its original Paragraph number.

5.3—Grammatical construction

5.3.1 Absolutes

To avoid creation of an unenforceable requirement, use “each”, “every”, “any”, or “all” with extreme caution.

5.3.2 Jargon

Do not use legal jargon. ACI Reference Specifications become legal documents by being referenced in a Project Specification and ACI Guide Specifications are used to write a part of the Project Specification. Write specifications with more emphasis toward effective communication than toward use of legal terms. Do not use such terms as “herewith”, “hereinafter”, “as per”, or “wherein”.

Likewise, do not use technical slang such as “rebar”, “pour concrete”, “wet concrete”, and “freeze/thaw.” Refer to the *ACI Style Manual* for recommended terminology.

5.3.3 Subjective language

Use specific, objective language rather than vague, subjective descriptions. Do not use the following words or phrases:

- Adequate;
- Approximately;
- In a workmanlike manner (or other similar phrases);
- To the satisfaction of the Specifier;
- Shall function as intended;
- Good;
- Nearly; and
- Special.

5.3.4 Options

It is acceptable to use the verb “may” to indicate that Contractor can exercise an option if prescribed conditions are satisfied. It is better, however, to rewrite the sentence to avoid using “may.” Where Contractor has limited, specified alternatives, use “either...or...” Do not use “may” to indicate

an alternative choice, because when “may” is used, Contractor is not obligated to perform the actions.

Examples:

Use: When surface temperature of concrete is within 20 °F of ambient or surrounding temperature, protection measures may be removed.

Use (best): Protection measures are not required when surface temperature of concrete is within 20 °F of the ambient or surrounding temperature.

Do not use: Concrete may be consolidated by vibration or rodding.

Use: Consolidate concrete either by vibration or rodding.

5.3.5 “Approved”

Do not use the word “approved” when referring to Architect/Engineer review of Contractor submittals. Use “accepted,” “reviewed,” or similar terms that do not relieve Contractor of obligations under Contract Documents.

5.3.6 Footnotes

Do not use footnotes. If clarifications are directed to the Specifier, include them in the Optional Requirements Checklist.

5.3.7 Underlining

Do not underline within a sentence for emphasis. All specification requirements are mandatory and underlining is unnecessary.

5.3.8 “Will”

Do not use “will” when referring to action to be taken by Contractor. The word “will” is used to provide information to Contractor of actions that will be taken by Owner or Architect/Engineer.

5.3.9 Abbreviations

Do not use abbreviations unless defined.

5.3.10 Pronouns

Do not use pronouns.

5.3.11 Use of “the”

This article is used to impart specificity to a noun. In ACI specifications, it is not required when the subject or object is known or has been previously identified.

Example:

Use: “Testing agencies shall be accepted by Architect/Engineer before performing any Work.”

Do not use: “Testing agencies shall be accepted by the Architect/Engineer before performing any Work.”

5.3.12 Referral phrases

The use of referral phrases in the text of ACI specifications depends generally on whether they are ACI Reference Specifications or ACI Guide Specifications.

5.3.12.1 ACI Reference Specifications

Referral phrases such as “unless otherwise permitted” and “unless otherwise required” are permitted in ACI Reference Specifications. These phrases may be used after establishing a default where the Specifier has an option to specify more stringent requirements or where the default requirements are not mandatory until the Specifier selects them to be part of the Project Specification. Ensure that the Optional Requirements Checklist (refer to 3.4.3) includes those items where the Specifier has the option to specify values that differ from the default requirements.

Referral phrases such as “as indicated in Contract Documents” and “where indicated in Contract Documents” are permitted when additional requirements for a project need to be indicated on the Project Drawings or in the Project Specification. Specific requirements such as dimensions will be in Contract Documents. Ensure that the Mandatory Requirements Checklist includes items required in Contract Documents (refer to 3.4.2).

