

ACI TCM-24

An ACI Manual

Technical Committee Manual

Reported by the ACI Technical Activities Committee



American Concrete Institute
Always advancing



2024 Technical Committee Manual

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ACI 2024 Technical Committee Manual

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PREFACE

The purpose of ACI, as stated in the 1904 Charter, is: To organize the efforts of its members for a nonprofit public service in gathering, correlating, and disseminating information for the improvement of the design, construction, manufacture, use, and maintenance of concrete products and structures.

By adhering to this purpose, professionals in the concrete industry recognize ACI as a neutral platform for producing reliable technical information.

Each committee member willingly contributes his or her training and knowledge for the benefit of the public at large. By maintaining a high standard of professional and technical ability in its committee memberships, ACI publishes reliable information on concrete and its applications.

ACI has over 125 technical committees, and each has a unique mission related to a specific knowledge area, but all committees are expected to serve the public consistent with the 1904 chartered purpose.

The characteristics of ACI technical committee operations include:

- (a) Open committee membership
- (b) Balance/lack of dominance
- (c) Coordination and harmonization of information
- (d) Transparency of committee activities to public
- (e) Consideration of views and objections
- (f) Resolution through consensus process

The technical committee documents of the American Concrete Institute represent the consensus of the committee

and ACI. Technical committee members are individuals who volunteer their services to ACI and specific technical committees.

ACI technical committee members are expected to:

(a) Hold the safety, health, and welfare of the public as their top priority

(b) Be truthful in presenting information and data during discussions, debates, and ballots concerning technical issues

(c) Act in a professional manner

(d) Conduct themselves in a manner that will bring credit to the Institute

(e) Not state that they are official representatives of an ACI committee unless authorized by the Technical Activities Committee (TAC), nor state they are official representatives of ACI unless authorized by the Board of Direction

By adhering to these characteristics, ACI committees have a reputation for operational integrity.

TAC is always looking for ways to improve and streamline committee procedures.

Comments are welcome and can be emailed to: discussion@concrete.org

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PART 1—ORGANIZATION AND OPERATION OF TECHNICAL COMMITTEES

CHAPTER 1—ORGANIZATION

1.1—Technical Activities Committee (TAC)

The Technical Activities Committee (TAC) is responsible for the oversight of technical committee activities; the development of ACI standards; and the technical content of convention programs, archival publications, and special publications of the Institute, including peer-reviewed articles in periodicals and symposium volumes. TAC reviews all technical committee documents and is the final authority on technical issues in all publications.

Each TAC member is assigned liaison responsibilities for several technical committees, is designated as the TAC contact, and is listed on the committee roster on the website as the TAC contact. TAC contacts are expected to keep TAC abreast of the activities of the committees. Chairs should keep the TAC contact fully aware of committee activities and progress and are encouraged to contact them for advice or information.

TAC establishes subcommittees to assist in its oversight responsibility. Actions of TAC subcommittees are subject to review and approval by TAC. TAC subcommittee chairs are appointed by the TAC Chair.

1.1.1 TAC Secretary

The role of TAC Secretary is currently assigned to the Director of Engineering.

1.1.2 TAC Construction Standards Subcommittee (TCSS)

The TCSS assists technical committees in preparation and maintenance of construction standards in the correct format and language, and in management of code development by the Institute.

1.1.3 TAC Repair and Rehabilitation Subcommittee (TRRS)

The TRRS advises TAC on issues related to repair and rehabilitation, including evaluation, maintenance, and protection. TRRS coordinates the efforts of technical committees as they report information on existing concrete and masonry construction.

1.1.4 TAC Productivity and Constructability Subcommittee (TPCS)

The TPCS assists select standards-writing committees by identifying issues in standards that may adversely affect the productivity of concrete operations and the constructability of concrete structures. Standards-writing committees identified by TPCS receive input on productivity and constructability issues throughout the balloting process of a standard before TAC review.

1.2—Technical committees

TAC forms technical committees and assigns each a mission. A technical committee mission identifies the knowledge area the committee is responsible for and is usually not document-specific. The chair of each technical committee is responsible for organizing and populating the committee to achieve the mission. Committee size is influenced by several factors, such as the mission, balance of interests, geographic location of the committee members, and the current

committee goals. ACI often attracts structural engineers, educators, and materials specialists. Committees are encouraged to expand expertise and participation by including architects, specifiers, contractors, younger members, and those outside the mainstream of ACI activity.

Technical committee chairs may create long-standing subcommittees and short-term task groups within the main committee to assist with committee work.

Changes to a document proposed by a subcommittee or a task group must be approved by the main committee.

ACI committee members are expected to contribute to the committee's work products, including written works. All work products of ACI committees belong to ACI. Technical committees are consensus bodies. By participating in committees, ACI committee members acknowledge that the rights to such work products, including any copyright, reside with ACI.

1.2.1 Number designations

Staff assigns a number to each committee. Technical committees are organized into five groups based on their scope:

100—General

200—Materials and properties of concrete

300—Design and construction

400—Concrete reinforcement and structural analysis

500—Specialized applications and repair

Staff also assigns designations for subcommittees and task groups.

1.2.2 Comparison of subcommittee and task groups

Table 1.2.2 is a summary of the similarities and differences between subcommittees and task groups.

Table 1.2.2—Differences between subcommittees and task groups

Topic	Subcommittees	Task groups
Availability	All committees	All committees
Establishment	Committee chair	Committee chair
ACI webpages	Front page is accessible on the overall directory and is visible to the public	Front page is accessible only from main committee page and is not visible to the public
Voting membership	All members are voting members. Main committee membership not required	All members are voting members. Main committee membership required
Balloting rules	No ACI requirements	No ACI requirements

1.2.3 Subcommittees

For committees with a broad mission, long-standing subcommittees can help address different aspects of the committee's work. Most subcommittees assist the main committee by working on specific topics or chapters for a document.

The main committee chair establishes the subcommittee. The chair submits a title, mission, goals, and roster to ACI. The subcommittee consists of a chair and voting members. There are no other categories of membership for a subcommittee. Voting members on subcommittees do not have to be members of the main committee. Associate members of the main committee can be voting members on subcommittees.

Subcommittee ballots are not bound by main committee balloting rules. Unless otherwise directed by the chair, simple majority of those voting carries the issue. Although subcommittee members who are nonvoting members of the main committee may participate and vote on subcommittee ballots, they do not vote on main committee ballots. Refer to 3.2 on formal balloting.

The chair of the main committee approves the roster for all subcommittees and the policies and procedures proposed by subcommittees. There are three types of subcommittees: editorial; steering; and liaison.

1.2.3.1 Editorial subcommittee

An editorial subcommittee provides a uniform editorial review of each document. The subcommittee usually consists of an individual or a small group with editorial experience.

1.2.3.2 Steering subcommittee

In a large committee, a steering subcommittee may be established to assist the chair by providing input on committee actions and plans.

1.2.3.3 Liaison subcommittee

Liaison members represent another country or outside organizations with an established relationship with ACI and are appointed to facilitate exchange of information with ACI. Such organizations may include technical societies, trade associations, and standards-developing organizations. No more than one liaison member from an outside organization can be appointed on a given committee.

1.2.4 Task groups

Task groups are established by the main committee chair to perform short-term tasks for the committee. Members of task groups must be members of the main committee. The chair submits a title, mission, goals, and roster to staff. A website will be created for the task group. The task group consists of a chair and voting members. There are no other categories of membership for a task group. Members of task groups must be members of the main committee. The task group is not bound by balloting rules.

1.3—Committee establishment, reorganization, and discharge

1.3.1 Establishment

TAC considers and approves requests to establish new technical committees or Innovation Task Groups (ITGs) and appoints the committee chair and TAC contact. The title and mission of the new committee are published in *Concrete International (CI)*.

1.3.1.1 Request to establish a new technical committee

To request a new technical committee, send the following information to the TAC Secretary:

- (a) A proposed title and mission for the committee
- (b) An explanation of why a new ACI committee should be established
- (c) A list of potential members
- (d) A slate of candidates for the position of chair
- (e) A list of short-term goals of the committee
- (f) A discussion of potential overlap and conflict with other committees

Additionally, TAC may request a representative of the proposed committee to attend the TAC meeting when formation of the new committee is discussed.

1.3.1.2 Request to establish an Innovation Task Group (ITG)

Innovation Task Groups (ITGs) are temporary technical committees that are formed to accelerate the development of a specific document, usually on new technology. TAC forms ITGs and assigns their mission. An ITG may operate as a joint committee with other organizations. The rules for technical committees presented in this manual apply to ITGs.

To request establishment of an ITG, send the following information to the TAC Secretary:

- (a) Explanation on how the new technology innovation will fit into ACI's general mission
- (b) Advantages of the new technology over existing technology in that field
- (c) List of competing technologies, if any
- (d) List of technical papers, reports, and other publications that address the new technology
- (e) List of field demonstration projects, if any, using the new technology
- (f) A statement demonstrating the maturity of the new technology to warrant the development of an ITG document for the transfer of this technology
- (g) List any ACI technical committee(s) whose mission includes this technology
- (h) Title and mission for the ITG
- (i) A slate of members and at least one candidate for chair
- (j) A work plan and schedule
- (k) A target time to complete the mission of the ITG

1.3.2 Reorganization

Occasionally, it may be necessary for TAC to reorganize a committee or merge committees. The reasons for such steps may include:

- (a) The committee has completed its assigned mission and a smaller committee is needed to maintain committee documents
- (b) The mission or direction of the committee needs to be changed
- (c) Committee reorganization is needed to accomplish the assigned mission
- (d) A standards-only writing committee is beginning a new cycle

Upon reorganization, TAC may appoint a new chair and discharge all members or appoint a new chair who is responsible for reviewing current membership. The committee will inherit the documents from the merged committee and, once revised, the documents will receive new numerical designations. Any new publication of the document will need to be balloted by the inheriting committee.

1.3.2.1 Reorganization with discharge of members

If TAC appoints a new chair and discharges the committee membership, all committee members are notified of the reasons for the discharge and given an explanation of future plans. Former committee members can apply for reappointment.

1.3.2.2 Reorganization with retention of members

If the present membership is to be retained, subject to review, the chair must:

(a) Review the activity of voting committee members and change the classification to a nonvoting status or terminate committee membership of those who have not demonstrated adequate activity

(b) Review the overall committee composition and decide on committee membership changes to obtain balance of interests (if required) and to maintain a reasonable size to accomplish tasks

(c) Add new committee members who have expertise related to the committee's mission and who can provide vitality to the committee

The chair may request a statement from a committee member on their desire to continue to serve. If a response to the request is not received in a reasonable time (2 months is recommended), the chair may consider it to signify a lack of interest and decide to terminate that individual's committee membership.

A membership questionnaire (on the Chair/Officer Work Area of the committee webpage) may be used to ask committee members if they desire to continue as active members, change membership status, or resign.

1.3.3 Discharge

TAC may discharge a committee that has completed its mission, is inactive, or is ineffective. TAC discharges an ITG when the ITG document(s) is published.

1.4—Joint committees and committee cooperation with other organizations

1.4.1 Cooperation

ACI committees can informally cooperate with other organizations as long as committee operating procedures are not impacted. If, however, that cooperation includes formal activities, such as creating technical documents, organizing conferences, or symposium sessions, these activities must be approved by TAC.

Individuals who want to be involved in creating industry-specific technical information on material properties of concrete or design, construction, inspection, and repair of concrete structures, should join ACI committees. Individuals who want to be involved with test method or specifications for reinforced concrete-related materials should join ASTM International committees. This division of responsibilities between ACI and ASTM International was formalized in 1936.

1.4.1.1 Seminars or workshops with cosponsoring organizations

ACI technical committees can sponsor joint seminars or workshops with one or more cosponsoring organizations if the following criteria are met:

- (a) Objective is desirable and within the field of ACI endeavor
- (b) Interests of both societies will be served equally well
- (c) Joint participation will avoid duplication of effort
- (d) Joint participation will speed document development
- (e) Joint participation will bring wider acceptance of results
- (f) Joint participation offers greater prospect of funds for research and experimentation

(g) Prospective membership would be harmonious, even though there might be anticipated differences of opinion

(h) ACI will receive full recognition in any publicity given the joint seminar or workshop

Joint seminar or workshop requests are to be submitted to TAC using the session request procedure of ACI and the appropriate procedure for the cosponsoring organization.

An existing committee may request to sponsor a joint session or workshop with another organization when at least 2/3 of committee voting members vote in favor of the proposed arrangement. The chair must forward comments from negative voters to the TAC secretary for approval by TAC. This is considered an administrative ballot and negative votes do not need to be resolved. The following questions should be addressed in the request to TAC:

- (a) What is the proposed title and mission for the joint session or workshop?
- (b) Who will be the lead sponsoring organization?
- (c) How will the interests of both organizations be served?
- (d) How will the joint sponsorship bring a wider and quicker acceptance of results?
- (e) What are the session or workshop goals and the anticipated time frame for achieving these goals?
- (f) After achieving these goals, does the proposed committee anticipate development of an SP?
- (g) Where and when would the joint session or workshop be held?

1.4.2 Joint committees

ACI technical committees can become joint committees with one or more cosponsoring organizations. According to ACI policy on joint committees, joint committees may be formed when the following criteria are met:

- (a) Objective is desirable and within the field of ACI endeavor
- (b) Interests of both societies will be served
- (c) Joint participation will avoid duplication of effort
- (d) Joint participation will speed document development
- (e) Joint participation will bring wider acceptance of results
- (f) Joint participation offers greater prospect of funds for research and experimentation
- (g) Prospective membership would be harmonious, even though there might be anticipated differences of opinion
- (h) ACI will receive full recognition in any publicity given the joint committee

Joint committee status may be initiated by the ACI Board of Direction, the Board, or the ACI Executive Vice President on behalf of the Board, may determine that it is in ACI's strategic interest for a committee to begin cooperative efforts with another organization. In that case, TAC will work with the committee to determine the most appropriate means for cooperation.

Joint committee status requests can also be submitted to TAC. An existing committee may request to become a joint committee with another organization when at least 75% of committee voting members vote in favor of the proposed arrangement. The chair must forward comments from negative voters to TAC. This is considered an administrative ballot and negative votes do not need to be resolved.

The following questions should be addressed in the request to TAC:

- (a) What is the proposed title and mission for the joint committee?
- (b) Who will be the lead sponsoring organization?
- (c) How will the interests of both organizations be served?
- (d) How will the joint sponsorship speed and bring a wider acceptance of results?
- (e) What are the committee goals and the anticipated time frame for achieving these goals?
- (f) After achieving these goals, does the proposed committee anticipate a change in committee or sponsorship status?
- (g) Where and how often would the joint committee hold regular meetings?

There are two options under which a technical committee can operate as a joint committee:

- 1. ACI is the major sponsor and another sponsoring organization is the minor sponsor; or
- 2. ACI is the minor sponsor and another sponsoring organization is the major sponsor.

When ACI is the major sponsor, joint committees are to operate in accordance with the *ACI Technical Committee Manual*. The minor sponsor may provide technical input during the TAC document review and provide names of individuals for TAC to consider when creating a chair slate. The committee is designated as a joint committee in all communications.

When ACI is the minor sponsor of a joint committee, the balloting and operating procedures are determined by the major sponsor. All items approved by the joint committee are submitted to the TAC Secretary for review by TAC. ACI requires that the committee is designated as a joint committee in all communications.

When a joint sponsorship is approved by TAC and the Board, a formal memorandum of understanding (MOU), including a specific agreement on committee operations, must be developed with the other organization(s). The ACI Executive Vice President is responsible for the execution of MOUs.

1.5—Membership categories

ACI technical committees have four categories of members: voting members; associate members; consulting members; and liaison members. All four categories have access to the technical committee webpage. Only voting members can vote on ballots; however, associate, consulting, and liaison members are allowed to offer opinions on ballots. Information about the qualifications, requirements, privileges, term, and appointment for all membership categories is given in 1.5.1 through 1.5.4. All membership changes must be emailed to headquarters along with a reason for the change in membership.

1.5.1 Voting members

1.5.1.1 Qualifications

Voting members must be able to contribute to accomplish the committees' goals. They must have the training, knowledge, experience, time, and facilities to perform the work. Voting members do not have to be ACI members but it is strongly recommended.

1.5.1.2 Requirements

Voting members are required to participate actively in committee work by contributing technical information, promptly returning all committee ballots, replying to correspondence, and regularly attending committee meetings.

Committee business is conducted through email; therefore, voting members need to provide an email address.

Regular attendance at committee meetings is important because that is where members usually arrive at consensus on major issues, resolve negative votes on web ballots, solve problems, plan future activities, and accomplish much of their work.

Meeting schedule conflicts are difficult to avoid because of the number of ACI committees and the varied interests of the voting members. Before granting voting member status to an applicant, the chair should verify that the applicant will be able to attend meetings and participate actively in the committee work. If an applicant cannot attend these meetings, another membership category may be desirable. The chair may waive meeting attendance requirements under justified circumstances, provided the voting member contributes to the work of the committee.

1.5.1.3 Privileges

Voting members receive minutes, information on items being balloted, and correspondence; may express opinions and make motions during committee meetings; vote on all ballots; have the right to appeal committee action; and have access to the committee's webpage.

1.5.1.4 Term

Voting membership has no set term.

1.5.1.5 Appointment

The chair appoints voting members of technical committees based on the applicant's personal knowledge and expertise. Appointment as a voting member is not based on affiliation or employment. An applicant's affiliation or employment will be considered, however, in determining balance of interests.

ITG voting members are appointed by the ITG chair. Voting members are appointed at two stages: 1) at the formation of the ITG; and 2) after the first draft is completed but before the first ballot of the document. At formation, the voting membership shall include the chair and at least three other individuals. After the first draft, at least three additional voting members shall be appointed; however, membership should not exceed 10 voting members. These additional voting members should represent a wide range of interests outside the ITG and have no direct economic interest in the outcome of the document.

The information published in an ITG document will be included in a later ACI committee document; therefore, to facilitate communication and connection with related technical committees, the ITG chair is encouraged to appoint members from related technical committees as voting members on the ITG.

1.5.2 Associate members

1.5.2.1 Qualifications

Associate members must be ACI members or be a member of a cosponsoring organization in the case of a joint committee.

1.5.2.2 Requirements

Associate members have no formal committee responsibilities.

1.5.2.3 Privileges

Associate members receive minutes, information on items being balloted, and correspondence; may express opinions, but not vote, during committee meetings; may express opinions, but not vote, on all ballots; and have access to the committee's webpage.

1.5.2.4 Term

Associate membership has no set term; however, when individuals no longer maintain their ACI membership, their associate memberships on technical committees are also terminated.

1.5.2.5 Appointment

All ACI members (individual, organizational/sustaining representatives, student, young professional, honorary, and fellow) can be appointed as an associate member to a maximum of three technical committees. A person maintaining a membership in an organization that cosponsors ACI joint technical committees can be appointed to a maximum of three such joint committees. An associate membership request does not require chair approval.

A person applying for voting membership may be appointed as an associate member by the chair for a variety of reasons, including maintaining balance of interests within the committee or limiting voting membership changes during balloting of a committee document.

1.5.3 Consulting members

1.5.3.1 Qualifications

Consulting members do not need to be ACI members but should have the expertise within the mission of the committee.

1.5.3.2 Requirements

Consulting members have no formal committee responsibilities.

1.5.3.3 Privileges

Consulting members receive minutes, information on items being balloted, and correspondence; may express opinions, but not vote, during committee meetings; may express opinions, but not vote, on all ballots; and have access to the committee's webpage.

1.5.3.4 Term

Consulting membership has no set term.

1.5.3.5 Appointment

Consulting members of technical committees are appointed by the chair based on the applicant's special expertise or a long-time association with the committee or its mission.

After a document is drafted, the chair of an ITG may appoint up to three nonvoting consulting members in addition to the voting members. These consulting members act as outside reviewers and are asked to provide a detailed review of the document.

1.5.4 Liaison members

1.5.4.1 Qualifications

Liaison members are appointed, by chair of the main committee, based on their affiliation with the related organization. Liaison members need not be ACI members but should have the expertise within the mission of the committee. If the liaison member's affiliation with the

related organization is terminated, the liaison membership on the ACI technical committee is also terminated.

1.5.4.2 Requirements

Liaison members are expected to facilitate the exchange of information between the ACI technical committee and the related organization.

1.5.4.3 Privileges

Liaison members receive minutes and information on items being balloted, may express opinions and vote during subcommittee meetings, are expected to vote on all subcommittee ballots, and have access to the main and subcommittee webpages.

1.5.4.4 Term

Liaison members are appointed for a 3-year term and may be reappointed.

1.5.4.5 Appointment

Liaison members are appointed to ACI subcommittees as voting members and to the main committee as nonvoting liaison members. ITGs have one liaison member from CIC.

1.6—Committee membership

1.6.1 Application for membership

Each prospective committee member (either main committee or subcommittee), regardless of membership category, is to submit a committee application (found on the ACI website), which will be forwarded to the chair of the appropriate technical committee.

With the exception of the chair and associate members, ACI membership is not required for technical committee membership, but is desirable. All committee members are encouraged to join ACI.

1.6.2 Appointments and membership changes

Chairs should add new members on a regular basis and remove inactive members while maintaining balance of voting interests. Effective committees should have sufficient turnover so that new ideas are constantly considered. The chair shall decide on all membership changes, including appointments to all membership categories, (except associate membership), terminations, or changes of membership status, and notify the TAC Secretary. These actions will be checked by staff for TCM compliance. The effective appointment date is the date when the membership changes appear on the committee website. No changes in membership voting status can be acted on during an open ballot or during the week of an ACI convention. For example, a member cannot change from voting member to associate or associate to voting while a web ballot is open or during ACI conventions.

ACI staff sends the individual and chair a formal appointment, termination, or status change notice showing the effective date.

Committee members accepting committee appointments give ACI permission to post their contact information on the ACI website in a password-protected area, accessible by other ACI committee members.

1.6.3 Appointments to joint committees

When ACI is the major sponsor of a joint committee, appointment of members conforms to ACI guidelines. When ACI is the minor sponsor of a joint committee, appoint-

ment of members conforms to the other society's guidelines. Written agreements between ACI and other organizations may regulate membership of joint committees when a different arrangement is desired.

1.6.4 *Overlap of membership between committees*

The chair should review the missions of closely related committees and develop overlapping membership where desirable, as cross-representation aids coordination. Sometimes it is necessary to use capable voting members in multiple committee assignments. Voting membership on more than three technical committees, however, is discouraged.

1.6.5 *Appointment not approved*

The chair may decline an application for voting membership for various reasons, including lack of qualifications, inability to attend committee meetings, committee balance, timing of a critical ballot, or committee size.

1.6.6 *Membership termination*

The chair should review periodically each voting member's performance. Voting members should participate actively by attending meetings regularly, answering correspondence, and returning web ballots. Chairs should contact inactive voting members and encourage them to become more active, consider resigning, or become an associate or consulting member of the committee. Because of ACI's stringent voting requirements, voting members who do not return ballots may stop a committee from successfully balloting a document. Failure of a voting member to participate actively in committee activities may result in termination of membership.

When a voting member's inactivity is documented, the chair may decide to change the individual's membership status to associate or consulting or may terminate the membership. These actions become official when staff acts on the chair's decision. Before terminating membership of a voting member, the chair is encouraged to discuss the situation with the TAC contact.

1.6.7 *Resignation from membership*

Committee members resign by notifying the chair and the TAC Secretary of such intent. Staff sends an official notice confirming the resignation.

1.6.8 *Appeal of membership action*

Individuals may appeal a membership action to TAC, such as a membership termination or a membership application that has been declined. The person submits the appeal to the TAC Secretary. The committee's TAC contact reviews the appeal and recommends action to TAC. The person may request to attend the TAC meeting when the appeal is considered.

1.7—Balance of interests

All committees should have broad-based membership to ensure balanced coverage, including members who represent interests materially affected by the committee's documents. All materially affected interests should have the opportunity for fair and equitable participation. These members can be classified into several interest categories that represent segments of the industry. ACI is an international organization and committee documents should reflect practices that are broadly applicable (refer to Appendix A). Wide geographical

distribution of committee members guards against publication of documents that are restricted to local practices.

The chair shall classify every member of a standards-writing committee into one of several interest categories (as defined in 1.7.1.1 through 1.7.1.7).

Membership should ensure balanced coverage of the subject.

1.7.1 *Interest categories*

The interest categories appropriate to the development of consensus in any given standards activity are a function of the nature of the standards being developed. Interest categories are discretely defined, cover all materially affected parties, and differentiate each category from the other categories.

1.7.1.1 *Producer*

A Producer interest is an organization, including any repacker or relabeler, or both, who manufactures, fabricates, assembles, distributes, or reprocesses a finished product that is used or applied by a contractor that is covered in the committee's mission. A voting member affiliated with a producer interest shall be classified as a Producer.

1.7.1.2 *Designers (including Engineers/Specifiers/Architects)*

A Designer interest is any organization, such as an architectural firm, engineering firm, or architectural and engineering firm issuing contract documents, administering the work under contract documents, or both that is covered in the committee's mission. A voting member affiliated with a Designer interest should be classified as a Designer.

1.7.1.3 *Contractors (including Applicators/Installers)*

A Contractor interest is any organization with whom the owner enters into an agreement for construction of the work that is covered in the committee's mission. A voting member affiliated with a Contractor interest should be classified as a Contractor.

1.7.1.4 *Owners (End-consumers)*

An Owner interest is an organization, such as a corporation, association, partnership, individual, or public body or authority with whom the contractor enters into an agreement and for whom the work is performed as is covered in the committee's mission. A voting member affiliated with an Owner interest should be classified as an Owner.

1.7.1.5 *Academics/Educators*

An Academic interest is an organization, such as a college, academy, school, or other educational institution, that provides educational or training services. A voting member affiliated with an Academic interest should be classified as an Academic. For example, an instructor, educator, or student would be considered an Academic.

1.7.1.6 *Researchers*

A Researcher interest is an organization who conducts research and development or provides experimental testing services related to the committee's mission. A voting member affiliated with a Researcher interest should be classified as a Researcher.

1.7.1.7 *Consultants*

A Consultant interest is an organization, including individuals or entities in the fields of life safety, security, engineering, or in any particular building component, equipment,

or system that has acquired detailed, specialized knowledge and experience in the design, evaluation, operation, repair, or installation of what is covered in the committee's mission. A voting member affiliated with a Consultant interest and that is not otherwise classified should be classified as a Consultant, except that a consultant retained by a Producer interest that is covered in the committee's mission should be classified as Producer.

1.7.1.8 General interest

Any voting member who does not fit into any of the discretely defined categories above should be classified as General interest.

1.7.2 Safety- and non-safety-related standards and documents

Codes are safety-related standards. Specifications are non-safety-related standards. Guides, reports and other non-mandatory language documents are not considered standards. Existing ACI codes are listed in the following:

ACI CODE-216.1-14(19)
 ACI CODE-307-08
 ACI CODE-313-16
 ACI CODE-318-19(22)
 ACI CODE-318.2-19
 ACI CODE-332-20
 ACI CODE-349-13
 ACI CODE-350-20
 ACI CODE-350.3-20
 ACI CODE-355.2-22
 ACI CODE-355.4-19(21)
 ACI CODE-369.1-22
 ACI CODE-374.1-05(19)
 ACI CODE-376-11
 ACI CODE-437.2-13
 ACI CODE-440.11-22
 ACI CODE-550.3-13
 ACI CODE-550.4-18
 ACI CODE-550.5-18
 ACI CODE-550.6-19
 ACI CODE-550.7-19
 ACI CODE-562-21

1.7.3 Criteria for committee balance

Standards-writing committees must have a balance of voting member interests to support the development of competent and objective standards. The criteria for balance are that:

(a) no interest category constitutes more than 1/3 of the membership of a committee that writes safety-related standards or

(b) no interest category constitutes more than 1/2 of the membership of a committee that writes non-safety-related standards (that is, the committee writes specifications, but not codes). ACI committees that write only non-standardized documents (that is, guides and reports only) are encouraged to be in balance but are exempt from these criteria.

A member's interest category shall be related to the mission of the committee, and so a member's interest category can be different on different committees. Committees that develop ACI standards must always be in balance. The chair reviews and adjusts voting membership and assigns interest categories to establish and maintain balance of the

committee. Balance of interests is not required in subcommittees or task groups.

Members may appeal their interest category to the committee chair and ultimately to TAC. Committees seeking exceptions to the requirements of this section can request TAC consideration. Questions regarding committee balance will be resolved by TAC. TAC will consider many factors affecting balance. This will include, but not be limited to, the total number of producer members on the committee, the number of members from a particular interest category, and the number of members representing a specific product.

More than one voting member from the same organization is discouraged on any committee. Voting membership from a single organization constituting more than 10% of the committee requires TAC approval.

1.7.4 Membership termination to achieve balance

To achieve balance of voting member interest, the chair may change voting members to nonvoting categories or terminate voting membership. This is done only after the chair has shown that a substantial effort has been made to obtain balance by adding new voting members and assigning new and existing members to appropriate categories of interest.

When a change of employment produces a change in classification that results in an imbalance in voting interests, a voting membership can be terminated or changed to another membership category. Reappointment as a voting member can be considered when balance of voting member interest is achieved and if the person requests reappointment.

1.8—Committee officers

1.8.1 Chair

Each technical committee shall have a chair and a TAC contact. All other committee officer positions are established at the chair's discretion.