5.3.12.2 ACI Guide Specifications

In ACI Guide Specifications, referral phrases such as “as indicated in Contract Documents” and “where indicated in Contract Documents” may be used when additional requirements for a project will also be indicated in Contract Documents.

5.3.12.3 Unacceptable referral phrases

Other types of referral phrases, such as “where required by the Specifier”, should not be included in ACI specifications. This type of referral phrase is informational and is not considered specification language. Such phrases may be included in Notes to Specifier of ACI specifications to help the Specifier develop the Project Specifications.

APPENDIX A—EXAMPLES

A.1—General

This Appendix provides examples of correct format for ACI Reference Specifications.

A.2—Single-item ACI specification

The first example is an excerpt from a single-item ACI Reference Specification—ACI Specification 330.1. (To conform to this Manual, this illustrative excerpt has been revised from the published version of ACI 330.1-03.)

Specification for Unreinforced Concrete Parking Lots Reported by ACI Committee 330

[Insert Committee Roster]

This Specification covers minimum requirements for the construction of unreinforced concrete parking lots on grade. Included are requirements for materials, placing, texturing, curing, jointing, and opening to traffic.

Keywords: concrete parking lots; concrete pavements; construction; curing; inspection testing; jointing; pavement; specifications; texturing.

CONTENTS

(Mandatory portion follows)

Part 1—GENERAL

- 1.1—Scope
- 1.2—Definitions
- 1.3—Reference organizations
- 1.4—Submittals
- 1.5—Storage and handling
- 1.6—Testing and inspection

Part 2—PRODUCTS

- 2.1—Concrete
- 2.2—Joint reinforcement
- 2.3—Membrane-forming curing compounds
- 2.4—Joint and sealant material
- 2.5—Forms

Part 3—EXECUTION

- 3.1—Subgrade preparation
- 3.2—Subbase
- 3.3—Setting forms
- 3.4—Placing joint reinforcement
- 3.5—Batching, mixing, and delivery
- 3.6—Placing and finishing fixed-form pavement
- 3.7—Placing and finishing slipform pavement
- 3.8—Edging
- 3.9—Final surface texture
- 3.10—Tolerances
- 3.11—Curing
- 3.12—Hot- and cold-weather construction
- 3.13—Jointing
- 3.14—Opening to traffic

(Nonmandatory portion follows)

Notes to Specifier

- General notes
- Foreword to Checklists
- Mandatory Requirements Checklist
- Optional Requirements Checklist
- Submittals Checklist

(Mandatory portion follows)

PART 1—GENERAL

1.1—Scope

1.1.1 This Specification covers requirements for the construction of unreinforced concrete parking lots on grade, including attached and integral curbs.

1.2—Definitions

1.2.1 These definitions are to assist in interpreting the provisions of this Specification...

PART 2—PRODUCTS

2.1—Concrete

2.1.1 Comply with ASTM C94 and the following requirements.

2.1.2 Cement type—ASTM C150, Type I cement, unless otherwise specified.

2.1.3 Strength—Specified compressive strength shall be 4000 psi at 28 days, unless otherwise specified.

...

PART 3—EXECUTION

3.1—Subgrade preparation

3.1.1 Prepare subgrade as required in Contract Documents.

3.1.2 Construct subgrade to ensure that the required pavement thickness is obtained in all locations.

...

A.3—Multiple-item ACI specification

The second example is an excerpt from a multiple-item ACI Reference Specification: ACI Specification 301-05. (In order to conform to this Manual, this illustrative excerpt has been revised from the published version of ACI 301-05.)

Specification for Structural Concrete An ACI Standard

Reported by ACI Committee 301

[Insert Committee Roster]

This Specification is an ACI Reference Specification that the Architect/Engineer can make applicable to any construction project by citing it in the Project Specification. The Architect/Engineer supplements the provisions of this ACI Reference Specification as needed by designating or specifying individual project requirements.

The document covers materials and proportioning of concrete; reinforcing and prestressing steels; production, placing, finishing, and curing of concrete; and formwork design and construction. Methods of treatment of joints and embedded items, repair of surface defects, and finishing of formed and unformed surfaces are specified. Separate Sections are devoted to architectural concrete, lightweight concrete, mass concrete, prestressed concrete, and shrinkage-compensating concrete. Provisions governing testing, evaluation, and acceptance of concrete as well as acceptance of the structure are included.

Keywords: admixture; aggregate; air entrainment; architectural concrete; cement; cementitious materials; cold weather; compressive strength; concrete; concrete construction; concrete durability; concrete slab; consolidation; conveyor; curing; density; exposed-aggregate finish; finish; floors; formwork; grout; grouting; hot-weather; inspection; joint (construction, contraction, and isolation); lightweight concrete; mix; mixture proportion; placing; prestressed concrete; prestressing steel; reinforced concrete; reinforcement; repair; reshoring; shoring; shrinkage-compensating concrete; specification; subgrade; temperature; test; tolerance; water-cementitious material ratio; welded wire reinforcement.

CONTENTS

(Mandatory portion follows)

Section 1—GENERAL REQUIREMENTS

1.1—Scope

1.1.1—Work specified

1.1.2—Work not specified

1.2—Definitions

1.3—Reference standards and cited publications

1.3.1—Reference standards

1.3.2—Cited publications

1.3.3—Field references

1.4—Standards-producing organizations

1.5—Submittals

1.5.1—General

1.5.2—Testing agency reports

1.6—Quality assurance

1.6.1—General

1.6.2—Testing agencies

1.6.3—Testing responsibilities of Contractor

1.6.4—Testing responsibilities of Owner's testing agency

1.6.5—Tests on hardened concrete in-place

1.6.6—Evaluation of concrete strength tests

1.6.7—Acceptance of concrete strength

1.6.8—Field acceptance of concrete

1.7—Acceptance of structure

1.7.1—General

1.7.2—Dimensional tolerances

1.7.3—Appearance

1.7.4—Strength of structure

1.7.5—Durability

1.8—Protection of in-place concrete

1.8.1—Loading and support of concrete

1.8.2—Protection from mechanical injury

Section 2—Formwork and formwork accessories

2.1—GENERAL

2.1.1—Description

2.1.2—Submittals

2.2—PRODUCTS

2.2.1—Materials

2.2.2—Performance and design requirements

2.2.3—Fabrication and manufacture

2.3—EXECUTION

2.3.1—Construction and erection of formwork

2.3.2—Removal of formwork

2.3.3—Reshoring and backshoring

2.3.4—Strength of concrete required for removal of formwork

2.3.5—Field quality control

Section 3—Reinforcement and reinforcement supports

3.1—GENERAL

3.1.1—Submittals, data, and drawings

3.1.2—Materials delivery, storage, and handling

3.2—PRODUCTS

3.2.1—Materials

3.2.2—Fabrication

3.3—EXECUTION

3.3.1—Preparation

3.3.2—Placement

Section 4—Concrete mixtures

4.1—GENERAL

4.1.1—Description

4.1.2—Submittals

4.1.3—Quality control

4.1.4—Materials storage and handling

4.2—PRODUCTS

4.2.1—Materials

4.2.2—Performance and design requirements

4.2.3—Proportioning

4.3—EXECUTION

4.3.1—Measuring, batching, and mixing

4.3.2—Delivery

...

(Nonmandatory portion follows)

Notes to Specifier

General notes

Foreword to Checklists

Mandatory Requirements Checklist

Optional Requirements Checklist

Submittals Checklist

(Mandatory portion follows)

SECTION 1—GENERAL REQUIREMENTS

1.1—Scope

1.1.1 *Work specified*—This Specification covers cast-in-place structural concrete. Provisions of this Specification shall govern except where other provisions are specified in Contract Documents.