The chair is responsible for leading the committee to accomplish its mission and goals. The chair has many specific responsibilities, including:

- (a) Initiating voting and consulting membership actions, including appointment, membership recruitment, evaluation, changes of voting category, and discharge
- (b) Preparing and distributing meeting agenda and minutes in a timely manner (approximately 3 weeks before and after a meeting)
- (c) Maintaining communication with the TAC contact
- (d) Conducting committee meetings
- (e) Establishing task groups and subcommittees as needed
- (f) Scheduling committee meetings
- (g) Initiating committee web ballots
- (h) Submitting committee documents to TAC
- (i) Providing leadership training for possible successors
- (j) Attending the TAC Chair breakfast workshop at each convention
- (k) Maintaining committee's webpages

1.8.1.1 Chair qualifications

A chair of an ACI technical committee must be a member of ACI. Prior service as vice chair or secretary and voting membership on the committee augment the candidate's experience.

The success of any committee effort depends largely on the skills of the chair. Chairs of ACI technical committees must be able to perform the chair responsibilities outlined in 1.8.1 and possess the following strengths:

- (a) Demonstrated ability and knowledge in the field covered by the committee
- (b) Demonstrated leadership ability
- (c) Administrative ability and initiative
- (d) Available time and facilities to perform the work
- (e) Ability to attend all ACI conventions

1.8.1.2 Chair term

TAC usually appoints a chair for a 3-year term, which expires at the end of an ACI spring convention. A chair may be reappointed for one additional term. Unusual circumstances are required to justify reappointment of a chair beyond 6 years.

ITG chairs are appointed for the duration of the ITG.

An incoming chair is granted officer rights on the committee webpage 30 days before the term becomes effective. An outgoing chair will maintain officer rights on the committee webpage for 30 days after the term ends. The website roster will show incoming and outgoing chairs with temporary classifications, such as incoming and outgoing chair.

1.8.1.3 Chair candidates

Chairs are responsible for preparing numerous individuals to assume the committee leadership to ensure continuity. Each year, chairs are asked to identify at least three possible replacements, in order of preference, with specific ratings in various categories. ACI staff will notify all committee members of the impending conclusion of their chair's term one convention before the chair term ends. Voting committee members interested in the position may submit their name to the outgoing chair to be included on the list of candidates for TAC consideration.

1.8.1.4 Chair appointment

Appointment and reappointment of technical committee chairs are among TAC's most important responsibilities. TAC considers the advice of chairs when appointing their successors, but chair appointments are TAC's responsibility. TAC may interview the proposed candidates during the selection process.

TAC considers the chair qualifications of the candidates and other factors when selecting chairs, including:

- (a) Rotating the chairs among all qualified committee members to keep committee output vigorous
- (b) Ensuring that an individual does not chair more than one ACI technical committee at a time
- (c) Ensuring participation of all segments of the concrete industry in committee activities

1.8.1.5 Chair resignation

A committee chair resigns by notifying the TAC Secretary and is asked to supply three replacement chair candidates.

1.8.2 Vice chair

A vice chair can assist the chair in administering the committee and is appointed at the chair's discretion. Appointment does not imply that the vice chair will become the next chair.

1.8.3 Secretary

A secretary is encouraged to support the chair by recording, preparing, and distributing meeting minutes; assisting with the balloting process; and handling correspondence. The secretary is appointed at the chair's discretion.

CHAPTER 2—TECHNICAL COMMITTEE OPERATIONS

2.1—Mission and title

The main purpose of ACI technical committees is to disseminate information through publications and convention sessions within the scope of the committee mission. TAC gives the chair considerable authority to accomplish the committee mission. In most cases, missions are broad so as not to limit the document type a committee produces. Mission statements are usually in the form of: "Develop and report information on <topic>." A change to the mission or title must be approved by committee ballot before submitting to TAC. This is considered an administrative ballot. Technical committee missions may be viewed in two categories: 1) general technical knowledge, such as fracture mechanics or durability; and 2) industry-specific knowledge, such as parking structures.

Committee missions and titles are approved by TAC and posted on the committee webpage. A committee request to change the mission will be considered by TAC.

2.2—Goals

Each committee periodically reviews and prepares specific goals that support the committee mission. Appointed chairs will be asked to submit the goals to be completed during their term. The chair submits information on the progress of the committee goals using the Modify Committee Home link on the webpage. Any or all of the goals in 2.2.1 to 2.2.5 may be included.

2.2.1 Develop new documents

A committee may prepare an ACI document within the mission of the committee. TAC approval is required before developing a new ACI document.

2.2.2 Maintain existing documents

Technical committees are required to periodically reapprove, update, revise, or withdraw their documents. TAC approval is not required before updating a published document; however, the committee should inform TAC of the intent not to revise an ACI document. If the committee does not revise, reapprove, or withdraw a document within the 8-year period, TAC may reapprove or withdraw it without committee recommendation.

2.2.3 Sponsor convention sessions and related publications

A committee may sponsor sessions at ACI conventions within the committee mission and may develop a related publication such as an ACI Symposium Publication (SP). TAC approvals are required for the development of sessions and special publications.

2.2.4 Develop seminars

ACI's Educational Activities Committee (EAC) reviews, approves, and manages all ACI seminars. In cooperation

with educational committees, a committee may develop ACI seminars or workshops within the committee mission. This includes suggesting qualified seminar topics, speakers, pertinent topics, or appropriate presentation materials.

2.2.5 Develop video information

A committee may develop video information. TAC approvals are required for the development of video products.

2.3—Meetings

All technical committee meetings (except closed or virtual interim meetings) are open to visitors. The chair is encouraged to give a brief introduction of the committee work and periodically summarize progress during the meeting.

2.3.1 Conducting committee meetings

Committee chairs are to exercise control to ensure orderly discussion at meetings. This is particularly important in large committees. Use parliamentary procedures, known as *Robert's Rules of Order*. *Robert's Rules of Order* for passing a motion is superseded by ACI rules if the motion is related to technical committee documents. If the chair cannot attend the meeting, he or she should designate an individual to chair the meeting so that committee work can continue uninterrupted.

2.3.2 Quorum

For issues involving technical documents, a quorum of 40% of all voting members must be present at the meeting to conduct business. ACI uses conventional rounding (for example, decimals greater than or equal to 0.5, round up). ACI Committee 318, and other standards-writing committees that have requested and received TAC exception to the 40% rule, must comply with the requirements in 3.3.2.

2.3.3 Administrative actions

For passage of administrative actions at committee meetings, affirmative votes are required from at least 50% of the voting members present at the meeting. Administrative actions include motions regarding sessions, SPs, goals, mission changes, meeting times, and approval of minutes.

2.3.4 Convention committee meetings

ACI committees are expected to meet at every ACI convention. Committee chairs are responsible for scheduling and calling committee meetings. ACI staff will reach out of all committee chairs before each convention to confirm the committee meeting day and time. If a change is requested, staff will do their best to try and accommodate the request and chairs will be notified of their committee meeting confirmation once scheduled.

Committee members and ACI staff must be notified at least 21 days in advance if a scheduled meeting is to be canceled.

Only members that are physically present at the meeting can vote. A member cannot call or videoconference into the meeting to cast a vote.

2.3.5 Interim committee meetings

Interim meetings can occur provided the requirements for physical or virtual meetings are met; however, such meetings are not to replace a convention meeting.

The agenda and minutes for the interim meeting must be posted on the committee website in accordance with 2.3.8 and 2.3.9.

2.3.5.1 Physical interim meetings

Chairs must submit a request to hold a physical interim meeting at least 3 months in advance. If approved, a notice of the meeting place and time will be published in *Concrete International (CI)*.

2.3.5.2 Virtual interim meetings

Chairs can hold a virtual interim meeting through their committee webpage on the ACI website or through other means provided the notification requirements are met. The virtual meeting must be set up at least 2 weeks in advance. No public notice is required because virtual meetings cannot accommodate visitors. The virtual meeting interface will generate an email regarding the virtual meeting, which will be sent to committee members.

2.3.6 Closed meetings

A closed committee meeting is permitted if the chair states that the matter under consideration is administrative rather than technical. For example, a meeting to discuss a slate of potential chairs is closed. Discussion of technical matters in a closed meeting is not allowed. For a closed meeting, the chair makes the usual arrangements through staff for the meeting room but is solely responsible for notifying members of the meeting. Closed meetings are not listed in the convention booklet. A closed meeting may only be attended by committee members and ACI staff.

2.3.7 Visitors

Visitors are welcome at committee meetings because committee work is of interest to the public, but their presence should not interfere with committee work. The chair should keep the presence of visitors in mind by periodically summarizing meeting progress.

2.3.8 Agenda

The chair should prepare the agenda in advance of the meeting and post it to the committee's website. The chair should send a notification to the committee members and the committee's TAC contact when the agenda has been posted and bring printed copies to the meeting for committee members and visitors.

2.3.9 Minutes

Record important deliberations, resolution of negative votes, and decisions reached during committee meetings in the meeting minutes. Minutes provide a continuous record of committee work and help prevent repeated discussion of the same subject. Post minutes to the committee's webpage approximately 3 weeks following the meeting. Approve the minutes by web ballot or at the next committee meeting. Post minutes to the committee webpage.

In addition to recording motions and voting results, the minutes should include the names of committee members and visitors in attendance and voting members not present.

2.4—Communication

Effective communication is vital to committee activity and progress. To ensure timely completion of committee work, concise correspondence with prompt attention and reply by members is necessary.

Committee chairs and secretaries are encouraged to use the committee webpage to speed committee communication.

2.4.1 Correspondence within a committee

Make available to the entire committee correspondence related to committee activities. This allows the members to be up-to-date before meetings so that committee discussions are more effective.

Make correspondence available to the main committee officers so that they are aware of the work and better able to coordinate the committee effort.

2.4.2 Correspondence between committees

Correspondence between committees usually occurs between the chairs, with copies sent to the TAC Secretary. If committee members correspond on committee activities, send copies to the chairs of the respective committees.

2.4.3 Correspondence with TAC and ACI headquarters

The committee files at ACI World Headquarters are the official files. The chair can either post all important correspondence, agenda and minutes, complete records of ballots, and resolution of negative votes to the committee's website as appropriate, or distribute copies to all committee members, the TAC Chair, TAC Contact, and the TAC Secretary. Anything sent to staff for processing, such as a document submittal, must be accompanied by instructions. Refer to the ACI website's Document Development page, which can be found under the Committees tab. Any material received at ACI headquarters without instructions is regarded as an information copy and, after the contents are noted, is placed in the committee file.

Post-draft documents to the website or distributed to all committee members, TAC Chair, TAC Contact, and TAC Secretary. Add the following disclaimer to the bottom of each page of a draft document: "This draft is not final and is subject to revision. Do not circulate or publish."

The ACI President and staff, other than the TAC Secretary, do not need copies of correspondence unless it relates to Institute matters outside of technical committee work.

If a committee is joint with another organization, additional distribution of correspondence may be required.

2.4.4 Discussion in outside publications

If an outside publication publishes articles or comments on a technical committee's area of expertise, a committee can respond by a letter to the editor or other appropriate means. The committee may reiterate published ACI information but must not present new technical information without TAC approval. TAC must approve all letters written by committees to outside entities. Individual committee members may express their opinion as appropriate but must indicate they do not represent ACI.

2.4.5 Coordination among committees

The missions of several committees may be closely related and the work of one committee may affect or overlap with another. To avoid publishing conflicting information in ACI documents, chairs must be aware of their committee's work in relation to other technical committees and reference other ACI documents when applicable. If a chair is unaware of another committee's work, a visit to that committee's webpage is helpful. The TAC contact or staff can assist the chair in identifying related committee work.

2.4.6 Committee reporting and webpage management

Each chair is expected to review and regularly update their committee webpage with respect to committee mission statements, documents, and member balance. Changes and updates to the website content can be executed by clicking on the Modify Committee Home on the committee page, or contacting the committee's TAC Contact.

2.4.7 Questionnaires

Chairs may find it useful to gather information by using questionnaires. Carefully design questionnaires to elicit meaningful responses. Send a copy, along with a summary of the results or other appropriate information, to the TAC Secretary. The summary should be made available to the committee and all respondents.

A membership questionnaire may be used to ask committee members if they desire to continue as active members, change membership status, or resign.

2.5—Breakfast meeting for technical committee chairs

At each ACI convention, TAC holds a breakfast meeting for technical committee chairs. These meetings are designed to allow the committee chairs to meet and interact with their TAC contacts, find out what is expected of them as chairs, hear about new developments, and ask questions.

The technical committee chairs are expected to attend these meetings. If the chair is unable to attend a meeting, the chair is to name an alternate so the committee can be represented at each meeting. Only one person should represent the committee. At the spring meeting, the incoming chairs are also invited to attend.

2.6—Technical committee certificates

ACI recognizes technical committee members with the following types of certificates for technical committee participation and outstanding service by committee members.

2.6.1 Chair certificates

On behalf of TAC, ACI sends a certificate of appreciation to outgoing technical committee chairs. The certificate recognizes the contributions of the person for chairing a specific committee and the years of service.

2.6.2 Outstanding service by committee members

The committee chair may recognize a committee member who has performed outstanding service, such as:

- (a) Extraordinary effort in the production or revision of a committee document
- (b) Leadership and administrative skills in organizing and conducting a successful technical session

The chair shall obtain TAC contact approval before recommending this recognition to ACI. ACI issues the certificate with the committee chair and the TAC contact as signatories.

2.6.3 Delmar L. Bloem Distinguished Service Award

The Institute established a Distinguished Service Award in 1969 to recognize noteworthy work on ACI technical committees. The name of the award was changed to the Delmar L. Bloem Distinguished Service Award in 1972 in honor of the late Delmar Bloem who had demonstrated,

over a period of many years, the characteristics and dedication required for the award. The award is given to a current (or recent) chair of a technical committee, or under special circumstances, to deserving individuals other than committee chairs, in recognition of outstanding performance.

One award may be given each year; however, there may be none or more than one recipient in any particular year.

Any ACI member can nominate another member. Nominators will submit to ACI Headquarters an email or letter emphasizing the chair or committee member's outstanding performance on a particular committee.

Nominations submitted by January 31 will be considered by TAC at the summer meeting. TAC approves the candidates at their summer meeting, and submits names and citations to the Board for approval in the fall. The awards are granted the following spring and the recipients are listed on the ACI website and in *CI*.

2.7—Staff assistance

Although the ACI engineering staff is not large enough to provide a permanent liaison for each committee, staff can assist a chair with technical, editorial, or administrative tasks.

2.8—ACI Foundation research funding – submissions and endorsements

2.8.1 ACI Foundation funding

The ACI Foundation is a subsidiary of the American Concrete Institute that receives, administers, and expends funds for educational, research, and scientific purposes. The ACI Foundation's Concrete Innovation Council (CIC) identifies new technologies and innovations which provide needed solutions for the concrete industry. The CIC will also help implement the use of such new technology when appropriate. CIC support may be through providing awareness, networking, road mapping or financial support. The CIC may also identify and support technologies for ITGs that may lead to new ACI committees.

2.8.2 Concrete Research Council (CRC)

The ACI Foundation's Concrete Research Council (CRC) seeks to advance the concrete industry through the funding of concrete research projects that further the knowledge and sustainability of concrete materials, construction, and structures in coordination with ACI Technical Committees where possible. Visit the ACI Foundations webpage to find out how CRC can assist committees with items such as:

- (a) Endorse a research project
- (b) Provide partial or full funding
- (c) Locate a research team
- (d) Secure funding outside of CRC

2.8.3 Concrete Innovation Council (CIC)

The CIC coordinates with TAC on the development of new technical documents, the formation of a technical committee, or the formation of an ITG. Should the development of such an ACI document require funding, the ACI Foundation will manage the funding.

CHAPTER 3—BALLOTING

3.1—Voting methods and rules

Web ballots and meeting ballots are the two methods of voting available to committees.

ACI's consensus process consists of three rules applicable to letter and meeting ballots: the 1/2 rule, the 40% rule, and the 2/3 rule (refer to Table 3.1).

Table 3.1—Three rules applicable to letter and meeting ballots

Rule	Description	Use
The 1/2 rule	At least half of all eligible voting members* must cast an affirmative vote	Web ballots for technical committees and ITGs
The 40% rule	At least 40% of all eligible voting members* must cast an affirmative vote	Meeting ballots for technical committees and ITGs†
The 2/3 rule	The number of affirmative votes must be at least twice the number of negative votes	Letter and meeting ballots for technical committees and ITGs
*Eligible voting members are all voting members on the committee roster, not only the number of members who voted.		
†Exceptions to the 40% rule are given in 3.3.2.		

Balloting examples, including web ballots, meeting ballots, and consideration of negative votes, are found on ACI's website.

Proxy voting is not allowed.

3.1.1 Administrative ballots

Administrative ballots are ballots that do not require a resolution of negative votes and may be either letter or meeting ballots. Administrative ballots are 14-day ballots. Examples of administrative ballots include:

- (a) Changing a title or mission statement
- (b) Selecting day and time of next meeting
- (c) Requesting joint committee status
- (d) Cosponsoring documents with other ACI technical committees
- (e) Sponsoring a session or special publication (SP)
- (f) Approval of committee meeting minutes
- (g) Transfer of documents from committee to committee (both committees need ballot)

3.2—Web ballots

A web ballot is an official written action to determine if an item has the consensus of a technical committee or ITG. Web ballots can be used to vote on preparing new documents, revising or withdrawing existing documents, reapproving documents, responding to TAC and public discussion comments, and administering administrative ballots.

A web ballot consists of one or several items. Each item passes or fails separately, and may include as much content as desired: an entire document, a chapter, a section, several sections, a paragraph, or other information.

Members have the following voting options for each item on the web ballot: affirmative, affirmative with comments, negative, or abstain. Members are expected to return a vote on each item.

Analyzing Letter Ballot Results (3.2.1) and Passing of Ballot Item

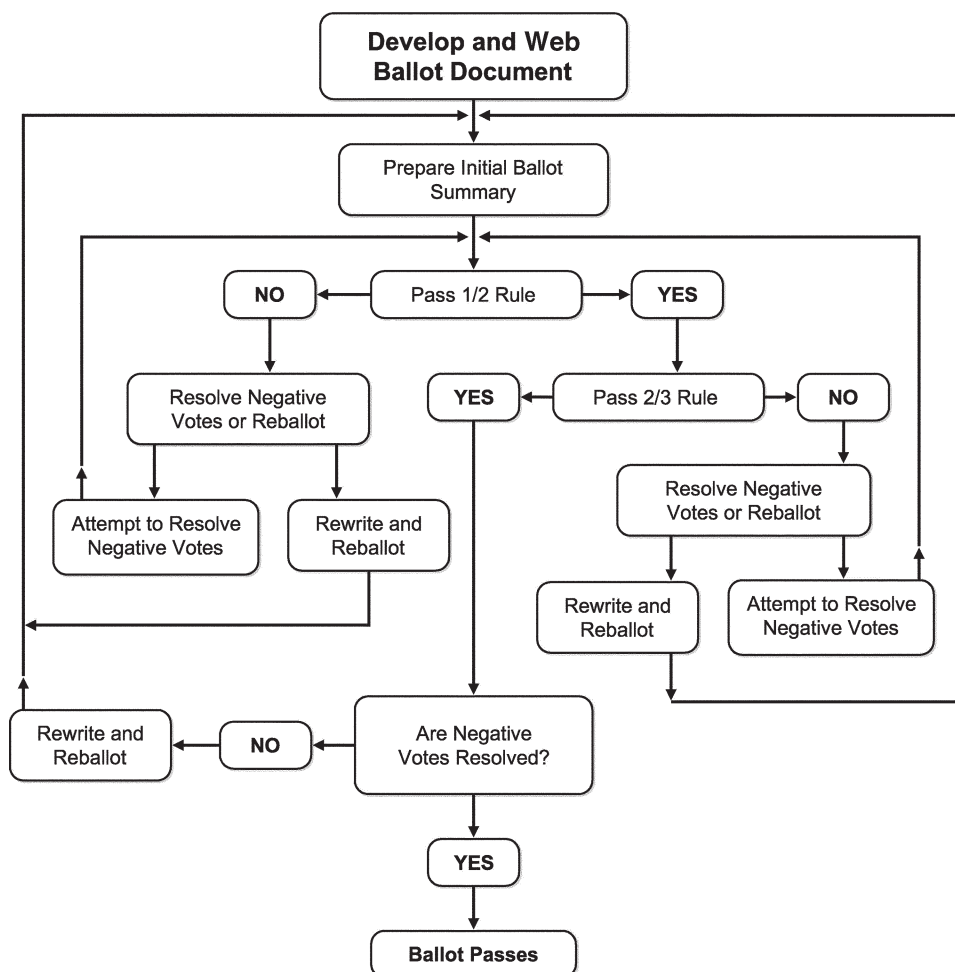


Fig. 3.2.1—Analyzing web ballot results and passing of ballot items.

If a member votes negative on an item and has editorial comments that are not part of the negative, they must be clearly marked as editorial. If the comments are not clearly marked, the chair must communicate with the negative voter to clarify which comments are editorial.

TAC strongly encourages the use of the balloting feature on the committee website for all web ballots.

3.2.1 Passage of web ballot items

Items on a web ballot pass if both the 1/2 rule and 2/3 rule are satisfied.

The 1/2 rule is satisfied if at least half of all eligible voting members on the committee roster cast an affirmative vote.

The 2/3 rule is satisfied if the number of affirmative votes is at least twice the number of negative votes.

A web ballot item supersedes all previous ballots on that same item.

A summary of the process to analyze web ballot results is shown in Fig. 3.2.1.

The final web ballot is defined as the last web ballot that contained an item that completed the document, allowing the committee to submit it for TAC review. A web ballot item to find negative votes from previous ballots nonpersuasive

is not considered a final web ballot. Balloting information and tools are found on the ACI website under Committees, Document Development Guidance.

3.2.2 Initiation and format

A committee chair can initiate a web ballot at any time, or a voting member can call for a web ballot by making a motion at a committee meeting. To pass such a motion, a majority of voting members present at the meeting must vote affirmatively.

The chair formats the web ballot items as deemed suitable. It is suggested to distribute the ballot items in portable document format (pdf) (not as word processing files) with page and line numbers. Committee members can then reference the page and line numbers when making comments using the document ballot form. The chair should upload the document ballot form, available on the ACI website, with the ballot.

3.2.3 Time frame

All web ballots must specify a closing date, which should be no less than 30 days from the date of initiation.

To specify a balloting period shorter than 30 days, the chair must obtain approval from the committee's TAC Contact and notify the TAC Secretary of the approval. In such a case, the chair must ensure that all voting members received the

web ballot and have had the opportunity to vote. An acceptable method is for the chair to contact any voting member who has not responded a few days before the ballot closes.

There are no restrictions on the maximum number of days that may be specified for a balloting period. For example, the chair may extend the closing date if an insufficient number of ballots are received by the closing date. All voting members must be notified in the case of an extension and given the opportunity to vote or change their existing vote. All votes received, including negative votes received during the extended voting period, shall be included in the ballot analysis. Votes received after the closing date are not counted and do not have to be resolved. Balloting ends at 11:59 pm Eastern Standard Time.

3.2.4 Votes

Voting members, including the chair, are required to vote on every item on all web ballots. For web ballots, submit a vote using the web ballot form or as required by the chair.

3.2.4.1 Affirmative votes

Affirmative votes require no further committee action.

3.2.4.2 Affirmative votes with comments

An ACI web ballot must allow for members to submit affirmative votes with comments. An affirmative vote with comment is considered as an affirmative vote when determining if an item in a web ballot passes. If the committee chair deems a comment is editorial and appropriate, the chair has the authority to implement the change if there are no objections by voting members; no further action by the committee is required.

If the chair or voting member believes that the comment is not editorial, or if there is doubt, the committee chair must ballot the comment.

The chair may also decide to relegate the changes suggested by the voter to new business to be addressed in a later revision of the document.

3.2.4.3 Negative votes with reason

An ACI web ballot must allow for members to submit negative votes. If a committee member casts a negative vote on an item in a web ballot, a reason for the negative vote must be included. The voter should provide alternative wording or a solution that would satisfy the voter's concerns. All negative votes cast on an item in a web ballot are considered by the committee using the resolution procedures described in 3.4.

If the negative voter does not provide a reason for the negative vote, the vote is recorded as a negative without comment. A negative without comment is considered an abstention when determining if a ballot item passes, does not need to be resolved by the procedures given in 3.4, and requires no further committee action.

3.2.4.4 Abstentions

Abstentions impact web ballots because only affirmative and negative votes are counted when applying the 1/2 rule to determine if a ballot passes. Voting members usually abstain if they do not have enough relevant expertise to cast an educated vote, or if they have a conflict of interest with the item being balloted. In addition, only affirmative and negative votes are counted when applying the 2/3 rule to determine if a ballot passes.

3.2.4.5 Ballots not returned

If a member does not return a vote on a web ballot, their ballot is recorded as not returned. An unreturned ballot is considered an abstention when determining if an item in a ballot passes, and can therefore impact the result in the same manner as an abstention. If an insufficient number of ballots are returned by voting members, items in the ballot will not receive enough affirmative votes to meet the 1/2 rule.

3.2.4.6 Comments from nonvoting members on committee

Associate, consulting, and liaison members may submit comments on web ballot items. The comments are not counted in the final ballot tally, do not affect the outcome of a ballot item, and do not have to be resolved. However, these comments must be distributed to the committee for review.

3.2.4.7 Comments from TPCS

Standards-writing committees identified by TPCS receive input on productivity and constructability issues throughout the balloting process of a standard before TAC review. When notified by the TPCS Chair that a standard has been selected for review, the Technical Committee Chair designates one or more committee representative(s) to interface with TPCS, and the TPCS Chair designates one or more TPCS Contact(s) to interface with the technical committee. The technical committee representative identifies ballots or published text in the document for TPCS review and conveys this information to the TPCS Contact. The TPCS Contact will be appointed as a consulting member of the technical committee and will also review each document ballot to identify items in need of TPCS review. The TPCS Contact may also identify issues in published committee standards in need of TPCS review that are not being balloted.

The TPCS Chair will assign a review group to evaluate each identified ballot item or issue in a published committee standard. The review group will consist of TPCS members and may also contain outside reviewers with specific expertise. Comments by the review group should focus on addressing constructability and productivity issues and will be reviewed by TPCS to develop a consensus list of comments. These comments will be returned to the technical committee chair by the TPCS Chair.

Comments on ongoing ballots will be submitted to the technical committee through the web ballot process. Therefore, it is important that the committee representative notify the TPCS Contact of any known balloting dates as early as possible. Comments on existing text will be conveyed directly to the committee representative.

Comments from TPCS do not affect the outcome of a ballot item and do not have to be resolved. However, these comments must be distributed to the committee for review. A response to each comment must be produced, and the technical committee must vote to approve the responses. Approved responses are returned to staff and the TPCS Chair and will be available to TAC during the document review.

3.2.5 Analysis and further action

Once the web ballot is closed, the chair reviews all votes received on individual items of the ballot and determines if each item satisfies the 1/2 and 2/3 rules. At this point, the chair shall notify the committee of the web ballot

results, including all editorial comments and negative votes received. Web ballot items that do not pass can be revised and submitted for another web ballot or withdrawn from further consideration.

If a ballot item passes but some members cast negative votes, further action by the committee is required. All negative votes cast on a passing ballot item must be resolved by the committee using the procedures described in 3.4. If a negative cannot be resolved on an item that pertains to a revision of a document, the ballot item can be withdrawn and no change is made to the document that relates to the ballot item.

3.2.5.1 Updating results

A negative vote withdrawn by a negative voter changes the vote tally and thus, the ballot meets the 1/2 and 2/3 rules. A withdrawn negative is reclassified as affirmative or abstention based on 3.4.1.

3.2.5.2 Revising and reballoting

Even if an item passes, the chair may decide that too many negative votes have been received and it is not practicable to attempt resolving them, or that the ballot has identified major deficiencies in the document. In either case, the chair informs the committee members that the ballot items will need to be revised and reballoted. Each ballot on an item supersedes the previous ballot on the same item, so the negative votes from the previous ballot do not have to be resolved.

3.2.6 Subcommittee web ballots

Committees with subcommittees shall establish procedures for subcommittee web ballots. The purpose of subcommittee ballots is to obtain the consensus opinion of that group, which is passed on to the main committee. The chair may require subcommittees to follow all of ACI's consensus procedures; however, because an item approved by the subcommittee must still be balloted by the main committee to be accepted, there is no ACI requirement that negatives on subcommittee ballots be resolved. Reasons for unresolved negative votes on subcommittee ballots need to be forwarded to the main committee.

3.2.7 Patented items

During balloting of the document, the committee must be informed if the document refers to the use of patented technology. If a member believes that a committee document under ballot would require a user of the resulting ACI document to violate the intellectual property rights, such as patents or copyrights, that member is expected to alert the committee. If the committee includes information on patented items within a document, include the disclaimer in 14.2.7.

3.3—Meeting ballots

A meeting ballot is a vote taken at either a convention or interim meeting in response to a motion made by a voting member. Meeting ballots can be used to vote on whether an existing document should be revised or withdrawn, resolve negatives on a meeting ballot, respond to TAC review comments of an approved document, respond to public discussion comments, and administer administrative ballots. Meeting ballots cannot be used to ballot a new document or

new revisions to a document. No new material is voted on at meetings.

A meeting ballot consists of a single item. This one item is in the form of a motion by a voting member. The motion may address the resolution of a negative vote in accordance with 3.4, responses to a TAC or public discussion comment, or other items. This one item passes or fails. Meeting ballots allow for flexibility in separating information that caused the ballot to fail, in reorganizing information included in the ballot item, and in immediately reballoting information that has consensus.

If using a meeting ballot to resolve negative votes received on a ballot on a document, a motion can include more than one negative. For such cases, the negatives must deal with the same topic so that they can be resolved by the same response.

3.3.1 Passage of item by meeting ballot

The 40% and 2/3 rules must be satisfied for an item to pass by meeting ballot. The 40% rule is satisfied if at least 40% of all eligible voting members on the committee roster cast an affirmative vote. The 2/3 rule is satisfied if the number of affirmative votes is at least twice the number of negative votes. The committee must consider negative votes on the meeting ballot by using procedures in 3.4.