1.1.2 *Work not specified*—The following subjects are not in the scope of this Specification:

- Precast concrete products;
- Heavyweight shielding concrete;
- Slip-formed paving concrete;
- Terrazzo;
- Insulating concrete;
- Refractory concrete;
- Shotcrete;
- Slipformed concrete walls; and
- Tilt-up concrete construction.

...

SECTION 2—FORMWORK AND FORMWORK ACCESSORIES

2.1—General

2.1.1 *Description*—This Section covers design, construction, and treatment of formwork to confine and shape concrete to the required dimensions.

2.1.2 Submittals

2.1.2.1 Submit the data required in 2.1.2.1.a through 2.1.2.1.f unless otherwise specified:

...

(All nonmandatory items follow the specification text and begin on a separate odd-numbered page.)

(Nonmandatory portion follows)

NOTES TO SPECIFIER

General notes

G1. ACI Specification 301-05 is to be used by reference or incorporation in its entirety in the Project Specification. Do not copy individual Sections, Parts, Articles, or Paragraphs

into the Project Specification, because taking them out of context may change their meaning.

G2. If Sections or Parts of ACI Specification 301-05 are copied into the Project Specification or any other document, do not refer to them as an ACI specification, because the specification has been altered.

G3. A statement such as the following will serve to make ACI Specification 301-05 a part of the Project Specification:

“Work on (Project Title) shall conform to all requirements of ACI 301-05 Specification for Structural Concrete published by the American Concrete Institute, Farmington Hills, Michigan, except as modified by these Contract Documents.”

G4. Each technical Section of ACI Specification 301-05 is written in the three-part Section format of the Construction Specifications Institute, as adapted for ACI requirements. The language is imperative and terse.

G5. ACI Specification 301-05 is written to the Contractor. When a provision of this Specification requires action by the Contractor, the verb “shall” is used. If the Contractor is allowed to exercise an option when limited alternatives are available, the phrasing “either...or...” is used. Statements provided in the specification as information to the Contractor use the verbs “may” or “will.” Informational statements typically identify activities or options that “will be taken” or “may be taken” by the Owner or Architect/Engineer.

Foreword to Checklists

F1. This Foreword is included for explanatory purposes only; it is not a part of ACI Specification 301-05.

F2. ACI Specifications 301-05 may be referenced by the Specifier in the Project Specification for any building project, together with supplementary requirements for the specific project. Responsibilities for project participants must be defined in the Project Specification. ACI Specification 301-05 cannot and does not address responsibilities for any project participant other than the Contractor.

F3. Checklists do not form a part of ACI Specification 301-05. Checklists assist the Specifier in selecting and specifying project requirements in the Project Specification.

F4. The Mandatory Requirements Checklist indicates work requirements regarding specific qualities, procedures, materials, and performance criteria that are not defined in ACI Specification 301-05. The Specifier must include these requirements in the Project Specification.

F5. The Optional Requirements Checklist identifies Specifier choices and alternatives. The Checklist identifies the Sections, Parts, and Articles of the ACI Reference Specification 301-05 and the action required or available to the Specifier. The Specifier should review each of the items in the Checklist and make adjustments to the needs of a particular project by including those selected alternatives as mandatory requirements in the Project Specification.

F6. The Submittals Checklist identifies information or data to be provided by the Contractor before, during, or after construction.

F7. *Recommended References*—Documents and publications that are referenced in the Checklists of ACI Specification 301-05 are listed below. These references provide guidance

to the Specifier and are not considered to be part of ACI Specification 301-05.

American Concrete Institute (ACI)

ACI 117R Notes to Specifier on Standard Specifications for Tolerances for Concrete Construction and Materials

ACI 201.2R Guide to Durable Concrete

...

ASTM International

C441 Test Method for Effectiveness of Pozzolans or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete Due to the Alkali-Silica Reaction

...

The above publications may be obtained from the following organizations:

American Concrete Institute (ACI)

P.O. Box 9094

Farmington Hills, MI 48333-9094

www.concrete.org

ASTM International

100 Barr Harbor Dr.

West Conshohocken, PA 19428

www.astm.org

Sason, A. S., "Evaluation of Degree of Rusting on Prestressed Concrete Strand," *PCI Journal*, V. 37, No. 3, May-June 1992, pp. 25-30.

MANDATORY REQUIREMENTS CHECKLIST

Section/Part/Article	Notes to Specifier
Reinforcement and reinforcement supports	
3.2.1.1	Specify required grades, types, and sizes of reinforcing steel.
3.3.2.7	Show splices on the Project Drawings.
Concrete mixtures	
4.2.2.6	Designate which portions of the structure are classified in accordance with Table 4.2.2.6 member types. Additional information on the effects of chlorides on corrosion of reinforcing steel is given in ACI 201.2R and ACI 222R. Test procedures must conform to those given in ASTM C1218/C1218M. An initial evaluation can be obtained by testing individual concrete ingredients for total chloride content. If total chloride-ion content, calculated on the basis of concrete proportions, exceeds that permitted in Table 4.2.2.6, it may be necessary to test samples of hardened concrete for water-soluble chloride-ion content as described in ASTM C1218/C1218M. Some of the total chloride ions present in the ingredients will either be insoluble or will react with the cement during hydration and become insoluble under the test procedure described. When concrete is tested for water-soluble chloride-ion content, the tests should be made at an age of 28 to 42 days. The limits in Table 4.2.2.6 are to be applied to chlorides contributed from the concrete ingredients, not those from the environment surrounding the concrete. The water-soluble chloride-ion limits in Table 4.2.2.6 differ from the acid-soluble chloride limits recommended in ACI 201.2R and ACI 222R. For reinforced concrete that will be dry in service, a limit of 1% has been included to control total soluble chlorides. Table 4.2.2.6 includes limits of 0.15 and 0.30% for reinforced concrete that will be exposed to chlorides or will be damp in service, respectively. These water-soluble chloride-ion limits compare with the recommended acid-soluble chloride-ion limits of 0.10 and 0.15 in ACI 201.2R while 222R recommends acid-soluble chloride-ion limits of 0.08 and 0.20% for prestressed and reinforced concrete, respectively.
...	...

OPTIONAL REQUIREMENTS CHECKLIST

Section/Part/Article	Notes to Specifier
General requirements	
1.6.3.2, 1.6.3.3, 1.6.4.1	Specify if other testing arrangements are required, such as Owner's testing agency establishing mixture proportions or any testing responsibilities of the Owner's testing agency that will be performed by the Contractor's testing agency.
1.6.3.2.g, 1.6.4.2.e	If accelerated testing of concrete is specified or permitted as an alternative to standard testing, specify the procedure from ASTM C684 that is to be followed. Specify when compressive test specimens are to be tested if other than 7 and 28 days.
1.6.5.2	Specify if nondestructive tests will be permitted to evaluate uniformity or relative in-place strength of concrete. Refer to ACI 228.1R for guidance on nondestructive test methods.
...	...

SUBMITTALS CHECKLIST

The items listed will be submitted by the Contractor and reviewed by the Architect/Engineer. All submittals and responses should be retained in files for future reference during the Work. Some submittal requirements shown will apply only when optional requirements are selected and written into the Project Specifications. Once optional requirements have been selected, review the Section/Part/Article indicated for the submittal item to see if it applies.

Section/Part/Article	Submittal Items and Notes to Specifier
General requirements	
1.6.3.1	Proposed testing agency.
1.6.3.2.e	Test data and documentation on materials and concrete mixtures.
1.6.3.2.f	Quality-control program of the concrete supplier.
1.6.3.2.g	Request to use accelerated testing and correlation data.
...	...