Meeting ballot results, including number of voting members present at the time of ballot, must be reported in the meeting minutes.

TAC recommends that the chair abstain on meeting ballots, unless the chair's vote influences the outcome of the item being balloted. For example, the chair's vote may be needed to meet the 40% rule.

3.3.2 Exception to the 40% rule

ACI Committee 318 and other committees that write standards can use the 1/2 rule instead of the 40% rule for the number of affirmative votes required to pass an item in a meeting ballot. The exception only applies to standards. The exception must be balloted and passed by the committee and then the committee must request and secure TAC approval before implementing the 1/2 rule.

3.4—Consideration of negative votes

Some negative votes received on letter or meeting ballot items that have passed require further action by the committee. Negative votes on administrative ballots, such as selecting the day and time of the next meeting, do not require resolution.

Resolution not required

The following negative votes do not have to be resolved and no further action is required by the committee:

- (a) Negative votes without comment received on a web ballot
- (b) Negative votes that have been withdrawn
- (c) Negative votes on finding the reason for a previous negative vote unrelated to the balloted item; however, the committee must ballot the comment as unrelated
- (d) Negative votes on finding the reason for a previous negative nonpersuasive

Resolution required

The following negative votes need to be resolved by the committee:

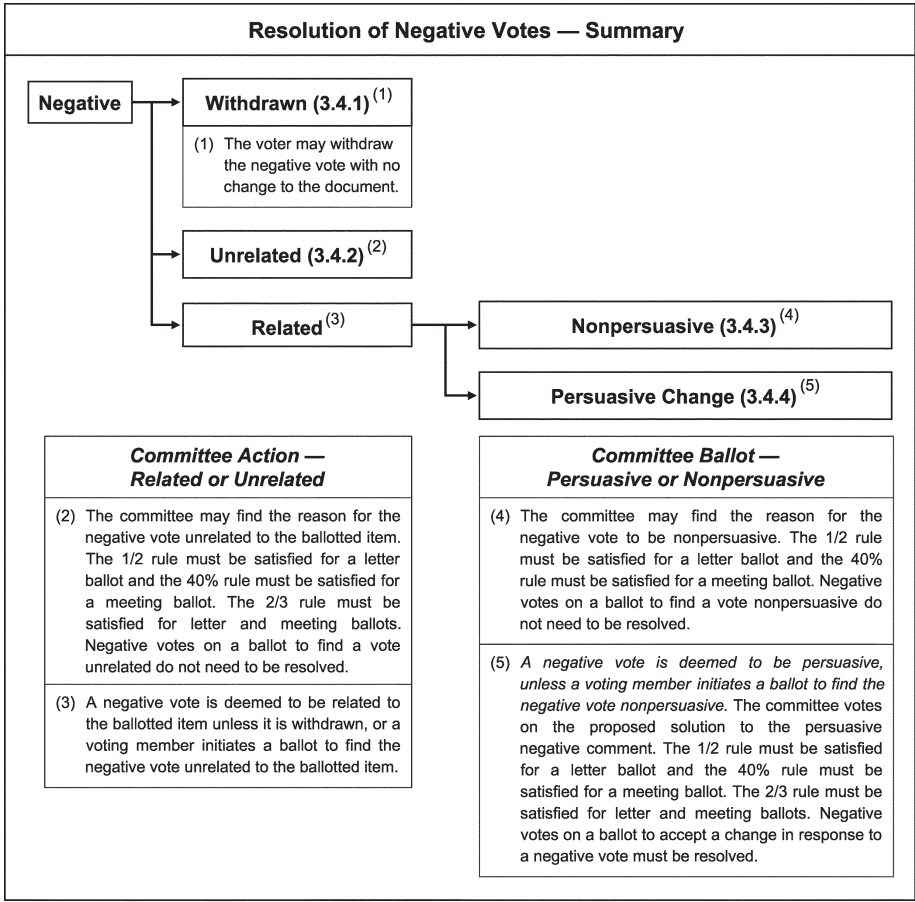


Fig. 3.4—Resolution of negative votes—summary.

(a) Negative votes on web ballots to approve new or revised wording in a document

(b) Negative votes on a letter or meeting ballot to approve revising a committee document to satisfy a persuasive negative vote or a resulting change to the document in response to TAC comments or public discussion

Methods of resolution

A negative vote is resolved through letter or meeting ballot in one of three ways:

(1) The committee may ballot to find that the reason for the negative vote is unrelated to the balloted item.

(2) The committee may ballot to find that the reason for the negative vote is nonpersuasive; giving reason for finding negative nonpersuasive.

(3) The committee may ballot to find that the reason for the negative vote is persuasive and approves a revision to the balloted item.

The balloted resolution of negative votes must be recorded in the meeting minutes. Figure 3.4 provides a summary of the process for resolving negative votes.

3.4.1 Withdrawal of negative vote (no change to document)

A voter may withdraw a negative vote during a committee meeting or in writing between meetings. Withdrawal of a negative vote must be recorded in the meeting minutes.

The voter may be willing to withdraw the negative vote based on either an editorial change or no change. If a voter withdraws a negative vote, the chair records the vote in the

final vote tally as affirmative or as an abstention in accordance with the voter’s wishes.

The voter’s decision to withdraw a negative vote may be on the condition that the committee considers the item as new business. This agreement must be recorded in the committee minutes and the item is listed on the agenda for future meetings until action is taken.

3.4.2 Unrelated to ballot item (no change to document)

The chair, through an item on a web ballot or a voting member at a meeting, may make a motion that the stated reason for the negative vote is unrelated to the balloted item.

By web ballot

The chair issues a web ballot with an item to find the reason given for a negative vote unrelated and provides supportive information. The ballot item must satisfy both the 1/2 and 2/3 rules to pass. Negative votes on this ballot item do not need to be resolved.

By meeting ballot

During a meeting, a voting member makes a motion that the reason given for a negative vote is unrelated and provides a statement to support the motion. The committee discusses the motion and then votes. The ballot must satisfy both the 40% and 2/3 rules to pass. Negative votes on this ballot do not need to be resolved.

If a web ballot item or meeting ballot to find a negative vote unrelated fails, the negative vote must be resolved under 3.4.3 or 3.4.4.

If the ballot to find a negative vote unrelated is successful, the ballot results and the committee's reasons are reported in the meeting minutes. The vote is recorded in the minutes as an abstention. The comment may be considered new business by the committee.

3.4.3 Nonpersuasive (no change to document)

The chair may issue a web ballot or a voting member at a meeting may make a motion that the stated reason for the negative vote is nonpersuasive.

By web ballot

The chair issues a web ballot with an item to find the reason given for a negative vote nonpersuasive and provides a statement to support the action. The ballot item must satisfy both the 1/2 and 2/3 rules to pass. Negative votes on this ballot item do not need to be resolved.

By meeting ballot

During a meeting, a voting member makes a motion that the reason given for a negative vote is nonpersuasive, and provides a statement to support the motion. The committee discusses the motion and then votes. The ballot must satisfy both the 40% and 2/3 rules to pass. Negative votes on this ballot do not need to be resolved.

If the ballot to find a negative vote nonpersuasive fails, the negative vote must be resolved under 3.4.4, or the committee must withdraw the item from further consideration and ballot a revised item. Ballot results are reported in the meeting minutes.

If the ballot to find a negative vote nonpersuasive is successful, the ballot results and the committee's reasons are reported in the meeting minutes. The original negative vote is recorded in the minutes as a nonpersuasive negative.

3.4.4 Persuasive (technical change to document)

Unless the negative vote is withdrawn, is found to be unrelated, or is found to be nonpersuasive, the negative vote must be considered persuasive. The committee must vote to approve a technical change to the document in response to the negative vote.

By web ballot

The chair issues a web ballot with an item to accept the proposed change. The ballot item must satisfy both the 1/2 and 2/3 rules to pass. Negative votes on a successful ballot item must be resolved by another web ballot or by meeting ballot.

By meeting ballot

During a meeting, a voting member makes a motion to accept the proposed change. The committee discusses the motion, considers suggested amendments, and then votes. The ballot must satisfy both the 40% and 2/3 rules to pass. Negative votes on a successful ballot must be resolved by another meeting ballot or by web ballot, unless the negative voter agrees that formal resolution of the negative vote is not required. Such an agreement shall be recorded in the minutes.

If a ballot to change a document in response to a persuasive negative vote fails, the negative vote must be resolved under 3.4, or the committee must withdraw the item and ballot a revised item that addresses the negative vote.

If a document is revised in response to a persuasive negative vote, the meeting minutes must report that the nega-

tive was found persuasive and give the approved technical change and the vote count.

3.4.5 Procedural appeals

ACI allows for procedural, not technical, appeals. A committee member whose negative vote is found unrelated or nonpersuasive has the right to a procedural appeal. The appeal must be submitted to TAC. The appeal cannot be submitted before the committee balloting on the document is complete.

3.5—Ballot summaries

Web ballot and meeting ballots for a document must be submitted to the TAC secretary. This submittal can be in an email directing staff to download the ballot from the committee's webpage. Meeting ballots must contain the following:

- (a) A list of the items balloted
- (b) A list of voting members present at the meeting
- (c) For each item, the initial vote tally, including:
 - (i) The number of affirmative votes
 - (ii) The number of affirmative with editorial comment votes
 - (iii) The number of negative votes and names of each negative voter
 - (iv) The number of abstentions and names of voters who abstained
 - (v) The resolution of each negative

3.6—Procedures when ACI is the minor sponsor

When ACI is the minor sponsor of a joint committee, the balloting and operating procedures are determined by the major sponsor. All items approved by the joint committee are submitted to the TAC Secretary for review by TAC.

PART 2—ACI STANDARDS

CHAPTER 4—DEVELOPMENT OF STANDARDS

4.1—Description

Standardization is the most rigorous consensus process used by ACI. It provides the widest input and highest overall quality assurance for a document. Documents that go through this process are identified as ACI standards; however, the word "Standard" does not appear in the title. The phrase "An ACI Standard" appears on the cover of the standard. ACI standards are written in mandatory language and can be referenced by model codes, authorities having jurisdiction over local building codes, persons or agencies that provide specifications, or in legal documents such as Project Specifications.

4.1.1 Standards

Standards may contain design, construction, durability, assessment, maintenance, repair, and rehabilitation requirements. Additional requirements may include, but are not limited to, sustainability, low-carbon, and resiliency. Standards must be worded in explicit, mandatory language so that there is only one possible interpretation.

Standards shall cite only mandatory-language documents. References to nonmandatory language documents such as

guides, reports, papers, and research results can be made in a separate commentary.

When submitting revisions to a design standard for review by TAC, the committee must provide reason statements for the revisions, including background information, and an explanation of the significance of the revisions. Committees should consider “new business” items from the previous standard when working on a revision.

4.1.1.1 Code requirements

An ACI code provides minimum requirements for concrete or masonry structures within its scope to safeguard public safety, health, and general welfare. Codes may be adopted by a model building code or by a regulatory agency or may be used by an industrial or governmental organization for which construction or manufacture of a work that uses concrete.

ACI committees can publish commentaries to complement their codes, which often provide supporting documentation for code provisions. A commentary is organized to parallel the code section numbering. Not all code sections require corresponding commentary sections, but all commentary sections require a corresponding code section.

A commentary is written in nonmandatory language and can reference documents that are written in nonmandatory language. Commentaries may offer alternatives for satisfying specific provisions in the codes and may refer to patented items that can be used to meet the intent of a specific provision. Because they are written in nonmandatory language, commentaries cannot be referenced by codes.

4.1.1.2 Code cases

A code case may:

1. Clarify or change an existing code or code provision
2. Provide new provisions for situations not covered by an existing code
3. Result in a new code requirement, which will be included in the next code edition
4. Provide specific requirements in code language for additions or alternatives not covered by an existing code

Code cases ensure that such clarifications or provisions are given general distribution.

The TAC Secretary considers code case requests and, if accepted, a processing fee is charged.

Individuals requesting a code case must do so in writing. The TAC Secretary acts as a liaison between the individual and the appropriate committee and is responsible for submitting requests to the committee. The code case will be published in *Concrete International (CI)* within 6 months of the date of approval. Code cases may also be published with the Code errata at the committee's request.

A code case applies only to the designated edition of a code (for example, ACI CODE-318-19) and not to other editions.

4.1.1.3 Acceptance criteria

An acceptance criteria document is a subset of a code and is written in such a form that its requirements can be coordinated directly with a specific code (for example, ACI CODE-318-19). Acceptance criteria follow the code requirements format.

4.1.1.4 Design specifications

A design specification provides minimum requirements for concrete or masonry structures within its scope to safeguard

the public safety, health, and general welfare. It is available for reference in legal documents other than building codes, such as federal government contracts. Design specifications follow the code requirements format.

4.1.2 Construction standards

ACI construction standards are written to direct the producers, testing agencies, and construction team and not the design professional. Construction standards are worded in explicit, mandatory language so that there is only one possible interpretation.

4.1.2.1 Construction specifications

Construction specifications are reference specifications that can be included as part of a contract between Owner and Contractor.

Titles of construction specifications should indicate that they pertain to construction.

4.1.2.2 Material specifications

Material specifications are reference specifications that prescribe requirements for materials used in projects, are written to the producer, and may be incorporated by reference into construction specifications or into Contract Documents.

ASTM committees have the general responsibility for developing material specifications for concrete-related products. In support of other ACI design or construction standards, and with TAC approval, ACI committees may develop material specifications. TAC and ACI staff will notify ASTM of this proposed activity and confirm that ASTM is not preparing a similar standard. Material specifications must be published as stand-alone documents and not as a section in a larger document.

The committee is to follow the document outline and format shown in the *Form and Style of ASTM Standards* (available at www.astm.org) for preparing a specification, but otherwise use ACI style. After publication by ACI, if a material specification falls within the scope of an ASTM subcommittee, ACI staff sends the test method to the ASTM staff manager responsible for the committee that addresses that area of technology.

4.1.2.3 Test methods

Test methods prescribe means of testing for compliance of materials or construction methods that are proposed for or used in projects. They are written to the testing agency and may be incorporated by reference in material specifications, construction specifications, or Contract Documents. They are subject to the process rules as described for material specifications.

Test methods are only to be developed when an ASTM standard test method has not been developed. The committee is to follow the document outline and format shown in the *Form and Style of ASTM Standards* (www.astm.org) for preparing a test method, but otherwise use ACI style. After publication, ACI staff sends the test method to the ASTM staff manager responsible for the committee that addresses that area of technology. ACI test methods must be withdrawn if ASTM subsequently develops a test method for the subject.

4.1.2.4 Inspection services specifications

Inspection services specifications are reference specifications written as part of a contract between Owner and

inspection agency. There is no recommended format for this type of specification, but it should conform to ACI style.

4.1.2.5 *Testing services specifications*

Testing services specifications are reference specifications written as part of a contract between Owner and testing agency or between Contractor and testing agency.

4.2—Procedures

The following is the procedure for processing ACI standards:

- (1) Preparation of a new document or revision of an existing document (4.2.1 and 4.2.2)
- (2) Web balloting of the draft document by the committee
- (3) Submission of the committee-approved document for TAC review
- (4) Revision of the document in response to TAC comments
- (5) A 45-day public discussion period through ACI
- (6) Submissions of committee-approved responses to comments received during the public discussion period for TAC review
- (7) Submission to Standards Board for final approval

It is not the intent of ACI to duplicate published work. Where satisfactory consensus standards exist for material specifications and test methods, such as those developed by ASTM International, those standards should be referenced in ACI documents.

4.2.1 *New standard*

Committees must obtain TAC approval before beginning work on a new ACI standard. The proposal, sent to the TAC Secretary, should indicate why it is needed and include a preliminary outline. If a design standard is proposed, a list of ACI or other standards that are likely to reference the design standard must also be submitted. Once TAC approves work on the new standard, ACI staff will assign the document a numerical designation—for example, ACI PRC-123 or ACI PRC-123.X. The letter “X” will be replaced by a number at time of publication.

Construction specification language and format requirements differ from other ACI documents. ACI construction specifications are written in accordance with Chapter 6. Committee E707—Specification Education hosts seminars occasionally on specification writing and the ACI website has an online presentations for viewing.

4.2.2 *Revising existing standards*

Committees are expected to revise, reapprove, or withdraw a standard on the cycle determined by the Standard Developing Organization (SDO) (typically 6 years). An interim (3-year) update is allowed. For standards that will be an ANS, the standard should be revised, reapprove, or withdrawn within 5 years from its adoption date. When the Standards Board releases the standard for publication, it is officially adopted. TAC or Staff shall notify the committee chair, 4 years after the document adoption date, that the document is approaching required revision, reapproval or withdrawal. The Chair shall submit a report to TAC before the 5th year on the status of the committee’s action on the document. The committee shall submit a written request to TAC prior to the end of the 5th year requesting an action to be taken by TAC. Standards cannot be

reapproved beyond 10 years if no action has been taken on the standard. The Committee Chair shall designate committee members undertaking revision of a construction specification who are to receive training as discussed in 4.2.1 before beginning work.

TAC may remove those standards from the *ACI Collection* that have not been reapproved or revised within 5 years of the adoption date. If the committee does not revise, ballot reapprove, or ballot withdraw a standard within the 5-year period, TAC may withdraw it without committee action.

4.2.2.1 *Reapproval*

The committee may ballot to reapprove a standard because the information in an existing standard, while not new, is still valid. The first reapproval of a standard is for 5 years. A second reapproval for not more than 5 years may be allowed by TAC if the committee reports an acceptable plan for revision of the standard within the second reapproval term. The committee is required to web ballot the reapproval. The reapproval may include updating referenced standards and minor editorial improvements of notation, terminology, metrication, or other similar items. A reapproval must not include technical changes. The committee must submit its recommendation for reapproval of the standard to TAC for approval. Include a web ballot summary and a statement that technological progress at this point does not require revision, or that the document is currently being revised but the revision is not complete. Include a summary of the updates to the document. Generally, TAC reviews only the committee’s ballot summary and the summary of updates. A reapproval does not change the year of adoption but the note “Reapproved” with the year of reapproval is added to the document number.

4.2.2.2 *Revision*

The committee should revise a standard when the information in the standard needs to be updated. Committees should consider “new business” items from the previous standard when working on a revision.

The committee must web ballot revisions according to Chapter 3 and submit the document to TAC for review. Upon adoption of a revised standard, the existing version is marked historical and no committee action is required. (A standard is designated historical when it has been superseded by a revision.) The revised standard’s number receives the new year of adoption.

Committees are to submit to TAC reason statements for revisions to ACI standards, including background information and explanations of the significance of the revisions.

4.2.2.3 *Withdrawal*

The committee should ballot for withdrawal of the standard when the committee determines that the information it contains is obsolete and should not be revised. A web ballot of the committee is required. The recommendation for withdrawal should include a statement that, in the judgment of the committee, the standard is no longer useful or amenable to updating. The committee’s recommendation and related ballot summary must be submitted to the TAC Secretary for review by TAC.

Upon TAC's approval of the recommendation, the document is no longer included in the next edition of the *ACI Collection*. It may still be available for purchase from ACI as a historical standard.

4.2.3 Maintenance of the content of ITG standards

After an ITG standard is published, TAC will request an ACI committee to assume jurisdiction over the ITG standard. Related technical committee(s) may have been identified during formation of the ITG.

The technical committee should:

(a) Review and revise the content of the ITG standard or incorporate the information into an existing committee standard

(b) Ballot the revised content of the ITG standard as soon as practicable because the ITG standard only has a 5-year life in the *ACI Collection*; however, TAC can extend that time. To request an extension, the Chair should e-mail the TAC Secretary requesting an extension and a reason why an extension is necessary.

4.2.4 Committee editorial review

The committee's editorial subcommittee or task group should edit a standard thoroughly before final committee web ballot. When submitting the standard to TAC, the chair should state that the editorial subcommittee has completed its task.

The editorial subcommittee should review the standard for organization, sentence structure, grammar, redundancy, spelling, and typographical errors. Because many people contribute to a standard, it is essential that the subcommittee review the separate sections for consistency in style and format. Members of the editorial subcommittee need to be familiar with the format and style of ACI standards.

4.2.5 Circulating draft standards

Mark drafts of ACI standards as "This draft is not final and is subject to revision. Do not circulate or publish." The chair may only circulate the draft to individuals outside the committee, TAC, and ACI staff to obtain expert technical advice not available in the committee or to ensure that all interested parties are given an opportunity to express viewpoints when developing an ACI standard.

Committee standards, at any stage of development, must not be released for publication other than to ACI or cosponsors of joint committees, except on approval of TAC. Similar restrictions apply to test data or unpublished technical information circulated in a committee.

Posting draft or published documents on independent websites is not permitted. Posting draft standards on the committee's ACI website is encouraged.

4.2.6 Coordination of ACI standards

4.2.6.1 Core codes

A core code is defined as any code directly referenced by an SDO or authority having jurisdiction. Codes will work in a synchronized manner based on how they are adopted by a core code.

Current core codes are:

ACI CODE-122.1—Thermal Bridge Mitigation for Buildings Having Concrete and Masonry Walls and Masonry Veneer—Code Requirements and Commentary

CODE-216.1—Determining Fire Resistance of Concrete and Masonry Construction Assemblies--

CODE-318—Building Code Requirements for Structural Concrete and Commentary

CODE-332—Code Requirements Residential Concrete and Commentary

CODE-349—Nuclear Safety-Related Concrete Structures—Code Requirements and Commentary

CODE-369.1—Seismic Evaluation and Retrofit of Existing Concrete Buildings—Code Requirements and Commentary

CODE-376—Refrigerated Liquefied Gas Containment Structure Design and Construction —Code Requirements and Commentary

CODE-440.11—Building Code Requirements for Structural Concrete Reinforced with Glass Fiber-Reinforced Polymer (GFRP) Bars—Code and Commentary

CODE-562—Assessment, Repair, and Rehabilitation of Existing Concrete Structures—Code Requirements and Commentary

Non-core codes should be referenced by core codes in either code or commentary, whenever applicable.

Current non-core codes are:

CODE-307—Code Requirements for Reinforced Concrete Chimneys and Commentary

CODE-313—Design Specification for Concrete Silos and Stacking Tubes for Storing Granular Materials and Commentary

CODE-318.2—Building Code Requirements for Concrete Thin Shells and Commentary

CODE-350—Code Requirements for Environmental Engineering Concrete Structures and Commentary

CODE-350.3—Code Requirements for Seismic Analysis and Design of Liquid-Containing Concrete Structures and Commentary

CODE-355.2—Post-Installed Mechanical Anchors in Concrete—Qualification Requirements and Commentary

CODE-355.4—Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary

CODE-369.1—Seismic Evaluation and Retrofit of Existing Concrete Buildings—Code and Commentary

CODE-374.1—Acceptance Criteria for Moment Frames Based on Structural Testing and Commentary

CODE-437.2—Acceptance Criteria for Moment Frames Based on Structural Testing and Commentary

CODE-550.3—Design Specification for Unbonded Post-Tensioned Precast Concrete Special Moment Frames Satisfying ACI 374.1

CODE-550.4—Qualification of Precast Concrete Diaphragm Connections and Reinforcement at Joints for Earthquake Loading and Commentary

CODE-550.5—Code Requirements for the Design of Precast Concrete Diaphragms for Earthquake Motions and Commentary

CODE-550.6—Acceptance Criteria for Special Unbonded Post-Tensioned Precast Structural Walls Based on Validation Testing and Commentary

CODE-550.7—Requirements for Design of a Special Unbonded Post-Tensioned Precast Shear Wall Satisfying ACI 550.6 and Commentary

Non-core codes can duplicate core code requirements for clarity, but duplication should be minimized to avoid conflict among codes.

Codes that use ACI CODE-318 as a basis for design of structural concrete elements should focus on unique aspects (loadings, unique design procedures) that are not addressed in ACI CODE-318.

Core and non-core code committees should work in collaboration to facilitate the adoption of all ACI codes.

Codes are developed on a 6-year cycle. A 3-year update will only be developed if significant new information arises after publication.

4.2.6.2 Industry standards

Table 4.2.6.2 lists committees that write the governing standards for a specific industry.

Table 4.2.6.2—Industry standards

ACI committee	ACI design and construction standards	
	New	Repair
301 — Specifications for Concrete	Construction	—
318 — Structural Concrete Building Code	Design	—
562 — Evaluation, Repair, and Rehabilitation of Concrete Buildings	—	Design
563 — Specifications for Repair of Structural Concrete in Buildings	—	Construction
307 — Concrete Chimneys	Design	—
313 — Concrete Bins and Silos	Design	—
332 — Residential Concrete Work	Design	—
350 — Environmental Engineering Concrete Structures	Design	—
346 — Cast-in-Place Pipe	Construction	—
349 — Concrete Nuclear Structures	Design	—
359 — Concrete Components for Nuclear Reactors	Design	—
376 — Concrete Structures for Refrigerated Liquefied Gas Containment	Design build	—

4.2.6.3 Interaction among standards-writing committees

ACI committees listed in Table 4.2.6.2 develop standards that are specific to an industry. ACI does not want to create standards with overlapping scopes; therefore, TAC limits the number of ACI standards to one for each industry for new and existing construction. For example, in the commercial building industry, ACI CODE-318 is the design standard, ACI SPEC-301 is the construction standard, ACI CODE-562 is the repair design standard, and ACI SPEC-563 is the repair construction standard. With approval from TAC, technical committees whose topics are intended to address specific industry segments are free to create a standard within its mission as long as the standard does not overlap that of

another standard. Ensure the scope of the standard does not overlap that of another ACI standard.

4.2.6.4 Proposed changes from outside of committee

Committees are permitted to propose changes to the ACI standards given in Table 4.2.6.2, such as ACI CODE-318. The proposed change must be approved by the submitting committee in accordance with balloting procedures of Chapter 3. The communication should include the proposed change in strikeout/underline, reason for change, and technical background. The committee receiving the proposed change is expected to consider the change in a timely fashion and notify the submitting committee of the results.

4.2.6.5 Coordination among technical committees

Coordination with other technical committees is an important part of developing standards. Some reasons for coordination with other committees are:

- To incorporate or reference information from another committee standard
- To minimize instances of standards with parallel or overlapping scopes
- To minimize technical conflicts between committee standards

If there are substantial technical conflicts between the standards of two technical committees, the matter can be referred to TAC. It is acknowledged that standards submitted for TAC review may conflict with or vary from published ACI documents. If committees are aware of such conflicts, the submitted standard should substantiate identified conflicts.

4.2.6.6 Standards sponsored with other ACI technical committees

ACI committees may agree to cosponsor a standard when the scope of the standard overlaps their missions. Committees may request to jointly sponsor a standard when at least 75% of voting members from each affected committee vote in favor of the proposed arrangement. The chairs must forward the comments of negative voters to TAC. In such arrangements, one committee is the major sponsor and the others are minor sponsors.

The procedure for processing the document through the committees is as follows:

- Major sponsor committee ballots document and resolves negatives
- Minor sponsor committee ballots document; at least 50% of committee must vote affirmative
 - If the ballot passes, the negatives and comments are sent back to the major sponsor committee for resolution.
 - If the ballot fails, the minor sponsor committee can choose to no longer cosponsor the document.
- Major sponsor committee submits document to TAC, showing all ballots and negative resolutions

The standard designation includes all sponsoring committees. Rosters of all sponsoring committees appear on the document.

4.2.6.7 Coordination with the Construction Liaison Committee (CLC)

Part of the ACI Board of Direction's Construction Liaison Committee (CLC) mission is to review technical committee standards that deal with constructability and economy. As

part of the TAC review process, staff sends standards that contain sections on construction to the CLC for review.

4.2.6.8 *Coordination with TAC*

TAC assists committees in preparing standards. As part of the TAC review process, staff sends construction standards to TCSC for review. The TCSC reviews draft construction standards for conformance to ACI format, style, and clarity of expression.

TAC established the TPCS to assist standards-writing committees to improve productivity and constructability. The TPCS review occurs during the document balloting process before TAC review and is facilitated by the establishment of lines of communication between TPCS and the document-writing committee.

4.2.6.9 *Coordination of terminology*

Concrete-related terms are defined within “ACI Concrete Terminology” (CT) to promote consistent use of terminology in ACI standards.

Technical committees define terms in their standards, and are to ensure consistent usage within both the technical committee and ACI. The CT is available on the ACI website. Individuals may submit proposed CT changes to TAC. The CT is updated on a yearly basis.

TAC reviews each standard’s definitions at the time of submission for TAC review.

4.2.7 *Translation of ACI standards*

Translation of an ACI standard into a language other than English may be permitted. Refer to the Board Policy on translation of ACI products. Where the Board Policy requires review and approval by the policies of the originating committee, TC considers an editorial change and no further balloting by TAC is required.

4.2.8 *Patented items*

ACI technical committee standards cannot and do not endorse or promote patented products or proprietary technology of any kind. ACI standards shall not refer directly to a particular patent or proprietary technology by use of trademarks or trade names. If a standard’s requirement can only be satisfied practicably by use of a patented material, product, process, procedure, or apparatus, full and apparent disclosure of the controlling patent shall be made within the commentary of the design standard or the optional requirements checklist of the specification.

ACI standards shall not mandate the use of patented items, but they may allow patented technology as a possible solution. During the balloting of such a requirement, the committee will be informed on the ballot that the ballot item includes references to patented technology. If participants in the ACI standards development process believe that a committee standard under ballot would require the user of the resulting standard to violate the intellectual property rights (such as patents or copyrights), those participants are encouraged to alert the committee. If the committee includes information on patented items within a standard, staff will include the patent disclaimer.

If an Accredited Standards Developer receives a notice that a proposed, revised, or approved American National Standard may require the use of such a patent claim that is

not already covered by an existing assurance, the procedures in this clause shall be followed. The Accredited Standards Developer shall receive from the patent holder or a party authorized to make assurances on its behalf, in written or electronic form, either:

(a) Assurance in the form of a general disclaimer to the effect that such party does not hold and does not currently intend holding any essential patent claim(s)

(b) Assurance that a license to such essential patent claim(s) will be made available to applicants desiring to use the license for the purpose of implementing the standard either:

- (i) Under reasonable terms and conditions that are demonstrably free of any unfair discrimination
- (ii) Without compensation and under reasonable terms and conditions that are demonstrably free of any unfair discrimination

Such assurance shall indicate that the patent holder (or third party authorized to make assurances on its behalf) will include in any documents transferring ownership of patents subject to the assurance, provisions sufficient to ensure that the commitments in the assurance are binding on the transferee, and that the transferee will similarly include appropriate provisions in the event of future transfers with the goal of binding each successor-in-interest. A record of the patent holder’s statement shall be retained in the files of ACI and shall be made publicly available on ACI’s website. The assurance shall also indicate that it is intended to be binding on successors-in-interest regardless of whether such provisions are included in the relevant transfer documents.

4.2.9 *Errata*

Errata are posted on the ACI website. When potential errors are discovered in an ACI standard, the committee chair has the authority to decide if a correction needs to be made and provides staff with the correction. The chair is not required to ballot the committee.

4.3—Writing standards

4.3.1 *Format*

Refer to Chapter 5 for format of codes. Refer to Chapter 6 for format of specifications.

4.3.2 *Units*

In accordance with ACI Board Policy, standards shall be published in two versions, one with inch-pound units and one with SI units.

This policy may be waived by TAC in exceptional circumstances. TAC approval to waive the requirements for two versions is required before submitting the standard to TAC. The application must describe the circumstances supporting a publication of one document with dual units.

The committee may prepare and ballot the second version or they may request that staff prepare the second version when it is considered an editorial conversion. If a committee considers a unit conversion editorial, no further balloting by the committee is required to approve the unit conversion. The chair can either decide if the conversion is editorial or initiate an administrative ballot. ACI standards are published with the unit conversion disclaimer.

For additional information on units, refer to Chapter 11.

4.3.3 Notation

Refer to Chapter 10 for information on notation.

4.3.4 Style

Refer to Chapter 9 for information on style.

4.4—TAC review

4.4.1 Submission package

Submit all materials required for submitting standards for TAC review to the TAC Secretary at least 3 months before a TAC meeting; standards will be given first priority. Submitting the standard by the deadline does not guarantee placement in the next TAC standard review cycle. Submit the Standard Submittal Checklist with the standard. The checklist can be found on the ACI website. TAC typically selects the standards for review in the order received. With the submittal, the chair shall include:

- (a) An electronic copy of the standard in Microsoft Word®
- (b) Original artwork, minimum resolution is 300 dpi
- (c) Statement of the type of standard being submitted
- (d) A ballot summary of the final web ballot(s), including resolutions to all negatives
- (e) A summary of revisions to the existing standard in the case of a revision
- (f) A statement of balance of interest

The committee is encouraged to provide a list of at least three potential external reviewers for the standard.

Standards prepared by joint committees may be subject to the review procedures of the sponsoring organizations. Discuss required submissions to such organizations with the TAC Secretary for coordination.

4.4.2 Staff editorial review

TAC has directed staff to perform an editorial review of each standard that is submitted for TAC review. Staff reviews the standard for grammatical errors, misspelled words, and ambiguous statements, and checks the standard for compliance with ACI style. All staff-recommended editorial changes are sent to the chair for approval. Once the chair and staff have agreed upon editorial items, staff submits the edited standard to TAC for review.

4.4.3 TAC review

One of the most important functions of TAC is the review of technical committee standards. TAC reviews standards for:

- (a) Technical content and correctness
- (b) Potential conflicts, duplications, and overlaps with other ACI standards
- (c) Compliance with ACI formats
- (d) Clarity
- (e) Mandatory language

The submitted standard is sent to all TAC members and select external reviewers who are experts on the subject matter and who are not members of the committee submitting the standard. ACI staff also forwards the standard to technical committees that have standards, guides, or reports that may cover the subject matter in the standard to help identify conflicts, duplications, and overlaps between committee standards. Reviewers are given 4 weeks to review the standard and submit comments.

TAC will review the entire standard, even if only one section has been revised.

4.4.3.1 TAC review group

Each standard is assigned to a TAC review group (RG) that is composed of a TAC member as review chief, two other TAC members as primary reviewers, and a staff liaison. All comments received from TAC members, external reviewers, TCSC, CLC, staff, and chairs of coordinating committees are compiled as TAC review comments and distributed to the RG by the review chief.

The TAC RG reviews all comments and meets with a committee representative, usually the chair, to discuss the TAC review comments. The review chief leads the discussion on TAC's behalf.

4.4.3.2 Review comment classifications

Reviewers classify each of their comments as primary (P), editorial (E), or secondary (S) and also provide specific page and line number references for each comment, or label them as "Page 0" and "Line 0" for general (G) comments that apply to the entire standard.

Primary (P) comments identify technical issues that the committee must address before publication of the standard.

Editorial (E) comments identify editorial issues that the committee must address before publication of the standard. The committee is expected to implement all E comments unless the committee agrees that the change is not an improvement or that it would change the intended meaning.

Secondary (S) comments identify technical or editorial issues that should be addressed either in this standard or the next revision of the standard.

General (G) comments identify issues general to the entire standard that the committee must address before publication of the standard.

4.4.4 TAC decision

After the RG meets with the committee representative, the RG makes a recommendation to TAC regarding the standard. TAC considers the recommendation and makes one of two decisions on the standard:

1. Draft standard is approved for further processing, contingent upon satisfactory response to TAC review comments in a timely manner and Standards Board approval.
2. Draft standard is not approved for further processing, and it is returned to the committee for revision, rebalancing, and resubmission (commonly called "3R").

The committee is notified of TAC's decision, and the official TAC review comments are sent to the committee for consideration.

4.4.4.1 Standard approved

When the standard is approved, the committee should act promptly to prepare a response to each TAC review comment.

4.4.4.2 Responding to TAC comments

The committee must document its response to each TAC review comment. The committee can agree with a P, E, or G comment and make an appropriate change to the standard or disagree with reason. When the committee disagrees, a reason statement for the disagreement must be documented.

The committee can agree with an S comment and make a change to the standard, disagree (no documentation is required), or agree to take the issue up as new business.

Responses to TAC comments must be approved by the committee by either web ballot or meeting ballot, regardless of whether the response resulted in a change to the standard. If a comment is strictly editorial and appropriate, the chair has the authority to implement the editorial change. These editorial changes do not need to be balloted. Include in the ballot the standard with the proposed changes resulting from the proposed responses to TAC comments using Track Changes.

After the standard has been revised in response to TAC review comments, the following shall be submitted to ACI staff:

- (a) The revised standard in Microsoft Word® format showing the changes to the version approved by TAC using the strikeout/underline feature
- (b) All original or revised artwork
- (c) The comment form including the committee responses to the TAC review comments
- (d) A ballot summary on the responses to TAC review comments, including any related committee minutes and negative withdrawals

When compliance with TAC review comments is verified, staff proceeds with preparing the standard for public comment.

If a committee decides to abandon a standard after TAC approval has been received, the committee is required to web ballot this decision. The balloting summary of the decision to abandon the standard must be submitted to ACI staff. This ballot is considered an administrative ballot and the negatives need not be resolved.

Technical committees must respond to TAC review comments within 2 years of the review, otherwise TAC approval is withdrawn. In such cases, the committee must resubmit the standard for TAC review and respond to a new set of TAC review comments. In exceptional cases, TAC may extend the time frame for acceptance of the committee responses upon written request from the committee chair with detailed explanation of the reasons.

4.4.4.3 Standard not approved

If the standard is not approved by TAC, the committee is usually expected to revise, reballot, and resubmit (commonly called “3R”) the standard to TAC. The decision not to approve is usually the result of major technical deficiencies in the standard. Therefore, TAC expects a comprehensive effort by the committee before the standard is resubmitted.

When a standard is not approved, the TAC RG will indicate what they believe is necessary to revise the standard. Although TAC expects the committee to address issues raised during the TAC review when revising the standard, the committee is not expected to respond individually to each review comment.

4.5—Public discussion process

4.5.1 Release for public discussion

When TAC approves a proposed standard, the balloting history shall be given procedural review by the ACI Standards Board. Upon review of the standard’s balloting history,

the Standards Board either approves opening the proposed standard for public discussion or returns the proposed standard to TAC with comments.

4.5.2 Public discussion

Proposed standards, other than code cases, approved by the Standards Board are made available for a 45-day public discussion and comment period. Upon TAC recommendation, the proposed standard, or its revision is made available on the ACI website. *Concrete International* has a standardization page in every issue that directs readers to the standardization webpage to look for standards open for public discussion.

An email that provides instructions on how to access the standard on the ACI website and how to submit comments is sent to all ACI members. Public discussion drafts will have the following disclaimer on the bottom of each page: “This draft is not final and is subject to revision. This draft is for public review and comment.”

4.5.2.1 Code case

A code case is adopted upon Standards Board approval and published in *CI* with a number for each code case and the adoption date. A code case can lead to a change in the next edition of the code. With this action, the code case is completed.

4.5.2.2 Provisional standard

Upon TAC recommendation and Standards Board approval, a proposed standard may be published as an ACI provisional standard before or during the public discussion period. TAC establishes an expiration date for the provisional standard and such a standard shall not be reapproved. A provisional standard may be referenced by other standards. Once public discussion and closure is completed, the term provisional is removed from the title of the standard.

4.5.3 Committee response to public comments

The technical committee must prepare and ballot a response to all comments received by the Institute during the public discussion period. While the Institute and the committee welcome all comments, those that pertain to provisions that have not been changed in the current revision are usually considered as new business for the next revision. In this case, an acknowledgment, a short explanation, and proposed committee actions under new business is usually an appropriate closure response.

After the response to public comments is prepared, it must be approved by the committee by either web ballot or meeting ballot. The committee-approved responses are submitted to the TAC Secretary for review and approval by TAC. The public commenters will be notified via email of the committee’s response and notified of their right to appeal, according to Section 4.6. Upon TAC approval, the balloting results are forwarded to the Standards Board. The committee responses to all public comments are posted online for a minimum of 90 days.

4.5.4 Release for publication

Balloting of the closure will be given procedural review by the ACI Standards Board. Upon Standards Board agreement that ACI’s procedures have been followed, the Standards Board releases the discussion and closure for publication in an ACI periodical, on the ACI website, or both, and recom-

mends publishing the standard as an ACI standard. Otherwise, the Standards Board returns the balloting of the closure to TAC with comments. Upon publication of the closure and any approved revisions, the standard is complete.

4.5.5 *Adoption as an ACI standard*

When the Standards Board releases the standard for publication, it is officially adopted.

4.6—Procedural appeal of committee actions related to standards development

ACI allows for procedural, not technical, appeals. Persons who have directly and materially affected interests and who have been or will be adversely affected by any procedural action or inaction by an ACI technical committee related to the development of a standard have the right to appeal. Standards developed under the ACI consensus process may be appealed, but appeals may be filed only on procedural grounds.

The ACI TAC, as the committee responsible for establishing and enforcing procedures for ACI technical committees and standards, will consider the appeal and will have final authority. If an appeal specifically calls into question an action of TAC itself, the appeal will be considered by the Standards Board, who will have final authority.

A voting committee member also has the right to appeal a TAC decision regarding a standard under development by a committee. In such cases, appeals must be filed within six months after the committee action in question to be considered.

Once a standard under development is released for public comment, any materially affected party may file an appeal. Appeals must be filed within 6 months after the draft is released for public comment.

4.6.1 *Procedural appeal requirements and procedure for submittal*

The appellant must submit an appeal package in writing to the TAC Secretary. The required elements of an appeal package are the appellant (including name, affiliation, and contact information), standard under appeal, basis of appeal (citation of relevant procedure), rationale for appeal (how was the procedure not followed), substantiation of how the appellant is materially affected, and supporting documentation. The burden of proof to show adverse effect shall be on the appellant. Because appeals are normally heard at ACI conventions, all appeal packages must be submitted in writing to the TAC Secretary at least 6 weeks before a convention for inclusion on the agenda of the hearing committee (TAC or Standards Board). Packages received within this 6-week window may be deferred to the next convention.

4.6.2 *Appeal review and adjudication process*

For appeals of technical committee action or inaction, the matter will be adjudicated by TAC according to the following process, except that if an appeal calls into question a specific action/inaction of TAC, then the Standards Board will adjudicate the appeal.

Upon receipt of an appeal package, the TAC Secretary informs the TAC Chair of the appeal and will perform a preliminary investigation, which will include informing the chair of the committee that is the subject of the appeal. The

appeal will be placed on the TAC agenda for discussion at the next appropriate meeting.

At the discretion of TAC, information may be independently gathered by ACI staff or another appointed task group. At TAC's discretion, hearing(s) may be scheduled (typically at the next scheduled TAC meeting) to allow TAC to hear directly from both the appellant and the committee representatives relevant to the standard in question. TAC will consider the information gathered from the appeal, investigation(s) and hearing(s) and will deliberate in closed session. Based on results of its deliberations, TAC will ballot a written response to the appeal. Formal response to the appeal will be issued by letter from the TAC Secretary to the appellant, with copy to the chair of the committee that is the subject of appeal, relating the findings and final decision of TAC regarding the appeal.

Upon receiving an appeal, the hearing committee (TAC or Standards Board) will resolve the appeal at the next scheduled meeting. Any member of the hearing committee with a conflict of interest on the subject matter of the appeal will be removed to ensure the hearing committee is fair and unbiased.

If an appeal is upheld, the standard shall not be processed further, but will be returned to the originating committee to address the findings of the appeal and re-initiate the standard review process related to the subject of the appeal.

CHAPTER 5—FORMAT AND LANGUAGE FOR CODES

5.1—General

Design requirements are written for the licensed design professional. Responsibilities of the licensed design professional are presented in ACI PRC-132-14.

A code provision should provide a single requirement.

Code provisions can include equations, lists, tables, or figures.

ACI codes may have attached nonmandatory text, called commentary, which is not considered part of the code.

5.2—Organization

5.2.1 *Frontmatter*

The organization of frontmatter of ACI codes is:

(a) **Title**—The title of the code appears prominently on the first page, and it should read “Topic—Code Requirements and Commentary”; for example, “Structural Concrete—Code Requirements and Commentary”.

(b) **Roster**—All voting members (on the main committee and subcommittees), consulting members, and liaison members at the time of the opening date of a document's last web ballot before submission for TAC review, are listed on the roster published on the front page of the committee document. Associate members are not listed. When a committee reapproves a code, the committee roster published with the original code is retained, and the roster of the current committee is not shown.

The chair may list other individuals who contributed to the document and should receive recognition.

Place an appropriate note immediately below the roster. The acknowledgement should not list specific contributions. An example of an appropriate note is: “Special

acknowledgements to {list of individuals} for their contributions to this Code.”

(c) **Synopsis**—A one- or two-paragraph synopsis should state the code’s scope and purpose, and should inform without going into too much detail. Each synopsis is printed in *Concrete International*, and should therefore make sense when read independently of the code.

(d) **Keywords**—Keywords indicate significant topics covered by the code. The title, synopsis, and table of contents of the document are good sources for keywords. List up to 20 keywords. The keywords should reflect the code’s subject matter without being too general. For example, avoid listing “concrete” or “water-cement ratio.” List keywords in alphabetical order and separate them with semicolons. Do not use multiple forms of the same word as keywords.

(e) **Table of contents**—A table of contents includes titles of chapters and articles only. Do not include page numbers in the table of contents; page numbers are assigned by staff after final formatting of the document.

(f) **Preface**—A preface is a brief summary of the subject, scope, and purpose of the code. It may contain a general identification of important code changes. If the code is to be approved by the International Code Council (ICC), it must include the following statement: This code was developed by a consensus-based process. This code can supplement a current (ICC) building code, supplement the codes governing new and existing structures of a local jurisdiction authority, or act as a stand-alone code in a locality that has not adopted an existing building code.

5.2.2 Code chapters

The first three chapters in codes are:

Chapter 1—General

Chapter 2—Notation and definitions

Chapter 3—Referenced standards

The code’s remaining chapters provide requirements in the general order of design, construction, inspection, and commissioning. Design chapters can include loads, analysis, structural systems, assessment of existing systems before repair, and member design and detailing. Construction chapters can include limits on materials, material properties, formwork, and construction processes. Inspection chapters can include quality assurance and quality control along with component testing to measure performance.

Design chapters are directed to the licensed design professionals.

In codes, construction and inspection chapters instruct the design professional to include requirements in Contract Documents.

Codes may be written with performance-based requirements or with prescriptive requirements or both.

The following is a description of information to be included in Chapters 1, 2, 3, and a member chapter.

CHAPTER 1—GENERAL

Chapter 1 includes the items in the following list. ACI codes should only address construction issues as they relate to the code’s design assumptions. Where required, ACI codes

can direct the licensed design professional to include pertinent construction information in the contract documents.

The adopting authority having jurisdiction over an ACI code needs to be clarified to avoid confusion.

1.1—Scope

1.2—General

1.3—Purpose

1.4—Applicability

1.5—Interpretation

1.5.1 The official version of this standard is the English language version using inch-pound units published by the American Concrete Institute.

1.5.2 In case of conflict between the official version of the code and other versions of the code, the official version governs.

NOTE: Use the language in 1.5.1 and 1.5.2 in all codes

1.6 Building Official

1.7 Written for Licensed Design Professional working for an Owner as the licensed design professional-of-record or within other contractual relationships, as a licensed design professional in a Design-Build team.

1.8 Testing and Inspection

1.9 Approval of special systems of design, construction, or alternative construction materials

CHAPTER 2—NOTATION AND DEFINITIONS

2.1 Code notation

The terms in this list are used in the code and as needed in the commentary.

R2.1 Commentary notation

The terms in this list are used in the commentary, but not in the code.

Units of measurement are given in the Notation to assist the user and are not intended to preclude the use of other correctly applied units for the same symbol, such as feet or kip.

2.2 Code definitions

The following terms are defined for general use in this code.

R2.2 Commentary definitions

For consistent application of the code, it is necessary that terms be defined where they have particular meanings in the code. The definitions given are for use in application of this code only and do not always correspond to ordinary usage. A glossary of most-used terms relating to cement manufacturing, concrete design and construction, and research in concrete is contained in “ACI Concrete Terminology” (CD) available on the ACI website.

CHAPTER 3—REFERENCED STANDARDS

Codes can only reference mandatory language standards, or parts thereof.

Referenced standards should be developed by an open consensus process.

Avoid referencing standards that reference technical information presented in previous versions of the same code. Satisfying such references creates technical inconsistencies and conflicts with the current code.

Organize referenced standards according to the sponsoring group.

List sponsoring groups in alphabetical order, as illustrated in Section 6.4.

CHAPTER X—DESIGN CHAPTER

In codes, a design chapter contains all the information, directly or by reference, required to analyze design or detail a structure, member, or a component.

Below is a sample outline.

CHAPTER X

X.1 Article

X.1.2 Section

X.1.2.3 Sub-section

X.1.2.3.4 Paragraph

X.1.2.3.4(a) Sub-paragraph

CHAPTER Y—CONSTRUCTION CHAPTER

A construction chapter contains information, directly or by reference, required to construct the Work. Articles in a construction chapter may include and require certain material requirements including strength and durability, tolerances, and construction processes.

CHAPTER Y

Y.1 Article

Y.1.2 Section

Y.1.2.3 Sub-section

Y.1.2.3.4 Paragraph

Y.1.2.3.4(a) Sub-paragraph

CHAPTER Z—INSPECTION AND TESTING CHAPTER

Inspection and testing for quality assurance and for conformance to the completed plans and specifications should be within the owner's scope of responsibility to eliminate any appearance of conflict of interest. In codes, provisions can require the licensed design professional to include specific inspection and testing items to be included in the contract documents.

5.2.3 Backmatter

The backmatter in codes may include appendixes and an index.

Appendixes can include code requirements, or they can be informational only, in which case they should not contain technical requirement. Appendixes, when used as part of the code requirements, are written to provide new material and to give alternate provisions to a chapter or section.

An index may be created at the end of code development. Index terms are selected from definitions, chapter headings, section headings, and subsection headings.

5.2.4 Article titles

Article titles can be a single word or a short phrase with the first word capitalized. Use lower case for subsequent words.

5.2.5 Section and subsection titles

Titles can be a single word or a short phrase. Capitalize the first word and use lower case for subsequent words. All articles have a title; for example, 1.1—General. Only sections that have subsections should have a title; for example, 1.1—General, 1.2.1 *Materials*. When multiple sections share a common subject, the common subject is followed by a colon, then by the specific aspect of that subject.

5.2.6 Provision numbering

Limit provisions to a maximum number of five levels, but four levels are preferred.

EXAMPLE

CHAPTER X

X.1—Article

X.1.2—Section

X.1.2.3—Sub-section

X.1.2.3.4—Paragraph

X.1.2.3.4(a)—Sub-paragraph

5.3—Language

5.3.1 Verb usage

1. Codes use only mandatory verbs
2. To direct or permit an action, “shall be” is normally used
3. To define a condition in present tense, “is” and “are” are normally used

4. Permissive verbs, such as “may” or “should” are never used in the code but can be used in the commentary

5.3.2 Adjectives and adverbs

Use adjectives or adverbs to achieve precision; they should not be ambiguous. Don't use shortened or jargon terms.

When referring to the material, use “reinforcing steel” or simply “reinforcement.”

The adjective “special” is reserved for seismic applications, inspectors, and post-tensioned anchorage devices defined in AASHTO.

EXAMPLE

Use: R.1.1.5 ... Recommendations for design and construction of some structures...

Instead of: R1.1.5 ... Recommendations for design and construction of some special structures...

The adjective “structural” is unnecessary when describing members or concrete. Use the adjective “nonstructural” where appropriate.

EXAMPLE

Use: Design and construction of one-way slabs...

Instead of: Design and construction of structural concrete one-way slabs....

Use the adjectives “compressive,” “tensile,” and “torsional” to describe force and stress. Do not use the nouns “compression” and “torsion” as adjectives.

EXAMPLE

Use: The nominal compressive strength of a nodal zone...

Instead of: The nominal compression strength of a nodal zone....

Don't use unenforceable adjectives or adverbs.

EXAMPLE

- | | |
|-----------------|-------------------|
| (a) Substantial | (g) Detailed |
| (b) Immediately | (h) Usual |
| (c) Currently | (i) Appropriately |
| (d) Recently | (j) Adequately |
| (e) Presently | (k) Comprehensive |
| (f) Rigorous | (l) Significantly |

Reinforcement “spacing” refers to the center-to-center distance between reinforcement and does not require additional description. “Clear spacing” is the distance between edges of reinforcement elements and must be stated explicitly.

The adjective “minimum” should be used with caution in conjunction with measured distances, such as “minimum spacing,” because it can imply a minus tolerance of zero.

5.3.3 Comparative phrases

When comparing measurements, use “longer,” “higher,” or “deeper.”

When comparing distances, use “longer” or “shorter;” although “greater” is acceptable.

When comparing reinforcing bars, use “bigger” or “larger.”

When comparing areas or volumes, use “larger.”

5.3.4 Preferred words or phrases

Don’t use “a and/or b;” use “a, b, or both.”

Don’t use “either...or.” Although “either...or” is used in other contexts, “either” is not usually required within a code. The exception is when a sentence begins with “either.”

Don’t use “neither” or “nor.”

Preferred	Avoid
axial load (to describe an externally applied load)	axial force
axial force (to describe an internal member force)	axial load
calculate	compute
corbel	bracket for a wall or column
continuous (to describe a condition that exists over two or more adjacent members)	full length
full length (to describe the full extent of a single member)	continuous
shear force (to describe a shear action)	shear
shear (to describe a force value)	shear force
twice	double
flexural moment	bending moment
torsion	torque
directly (to describe relative position)	immediately

5.4—References**5.4.1 References to provisions and chapters**

The entire code must be satisfied, so reminder references to related provisions are unnecessary. The commentary can be used to alert the user to related provisions.

EXAMPLE

Use: Deep beams shall be designed by taking nonlinear distribution of strain into account, or by Appendix A.

Instead of: Deep beams shall be designed by taking nonlinear distribution of strain into account, or by Appendix A. (Refer also to 11.7.1 and 12.10.6.)

If a code has member chapters, provisions in member chapters can reference provisions in other nonmember chapters; however, provisions of other member or nonmember chapters usually should not reference provisions of member chapters.

If cross referencing is necessary, check the cross references to ensure there is no circular logic path.

5.4.2 Compliance phrases

Use “conform to” instead of “satisfy” or “in accordance with” for compliance with material requirements.

EXAMPLE

Use: Design of parking lots shall conform to yyy.

Instead of: Concrete xxx shall satisfy yyy.

Use “in accordance with” instead of “satisfy” or “conform to” for design actions.

EXAMPLE

Use: Concrete xxx shall be in accordance with yyy.

Instead of: Design of xxx shall satisfy yyy.

Use “in accordance with” instead of “shall provide” for design selections.

EXAMPLE

Use: A_{st} shall be in accordance with....

Instead of: A_{st} shall provide...

Use “in accordance with” instead of “shall provide” for design selections.

5.4.3 Referenced standard style

A reference to a standard within a provision should include only its serial designation and not its title or date, unless referring to a standard for historical purposes. Standards that are written in mandatory language and referenced in the code are considered referenced standards.

Include the date and title of the referenced standard in Chapter 3.

The latest version of the referenced standard is the preferred reference.

If a code includes exceptions to a referenced standard or a historical version of the standard is referenced, provide an explanation in the commentary. Consider asking the sponsoring group to revise the standard so that exceptions or reference to a historical standard are not needed.

5.5—Commentary to a code**5.5.1 General**

A code must be understandable and usable without the need for a commentary. The commentary text, tables,

figures, or illustrations must not interpret a code in a way that conflicts with the code text, or create ambiguity in the code. Commentary is denoted with an “R” designation before the provision number, including equations and figures.

Commentary may provide:

- (a) Basis for a code provision including pertinent references
- (b) Cross reference to related material in other standards or in other code sections
- (c) References to address situations outside the stated limits of a provision
- (d) Discussion highlighting new code provisions (remove this type of commentary in subsequent code versions)
- (e) Explanation of how a provision may be used or refer to another section
- (f) Guidance and coordination for design and construction relevant to the execution of the Work
- (g) Discussion of methods by which performance criteria may be measured and assured
- (h) Instructions for commissioning a Work for assumption by the Owner

Commentary should not:

- (a) Repeat the code provision
- (b) Provide general design and construction education
- (c) Provide design aids or examples
- (d) Provide exceptions to the code provision
- (e) Contain additional code requirements
- (f) Use mandatory language, except to paraphrase or explain a code provision

EXAMPLE

Use: Concrete for members subject to freezing-and-thawing exposures is to be air entrained in accordance with 5.3.3.

Instead of: Concrete for members subject to freezing-and-thawing exposures should be air entrained in accordance with 5.3.3.

5.5.2 Commentary references

A reference should be:

- (a) Explicitly relevant
- (b) In English
- (c) Peer reviewed

A reference should not be:

- (a) A company report
- (b) Personal communication
- (c) A laboratory report
- (d) An unpublished proceeding

5.5.3 Cited reference style

Use author/date format for publications cited in the commentary.

In citing publications by author/date within parentheses in the text, do not place a comma between the author's name and the year of publication.

EXAMPLE

Use these formats in the text:

- (a) One author: (Smith 2015)
- (b) Two authors: (Smith and Jones 2015)
- (c) Three or more authors: (Smith et al. 2015)
- (d) Separate works by different authors with a semicolon: (Smith 2015; Jones and Johnson 2015)
- (e) Separate works by same author with a comma: (Smith 2001, 2015; Jones et al. 2015)
- (f) If an author or group of authors has two works with the same year, designate them “a” and “b” (and so on, as necessary): (Smith et al. 2015a,b; Jones 2015)

CHAPTER 6—FORMAT AND LANGUAGE FOR CONSTRUCTION SPECIFICATIONS

6.1—General

ACI construction specifications are written to the Contractor, must be referenced in Contract Documents, and may be included in the general building code. The construction specifications may include Owner-provided services that the Contractor is required to use to complete his work. Construction specifications follow the single-item or multiple-item format listed in 6.2.

ACI Specifications are not to include commentaries unless specifically permitted by TAC. The attached Notes to Specifier are written to specifiers in nonmandatory language and are not a part of the specification.

Single-item specifications address a single product or process, and are similar to the Construction Specifications Institute's (CSI) narrow scope specification.

Multiple-item specifications address more than one technical product or process, and are similar to CSI's broad scope specification.

The Notes to Specifier usually include a list of cited references, a Mandatory Requirements Checklist, and an Optional Requirements Checklist.

The Mandatory Requirements Checklist identifies provisions that do not have a default requirement and specific requirements must be provided in Contract Documents.

The Optional Requirements Checklist identifies alternatives to default requirements or optional requirements that the specifier may want to incorporate through Contract Documents.

Reference to other ACI construction specifications is allowed in an ACI specification. Refer to 6.4.3 for additional guidance.

6.2—Format

6.2.1 Single-item specifications

ACI construction specifications are written in the three-part section format of the Construction Specifications Institute (CSI) as modified by ACI. Part 1 covers general administrative requirements such as definitions, submittals, referenced standards, and acceptance criteria; Part 2 addresses products and materials; and Part 3 deals with execution. The specification is followed by Notes to Specifiers and the Checklists, which are directed to the specifier

and are not part of the specification. Below is an example of an outline for a single-item specification.

EXAMPLE

Title page—Title, roster, synopsis, keywords, and table of contents

Part 1—General

- 1.1—Scope
- 1.2—Interpretation
- 1.3—Definitions
- 1.4—Referenced standards
- 1.5—Submittals
- 1.6—Delivery, storage, and handling
- 1.7—Quality assurance, quality control, and acceptance of work

Part 2—Products

- 2.1—Materials
- 2.2—Accessories
- 2.3—Off-site fabrication

Part 3—Execution

- 3.1—Preparation
- 3.2—Transportation
- 3.3—Installation
- 3.4—Testing inspection
- 3.5—Repair
- 3.6—Cleaning

Notes to Specifier

General Notes

Foreword to Checklists

Checklist references

- Mandatory requirements checklist
- Optional requirements checklist

6.2.2 Numbering within single-item specifications

Provisions in the specification are numbered sequentially.

EXAMPLE

- 1.2.3.b
- 1 denotes Part 1 (Requires heading)
- 2 denotes Article 2 (Requires heading)
- 3 denotes Provisions 3 (No heading)
- b denotes subprovision or a list

6.2.3 Multi-item specifications

Below is the outline for a multi-item ACI specification. The first section provides general requirements and is followed by sections that address each technical subject within the scope of the specification. Each technical section includes three parts: General, Products, and Execution.

EXAMPLE

Title page—Title, roster, synopsis, keywords, and table of contents

SECTION 1—GENERAL REQUIREMENTS

- 1.1—Scope
- 1.2—Interpretation
- 1.3—Definitions
- 1.4—Referenced standards
- 1.5—Submittals
- 1.6—Quality control and quality assurance

SECTION 2—(FIRST ITEM TECHNICAL SECTION)

Part 2.1—GENERAL

- 2.1.1—Scope
- 2.1.2—Storage and handling
- 2.1.3—Testing and inspection

Part 2.2—PRODUCTS

- 2.2.1—Materials
- 2.2.2—Accessories
- 2.2.3—Off-site fabrication

Part 2.3—EXECUTION

- 2.3.1—Preparation
- 2.3.2—Transportation
- 2.3.3—Installation
- 2.3.4—Testing inspection
- 2.3.5—Repair
- 2.3.6—Cleaning

SECTION 3—(SECOND ITEM TECHNICAL SECTION)

Part 3.1—GENERAL

Part 3.2—PRODUCTS

Part 3.3—EXECUTION

- Section 4 and beyond as needed
- Notes to Specifier
- General Notes
- Foreword to Checklists
- Checklist references
- Mandatory requirements checklist
- Optional requirements checklist

6.2.4 Numbering within multi-item specifications

Provisions in the Specification are numbered sequentially.

EXAMPLE

- 4.3.2.1.c
- 4 denotes Section 4 (Requires heading)
- 3 denotes Part 3 (Requires heading)
- 2 denotes Article 2 (Requires heading)
- 1 denotes Provision 1
- c denotes Subprovision or list

6.2.5 Description of title page

(a) Title—The title of the specification title appears prominently on the first page, and it should read, “Topic—Specification”; for example, “Epoxy Injection—Specification”.

(b) Roster—All voting members (on the main committee and subcommittees), consulting members, and liaison members at the time of the opening date of a document’s last web ballot before submission for TAC review are listed on the roster published on the front page of the specification. Associate members of the committee are not listed on the roster. If a committee reapproves a specification, the committee roster published with the original specification is retained, and the roster of the current committee is not shown.

The chair may list other individuals who contributed to the document and should receive recognition. Place an appropriate note immediately below the roster. The acknowledgement should not list specific contributions. An example of an appropriate note is “Special acknowledgements to [list of individuals] for their contributions to this Specification.”

(c) Synopsis—A one- or two-paragraph synopsis should state the specification’s scope and purpose, and should inform about content without going into too much detail. The synopsis is printed in *Concrete International (CI)*, and should therefore make sense when read independently of the specification.

(d) Keywords—Keywords indicate significant topics covered by the specification. The title, synopsis, and table of contents of the document are good sources for keywords. List up to 20 keywords. The keywords should reflect the specification’s subject matter without being too general. For example, avoid listing “concrete.” List keywords in alphabetical order and separate them with semicolons. Do not use multiple forms of the same word as keywords.

(e) Table of contents—The table of contents includes part and article-level titles. Do not include page numbers in the table of contents; page numbers are assigned by staff after final formatting of the document.

6.2.6 Description of Part I, General

6.2.6.1 Scope

The scope provides a short statement that describes the specification’s application. A single-item specification whose scope of work is also covered in a multi-item specification, such as ACI SPEC-301 or ACI SPEC-350.5, should include provision 1.1.6 to clarify that the single-item specification governs with respect to the overlapping scope. For example, ACI SPEC-305.1 is a single-item specification covering hot weather concreting, and ACI SPEC-301 is a multi-item specification that also includes provisions related to hot-weather concreting. Therefore, ACI SPEC-305.1 should include 1.1.6 shown below. If the scope of a single-item specification is not included in ACI SPEC-301 or ACI SPEC-350.5, provision 1.1.6 is not required. For example, ACI SPEC-548.4 on latex-modified concrete overlays would not require 1.1.6. If 1.1.6 is used, there should be a corresponding entry in the Optional Requirements Checklist (refer to 6.2.9.2) to instruct the specifier to indicate which provisions in the single-item specification are not applicable. For example, the checklist entry in ACI SPEC 305.1 could say: “Specify which provision or provi-

sions in ACI SPEC-305.1 are not applicable.” The objective is to avoid conflicting requirements if ACI specifications with overlapping scope are referenced in Contract Documents.

ACI construction specifications are written to be applicable to different types of projects. As a result, the specification may include requirements that are not applicable to a specific project. A statement in the scope informs the Contractor that provisions not applicable to the Work are to be ignored. The specification should clarify its relationship to the Contract Documents and referenced standards. The following is preferred wording for the scope of construction specifications.

PREFERRED WORDING

1.1—Scope

1.1.1 This specification covers...

1.1.2 This Specification is incorporated by Contract Documents and provides requirements for the Contractor.

1.1.3 This Specification governs for construction within its scope, except project-specific Contract Documents govern if there is a conflict.

1.1.4 This Specification governs if there is a conflict with referenced material and testing standards.

1.1.5 Contractor is permitted to submit written alternatives to any provision in this Specification for consideration.

1.1.6 [If required] Unless otherwise specified, this Specification governs for Work covered by 1.1.1 if referenced in Contract Documents along with ACI SPEC-301 and ACI SPEC-350.5.

1.1.7 Ignore provisions of this specification that are not applicable to the Work.

1.1.8 Values in this Specification are stated in inch-pound units. A companion specification in SI units is available.

1.1.9 The Notes to Specifier are not part of this Specification.

6.2.6.2 Interpretation

The interpretation provides the rules for interpretation of the specification and explains key phrases and words. All specifications shall have an interpretation section that follows the scope. ACI construction specifications shall include the following provisions that are applicable to the Specification.

1.2—Interpretation

1.2.1 Unless otherwise explicitly stated, this Specification shall be interpreted using the following principles.

1.2.1.1 Interpret this Specification consistent with the plain meaning of the words and terms used.

1.2.1.2 Definitions provided in this Specification govern over the definitions of the same or similar words or terms found elsewhere.

1.2.1.3 Whenever possible, interpret this Specification so that its provisions are in harmony and do not conflict.

1.2.1.4 Headings are part of this Specification and are intended to identify the scope of the provisions or sections that follow. If there is a difference in meaning or implication between the text of a provision and a heading, the meaning of the text governs.

1.2.1.5 Footnotes are part of this Specification. The meaning of the provision text governs in the event of a difference in meaning or implication between the provision text and a footnote to that provision.

1.2.1.6 Where a provision of this Specification involves two or more items, conditions, requirements, or events connected by the conjunctions “and” or “or,” interpret the conjunction as follows:

“and” indicate that all of the connected items, conditions, requirements, or events apply

“or” indicates that the connected items, conditions, requirements, or events apply singularly

1.2.1.7 The use of the verbs “may” or “will” indicates that the Specification provision is for information to the Contractor.

1.2.1.8 The phrase “as indicated in Contract Documents” means the specifier included the provision requirements in Contract Documents.

1.2.1.9 The phrase “unless otherwise specified” means the specifier may have included an alternative to the default requirement in Contract Documents.

1.2.1.10 The phrase “if specified” mean the specifier may have included a requirement in Contract Documents for which there is no default requirement in this Specification.

1.2.1.11 If an ACI specification refers to combined ASTM standards, complete designations of the standards should be shown in the specification and the following provision should be included in the interpretation article: “Unless otherwise stated, the inch-pound [or SI, whichever is applicable] system of units is applicable to combined standards referenced in this Specification.”

6.2.6.3 Definitions

The following terms are unique to specifications and shall be included without modifications, if used, in the specification. Words capitalized in the definitions below should be capitalized throughout the specification. See 10.2.2 for guidelines on writing definitions.

1.x—Definitions

The following definitions shall govern in this Specification.

accepted—determined by Architect/Engineer to be in compliance with Contract Documents.

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

Construction Documents—written and graphic documents and specifications prepared or assembled for describing the location, design, materials, and physical characteristics of the elements of a project necessary for obtaining a building permit and construction of the project.

Contract Documents—set of documents that form the basis of a contractual relationship between an Owner and Contractor or design-builder. These documents are defined by the contractual agreement, and can contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes.

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

drawings—graphic presentations that detail requirements for Work and may include written notes.

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

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

specialty engineer—an individual representing Contractor who is licensed to practice engineering as defined by the statutory requirements of the professional licensing laws of the state or jurisdiction in which the project is to be constructed.

Specification—the written document that details requirements for Work.

submit—provide to Architect/Engineer for review.

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

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

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

6.2.6.4 Referenced standards

Refer to 6.4.

6.2.6.5 Personnel certification programs

Reference only those personnel certification programs that are widely available to the industry.

6.2.6.6 Plant certification programs

Reference only plant certification programs that are widely available to the industry.

6.2.6.7 Submittals

List submittals to be furnished by Contractor, such as product data and procedures, shop drawings, samples, quality-control data, design data, and test reports. This list must be coordinated with provisions that require submittals. Admin-

istrative requirements, such as distribution and schedules for submittals, are given in other parts of Contract Documents.

6.2.6.8 Delivery, storage, and handling

Specify requirements for packaging and shipping, acceptance at the site, and storage and protection. Allowances and unit prices are not included. Unless more restrictive requirements are intended, do not repeat packaging or other requirements that are included in referenced specifications for materials or products.

6.2.6.9 Quality assurance and quality control

Define qualifications for testing and inspection agencies and the interrelated responsibilities of Contractor, Owner's testing agency, Contractor's testing agency, and inspection agency.

6.2.6.10 Warranties, regulatory requirements, and safety

Warranties and safety are specifically addressed in the Owner-Contractor Agreement including the General Conditions, and are defined further, along with regulatory requirements, in the specific Project Specifications prepared by the licensed design professional. ACI reference specifications, therefore, should not address warranties, regulatory requirements, or safety to avoid conflicts with the primary contractual documents.

6.2.7 Description of Part 2, Products

6.2.7.1 Materials

Provide statements describing primary materials and their accessories to be furnished. Refer to applicable standard specifications, and include separate provisions for each material specified. Accessories provide necessary aid for the preparation or installation of primary materials.

6.2.7.2 Mixtures

Provide mixture performance requirements, or mixture proportions and procedures for mixing materials.

6.2.7.3 Fabrication

Describe shop-manufactured, fabricated, or assembled items, such as requirements for shop assembly, shop or factory finish, and tolerances.

6.2.7.4 Source quality control

List tests and inspections for quality control required at the source. Include statements for procedures and methods of verification of performance or compliance. List inspection requirements that will be used by the Quality Assurance Agency.

6.2.8 Description of Part 3, Execution

6.2.8.1 Preparation

State site conditions and actions necessary for the proper installation of products into the Work.

6.2.8.2 Sequence

Describe product placement sequence.

6.2.8.3 Installation

State actions necessary for installation of products furnished under Part 2. Include separate provisions for each product with specific installation procedures and tolerances.

6.2.8.4 Post-installation testing

Define tests and inspections for installed or completed Work.

6.2.8.5 Repair

Define deficient Work and provide corrective actions for final acceptance.

6.2.8.6 Protection

List actions required to protect installed Work before acceptance.

6.2.9 Description of Notes to Specifiers

Notes are appended to the specification and are not part of the specification. These notes are for the specifier and include general notes, foreword to checklists, references, and checklists. The general notes provide guidance on how to incorporate the ACI specification into Contract Documents. The foreword to the checklists explains how to modify the ACI specification in Contract Documents for the project. There are two types of checklists: the mandatory requirements checklist and optional requirements checklist. The mandatory requirements checklist identifies information that is required to be included in Contract Documents because there is no default requirement in the specification. The optional requirements checklist identifies alternatives to default requirements or optional requirements for which there are no default requirements. A default requirement is a limiting requirement that has been selected for the specification. Unless otherwise specified in Contract Documents, default requirements are mandatory conditions of the specification. The optional requirements checklist provides guidance to the specifier in specifying alternative or additional requirements. Checklists do not provide explanations for the requirements; instead, refer to ACI guides and reports for additional information.

To assist the specifier, checklists notes can include:

- (a) Reference citations
- (b) Recommended values
- (c) Alternative products
- (d) Alternative installation procedures

Refer to 6.2.9.4 for checklist format.

6.2.9.1 General notes, foreword to checklists, and list of references

ACI construction specifications shall include the following wording without modification except for insertion of title and number of the ACI specification. Paragraphs F4, F5, and F6 may be omitted if they do not apply.

NOTES TO SPECIFIER

General notes

G1. ACI Specification XXX is to be used by reference in the technical specifications of the Contract Documents. Do not copy individual sections, parts, articles, or paragraphs into the technical specifications of the Contract Documents because taking them out of context may change their meaning.

G2. If sections or parts of ACI Specification XXX are copied into the technical specifications of the Contract Documents or any other document, do not refer to them as an ACI specification.

G3. A statement such as the following will serve to make ACI Specification XXX a part of the technical specifications of the Contract Documents:

“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 XXX 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. If ACI Specification XXX is referenced in Contract Documents along with another ACI specification that contains overlapping provisions, identify which requirements are in conflict and state in Contract Documents which requirements govern.

Foreword to checklists

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

F2. ACI Specification XXX may be referenced by the specifier in the technical specifications of the Contract Documents for any building project, together with supplementary requirements for the specific project. Responsibilities for project participants must be defined in the technical specifications of the Contract Documents. ACI Specification XXX cannot and does not address responsibilities for any project participant other than Contractor.

F3. Checklists do not form a part of ACI Specification XXX. Checklists assist the specifier in selecting and specifying project requirements in the technical specifications of the Contract Documents.

F4. The Mandatory Requirements Checklist indicates work requirements regarding specific qualities, procedures, materials, and performance criteria that are not defined in ACI Specification XXX. The specifier must include these requirements in the technical specifications of the Contract Documents.

F5. The Optional Requirements Checklist identifies specifier alternatives or additions. The checklist identifies the sections, parts, and articles of ACI Specification XXX 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 or additions as mandatory requirements in the technical specifications of the Contract Documents.

F6. Cited references—Documents and publications that are referenced in the checklists of ACI Specification XXX are listed below. These references provide guidance to the specifier and are not considered to be part of ACI Specification XXX.

(Provide a list of the applicable references using the format in 8.3.)

6.2.9.2 Mandatory requirements checklists

Notes are provided in the mandatory requirements checklist if a product or installation procedure is required for construction within the scope of the specification but there is no default requirement in the specification. Minimize the number of items in the mandatory requirements checklist. The following shows an example of notes in a mandatory requirements checklist.

EXAMPLE	
Mandatory Requirements Checklist	
Section/ Part/Article	Notes to Specifiers
4.2.2.8 Specified strength	Indicate the specified compressive strength of concrete f'_c for various portions of the Work. Sample language for Contract Documents: “The specified compressive strength of concrete, f'_c , for all concrete in the Work is 4000 psi.”

Items outside the scope of the specification, such as directions on how to write Contract Documents or project administrative requirements, cannot be included. The General Notes provide guidance on how to incorporate the specification into Contract Documents. Do not add a mandatory requirement for the scope statement that requires the specifier to specify the scope. Reminders to the designer of what to include on project drawings may be included in the checklist notes but are not appropriate in the specification text because the specification is not written to instruct the designer.

6.2.9.3 Optional requirements checklists

The specifier may want other requirements in place of the default requirements in the reference specification. In addition, the specifier may wish to require items for which there are no default requirements in the specification. The optional requirements checklist informs the specifier of the options that may be invoked and can provide sample language that the specifier can use in Contract Documents. Limited discussion or citations explaining circumstances when an option should be invoked may be included.

6.2.9.4 Checklist format

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:

- (a) Concise instruction to specifier
- (b) Concise guidance to specifier (optional)
- (c) References for additional guidance (optional)
- (d) Sample language to invoke optional requirement (optional)

The following is an example of an entry in an optional requirements checklist.

EXAMPLE	
Optional Requirements Checklist	
Section/ Part/Article	Notes to Specifiers
5.3.2.6 Joint preparation	<p>If bond is required at construction joints, specify acceptable joint preparation. The following joint preparations are acceptable:</p> <ol style="list-style-type: none"> (1) Adhesive applied in accordance with the manufacturer's recommendations (2) Surface retarder in accordance with manufacturer's recommendations (3) Roughened surface that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, or damaged concrete at the surface (4) Portland-cement grout of the same proportions as the mortar in the concrete in an acceptable manner. <p>Sample language for Contract Documents: "At construction joints, roughen the surface that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, or damaged concrete at the surface." Alternatively, the specifier may allow Contractor to choose any of the four options.</p>

6.2.9.5 Referral phrases and checklists

The committee must ensure that there is an entry in the appropriate checklist for every occurrence of a referral phrase (6.3.11) in the text of the specification. Conversely, every checklist entry must refer to a provision with a referral phrase. If there is no referral phrase in a provision, there should not be a checklist entry referring to that provision.

6.3—Language

6.3.1 Tolerances

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

EXAMPLE

Tolerances for reinforcement location shall be in accordance with ACI CODE-117.

6.3.2 Verb usage

Write ACI specifications in mandatory language. Use terse imperative language. Avoid passive tense. **Do not provide a reason for the requirement.**

EXAMPLE

Use: "Cure concrete."

Instead of: "The concrete shall be cured so that it will gain strength."

6.3.3 Gender-specific language

Avoid using gender-specific terms. Such terms can often be replaced by "operator" or "person."

6.3.4 Subjective language

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

adequate
all
any
appropriately
approximately
comprehensive
detailed
each
every
good
in a workmanlike manner (or other similar phrases)
immediately
nearly
rigorous
shall function as intended
to the satisfaction of the specifier
significantly
special
substantial
such
thoroughly
usual

6.3.5 Time-related requirements

Specify ending points for time-related requirements.

EXAMPLE

Use: "Keep forms wet until concrete is placed."

Instead of: "Keep forms wet."

6.3.6 Qualitative requirements

Avoid qualitative requirements and refer to measurable parameters.

EXAMPLE

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

Instead of: "Keep masonry units warm."

6.3.7 Repetition of items

Specify an item one time only. If needed again, refer to the item by its original provision number. Do not use the word "section" before the provision number.

6.3.8 Jargon and slang

Do not use legal jargon. ACI specifications become legal documents by being referenced in Contract Documents. Write specifications with more emphasis toward effective communication than toward use of legal terms. Do not use such terms as "herewith," "hereinafter," "as per," "thereof," or "wherein."

Likewise, do not use technical slang such as “rebar,” “pour concrete,” “wet concrete,” and “freeze/thaw.” Refer to 9.6.3 for additional examples of preferred terminology.

6.3.9 *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.

6.3.10 *Responsibilities*

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

6.3.11 *Referral phrase*

Three types of referral phrases are used in ACI Specifications to indicate to the Contractor that there may be additional requirements in Contract Documents and to alert the Architect/Engineer that there is a checklist entry for that provision.

If the referral phrase, “as indicated in Contract Documents,” is used in the provision, the specifier must include the provision requirements in Contract Documents for the specification to be complete. The Mandatory Requirements Checklist provides instructions on what needs to be specified.

If the referral phrase, “unless otherwise specified,” is used in the provision, the specifier may wish to include an alternative to the default requirement in Contract Documents. The Optional Requirements Checklist provides guidance on the alternative that may be specified in Contract Documents.

If the referral phrase, “if specified,” is used in the provision, the specifier may wish to include an additional requirement in Contract Documents. The Optional Requirements Checklist provides guidance on the requirement the specifier may wish to include in Contract Documents.

6.3.12 *Compliance phrases*

Use “conform to” if referring to compliance with materials specifications and “in accordance with” for compliance with test methods and practices.

6.3.13 *Article use*

“The,” “a,” and “an” are used to impart specificity to a noun. They are not required when the subject or object is known or has been previously identified. Such words that do not require an article before their use are: Architect/Engineer, Contractor, Contract Documents, inspection agency, licensed design engineer, and Owner.

EXAMPLE

Use: “Testing agencies shall be accepted by Architect/Engineer.”

Instead of: “The testing agencies shall be accepted by the Architect/Engineer.”

6.3.14 *Pronouns*

The use of personal pronouns is discouraged.

6.3.15 *Options*

It is acceptable to use the verb “may” to indicate that the Contractor can exercise an option if prescribed conditions

are satisfied. It is better, however, to rewrite the sentence to avoid using “may.” Use “either... or...” if the Contractor has limited, specified alternatives. Do not use “may” to indicate an alternative choice, because when “may” is used, the Contractor is not obligated to perform the actions.

6.3.16 *Conditional phrases (use of “if,” “when,” and “where”)*

Conditional phrases “if,” “when,” and “where,” are used in provisions if the action depends on whether a stated condition is satisfied. When so used, these words have the following meanings:

If—on condition that; in case that

When—at the time that; in the event that

Where—in whatever place

These meanings have subtle differences. For consistency, use “when” for cases that refer to time, use “where” for cases that refer to position, and use “if” for all other cases.

EXAMPLE

If ambient relative humidity is less than 50%, use accepted measures to protect concrete surface from moisture loss.

Where concrete surface will be exposed to rain, use epoxy-based coating.

When in-place compressive strength of concrete reaches at least 3000 psi, install self-threading anchors in accordance with manufacturer’s instructions.

6.4—Referenced standards

6.4.1 *Standards in specification text*

ACI construction specifications often refer to standards developed by other organizations. There are two key requirements for such referenced standards. The standard must be written in mandatory language and it has to have been developed by a standards developer (refer to Chapter 4).

Referenced standards are listed in Part 1 of a single-item specification and in Section 1 of a multi-item specification. Include the full title and year designation in the list of referenced standards. It is preferred to use the latest version of referenced standards unless there is a reason not to. Do not indicate the year of the standard where the standard is mentioned in the text of the specification. Organize referenced standards according to the standards-producing organization and list the organizations in alphabetical order.

EXAMPLE

1.4 *Referenced standards*

Standards cited in this Specification are listed by name of standards-producing organization; designation, including year; and title.

1.4.1 *American Concrete Institute*

ACI SPEC-117-10—Tolerances for Concrete Construction and Materials—Specification

1.4.2 *ASTM International*

ASTM C39/C39M-18—Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

It is acceptable for an ACI specification to modify an ASTM specification for a specific requirement.

EXAMPLE

Use fine aggregates conforming to ASTM C404, Size No. 2, except that all materials shall pass the No. 16 sieve.

6.4.2 References in checklists

The cited references in the checklists are to be listed as the last item of the Foreword to Checklists using the format in 8.3.

6.4.3 Reference to other ACI construction specifications

6.4.3.1 Referencing entire specification

A construction specification (the main specification) may refer to other ACI construction specifications (referenced specification). The committee, however, should carefully review the referenced specification to avoid having missing, redundant, or conflicting provisions. Because most ACI construction specifications do not have default requirements for all products or procedures needed to complete the Work, information required to make the referenced specification complete must be provided in the Contract Documents. In addition, the Contractor needs to be aware that the specifier referencing ACI construction specifications may include supplementary requirements in the Contract Documents corresponding to the checklist items in the referenced ACI construction specification. Language similar to the following should be used if the specification refers to another ACI construction specification: “(Insert scope of work) shall be in accordance with ACI XXX including supplementary requirements indicated in Contract Documents;” for example, “Concrete construction during hot weather shall be in accordance with ACI SPEC-305.1 including supplementary requirements indicated in Contract Documents.”

The provision that refers to another ACI construction specification should have a corresponding entry in the mandatory requirements checklist that instructs the specifier to review both the mandatory and optional requirements checklists of the referenced specification and provide the necessary information or requirements in the Contract Documents. The following is an example of the language to be included in the mandatory requirements checklist: “Review the mandatory and optional requirements checklists in the Notes to Specifier of ACI XXX and provide the necessary requirements in the Contract Documents.”

If the referenced specification has requirements that conflict with the main specification, the main specification should state that its provisions govern in case of conflicts with the referenced specification. An example of the language to use is: “Provisions of this Specification shall govern if there are conflicts with ACI XXX.”

6.4.3.2 Referencing sections of multi-item specifications

A construction specification may refer to applicable sections of another multi-item specification. The same principles discussed in 6.4.3.1 apply. The specifier will need to review the entries in the mandatory and optional requirements checklist that pertain to the referenced sections and provide missing information in the Contract Documents. Language

similar to the following should be used in the specification that refers to sections of a multi-item ACI construction specification: “Requirements for (insert scope of work) shall be in accordance with Sections x, y, and z of ACI XXX including supplementary requirements indicated in Contract Documents;” for example, “Requirements for formwork, reinforcement, concrete materials, concrete production, and construction of cast-in-place concrete shall be in accordance with Sections 1,2, 3,4, and 5 of ACI SPEC-301 including supplementary requirements indicated in Contract Documents.” The provision that refers to sections of a multi-item ACI construction specification should have a corresponding entry in the mandatory requirements checklist that instructs the specifier to review the mandatory and optional requirements checklists pertaining to those sections in the referenced specification and provide the necessary information or requirements in the Contract Documents. The following is an example of the language to be included in the mandatory requirements checklist: “Review the items in the mandatory and optional requirements checklist in the Notes to Specifier of ACI XXX that apply to the referenced sections of ACI XXX and provide the necessary requirements in the Contract Documents.”

Care is required if referring to sections of another ACI construction specification. The committee needs to understand the content of the referenced sections to avoid having missing, redundant, or conflicting provisions in the committee’s specification. In some ACI multi-item specifications, there may be specialty sections that invoke general sections of the specification. For example, Section 6 of ACI SPEC-301 on architectural concrete invokes Sections 1 through 5 of ACI SPEC-301. Thus, if a construction specification were to refer to the provisions for architectural concrete in ACI SPEC-301, the recommended wording is: “Requirements for cast-in-place architectural concrete shall be in accordance with Sections 1 through 6 of ACI SPEC-301 including supplementary requirements indicated in Contract Documents.”

6.5—Guide for specifying concrete construction

6.5.1 General

There may be cases where a committee decides that it is not possible to write a reference construction specification that would have general applicability. This may occur if the construction activity to be covered by the specification is complex and the requirements may be based on site-specific conditions. In such cases, the committee may decide to write a guide for writing a project-specific specification for a particular aspect of concrete construction. The resulting document would not be published as an ACI standard but would be developed as a guide in accordance with Chapter 7. The document would be titled “Guide for Specifying (enter topic covered).” An example is ACI PRC-506.5 “Specifying Underground Shotcrete—Guide.” Such guides should not be referenced in Contract Documents. The specifier must include in the Contract Documents the provisions recommended in the Guide.

6.5.2 Format

There is no rigid format for writing this type of guide. In general, the guide may contain technical discussion on the

factors to be considered in specifying the requirements for a particular construction activity. The discussion would be followed by a guide specification in two-column format, with the left column providing the recommended specification text and the right column providing notes to the specifier. The content of the guide specification should follow the general three-part format discussed in 6.2. The recommended specification text should be written in terse mandatory language using the imperative mood as discussed in 6.3. The following examples of the content of a guide specification are taken from ACI PRC-506.5.

Recommended specification	Notes to Specifier
Submit proposed methods for mixing, conveying, finishing, curing, and testing along with a list of proposed equipment for each task.	Consider these additional submittals: <ul style="list-style-type: none"> • The shotcrete placement plan • Specific provisions to cure and protect in-place shotcrete.
Cement shall conform to ASTM C150 or be of the type specified by the owner.	Usually a Type I, II, or III cement is specified, but other types may be specified under certain circumstances. Type II or other types may require special attention to the accelerator compatibility.
For mixtures volume-batched on site, check aggregate moisture content and mixture proportions at the frequency specified by the engineer.	The suggested frequency is daily unless moisture content obviously has not changed.
Shotcrete that is nonconforming shall be removed and replaced by the contractor. Alternatively, if approved by the owner, additional shotcrete shall be applied.	If the project QA organizations determine to accept the shotcrete “as-is,” no further remedial action will be necessary.
Natural curing is allowed only if the underground environmental conditions are satisfactory, such as when the relative humidity is above 85%.	In the case of natural curing, an 85% relative-humidity condition is not by itself sufficient and may need to be augmented by spraying water on the finished shotcrete. Extremes of heat, cold, or excessive evaporation and dry-out due to airflow should always be avoided.

6.6—Appendixes

Appendixes are generally not allowed in specifications; however, they may be included if they are approved by TAC. Appendixes are considered to be written in nonmandatory language and can only contain information-only material. They appear after the checklists.

PART 3—GUIDES AND REPORTS

CHAPTER 7—DEVELOPMENT OF GUIDES AND REPORTS

7.1—General

Technical committees may author ACI guides and reports. ACI guides and reports are written in nonmandatory language. Mandatory language can only be used in nonmandatory-language documents when quoting directly from or referring to provisions in a document that uses mandatory language.

7.2—Description of guides and reports

7.2.1 Guides

ACI guides present committee recommendations for analysis, design, specifying, selection, evaluation, testing, construction, or repair of concrete materials or structures. If the committee does not give recommendations, the document should not be titled as an ACI guide. ACI guides can be in the form of handbooks, manuals, and TechNotes.

A guide can provide pertinent examples and case studies to explain covered concepts and indicate advantages and disadvantages of various alternatives.

ACI committees can write guides to assist the user to develop Project Specifications for a specific construction activity.

7.2.1.1 Handbooks and manuals

Handbooks provide guidance on how to apply design standards in practice. Charts, tables, and figures may also be used to illustrate the detailed steps in designing a concrete member or a structure. Handbooks may also include examples to illustrate specific design methods. Examples of handbooks include MNL-17, *ACI Design Handbook*, and SP-4, *Formwork for Concrete* (which is individually authored but committee sponsored).

Manuals provide guidance and instructions to field personnel involved in different aspects of concrete construction. An example is MNL-2, *ACI Manual of Concrete Inspection*.

7.2.1.2 TechNotes

TechNotes are narrowly focused, single-topic guides, usually practice oriented. A TechNote presents specific direction on a particular issue, and may contain pictures, figures, tables, and numeric examples. TechNotes can cover topics such as design, construction, or repair methods, or can provide recommendations on a concrete technology. TechNotes are published electronically and in the *ACI Collection*. In addition, TechNotes may be published in *Concrete International (CI)* at the editor’s discretion. The committee is to maintain a TechNote in accordance with 7.3.2. Refer to 8.1.1.2 on how to write a TechNote.

7.2.2 Reports

ACI reports provide information on concrete technology in the committee’s area of expertise. Reports may include recommended action but are not required to do so. Reports can cover topics such as research results, design or construction methods, or current knowledge on a particular concrete technology.

If there is insufficient knowledge to write a comprehensive ACI report, committees may publish Emerging Technology Reports.

7.2.2.1 Emerging Technology Report (ETR)

An ACI Emerging Technology Report provides information on emerging concrete technology in the committee’s area of expertise where there is insufficient knowledge to write a comprehensive ACI report. It introduces a new technology into practice by providing basic information to allow implementation and accumulation of performance histories. The document should include a statement of limitations and a discussion of research needed to provide the missing information. These documents are identified by the designation “Emerging Technology Report” on the front cover and title page, and by an introductory statement on the title page. The

document shall have a maximum lifetime of 10 years from date of initial publication, by which time it must be withdrawn or revised and published as a report or guide.

To publish the document as a regular ACI report, the committee must web ballot to remove the ETR designation from the next edition. When submitting the revised document for TAC review, the chair must include a written summary of the committee's reasoning for removing the designation. TAC approval is needed to remove the ETR designation.

7.2.2.2 Investigation reports

Investigation reports are individually authored papers that are reviewed by TAC.

7.2.3 Errata

Errata are posted on the ACI website. When potential errors are discovered in an ACI guide or report, the committee chair has the authority to decide if a correction needs to be made and provides staff with the correction. The chair is not required to ballot the committee.

7.3—Development

7.3.1 New guides and reports

Committees must obtain TAC approval before beginning work on a new document. The proposal, sent to the TAC Secretary, should indicate why it is needed and include a preliminary outline that clearly defines the intended proposed chapter and section headings. Refer to 8.1.1 for an example outline. Once TAC approves the work on the new document, ACI staff will assign the document a numerical designation; for example, ACI PRC-123.X. The letter will be replaced by a number at time of publication.

ACI guides and reports are developed in a four-step process:

1. Preparing a new document or revising an existing document
2. Web balloting the draft document according to the procedures of Chapter 3
3. Submitting the committee-approved document for TAC review, according to the procedures of 7.4. (There is no public discussion period for ACI guides and reports.)
4. Revising the document in response to TAC comments.

Once a document has been approved by TAC and the committee has responded adequately to TAC's review comments, ACI publishes the document.

7.3.2 Existing guides and reports

Committees are expected to reapprove, revise (full or incremental), or withdraw a document within 8 years from its adoption date. The adoption date is the month and year of first publication. TAC may remove documents, without committee approval, from the *ACI Collection* that have not been reapproved or revised within 8 years of the adoption date. In the case of an ITG document, the document is removed from the *ACI Collection* after 5 years; however, TAC can extend the time period. To request an extension, the Chair should e-mail the TAC Secretary requesting an extension and a reason why an extension is necessary.

If the committee does not recommend reapproval, revision (full or incremental), or withdrawal of a document within the 8-year period, TAC may reapprove or withdraw it without committee action.

7.3.2.1 Reapproval

The committee may decide to reapprove a document because the information in an existing document, while not new, is still valid. The first reapproval of a document is for 5 years. The second and subsequent reapprovals (if any) are for 3 years. The committee is required to web ballot the reapproval. Negative votes do not need to be resolved, but the ballot must still pass the 1/2 and 2/3 rules. The reapproval may include updating references and minor editorial improvements of notation, terminology, metrication, or other similar items. A reapproval must not include technical changes.

The committee must submit its recommendation for reapproval of the document to TAC for approval. The recommendation includes a web ballot summary and a statement that technological progress at this point does not require revision or that the document is currently being revised but the revision is not complete. Include a summary of the updates to the document. Generally, TAC reviews only the committee's ballot summary and the summary of updates. A reapproval does not change the year of adoption but "Reapproved" with the year of reapproval is added to the document number.

7.3.2.2 Revision

The committee should revise a document when the information in the document needs to be updated. Committees should consider "new business" items from the previous document when working on a revision.

The committee must web ballot revisions according to Chapter 3 and submit the document to TAC for review.

7.3.2.2.1 Full revision

A full revision requires a complete review and reballoting of an existing document through the full committee. Updated information should be added and outdated content should be removed, as appropriate. All changes must be balloted and approved through the full committee. Upon adoption of a fully revised document, the existing version is marked historical. (A document is made historical when it has been superseded by a revision.) The revised document's number receives the new year of adoption.

7.3.2.2.2 Incremental revision

In lieu of conducting a full document revision, the committee may consider updating selected portions of a document for an incremental revision. This option allows quicker dissemination of the latest information approved by the committee. The guidelines below should be used to determine when incremental document revisions are appropriate.

(a) Incremental document revisions should be considered for substantive changes, such as technical changes or updated examples.

(b) Incremental document revisions should not be considered for documents that are deemed standards (that is, codes; code cases; acceptance criteria; design, materials, and construction specifications; and test procedures).

(c) Incremental document revisions should not be considered for documents that are 10 years or more after their last full review.

(d) Incremental revisions to a document are limited to once per year.

Minimum requirements for an incremental document revision are the following:

- (a) Substantive changes that are useful to the industry are required, but associated changes should also be made so that the document is current.
- (b) Updated references should be provided including referenced standards.
- (c) Updated notation and definitions should be included when new items are added or modified.
- (d) Changes must be balloted and approved through the full committee voting process prior to review by TAC, consistent with full document reviews.
- (e) All proposed changes must be highlighted or tracked in the revised document for TAC review.

Committees must obtain TAC approval before submitting an incremental revision for review. The incremental document revision form, sent to the TAC Secretary, should include a summary of major changes and justification for the incremental review request. When a document receives an incremental revision, committees may request an extension of the 8-year cycle for a full document review. The duration of the extension will depend on the timing and scope of the incremental revision. Typical extensions are 2 to 3 years. A maximum of a 10-year extension may be granted at the discretion of TAC, at which time a full revision of the document is required by the committee and will be reviewed by TAC.

7.3.2.3 *Withdrawal*

The committee should recommend withdrawal of a document when the committee determines that the information it contains is obsolete and should not be revised. A web ballot of the committee is required. Negative votes do not need to be resolved, but the ballot must still pass the 1/2 and 2/3 rules. The recommendation for withdrawal should include a statement that, in the judgment of the committee, the document is no longer useful or amenable to updating. The committee's recommendation and related ballot summary must be submitted to the TAC Secretary for review by TAC.

Upon TAC's approval of the recommendation, the document is not included in the next edition of the *ACI Collection*. It may still be available for purchase from ACI as a historical document.

7.3.2.4 *ITG guides and reports*

After an ITG document is published, TAC will request an ACI committee consider the incorporation of the content of the ITG document into a new or existing committee document. Related technical committee(s) may have been identified during formation of the ITG as described in 1.3.1.2.

The technical committee should:

- (a) Review and revise the content of the ITG document or incorporate the information into an existing committee document
- (b) Ballot the revised content of the ITG document as soon as practicable because the ITG document only has a 5-year life in the *ACI Collection*; however, TAC can extend the period. To request an extension, the Chair should e-mail the TAC Secretary requesting an extension and a reason why an extension is necessary.

7.3.3 *Documents sponsored with other ACI technical committees*

ACI committees may agree to cosponsor a document when the scope of the document overlaps their missions. Committees may request to jointly sponsor a document when at least 75% of voting members from each affected committee vote in favor of the proposed arrangement. The chair must forward the comments of negative voters to TAC. In such arrangements, one committee is the major sponsor, and the others are minor sponsors.

The procedure for processing the document through the committees is as follows:

1. Major sponsor committee ballots document and resolves negatives
2. Minor sponsor committee ballots document; at least 50% of committee must vote affirmative
 - a. If the ballot passes, the negatives and comments are sent back to the major sponsor committee for resolution
 - b. If the ballot fails, the minor sponsor committee can choose to no longer cosponsor the document
3. Major sponsor committee submit document to TAC, showing all ballots and negative resolutions

The document designation includes all sponsoring committees. Rosters of all sponsoring committees appear on the document.

7.3.4 *Restrictions on circulating drafts*

Add the following disclaimer to the bottom of each page of a draft document: "This draft is not final and is subject to revision. Do not circulate or publish." Include date of the final draft. The chair may only circulate the drafts to individuals outside the committee, TAC, and ACI staff to obtain expert technical advice not available in the committee or to ensure that all interested parties are given an opportunity to express viewpoints.

Committee documents, at any stage of development, must not be released for publication other than to ACI or cosponsors of joint committees, except on approval of TAC. Similar restrictions apply to test data or unpublished technical information circulated in a committee.

Posting of draft documents on the committee's ACI website is encouraged. Posting of draft documents on independent websites is not permitted because control, copyright, and document status are not secure.

7.3.5 *Coordination of information*

7.3.5.1 *Technical committees*

Coordination with other technical committees is an important part of processing documents. Some reasons for coordination with other committees are:

- (a) To provide agreement for information that will be incorporated or referenced in another committee document
- (b) To improve quality of the document through the input of another committee
- (c) To minimize instances of documents with parallel or overlapping scopes
- (d) To minimize technical conflicts between committee documents

If substantial difficulties arise between two committees, the matter can be referred to TAC.

Documents submitted for TAC review may be in conflict with or vary from existing ACI documents. The committees should identify conflicts between the submitted document and existing ACI documents and provide reasons for the differences, if applicable.

7.3.5.2 Construction Liaison Committee (CLC)

Part of the ACI Board of Direction's Construction Liaison Committee (CLC) mission is to review technical committee documents that deal with constructability and economy. As part of the TAC review process, staff sends documents that contain sections on construction to CLC for review.

7.3.5.3 Terminology

TAC reviews each document's definitions at the time of submission for TAC review. If the committee wants to develop a unique definition for a term defined in "ACI Concrete Terminology" (CT), they must provide the reason for the modification.

7.3.6 Translation of ACI documents

Translation of an ACI document into a language other than English may be permitted. Refer to the Board Policy on translation of ACI products. Where the Board Policy requires review and approval by the policies of the originating committee, TAC considers translation an editorial change and no further balloting by the committee is required.

7.3.7 Guides and reports authored by ACI chapters

ACI chapters may publish their documents without TAC approval. They must, however, use a disclaimer stating that the document was prepared and reviewed by the chapter and has not been reviewed or approved by ACI. Chapter documents must only use chapter logos on their documents.

If a chapter wishes to use the ACI logo, the document must be processed through an ACI technical committee and receive a TAC review and approval.

7.4—Writing guides and reports

7.4.1 Format

Refer to Chapter 8 for format of a guide or a report.

7.4.2 Units

In accordance with ACI Board Policy, guides and reports shall be published in dual units (14.3). The primary units shall be stated in inch-pound followed by SI units in parentheses.

Soft unit conversion of a document may be considered editorial. No further balloting by the committee is required to approve the unit conversion. When hard unit conversions are developed, they must be balloted.

This dual-units requirement may be waived by TAC in exceptional circumstances. TAC approval to waive the requirements for dual units is required before submitting the document to TAC. The application must describe the circumstances supporting a waiver.

Design examples and certain figures and tables do not need to be in dual units because of the resulting complexity if dual units were incorporated.

For additional information on units, refer to Chapter 11.

7.4.3 Notation

Refer to Chapter 10 for information on notation.

7.4.4 Style

Refer to Chapter 9 for information on style.

7.4.5 Editorial review

The committee's editorial subcommittee or task group should thoroughly edit a document before final committee web ballot.

The editorial subcommittee should review for document structure, sentence structure, grammar, redundancy, spelling, and typographical errors. Because many people contribute to a document, it is essential that the subcommittee review the separate sections for consistency in style and format. The editorial subcommittee should be familiar with Chapters 8 and 9.

7.5—TAC review

7.5.1 Submission package

All materials required for submitting documents for TAC review shall be submitted to the TAC Secretary by the deadlines listed on the Document Development Guidance webpage. Submitting the document by the deadline does not guarantee placement in the next TAC document review cycle. TAC typically accepts the documents in the order received. With the submittal, the chair shall include:

- (a) An electronic copy of the document in Microsoft Word®
- (b) Original artwork
- (c) A ballot summary of the final web ballot(s), including resolutions to all negatives
- (d) A summary of revisions to the existing document in the case of a revision

The committee is encouraged to provide a list of at least three potential external reviewers for the document.

Documents prepared by joint committees may be subject to the review procedures of the sponsoring organizations. Coordinate with staff the required submissions to such organizations.

7.5.2 Staff editorial review

TAC has directed staff to perform an editorial review of each document that is submitted for TAC review. Staff reviews the document for grammatical errors, misspelled words, ambiguous statements, and checks the document for compliance with ACI style. All staff-recommended editorial changes are sent to the chair for approval. Once the chair and staff have agreed upon editorial items, staff submits the edited document to TAC for review.

7.5.3 TAC review

One of the most important functions of TAC is the review of technical committee documents. TAC reviews documents for:

- (a) Technical content and correctness
- (b) Potential conflicts, duplications, and overlaps with other ACI documents
- (c) Compliance with ACI formats
- (d) Clarity

The submitted document is sent to TAC and selected external reviewers who are experts on the subject matter and who are not members of the committee submitting the document. ACI staff also forwards the document to committees that have guides or reports that may cover the subject matter in the document to help identify conflicts, duplications, and overlaps between committee documents. Reviewers are given approximately 4 weeks to review the document and submit comments.

TAC may review the entire document, even if only one section has been revised, because a revision of one section of the document may necessitate a change elsewhere in the document.

7.5.3.1 TAC review group

Each document is assigned to a TAC review group (RG) that is composed of a TAC member as review chief, two other TAC members as primary reviewers, and a staff liaison. All comments received from TAC members, external reviewers, CLC, staff, and chairs of coordinating committees are compiled as TAC review comments and distributed to the RG by the review chief.

The TAC RG reviews all comments and meets with a committee representative, usually the chair, to discuss the TAC review comments. The review chief leads the discussion on TAC's behalf.

7.5.3.2 Review comment classifications

Reviewers classify each of their comments as primary (P), editorial (E), or secondary (S) and also provide specific page and line number references for each comment, or label them as "Page 0" and "Line 0" for general (G) comments that apply to the entire document.

Primary (P) comments identify technical issues that the committee must address before publication of the document.

Editorial (E) comments identify editorial issues that the committee must address before publication of the document. The committee is expected to implement all E comments unless the committee agrees that the change is not an improvement or that it would change the intended meaning.

Secondary (S) comments identify technical or editorial issues that should be addressed either in this document or the next revision of the document.

General (G) comments identify issues general to the entire document that the committee must address before publication of the document.

7.5.4 TAC decision

After the RG meets with the committee representative, the RG makes a recommendation to TAC regarding the document. TAC considers the recommendation and makes one of the following decisions on the document:

(a) Document is approved for publication, contingent upon satisfactory response to TAC review comments in a timely manner

(b) Document is not approved for publication, and it is returned to the committee for revision, reballoting, and resubmission (commonly called "3R")

The committee is notified of TAC's decision, and the official TAC review comments are sent to the committee for consideration.

7.5.4.1 Document approved

When the document is approved, the committee should act promptly to prepare a response to each TAC review comment.

7.5.4.2 Responding to TAC comments

The committee must document its response to each TAC review comment. The committee can agree with a P, E, or G comment and make an appropriate change to the document or disagree with reason. When the committee disagrees, a detailed reason statement for the disagreement must be documented.

The committee can agree with an S comment and make a change to the document, disagree (no documentation is required), or agree to take the issue up as new business.

Responses to TAC comments must be approved by the committee by either web ballot or meeting ballot, regardless of whether or not the response resulted in a technical change to the document. If a comment is strictly editorial and appropriate, the chair has the authority to implement the change. These editorial changes do not need to be balloted. Include with the ballot the document with proposed changes resulting from the proposed responses to TAC comments using Track Changes.

After the document has been revised in response to TAC review comments, the following shall be submitted to ACI staff:

(a) The revised document in Microsoft Word® format, showing the committee's changes using the Track Changes feature

(b) All original or revised artwork

(c) The comment form including the committee responses to the TAC review comments

(d) A ballot summary on the responses to TAC review comments, including any related committee minutes that provide records of the resolution of negative votes and negative withdrawals

When compliance with TAC review comments is verified, the document is adopted. The adoption date is the same as the publishing date.

If a committee decides to abandon a document after TAC approval has been received, the committee is required to web ballot this decision. The balloting summary of the decision to abandon the document must be submitted to ACI staff. This ballot is considered an administrative ballot and the negatives do not need to be resolved.

Technical committees must respond to TAC review comments within 2 years of the review, otherwise the TAC approval may be withdrawn. In such case, the committee must resubmit the document for TAC review and respond to a new set of TAC review comments. In exceptional cases, TAC may extend the time frame for acceptance of the committee responses upon written request from the committee chair with detailed explanation of the reasons.

7.5.4.3 Document not approved

If the document is not approved by TAC, the committee is usually expected to revise, reballot, and resubmit (commonly called "3R") the document to TAC. The decision not to approve is usually the result of major technical deficiencies in the document. Therefore, TAC expects a comprehensive effort by the committee before the document is resubmitted.

When a document is not approved, the TAC RG will indicate what they believe is necessary to revise the document. Although TAC expects the committee to address issues raised during the TAC review when revising the document, the committee is not expected to respond individually to each review comment.

7.6—Appeal of committee actions related to documents

Persons who have directly and materially affected interests and who have been or will be adversely affected by any procedural action or inaction by an ACI technical committee

related to the development of a document have the right to appeal. Documents developed under the ACI consensus process may be appealed, but appeals may be filed only on procedural grounds.

The ACI TAC, as the committee responsible for establishing and enforcing procedures for ACI technical committees and documents, will consider the appeal and will have final authority. If an appeal specifically calls into question an action of TAC itself, the appeal will be considered by the Standards Board, who will have final authority.

During the development of a document in committee, only voting members of the relevant committee may file an appeal of a committee action. A voting committee member also has the right to appeal a TAC decision regarding a document under development by a committee.

7.6.1 Appeal requirements and procedure for submittal

The appellant must submit an appeal package in writing to the TAC Secretary. The required elements of an appeal package are the appellant (including name, affiliation, and contact information), standard under appeal, basis of appeal (citation of relevant procedure), rationale for appeal (how was the procedure not followed), substantiation of how the appellant is materially affected, and supporting documentation. The burden of proof to show adverse effect shall be on the appellant. Because appeals are normally heard at ACI conventions, all appeal packages must be submitted in writing to the TAC Secretary at least 6 weeks before a convention for inclusion on the agenda of the hearing committee (TAC or Standards Board). Packages received within this 6-week window may be deferred to the next convention.

7.6.2 Appeal review and adjudication process

For appeals of technical committee action or inaction, the matter will be adjudicated by TAC according to the following process, except that if an appeal calls into question a specific action/inaction of TAC, then the Standards Board will adjudicate the appeal.

Upon receipt of an appeal package, the TAC Secretary informs the TAC Chair of the appeal and will perform a preliminary investigation, which will include informing the chair of the committee that is the subject of the appeal. The appeal will be placed on the TAC agenda for discussion at the next appropriate meeting.

At the discretion of TAC, information may be independently gathered by ACI staff or another appointed task group. At TAC's discretion, hearing(s) may be scheduled (typically at the next scheduled TAC meeting) to allow TAC to hear directly from both the appellant and the committee representatives relevant to the standard in question. TAC will consider the information gathered from the appeal, investigation(s) and hearing(s) and will deliberate in closed session. Based on results of its deliberations, TAC will ballot a written response to the appeal. Formal response to the appeal will be issued by letter from the TAC Secretary to the appellant, with copy to the chair of the committee that is the subject of appeal, relating the findings and final decision of TAC regarding the appeal.

The hearing Committee (TAC or Standards Board) will endeavor to conduct appropriate investigations and hearings

within 1 year of receipt of an appeal and issue a final decision within 18 months of the date of appeal, though adjustments may be necessary to complete a thorough consideration of the matter. The appellant and subject committee officers will be informed by the TAC Secretary if delays are encountered in meeting this schedule.

If an appeal is upheld, the document shall not be processed further, but will be returned to the originating committee to address the findings of the appeal and re-initiate the document review process related to the subject of the appeal.

CHAPTER 8—FORMAT AND LANGUAGE FOR GUIDES AND REPORTS

8.1—Format

8.1.1 Outline

Below is an example of an outline with the required sections for ACI guides and reports, with the exception of TechNotes.

8.1.1.1 Guide and report outline example

EXAMPLE

Title page—Title, roster, synopsis, keywords, and table of contents

CHAPTER 1—Introduction and Scope

1.1—Introduction

1.2—Scope

CHAPTER 2—Notation and definitions

2.1.—Notation

2.2—Definitions

FINAL CHAPTER—References

Appendix (if used)

Appendix A—Title

A.1—Title

8.1.1.2 TechNote outline example

The structure and body of a TechNote consists of an introduction; a short, concise question; followed by the answer, which is a brief summary of the subject matter; discussion; and an optional summary. The TechNote format is found on the Document Development Guidance webpage.

8.1.2 Description of required front matter

(a) Title—The title of the document appears prominently on the first page, and it should read “Topic—Report (or Guide)”; for example, “Foundations for Dynamic Equipment—Report”.

(b) Roster—All voting members (of the main committee and the subcommittee that developed the document), consulting members, and liaison members at the time of the opening date of a document's final web ballot before submission for TAC review are listed on the roster published on the front page of the committee document. Associate members are not listed. When a committee reapproves a document, the committee roster published with the original document is retained, and the roster of the current committee is not shown.

The chair may list other individuals who contributed to the document and should receive recognition.

Place an appropriate note immediately below the roster. The acknowledgement note should not list specific contributions. An example of an appropriate note is: “Special acknowledgements to {list of individuals} for their contributions to this [report or guide].”

(c) Synopsis—A one- or two-paragraph synopsis should state the document’s scope and purpose, and should inform and spark interest without going into too much detail. Each synopsis is printed in *Concrete International (CI)*, and should therefore make sense when read independently of the document.

(d) Keywords—A list of items discussed in the document that aid users in retrieving material. The title, synopsis, and table of contents of the document are good sources for keywords. Approximately three to 10 keywords are required. The keywords should reflect the document’s subject matter without being too general. For example, avoid listing “concrete” or “water-cement ratio.” List keywords in alphabetical order and separate them with semicolons. Do not use multiple forms of the same word as keywords.

(e) Table of contents—A table of contents includes titles of chapters and sections. Do not include page numbers in the table of contents; page numbers are assigned by staff after final formatting of the document.

(f) References—Final chapter; includes standards and cited references.

8.1.3 Description of chapters

Chapter 1—Introduction (1.1) and Scope (1.2)—provides the history, the scope of the document and context of the information, and may provide a brief description of each chapter in the document.

Chapter 2—Definitions and notation—list the notation used throughout document. Arrange in alphabetical order, with roman letters appearing first and Greek letters at the end. Upper-case letters should come before lower-case letters in the list. Define technical terms that are unique to the document. Refer to “ACI Concrete Terminology” (CT) on the ACI website.

For documents with terms defined, add the following statement:

ACI provides a comprehensive list of definitions through an online resource, “ACI Concrete Terminology.” Definitions provided here complement that source.

Other chapters—Present information in a logical order.

8.1.4 Description of back matter

Appendixes—Some documents use appendixes to present supplementary information such as long derivations, research data, or sample calculations. Use a separate appendix for each main purpose, lettered consecutively (Appendix A, Appendix B, etc.). Appendixes, if included, should follow the reference chapter. Appendixes should also be listed in the table of contents.

8.1.5 Numbering and titles

Chapters and sections should have titles. Items may or may not be titled, but number them consecutively following the decimal designation system. The numbering system should not exceed four levels.

EXAMPLE

Chapter 1—Chapter (title)
1.1—Introduction—Section (title)
1.1.1 Item
1.1.1.1 Sub-item

8.2—Language

8.2.1 General principles

Technical writing must be precise and convey a single, specific meaning. Using multiple terms when referring to a single item or idea creates confusion, and can lead to misinterpretation of information. ACI requirements for technical writing include:

- (a) Avoid words or phrases that have more than one meaning that can be applicable to the context of the document
- (b) Do not use slang expressions
- (c) If there is any doubt that a specific phrase or term can be confused with another and it must be used in the document, define the exact intended meaning at its first mention or in the definitions chapter
- (d) Use terminology and definitions from the CT unless there is a technical reason for using a different definition

8.2.2 Clarity

ACI technical document language should not hedge or convey uncertainty, as this causes the document to lose credibility to the reader. Avoid beginning sentences with phrases such as “It is recommended that...,” “Committee XXX recommends that...,” or “It is suggested that...” It is understood that the document presents recommendations of the committee.

When using phrases such as “It has been observed that...” or “Research has shown that...,” the reader wonders, “Who observed? What research?” In these instances, identify the source or cite a reference.

8.2.3 Gender-specific language

Avoid using gender-specific terms, such as “he,” “she,” or “man,” when possible. Such terms can often be replaced by “operator” or “person.”

8.2.4 Vague language

Do not use vague adjectives or adverbs.

EXAMPLE

- (a) Adequately
- (b) Appropriately
- (c) Comprehensive
- (d) Currently
- (e) Immediately
- (f) Presently
- (g) Recently (recent)
- (h) Rigorous
- (i) Significantly
- (j) Substantial
- (k) Usual

8.2.5 Active versus passive voice

When possible, write in the active voice. This means that the subject of the sentence performs the verb of the sentence, which makes for more forceful and direct writing. The

passive voice usually employs a form of the verb “to be.” When using the passive voice, the subject of the sentence receives the action of the verb.

EXAMPLE

Active: The manual provides helpful hints for writing technical papers.

Passive: Helpful hints for writing technical papers are provided in this manual.

8.3—References

Cited references should be in the author/date format.

All references must be mentioned at least once in the document to be included as a reference. References need to be published and accessible to the public. References should not be made to withdrawn documents, except for historical documents. ACI does not publish bibliographies. Include each element of the authored reference, including month and page number(s) where applicable.

EXAMPLE

CHAPTER 10—REFERENCES

ACI committee documents and documents published by other organizations are listed first by document number, full title, and year of publication followed by authored documents listed alphabetically.

American Concrete Institute (ACI)

ACI PRC-212.3-04—Chemical Admixtures for Concrete

American Society of Civil Engineers (ASCE)

ASCE/SEI 7-10—Minimum Design Loads of Buildings and Other Structures

ASTM International

ASTM C39/C39M-12—Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

Authored documents

Kosmatka, S. H.; Kerkhoff, B.; and Panarese, W. C., 2002, *Design and Control of Concrete Mixtures*, EB001, 14th edition, Portland Cement Association, Skokie, IL, 372 pp.

Mathur, R.; Lee, H.; and Orsolini, G., 1999, “Two-Level Design Spectrum for Highway Bridges,” *Seismic Response of Concrete Bridges*, SP-187, K. Krishnan, ed., American Concrete Institute, Farmington Hills, MI, pp. 345-360.

Cite references in the text as follows.

EXAMPLE

(Smith 2013) one author

(Smith and Jones 2013) two authors

(Smith et al. 2013) three or more authors

(Smith 2013; Jones and Johnson 2013)...separate works by different authors with a semicolon

(Smith 2012, 2013; Jones et al. 2013)...separate works by the same author with a comma

(Smith et al. 2013a,b; Jones 2013)...if an author or group of authors has two works with the same year, designate them “a” and “b” (and so on, as necessary).

A project-specific correlation is required to estimate in-place strength from the wave speed (ACI PRC-228.1).

Refer to Helgason and Hansen (1974) for information on fatigue strength of reinforcing bars.

Research at the University of Nebraska (Amorn et al. 2007) has shown that deformed wire has similar fatigue resistance to that of reinforcing bars.

If possible, reference printed publications. For original content available only from electronic sources, however, include as much information as possible: author, title of page, title or owner of site, URL, and date that the site was accessed.

EXAMPLE

Whitmore, D., *Installation of Embedded Galvanic Anodes*, American Concrete Institute, <http://www.concrete.org/general/RAP-1.pdf> (accessed Feb. 17, 2016)

If there is no author, the owner of the site may be substituted for the author.

EXAMPLE

American Concrete Institute, *Concrete: A Century of Innovation*, American Concrete Institute, <http://www.concrete.org/staffreport/concrete.html> (accessed Feb. 17, 2016)

For electronic journals, follow the same format for paper journals, and add the URL.

EXAMPLE

Suryavanshi, A. K., “Cementitious Adhesive for Ceramic Tiles,” *Concrete International*, V. 26, No. 8, 2004, <http://www.concreteinternational.com> (accessed Feb. 17, 2016)

Websites:

For website with no author and a publication date

EXAMPLE

American Concrete Institute, 2021, ACI Adopts Three New Position Statements, Last modified April 28, 2021, <https://www.concrete.org/news/newsdetail.aspx?f=51732818>

In-text citation: (American Concrete Institute 2021)

For website with no author or date of publication

EXAMPLE

American Concrete Institute, n.d., “ACI Adopts Three New Position Statements,” Accessed Oct. 1, 2021, <https://www.concrete.org/news/newsdetail.aspx?f=51732818>.

In-text citation: (American Concrete Institute, n.d.)

PART 4—STYLE

CHAPTER 9—ACI TECHNICAL WRITING STYLE

For writing style questions or issues not addressed in the TCM, refer to the latest edition of *The Chicago Manual of Style*.

9.1—Units

The primary units are stated in inch-pound units followed by SI units in parentheses.

9.2—Equations

When a single equation is part of a provision/section or sentence, use a sentence fragment with a colon before the equation.

EXAMPLE

8.5.7.4 If shear reinforcement perpendicular to axis of the member provided, V_s , shall be

$$V_s = \frac{A_v}{s} f_{yt} d \quad (8.5.7.4)$$

If several equations are part of a provision/section, use a full sentence to introduce the equations.

EXAMPLE

7.6.3.1 Moments M_1 and M_2 at the end of a member shall be calculated with Eq. (7.6.3.1a) and Eq. (7.6.3.1b)

$$M_1 = M_{1ns} + \delta_s M_{1s} \quad (7.6.3.1a)$$

$$M_2 = M_{2ns} + \delta_s M_{2s} \quad (7.6.3.1b)$$

Place simple mathematical expressions in line with text.

EXAMPLE

Use: For a composite member with a concrete core encased by structural steel, the thickness of the steel encasement shall be not less than $b\sqrt{\frac{f_y}{3E_s}}$ for each face of width b or less than $h\sqrt{\frac{f_y}{8E_s}}$ for circular sections of diameter h .

Instead of: For a composite member with a concrete core encased by structural steel, the thickness of the steel encasement shall be not less than

$$b\sqrt{\frac{f_y}{3E_s}} \text{ for each face of width } b$$

or less than

$$h\sqrt{\frac{f_y}{8E_s}} \text{ for circular sections of diameter } h.$$

Where practical, place a variable being defined on the left side of the expression.

Use:

Specified compressive strength, psi	Required average compressive strength, psi
$f'_c < 3000$	$f_{cr}' = f'_c + 1000$
$3000 \leq f'_c \leq 5000$	$f_{cr}' = f'_c + 1200$
$f'_c > 5000$	$f_{cr}' = 1.10f'_c + 700$

Instead of:

Specified compressive strength, psi	Required average compressive strength, psi
$f'_c < 3000$	$f_{cr}' = f'_c + 1000$
$3000 \leq f'_c \leq 5000$	$f_{cr}' = f'_c + 1200$
$5000 < f'_c$	$f_{cr}' = 1.10f'_c + 700$

9.2.1 Equation numbering

If an equation is referenced by another provision/section, including an equation in a table, it must have an identification number (XX) and requires the abbreviation “Eq.” The equation number is the same as the provision or section number. If a provision/section contains more than one equation, add a letter suffix to the number.

EXAMPLE

7.6.3.1 Moments M_1 and M_2 at the end of a member shall be calculated with Eq. (7.6.3.1a) and Eq. (7.6.3.1b)

$$M_1 = M_{1ns} + \delta_s M_{1s} \quad (7.6.3.1a)$$

$$M_2 = M_{2ns} + \delta_s M_{2s} \quad (7.6.3.1b)$$

9.3—Figures

9.3.1 Figure captions

Each figure requires an italicized caption. The word “figure” must be abbreviated as “Fig.” followed by the provision number, an Em dash (—), and the caption. The first letter of the title is capitalized, the remaining letters are lowercase. Place a period at the end of figure captions.

9.3.2 Figure numbers

Figure numbers are the same as the provision or section number. If a provision or section refers to more than one figure, add a letter suffix to the figure number. Begin sentences with the full word “Figure” rather than the abbreviation “Fig.”

9.3.3 Figure quality and copyright

Transmit each figure as an individual file of the highest available quality in an editable format. Figures cannot be placed in the text as images or object. Figures that are embedded in the Microsoft Word® document are usually not of the best quality and are used by ACI Staff as a reference only with respect to the general position within the document. ACI expects that committees have permission to use the figures that are in a document. If a figure requires permission, contact ACI to coordinate permission. ACI staff places all figures in their proper position before publication. All submitted figures should have high contrast and be easy to read. Adhere to the following guidelines when submitting graphics for documents.

For electronic photos:

(a) .eps, .tif, .jpg, or high-resolution (600 dpi) .pdf files are the preferred formats. Avoid .bmp or .gif files.

(b) Photos should be a minimum of 300 dpi and need to be at least 3.33 in. wide.

(c) Digital editions of the publication are published in color, and print editions are printed in black and white.

For drawings and line art:

(a) eps, .tif, .jpg, or high-resolution .pdf files are the preferred formats. Avoid .bmp or .gif files.

(b) Avoid using fill patterns, or shading, in figures as they do not reproduce well.

(c) Use only sans-serif fonts, such as Arial or Helvetica, for labels in drawings and graphics.

(d) Avoid using fine lines and small text that can become illegible when the figure is reduced for publication.

(e) Avoid using color as a distinction between lines in a graph or photograph, as the print editions will be printed in black and white.

For printed photographs:

(a) Original high-contrast photographs result in the highest-quality printed image.

(b) If photographs cannot be reproduced with suitable quality and contrast, staff will eliminate the image and revise the text accordingly.

Videos are allowed in electronic guides and reports. The committee must submit a video that can be embedded in an electronic document; URLs to videos are not allowed. A photo is required for the printed document.

Figure size:

Figures are formatted to fit within a column of 3.3 in., or a full page-width margin of 7.0 in. The maximum width for a figure in the Commentary is 5.0 in.

Text:

Annotations, notes, and internal captions use sentence case (only the first word capitalized).

All the text in a group of figures must appear identically sized on the printed page (provide to ACI Publishing Services a table of figure widths that will render the text at the intended size).

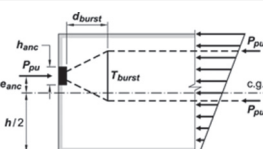
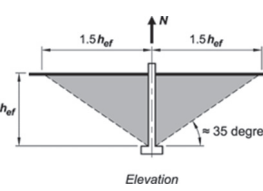
Text is sized as follows:

Minimum text height = 0.08 in.	
Text type	Height
Full size (must use when combined with superscript/subscript)	0.10 in.
Subscript/superscript	0.08 in.
Reduced size (no subscript/superscript)	0.08 in. minimum

Font styles used are as follows:

Regular body text	Font style
Annotations, notes	Arial
Internal captions	Arial + italic (not underlined)

Notation/variables	Font style
Roman characters	Arial + bold + italic
Arabic numerals	Arial + bold
Greek characters	Symbol + bold (+ italic in 318 only)
ℓ	MT Bold + bold

Purpose	Thickness	Example
Edge of concrete (without predicted breakout shading)	0.006 in. black, plus inner 0.05 in. shaded	
Strut	0.020 in.	
Edge of concrete (with predicted breakout shading)	0.025 in.	
Predicted breakout boundary	0.006 in.	
Object	0.010 in.	
Leader, dimension, break line, centerline	0.006 in.	

9.4—Tables

9.4.1 Table captions

Each table requires a number, followed by an Em dash (—), and the caption. A table title is at the top, the first letter of the title is capitalized, the remaining letters are lower case, and the table caption is boldfaced.

9.4.2 Table numbers

Table numbers are the same as the provision or section number. If more than one table is in a provision or section, add a letter suffix to the table number.

9.4.3 Table footnotes

Footnotes in tables are mandatory information and are shown at the bottom of the table. Symbols used for table notes should follow this list: *, †, ‡, §, #, ||.

9.4.4 Table formatting

All tables must be in an editable format. They cannot be placed in the text as images or objects. The left-most column should contain the conditions and the other column or columns should contain the result. Use column and row lines only as necessary for clarity. Do not use lines on sides of a table. If a table row needs to be referenced, assign a letter to that row.

EXAMPLE

Table 11.6.4.2—Minimum A_v/s

Beam type	Minimum A_v/s , in. ² /in.
Nonprestressed	Larger of (a) and (b):
	$0.75\sqrt{f'_c} \frac{b_w}{f_{yt}}$ (a)
	$50 \frac{b_w}{f_{yt}}$ (b)
Prestressed*	Smaller of (c) and (d):
	$0.75\sqrt{f'_c} \frac{b_w}{f_{yt}}$ (c)
	$\frac{A_{ps}f_{pu}}{80f_{yt}d} \sqrt{\frac{d}{b_w}}$ (d)

*Members are considered prestressed where the effective prestress force is not less than 40% of the tensile strength of flexural reinforcement.

9.5—Lists

The first word in the list is capitalized, unless it is a number, symbol, or equation. Use a complete sentence followed by a colon to introduce a list; the list itself does not need punctuation or a conjunction, such as “and,” after the penultimate term.

When using lists:

- (a) Lettered—Preferred identifier for a list
- (b) Numbered—Permitted when sequential actions are required or if it is a section with a letter
- (c) Bulleted—Do not use bulleted lists

Mathematical expressions in a list do not require an equation number and do not have units because units are implied in the calculation.

EXAMPLE

Spacing of flexural reinforcement closest to the tension face in each direction shall not exceed the smallest of (a) through (d), where stress f_s shall be calculated or taken as $2/3f_y$:

- (a) $3h$
- (b) 18 in.
- (c) $15 \left(\frac{40,000}{f_s} \right) - 2.5c_c$
- (d) $12 \left(\frac{40,000}{f_s} \right)$

Units are not provided for constants in equations if the intent of the calculation is clear. If a code uses a constant that has unusual units, provide an explanation in the commentary. Where a provision/section involves two or more items connected by the conjunctions “and” or “or,” the conjunction shall be interpreted as follows:

- (a) “And” indicates that all the items apply
- (b) “Or” indicates that any one of the items applies

EXAMPLE

Area of transverse torsion reinforcement, $(A_v + 2A_t)/s$, is the greater of (a) and (b):

- (a) $\sqrt{f'_c} \frac{b_w}{f_{yt}}$
- (b) $50b_w/f_{yt}$

9.6—Grammar

9.6.1 Gender-specific language

Avoid using gender-specific terms, such as “he,” “she,” or “man,” when possible. Such terms can often be replaced by “operator” or “person.”

9.6.2 Conditional phrases (use of if, when, and where)

These conditional phrases are used in provisions where the action depends on whether a stated condition is satisfied. When so used, these words have the following meanings:

- If—on condition that; in case that
- When—at the time that; in the event that
- Where—in whatever place or situation

These definitions have subtle differences. For consistency, use “when” for cases that refer to time, use “where” for cases that refer to position, and use “if” for all other cases.

9.6.3 Acceptable and unacceptable terminology

Certain terms and phrases should typically not be used in ACI documents. Some terms to be avoided are listed in the following along with their acceptable alternatives.

Avoid	Use
about	approximately
air-entraining agent	air-entraining admixture
below	the following
chairman	chair

concrete block and cmu	concrete masonry unit
control joint	contraction joint
cost (when referring to monetary cost)	price
e.g.	for example
epoxy (as a verb)	apply epoxy
form streaking	formstreaking
form work	formwork
freeze/thaw	freezing and thawing
freezing and thawing durability	resistance to freezing and thawing
furthermore	in addition (additionally)
gage	gauge
ground-granulated blast-furnace slag	slag cement
high performance concrete	high-performance concrete
i.e.	that is
lateral force resisting system	lateral-force-resisting system
microsilica	silica fume
mix (noun) or mix design	mixture proportions
NPC	normal cement
PFA	fly ash
Portland cement	portland cement
pour concrete	place concrete
rebar	reinforcing bar (in some instances, reinforcement should be used)
referred to as	called
see	refer to
self-compacting concrete	self-consolidating concrete
shearing stress	shear stress
since (if not referring to time)	because
slab(s)-on-grade	slab(s)-on-ground
stud shear reinforcement	shear stud reinforcement
superplasticizer	high-range water-reducing admixture
trial mix (trial mixes)	trial batch
water tightness	watertightness
water cementitious ratio or water-to-cementitious-material ratio	water-cementitious materials ratio
w/(c+m) water-cementitious material ratio	water-cementitious materials ratio (w/cm)
water reducer	water-reducing admixture
water to cement ratio	water-cement ratio (w/c)
wet or plastic concrete	fresh concrete

9.6.4 Numbers

Within the body of text, always spell out numbers less than 10 unless accompanied by units of measurement or a decimal place. Use numerals for numbers 10 and higher, unless at the start of a sentence.

Use commas to separate numbers greater than 9999.

Numerals should not be used to begin a sentence. When a sentence cannot be restructured to move the numeral elsewhere in the sentence, spell out the number.

9.6.5 Hyphens

Punctuate two or more compound adjectives with hyphens or commas.

Use hyphens between whole numbers and fractions that precede a unit abbreviation.

Do not use a hyphen for an adjective composed of a number and a unit.

Hyphenate the following commonly used industry terms:

- (a) Post-tensioning
- (b) Saturated surface-dry
- (c) Strike-off
- (d) High-range water-reducing admixture

9.6.6 Serial comma

The serial comma is used in ACI technical writing. Therefore, when listing three or more items that are separated by commas, a comma should precede the word “and” or “or” before the last item.

9.6.7 Footnotes

Footnotes should not be used in provisions or sections, but they may be used in tables and figures.

9.6.8 Parentheses and brackets

Don’t use parenthetical expressions.

9.6.9 Abbreviations

Define abbreviations or acronyms in the body of the document in each chapter the first time they are used.

9.6.10 Capitalization

Capitalize specific types, classes, or categories; any mention of a specific figure, table, or equation; and the names of ACI certification programs.

9.6.11 Per versus “/”

Typically, a slash (solidus) should be used between unit abbreviations when one unit is being measured per the other. The exceptions are units commonly expressed as acronyms, such as mph and psi.

EXAMPLE

For best results, 3 gal./lb (9 L/kg) should be added.

Use the word “per” to separate units that are not abbreviated.

9.6.12 And/or

Don’t use “a and/or b;” use “a, b, or both.”

CHAPTER 10—NOTATION AND DEFINITIONS

10.1—Notation

10.1.1 General

List all notation used in the document in Chapter 2. The notation description given in Chapter 2 must be consistent within the document.

10.1.2 Rules for writing notations

Notation descriptions should be unique, brief, and provide the essence of the term. Follow these rules when making a symbol:

- (a) Use italicized Roman letters for dimensions, force, and temperature
- (b) Use Greek uppercase letters for mathematics
- (c) Use Greek lowercase letters for dimensionless terms
- (d) Subscripts may be a single letter or an abbreviation

10.1.3 Format

When listing notation, uppercase notation precedes lowercase notation of the same letter. Roman letters precede Greek letters.

10.1.4 Notation use in text
The following notation is widely used and the descriptions should not be repeated in places other than Chapter 2:
 $A_s, A_v, b, b_w, d, d_b, h, f'_c, f_y, f_{yt}, \ell_d, \ell_n, M_n, M_u, N_n, N_u, P_u, P_n, s, t, T_n, T_u, V_u, V_n, \lambda,$ and ϕ .
Other notation description is typically given on initial use within a section. For subsequent use of the notation, use only the notation symbol.

EXAMPLE

First use of notation in section:
Concrete shall be proportioned to provide an average compressive strength, f_{cr}' , as prescribed...

Subsequent use of notation in section:
The value of f_{cr}' used as the basis for selection...

Notation should not begin a sentence.
Use “greater than” or “less than” in text and the symbols “>” and “<” in tables and equations.

10.2—Definitions
Definitions are listed in Chapter 2 of guides, reports, and codes in alphabetical order. List definitions in Part 1 of single-item specifications and Section 1 of multi-item specifications. Define technical terms that are unique to the document. Refer to *Concrete Terminology* (CT) on the ACI website for definitions. The committee should not prepare a definition for non-concrete-related terms that are defined in a dictionary or by another recognized authority.
The committee should prepare a definition for concrete-related terms that are important to understand the document.

The committee may prepare a definition for a non-concrete-related term that is important to understand the document and is not adequately defined in a dictionary, but such a term will usually not be included in the CT.

The committee may duplicate terms that are defined in the CT in a document if those terms are deemed important and necessary to understand that particular document.

The committee may prepare a different definition for a term that is defined in the CT, but must submit justification for the modification with the revised definition.

For documents with terms defined, add the following statement:
ACI provides a comprehensive list of definitions through an online resource, “ACI Concrete Terminology.” Definitions provided here complement that source.

10.2.1 ACI Concrete Terminology
“ACI Concrete Terminology” (CT) provides concrete-related definitions.

10.2.1.1 Process for submitting terminology
When ACI committee reports and guides are submitted for TAC review and approval, the definitions are automatically reviewed. The review of these terms includes a comparison with the CT definitions. Individuals and committees may also directly suggest changes to the definitions in the CT by submitting them to the TAC Secretary.

10.2.1.2 Referencing the CT

The CT can be referenced in ACI documents using the following format with the appropriate year.
ACI, 2016, “ACI Concrete Terminology,” American Concrete Institute, Farmington Hills, MI, 94 pp.
10.2.2 Writing and formatting definitions
ACI style is to mimic the dictionary, which includes the term and the definition. Unless the term is a proper noun, it is not capitalized. The term is in bold font.
(a) State the definition without repeating any form of the term defined.
(b) Write clear and explicit definitions that are not liable to misinterpretation. Use language that is understandable to non-experts.
(c) Complete the definition in one sentence. If two or more phrases are needed to state the meaning, connect them with semicolons.
(d) Describe the essential characteristics of the term. Do not provide the context in which the term is used or details such as how things are made, used, or measured.
(e) Avoid the use of adjectives and nouns that denote an absolute, unqualified, or unconditional property or capability; for example: waterproof, stainless, unbreakable, vapor barrier, gas-free, flat, safe, rigid, or pure.
(f) Avoid the use of relative properties or capabilities; for example: strong, high, accurate, and clean.
(g) Avoid lists in definitions because lists are rarely all-inclusive.
(h) When a term has more than one definition, number each definition.
(i) Do not include details such as how things are made, used, or measured.
(j) Do not define trademarked terms.

CHAPTER 11—UNITS OF MEASUREMENT

11.1—Policy
ACI technical documents must adhere to the ACI policy on metrication given in 14.3. IEEE/ASTM SI 10 cited in the Board Policy is available as a separate publication from ASTM International.

11.2—Inch-pound units
Abbreviated units only when preceded by a numeral. Do not add an “s” to the end of a unit abbreviation to make it plural.
Derived units are formed by combining base units, supplementary units, and other derived units according to the algebraic relations linking the corresponding quantities. Several examples of derived units are given in Table 11.2. Note that some of the derived units have been given special names.

Table 11.2—Derived inch-pound units

Quantity	Unit (name)	Abbreviation	Derivation
Area	square foot	ft ²	—
	square yard	yd ²	—
Density, mass per unit volume	pounds per cubic foot	lb/ft ³	—



Length	inch	in.	—
	feet	ft	—
Mass	pound	lb	—
Velocity	foot per second	ft/s	—
Volume	fluid ounce	fl oz	—
	cubic yard	yd ³	—
	gallon	gal.	—
Temperature	Fahrenheit	°F	—
Force	pound	lb	—
Frequency	hertz	Hz	1/s
Pressure or stress	pounds per square inch	psi	—
	pounds per square foot	lb/ft ²	—

11.3—SI units

“Metric” is a somewhat generic term, as there are many different metric systems in use worldwide. For example, many countries use kgf/cm² instead of Pa for stress. The International System of Units (SI) is the metric system adopted in the United States. SI includes seven base and two supplementary units and a large number of derived units. Prefixes are used with the base units and derived units to indicate powers of 10.

Derived units are formed by combining base units, supplementary units, and other derived units according to the algebraic relations linking the corresponding quantities. Several examples of derived units are given in Table 11.3. Note that some of the derived units have been given special names.

Table 11.3—Derived SI units

Quantity	Unit (name)	Abbreviation	Derivation
Area	square millimeter	mm ²	—
	square meter	m ²	—
Density, mass per unit volume	kilograms per cubic meter	kg/m ³	—
Length	millimeter	mm	—
	meter	m	—
Mass	kilogram	kg	—
Velocity	meter per second	m/s	—
Volume	milliliter	mL	—
	cubic meter	m ³	—
	liter	L	—
Temperature	Celsius	°C	—
	kelvin	K	—
Electrical potential	volt	V	m ² ·kg/(s ³ ·A)
Force	newton	N	kg·m/s ²
Frequency	hertz	Hz	1/s
Pressure or stress	pascal	Pa	kg/(m·s ²)
Quantity of electricity	coulomb	C	s·A
Current	ampere	A	—

11.4—Hard versus soft conversion

“Soft” conversions are exact mathematical conversions, rounded to an appropriate number of significant digits.

“Hard” conversions are measurements in one system converted to a standard dimension in the other system that would be used in design and construction.

The ACI Board Policy statement requires ACI codes and specifications be published in two separate versions, one using hard-converted SI units and the other inch-pound units. Other ACI documents must be published using dual units. The primary units are stated in inch-pounds followed by SI units in parentheses.

Except for the codes and specifications, conversions may be either hard or soft, as appropriate. Soft conversions are generally appropriate for reporting measured values such as test data or dimensions of existing structures. Hard conversions are appropriate for codes and specifications and for making recommendations, setting requirements, or discussing products that are available in that system of measurement. If manufacturers have elected to make only soft conversions of their products, use their soft-converted values to describe or reference the product.

11.4.1 Soft metric conversion

To make soft metric conversions, apply the conversion factor from IEEE/ASTM SI 10 (Table 11.6.1), then round to the number of significant digits that gives an accuracy equivalent to that of the inch-pound value. Show the resulting soft-converted value in parentheses following the inch-pound value.

(a) Make a soft metric conversion of the ASTM C39/C39M test result of 4030 psi.

Use the conversion factor of 1 psi = 6.894757 kPa:

$$4030 \text{ psi} \times 6.894757 \text{ kPa/psi} = 27785.87071 \text{ kPa} = 27.78587071 \text{ MPa}$$

In ASTM C39/C39M, compressive strength is reported to the nearest 10 psi, which is approximately 70 kPa. Thus, it would be appropriate to report the strength to the nearest 0.1 MPa. One would show the soft conversion in an ACI document as:

ASTM C39/C39M test result of 4030 psi (27.8 MPa)

(b) Make a soft conversion of a distance of 125 ft.

First, use the exact conversion of 0.3048 m = 1 ft:

$$125 \text{ ft} \times 0.3048 \text{ m/ft} = 38.100 \text{ m}$$

Assuming three figures are significant, that is, distance was reported to the nearest foot, you would show the soft conversion as “a distance of 125 ft (38.1 m).”

If, however, the distance of 125 ft was obtained by rounding to the nearest 5 ft so that the value could have been anywhere between 123 and 127 ft, only two significant figures are justified, and you would write the conversion as “a distance of 125 ft (38 m).” Refer to 11.6.3 for information on rounding.

If you do not know the precision of the measurement, make a reasonable estimate. Ideally the number of significant digits retained should be such that precision is neither sacrificed nor exaggerated in making the conversion. See the documents of ACI Committee 304 for an example of soft conversion.

11.4.2 Hard metric conversion

Apply the appropriate conversion factor from IEEE/ASTM SI 10 (Table 11.6.1) and then round to the standard

dimension that would be used when design and construction are in the other system of units. Show the original value followed by the hard conversion separated by the word “or” or placed in brackets.

For hard conversion of bar spacing of 16 in., first multiply by the conversion factor:

$$16 \text{ in.} \times 25.4 \text{ mm/in.} = 406.4 \text{ mm}$$

The 406.4 mm value could be rounded to 410 mm, to have the same precision as the original 16 in. But for hard conversion, it would be more appropriate to use further rounding that reflects actual field practice: “bar spacing of 16 in. or 400 mm” or “bar spacing of 16 in. (400 mm).”

Using the word “or” indicates that 400 mm is an alternative to, but not necessarily an exact equivalent of 16 in. Always consider using actual dimensions of products and equipment that are available and manufactured to SI dimensions when making a hard metric conversion, and vice-versa when going from SI to inch-pound units. The exception is if comparing test results with a specification limit that is given as decimal percent.

All ACI documents containing both inch-pound and SI units, with one as a hard conversion of the other, shall include the following statement in the first chapter:

“The paired values stated in inch-pound and SI units are usually not exact equivalents. Therefore, each system is to be used independently of the other. Combining values from the two systems may result in nonconformance with this document [guide or report, as appropriate].”

11.5—Format for unit names and abbreviations

11.5.1 General

A unit name is its full, written name, such as kilogram or microgram. Its abbreviation is the letters used to shorten it, such as kg or μg .

When spelling out the full name of a unit, print the unit name in lower case, even those derived from a proper name, such as newton, kelvin, hertz, or pascal.

Use the plural of written unit names—“several kilograms.”

Use abbreviations in conjunction with numerals (the area is 10 m^2); write out names if numerals are not used, such as “area is measured in square meters.”

Indicate the product of two or more units in abbreviated form by using a dot positioned above the line— $\text{kg} \cdot \text{m} \cdot \text{s}^{-2}$.

Do not mix names and abbreviations—write N·m or newton meter, not N·meter or newton·m.

11.5.2 Percentages, decimals, and fractions

Use the percent (%) symbol when using percent as a unit for a ratio with a denominator of 100. Do not add a space between the number and the percent symbol.

Do not use percent on numbers that include decimals.

EXAMPLE

Use: 0.0001

Instead of: 0.01%

Do not use numbers with exponents.

EXAMPLE

Use: 0.0001

Instead of: 1×10^{-4}

Do not confuse “percentage point” with “percent.” Use “percentage point” where changes to values measured in “percent” are made.

EXAMPLE

Use: For f_c' greater than 5000 psi, it is permitted to reduce air content indicated in Table X.X by 1.0 percentage point.

Instead of: For f_c' greater than 5000 psi, it is permitted to reduce air content indicated in Table X.X by 1.0%.

Do not spell out fractions. Use numerals.

Fractions are common for measured distances in inch-pound units.

EXAMPLE

Use: A specified cover of $3/4$ in.

Instead of: A specified cover of 0.75 in.

11.5.3 Degrees

Don’t abbreviate the word “degree.” When referring to Fahrenheit or Celsius, use the degree symbol ($^{\circ}$), not the word “degree.” Do not add a space between the number and the degree symbol. When referring to an angle, spell “degree.”

11.6—Conversion of units

Converting from one system of units to another requires two steps: multiplying or dividing by the appropriate conversion factor, and rounding off to an appropriate number of significant digits.

11.6.1 Conversion factors

Table 11.6.1 lists conversion factors for measurements commonly used in the concrete industry.

11.6.2 Significant digits

The most difficult part of conversions is selecting the appropriate number of significant digits to use after making a conversion. Given the number of digits in the conversion factors and that conversions are usually made on a calculator, it is possible to end up with impractical converted values. In all conversions, the number of significant digits retained should be such that accuracy is neither sacrificed nor exaggerated by the conversion process.

For example, consider a concrete with a 6 in. slump.

$$(6 \text{ in.}) \times (25.4 \text{ mm}/1.0 \text{ in.}) = 152.4 \text{ mm}$$

The original unit provides one significant digit of accuracy. Converting provides four significant digits, which implies greater accuracy. Provide one to two significant digits, as appropriate. Significant digits are any digits necessary to define a value or quantity. Generally, leading zeros are not significant; trailing zeros may or may not be significant.

Table 11.6.1—Conversion factors for commonly used values in the concrete industry

From	Multiply by	To get
Area		
1 square yard (yd ²)	0.8361274	square meter (m ²)
1 square foot (ft ²)	0.0929034 (exact)	square meter (m ²)
1 square inch (in. ²)	645.16 (exact)	square millimeter (mm ²)
Area per volume (coverage)		
1 square foot per gallon (ft ² /gal.)	0.02454	square meter per liter (m ² /L)
Energy		
BTU	1055.87	joule (J)
Heat		
thermal conductivity (<i>k</i> value) (BTU / ft·h·°F))	1.730735	watt per (meter·kelvin) (W/(m·K))
thermal resistance (<i>R</i> value) (ft ² ·h·°F/BTU)	0.176110	square meter·kelvin per watt ((m ² ·K)/W)
specific heat (BTU / (lb·°F))	4186.800	joule per (kilogram·kelvin) (J/(kg·K))
Force		
1 pound (lb)	4.448222	newton (N)
1 kip (1000 lb)	4.448222	kilonewton (kN)
Length		
1 inch (in.)	25.4 (exact)	millimeter (mm)
1 foot (ft)	0.3048 (exact)	meter (m)
1 yard (yd)	0.9144 (exact)	meter (m)
1 mile (mile)	1.609 44	kilometer (km)
Mass		
1 pound (lb)	0.4535924	kilogram (kg)
1 ton (=2000 lb)	0.9071847	metric ton (t)
ton, long (=2240 lb)	1016.047	kilogram (kg)
ton, short (=2000 lb)	907.1847	kilogram (kg)
Mass per volume		
1 pound per cubic foot (lb/ft ³)	16.018846	kilogram per cubic meter (kg/m ³)
1 pound per cubic yard (lb/yd ³)	0.5932764	kilogram per cubic meter (kg/m ³)
1 pound per gallon (lb/gal.)	0.1198264	kilogram per liter (kg/L)
Pressure (stress)		
1 pound per square inch (psi, lb/in. ²)	6.894757	kilopascal (kPa)
1 pound per square foot (psf, lb/ft ²)	47.88026	pascal (Pa)
1 kip per square inch (ksi, kip/in. ²)	6.894757	megapascal (MPa)
Temperature		
Fahrenheit (°F)	(°F – 32)/1.8 (exact)	Celsius (°C)
Celsius (°C)	1.8 °C + 32 (exact)	Fahrenheit (°F)
Temperature difference (°F)	5/9	Temperature difference (°C)
Volume per mass and volume per volume		
1 fluid ounce per cubic yard (oz/yd ³)	38.68071	milliliter per cubic meter (mL/m ³)
1 fluid ounce per 100 pounds (fl oz/100 lb)	65.19847	milliliter per 100 kilogram (mL/100 kg)
1 gallon per cubic yard (gal./yd ³)	4.951132	liter per cubic meter (L/m ³)

EXAMPLE

6 = one significant digit

0.0037 = two significant digits

1.297 = four significant digits

1000 = one, two, three, or four significant digits, depending upon the precision of the original measurement; if measurement is to the nearest digit, there are four significant units.

11.6.3 Rounding

After considering the precision of a value, round the converted value so that the same level of precision is implied as in the original value.

If the inch-pound measurement is expressed as a combination of units, convert to the smaller unit and then multiply by

the appropriate conversion factor. For example, convert 5 ft 6 in. to 66 in. before converting.

Do not round off either the unit or conversion factor before multiplying.

After multiplying by the conversion factor, round off to a number of significant digits to represent the accuracy of the original measurement.

After rounding off, move the decimal point as necessary to express the SI converted value using one of the preferred prefixes. The numerical value for SI dimensions should be between 1 and 999. For example, use 1.2 km, not 1200 m.

Going back to the example of 6 in. slump in 11.6.2, the implied precision of the measurement is ±0.5 in. or approximately ±10 mm. Therefore, the appropriate conversion of 6 in. slump is 150 mm slump.

11.6.4 Reinforcing bar designations

Converting reinforcing bar designations is complicated by the various schemes used to designate bar sizes and properties. The best approach is to fully describe the bars in terms of physical dimensions such as diameter or cross-sectional area rather than using a national designation. Also, different countries use different standards in which the tensile properties of the steel may differ from those in the United States. Report the properties of the steel used such that the reader can understand the reinforcement without detailed knowledge of a particular country's design standard.

11.6.5 Degree of precision

In the context of this section, precision refers to the lowest common working limit for a measured quantity. For example, a measuring tape is commonly shown to 1/8 in.

It is not appropriate to report or require more precision in measurements than is appropriate for the values being discussed.

11.6.6 Mass versus weight

Mass represents the amount of substance in an object and weight represents the gravitational force acting on the object. In the inch-pound system, the pound (lb) is used as both the unit of weight (or force) and as the unit of mass. In general, there is no need to make a distinction between mass and weight except when performing a dynamic structural analysis. In this case, the mass of the object has to be used in the calculations. The mass is obtained by dividing the weight in pounds by the gravitational acceleration g , which is 32.2 ft/s². The resulting quantity has the unit slug.

In the SI system, kilogram is the unit of mass and newton is the unit of force. The weight of an object in newtons is obtained by multiplying the mass in kilograms by 9.81 m/s², which is the gravitational acceleration in SI units.

When converting a quantity in units of pounds to the corresponding quantity in SI units, make sure that the correct conversion factor is used. For example, pounds of cement in a mixture represent the mass (amount) of cement and would be converted to kilograms by multiplying the number of pounds by 0.4545924. On the other hand, a dead load in pounds would be converted to newtons by multiplying the number of pounds by 4.448222.

11.6.7 Decimal point and implied tolerances

If numerical limits are given in a document, the tolerances should also be given. If tolerances are not stated explicitly, then tolerances are implied by the way the limit is written. For example, if a temperature is specified as 23°C, by the rules of rounding, any temperature between 22.5°C and 23.5°C will round to 23°C and satisfy this requirement. However, if the temperature is specified as 23.0°C, then the permitted range is from 22.95°C to 23.05°C. If a numerical limit is given as a whole number, the implied tolerance is ± 0.5 , if a limit is given to the nearest 0.1 the implied tolerance is ± 0.05 , and so forth. These principles need to be considered when using decimal points in numerical limits.

PART 5—SESSIONS AND VIDEO PRODUCTS

CHAPTER 12—CONVENTION SESSIONS AND RELATED PUBLICATIONS

12.1—Committee planning

ACI offers mini sessions and convention sessions that are held at ACI conventions.

Mini sessions are limited to 1 hour in length and are held during the first hour of a committee's regularly scheduled meeting time. Each presentation should be a minimum of 10 minutes. Mini sessions support PDH's and symposium publications are permitted; however, presentations will not be recorded. ACI will provide an LCD projector and screen for mini sessions; however, speakers must provide their own laptops.

ACI technical committees should regularly plan technical convention sessions at ACI conventions. Committees need to initiate an administrative ballot for a new technical session.

Presentation materials used during technical sessions at ACI conventions are to be high quality and are expected to report new or unpublished work that adds to the existing knowledge base. Presentations that promote the use of proprietary products without sufficient, objective, supporting data are generally not acceptable.

Depending on the subject and the number of presentations that can be generated, the committee may decide to plan a session, multiple sessions, or a symposium. The guidance in this chapter applies to sessions and symposia, referred to as sessions for simplicity.

A typical convention technical session is 2 hours in length. A symposium is a larger event and usually consists of at least four 2-hour sessions, two of which may run concurrently. The ACI website contains the necessary forms for requesting a technical session.

12.2—TAC approval

TAC uses a two-step process to approve technical convention sessions:

1. Preliminary approval of a session proposal, which requires submitting basic information about the proposed session, such as the name of the moderator, the general topic, and goals of the session.
2. Final approval of the session program, which requires submitting all final details about the session, including a list of all speakers and the titles and abstracts of their presentations.

TAC uses the following criteria when approving session requests:

- (a) The request form indicates a strong justification for the session, including:
 - (i) A statement on the scope of the session and how it would benefit the attendees
 - (ii) How the speakers are selected
 - (iii) A description of the content of the session
 - (iv) An abstract for each presentation
- (b) The scope and outcome are relevant to ACI's mission, including:

- (i) Presentation of new documents
- (ii) Emerging technology
- (iii) Awareness of an established technology
- (c) The session is sponsored by more than one technical committee

(d) The session topic is relevant to the convention theme.

A technical committee may seek to publish papers related to their sessions as an ACI Symposium Publication (SP)

There is only one-step process for approving mini sessions. Committees should submit requests for mini sessions to TAC at least 6 months before the planned convention.

12.2.1 Session moderator training

The session moderator and comoderator are encouraged to review the online Session Moderator Training available on the ACI website.

12.3—Sponsorship of technical sessions at non-ACI conventions

Technical committees may sponsor technical sessions that are held outside ACI conventions. The technical content of the proposed session is to be consistent with the committee's mission and there is to be no financial obligation by the committee or the Institute. The request shall be submitted to the SP and Session Coordinator.

TAC will consider a request to publish proceedings from a technical session held outside an ACI convention. Refer to 12.5.1 for details.

12.4—Convention session procedures

12.4.1 Initiating a session

A technical committee usually volunteers to either sponsor or cosponsor a technical session, but TAC may ask a committee to assume such an assignment. If appropriate, the committee should consider inviting other committees to cosponsor the session.

Session topics should relate to the convention theme if possible, but it is not required. Potential session topics may include presentations of new committee documents, new research findings, case histories, or timely topics that the committee determines will be of interest to convention attendees.

After deciding to sponsor a session, the committee selects a session moderator who will have overall responsibility for the session. A co-moderator should also be selected, and a task group may be organized to assist in selecting session presentations.

12.4.2 Preliminary TAC approval

The preliminary technical session request form is completed by the committee chair or proposed session moderator and submitted to staff from the ACI website. The proposal should indicate to TAC that the committee is planning the session with a clear objective (200 to 300 words) and has chosen session topics that will be of widespread interest.

TAC reviews the session request and accepts it, declines it, or requests additional information before making a decision. When TAC approves a session, a time slot is reserved by staff at the requested convention. The session moderator will be notified of the TAC decision by staff. A call for papers (presentations) in *Concrete International (CI)* may be submitted online.

12.4.2.1 Deadlines for preliminary TAC approval

The committee should submit a preliminary technical session request form to TAC at least two conventions before the convention where the technical session will be held.

If the committee plans to have a call for papers, more lead time is required. Refer to 12.4.5.1 for guidance on preparing a call for papers or presentations. Refer to the ACI website for technical session and SP deadlines.

12.4.3 Time allotted for presentations

Typically, each convention session consists of 2 hours with an appropriate number of 20-minute presentations, adequate time for floor discussion, and speaker introductions. Sessions with fewer than four presentations are discouraged and sessions with more than six presentations will not be approved. Session moderators are responsible for monitoring presentation times, discussions, and the timely conclusion of each presentation and the session.

TAC and the Convention Committee require that a timetable of speakers be published in the convention program and posted outside the session room. This allows for convention attendees to plan their time to attend specific presentations.

12.4.4 Sessions honoring prominent ACI members

The ACI Board of Direction approved a policy in 1991 for honoring prominent ACI members with sessions at conventions with the requirements that:

- (a) The honored individual has made an outstanding contribution to ACI and the concrete industry.
- (b) The Committee has the responsibility of evaluating the honored individual's contributions and approving this event.

(c) The request for sessions honoring prominent ACI members is reviewed for technical content and approved by TAC.

(d) The proposal for sessions and dinner honoring a prominent ACI member is submitted for consideration to the Committee by TAC after approving the technical content.

(e) The sessions and dinner must be approved at least one convention in advance by the Convention Committee.

(f) The sessions and dinner cannot be held to conflict with the Opening Reception, the President's Reception, or the Concrete Mixer.

Sessions honoring prominent ACI members should adequately reflect and represent their field of activity and may consist of either multiple sessions or a symposium and are titled accordingly:

(a) Session Honoring [Name of prominent ACI member], Part 1: [Title], Part 2: [Title], etc. Sessions usually consist of a minimum of two 2-hour sessions.

(b) Symposium Honoring [Name of prominent ACI member], Part 1: [Title], Part 2: [Title], Part 3: [Title], Part 4: [Title], etc. Symposia usually consist of a minimum of four 2-hour sessions.

12.4.5 Speakers

There are several sources to identify prospective speakers such as the committee itself, known authorities in the subject field, or a call for papers in *CI*.

12.4.5.1 Calls for papers

Calls for papers or presentations are published announcements in *CI* requesting people to submit abstracts for presentation at ACI conventions or other meetings. Calls for papers are initiated on the ACI website. Complete all fields of the form, including whether a manuscript is expected to be submitted if the abstract is selected. Issue the call for papers or presentations as soon as TAC approves the preliminary session request. The call should indicate the session objective and list examples of potential topics for presentation. Give the name of the person to whom the abstracts are to be sent along with the deadline for receipt of abstracts and the date for final papers (for SPs). (Abstracts should be sent to the moderator 8 months before the technical session.) Refer to a current issue of *CI* for examples of calls for papers.

A typical time schedule is:

Actions	Time (months) before the technical session
Submit preliminary request for session	12
Submit preliminary request for companion session SP (optional)	18
Initiate Call for Papers (presentations) at the ACI website. There is a 3-month lead time for publication of the notice in <i>CI</i> .	16
A Call for Papers is published in three consecutive issues of <i>CI</i> .	13 to 11
All abstracts should be received by the moderator(s) so that the committee can select final speakers.	8

12.4.5.2 Selecting speakers

Contact prospective speakers early, but do not make definite arrangements until receiving preliminary TAC approval. At initial contact, speakers should have an idea of the presentation subject and possible title.

Prospective speakers should prepare an abstract (2000 to 300 words) of the presentation as soon as possible and submit it to the session moderator for the committee's consideration.

The sponsoring committee should review the submitted abstracts with regard to the theme of the session. In selecting speakers, consider the quality of past presentations by prospective speakers, if such information is available. Avoid selecting speakers who have a history of failing to appear at previous conventions to make their presentations. Submit to the Event Services Department the names and addresses of speakers who are not ACI members so that they can receive registration forms. Encourage speakers to visit the ACI website for the latest convention information.

12.4.5.3 Notifying speakers

Upon selection by the sponsoring committee, notify speakers that they are on the tentative program, inform them of the allocated presentation time, and ask them to proceed with preparing their presentation.

If paper versions of the presentations are to be considered for session or symposium publication (SP), indicate the deadline for submission of manuscripts and approximate date for notification of acceptance. Also, advise the speakers that selection of a presentation for convention session does not guarantee publication of a paper and that manuscripts are reviewed in accordance with the ACI publication policy.

ACI does not pay speakers' expenses or travel, or offer an honorarium.

Notify speakers who are not selected for the program. If an SP is planned and if the abstracts have merit, those submitting the abstracts may be asked to prepare papers to be considered for the SP with other papers developed from the technical session.

12.4.6 Final TAC approval

For final approval by TAC, submit all details of the technical session, including summary of the session to be published in the convention program (200 to 300 words), the name and contact information of the moderator(s) and of each speaker, titles of their presentations, and abstracts (200 to 300 words) for each presentation. The final session request form is completed online by the session moderator, who has completed the session moderator training, and submitted to staff. These forms can be found on the ACI website. TAC will make a final review to determine whether the session will be approved. If the session receives final approval, staff will notify the moderators and the committee chair. The information in the final approval form will be used in the pre-convention program mailing, in *CI*, and in other publicity announcements. The sponsoring committee should arrange for appropriate local publicity, specialized publicity, and attendance from particular groups that might be interested in the session.

The committee may not alter the details of the session once final approval has been granted without the permission of TAC. Submit any requested changes to the SP and Session Coordinator.

12.4.6.1 Deadlines for final TAC approval

Sessions must be submitted for final TAC approval no later than the Friday after the end of the preceding convention. Failure to meet the deadline will postpone TAC review and thus the session may be postponed or not approved.

12.4.7 Staff assistance

ACI Event Services staff will secure the necessary standard audio visual equipment for the session once staff is advised of the committee's needs.

Staff sends copies of authors' guides and guidelines for preparing slides to session moderators for distribution to the speakers.

12.4.8 Presentation materials

Quality slides are important to the overall quality of a presentation. TAC encourages speakers to prepare slides using Microsoft PowerPoint®. Presentations should be professional in appearance. Presenters should refrain from the use of brand names and specific product endorsement whenever possible. Small logos are acceptable.

12.5—Publication of session papers in an ACI Symposium Publication

The committee may wish to publish papers from convention sessions or a symposium in a Symposium Publication (SP). A minimum of 10 papers is recommended for an SP. ACI SPs are published in PDF format. Contact ACI staff if interested in publishing in a different format. Individual authors are encouraged to submit their papers for consid-

eration by an ACI periodical if a collection of papers as an SP is not planned. An SP may include papers from convention sessions, papers submitted but not presented, and other papers dealing with the same subject matter received by the Institute and approved by the committee for inclusion in the SP. Papers must be original unless otherwise approved by TAC. Committees must approve by administrative ballot a request to sponsor a special publication before submitting such a request to ACI.

If an SP is to be available at the time of the technical session, it requires careful planning, coordination with the SP and Session Coordinator, and a rigid timetable for manuscript submissions and reviews. Technical session and SP deadlines are available on the ACI website.

Final manuscripts and all backup material should be submitted at least 3 months before the technical session to ensure that the SP will be available for sale at the convention or other event. In rare cases, however, the SP may still be published after the technical session. In this case, final manuscripts and all backup material must be submitted to the SP and Session Coordinator no later than 6 months after the technical session.

Information on obtaining TAC preliminary and final approvals and preparing an SP can be found on the ACI website.

12.5.1 *SP from conferences outside ACI conventions*

TAC will consider requests to publish proceedings from technical sessions held at conferences outside an ACI convention, provided the following requirements are met:

- (a) The conference must have formal cosponsorship by ACI
- (b) The technical session must be associated with an ACI committee
- (c) A financial agreement must be in place for publishing the SP
- (d) ACI's SP procedures must be followed on all papers

Co-sponsorship by ACI requires the approval of the ACI Executive Vice President. The topic of the SP should precede the name of the conference in the title. Submit the request, along with a discussion of the financial implications for ACI to the SP and Session Coordinator.

12.5.2 *SP honoring an individual*

SPs honoring an individual can have a title and preface dedicated to the individual. The topic of the SP, however, should precede the name of the individual being honored in the title. The preface should be no more than 1 page (approximately 600 words). The preface should discuss the individual's contribution to the concrete industry.

12.5.3 *Preliminary TAC approval*

For preliminary TAC approval, the committee must submit a preliminary SP request to the ACI staff SP and Session Coordinator before proceeding with production of an SP. TAC approves or declines preliminary SP requests based on appropriateness of the subject matter and anticipated usefulness of the publication. When a decision is made to publish an SP, the committee should submit an online preliminary SP request form to the ACI staff SP and Session Coordinator before proceeding with production of an SP. This request should:

- (a) Identify the SP editor(s), including contact information
- (b) Provide a brief overview of the proposed SP

(c) List proposed paper titles and authors, including their contact information (this requirement may be waived if a call for papers is planned to be issued in *CI*)

(d) Provide a timetable leading to the publication of the SP

(e) Identify individuals serving on the scientific committee that will advise the sponsoring committee on matters related to the session and serve as reviewers for the papers. It is advantageous to have the scientific committee composed, at least partially, of representatives from other ACI committees with an interest in the topic of the SP. These other committees should also be considered for cosponsorship of the SP.

12.5.4 *Preparation of papers*

Information on the ACI website includes:

(a) Information for SP editors (processing information, initial and final approval requirements, initial and final paper submission checklists, calls for papers, review forms, and paper awards criteria)

(b) Information for SP paper authors (manuscript guidelines and copyright transfer form)

All SP papers, including figures, require dual units. SI (metric) or inch-pound units of measurement can be used as primary units. The secondary units must be provided in parentheses.

Some papers presented at a convention session might not be published. Experience shows that some oral presentations cannot be adapted to written format. After the SP editor selects presentations for the session or symposium publication, notify the presenters promptly that an SP is planned, and invite them to prepare a manuscript for review. Give authors a firm deadline for submission of manuscripts.

12.5.5 *Review of papers*

TAC generally delegates coordinating the reviews of SPs to the SP editor. The editor selects at least two qualified reviewers for each paper. Except in special cases approved by TAC before papers are reviewed, a reviewer must not review more than 25% of the papers for any SP or 10 papers, whichever is less.

The editor should provide the SP and Session Coordinator with a list of the reviewers and how many papers each reviewer has been assigned. When the SP editor has authored one of the papers, the editor shall submit that paper to the SP and Session Coordinator, who will assign anonymous reviewers.

Reviewers follow the criteria listed in the manuscript review forms available on the ACI website. Reviews should be returned to the editor within 30 days. At least two reviewers must recommend publication. If one of the two reviewers does not recommend publication, a third reviewer shall be assigned. For convention sessions, session papers that are not to be published in the SP are permitted to be shared with the audience if the author gives permission. Inform the session audience that these papers can be found on the ACI website for a short time following the session. All papers made available on the session handout page must be reviewed by the editor for style before posting.

The editor provides authors with copies of anonymous review comments and instructions for submitting final manuscripts. Authors must address review comments in preparing

their final manuscripts, and must provide an explanation to the editors why particular review comments were not incorporated into the final manuscript.

The editor is responsible for determining that the final manuscript addresses all review comments in a satisfactory manner. Final manuscripts for all papers, along with all reviews, a preface providing background information and a summary of the SP contents, and any other information requested are then submitted to ACI staff for final TAC approval.

12.5.6 Final TAC approval

For final TAC approval, the committee must submit a final SP request to the ACI Staff and Session Coordinator, including the completed SP, the table of contents, preface, all papers, the reviews for all papers with the reviewers' names, copyright transfer forms, and the number of accepted and declined papers. TAC reviews the final documentation and verifies that procedures have been followed. Following TAC approval, ACI staff prepares materials for publication of the SP.

CHAPTER 13—DEVELOPMENT OF VIDEO PRODUCTS

ACI technical committees may decide that, for a particular topic, the most effective means of communication is a video. The distribution of video products is a rapidly moving area of technology and it is anticipated that videos will be produced in a standard movie format for playback on computers. The movie files may be distributed as part of a Special Publication published on a DVD, or by other methods approved by TAC.

Videos are to be professional quality and report information that adds to the existing knowledge base. Videos that describe proprietary products without sufficient, objective, supporting data are not acceptable.

The ACI logo and committee sponsorship should be visually shown at the beginning of the video and in ending credits.

13.1—Initial approval

The technical committee votes to approve the video concept in accordance with Chapter 3. The concept should include the scope and goals of the video.

After committee approval, the video concept is to be submitted to TAC.

13.2—Funding request

After TAC approves of the concept, and if the committee requests funds to create the video, the committee should contact the TAC Secretary.

13.3—Secondary approval

The technical committee votes to approve a detailed description of the proposed video in accordance with 3.2. The details should include a story board and script.

After committee approval, the video description is to be submitted to TAC.

Upon TAC approval, Institute resources can be expended by authorized staff.

13.4—Final approval

After completion, the technical committee ballots to approve the video. A passing ballot requires 75% of voting

members to vote affirmative, and negatives do not require resolution.

After committee approval, the video is submitted to TAC.

Upon TAC approval, the video is adopted. The adoption date is the month the video is initially available to the public. The video will be posted on the member side of the committee webpage.

TAC will recommend a distribution method to ACI's Executive Vice President.

13.5—Revision

The committee may not alter the video without TAC approval.

A revision of a video should follow the same process as the creation of a video; that is, initial approval, funding request (if needed), approval of detailed description of the revision, and final approval.

PART 6—POLICIES

CHAPTER 14—DOCUMENT-RELATED INSTITUTE POLICIES

14.1—Publication

14.1.1 Stand-alone document

All technical committee documents are published in electronic format, hard copy format, or both, and are available for purchase.

14.1.2 ACI Collection

The *ACI Collection* is published annually and contains a majority of ACI's technical committee documents. If TAC decides not to include an entire document in the *ACI Collection*, a synopsis or notice is included in the *ACI Collection*.

14.2—Legal and directional statements

Under certain conditions, ACI documents require introductory or disclaimer statements to be included when the documents are printed.

14.2.1 Disclaimer on first page of guides and reports

Nonmandatory language documents shall have the following statement on the first page:

“ACI Committee Reports and Guides are intended for guidance in planning, designing, executing, and inspecting construction. This document is intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the information it contains. ACI disclaims any and all responsibility for the stated principles. The Institute shall not be liable for any loss or damage arising there from. Reference to this document shall not be made in contract documents. If items found in this document are desired by the Architect/Engineer to be a part of the contract documents, they shall be restated in mandatory language for incorporation by the Architect/Engineer.”

14.2.2 Disclaimer on inside front cover

All ACI documents shall have the following statement on the inside front cover:

“Copyright by the American Concrete Institute, Farmington Hills, MI. All rights reserved. This material may not be reproduced or copied, in whole or part, in form or media, without the written consent of ACI.

“The technical committees responsible for ACI committee reports and standards strive to avoid ambiguities, omissions, and errors in these documents. In spite of these efforts, the users of ACI documents occasionally find information or requirements that may be subject to more than one interpretation or may be incomplete or incorrect. Users who have suggestions for the improvement of ACI documents are requested to contact ACI via the errata website at <http://www.concrete.org/publications/documenterrata.aspx>. Proper use of this document includes periodically checking for errata for the most up-to-date revisions.

“ACI committee documents are intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. Individuals who use this publication in any way assume all risk and accept total responsibility for the application and use of this information.

“All information in this publication is provided ‘as is’ without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose or non-infringement.

“ACI and its members disclaim liability for damages of any kind, including any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of this publication.

“It is the responsibility of the user of this document to comply with all applicable laws and regulations of any nature, and to establish environmental and/or health and safety practices appropriate to the specific circumstances involved with its use. ACI does not in any way represent, imply, or warrant that the information in this document complies with any or all laws, nor does it make any representations with regard to environmental and/or health and safety issues and the use of this document. The user must determine the applicability of all laws and regulatory limitations before applying the document and must comply with all applicable laws and regulations, including but not limited to, United States Occupational Safety and Health Administration (OSHA) health and safety standards.

“Participation by governmental representatives in the work of the American Concrete Institute and

in the development of Institute standards does not constitute governmental endorsement of ACI or the standards that it develops.”

14.2.3 Statement describing ITG reports

The first page of Innovative Task Group (ITG) documents shall include the following statement:

“ACI encourages the development and appropriate use of innovative technologies through the publication of the Innovation Task Group Documents. These documents present information and recommendations based on available test data, technical reports, limited experience with field applications, and the opinions of committee members. The presented information and recommendations, and their basis, may not be as extensively developed and tested as those for more mature technologies. This document identifies areas in which information is believed to be less fully developed, and describes related research needs. The professional using this document should understand the limitations of this document and exercise judgment as to the appropriate application of this innovative technology.”

14.2.4 Statement describing Emerging Technology Reports

The first page of an ETR shall include the following statement:

“ACI encourages the development and appropriate use of new and emerging technologies through the publication of the Emerging Technology Reports. These documents present information and recommendations based on available test data, technical reports, limited experience with field applications, and the opinions of committee members. The presented information and recommendations, and their basis, may not be as extensively developed and tested as those for more mature technologies. This report identifies areas in which information is believed to be less fully developed, and describes related research needs. The professional using this document should understand the limitations of this document and exercise judgment as to the appropriate application of this emerging technology.”

14.2.5 Translation disclaimer

The first page of a translated document shall include the following statement:

(a) “Copyright by the American Concrete Institute (ACI), Farmington Hills, MI. All rights reserved. This material may not be reproduced or copied, in whole or part, in any form or media, without the written consent of ACI.”

(b) “This document was originally published in English. Consequently, whenever there is doubt

about the exact meaning, it is the English version that must be taken as authentic.”

(c) “This translation is not able to, nor intended to, supplant individual training, responsibility, or judgment of the user of the information presented. Individuals who use this publication in any way assume all risk and accept total responsibility for the application and use of this information. All information in this publication is provided ‘as is’ without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose or non-infringement.”

(d) “ACI and its members disclaim liability for damages of any kind, including any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of this publication.”

14.2.6 *Metric unit conversion disclaimer*

The first page shall include the following statement:

“The official version of this ACI document uses inch-pound units. A conversion of an ACI document into SI units is for the convenience of users. Care has been taken to ensure that the conversion is correct; however, ACI does not guarantee its accuracy. Official interpretation of this ACI document shall be based only on the U.S. customary units.”

14.2.7 *Patent disclaimer*

Documents including patented items shall have the following statement on the first page:

“By publication of this standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer.”

14.2.8 *Certification statement*

Documents including certification shall have the following statement:

“The materials, processes, quality control measures, and inspections described in this document should be tested, monitored, or performed as applicable only by individuals holding the appropriate ACI Certification or equivalent.”

14.3—ACI metrication policy

The ACI Board of Direction approved the following policy on metrication:

The general policy of ACI shall be that all new and revised ACI codes and specifications shall be published in two sepa-

rate versions, one using inch-pound units and one using hard-converted SI units. Exceptions to this policy will depend upon industry needs and TAC approval. All new and revised ACI standards and other publications shall use dual units. Nonarchival information, such as visual materials used at convention sessions, shall use units of measurements selected by the author. All conversions shall conform to the latest version of IEEE/ASTM SI 10, supplemented where applicable by ASTM E621. In hard conversions, due consideration shall be given to uniformity among Institute documents and to availability of metric products for concrete construction.

ACI Board Committees shall establish provisions to implement this policy.

TAC shall review and recommend revisions to this policy to the Board on an as-needed basis to meet the demand for metrication of ACI documents.

APPENDIX A—TAC’S INTERNATIONAL OUTREACH

ACI’s strategic interests

From ACI’s recently approved strategic plan, ACI’s vision is a future where everyone has the knowledge needed to use concrete effectively to meet the demands of a changing world. ACI’s mission is to develop and disseminate consensus-based knowledge on concrete and its uses.

ACI wants to positively impact the global concrete community through mutually beneficial alliances. To achieve this, ACI will establish and expand strong and productive relationships with external organizations and individuals whose missions and visions are similar to ACI’s.

Purpose of ACI technical committees’ international outreach

A technical committee mission focuses on a knowledge area that is related to the concrete technology or infrastructure. To develop reliable information, committees strives to maintain expertise and participation from varying geographic regions, as well as a balance of interests among producers, users, consultants, and general interest.

Design and construction of the concrete infrastructure has become a global business for many organizations. We want these organizations to come to ACI for reliable information that is relevant to the region, design, or construction that is occurring. ACI documents, therefore, will generally benefit users by obtaining committee consensus on issues that includes experts from different regions and countries.

Avenues for committee international outreach

ACI committee output is information, so the purpose of a committee’s international outreach must be related to improving or expanding committee information. Technical sessions (or symposiums) are a common way for a committee to publicly discuss various aspects of a topic that doesn’t yet have consensus. Once there is sufficient investigation and experience with a relevant topic, a committee can create a consensus document. Once consensus is obtained and reported in a committee document, technical sessions can be an outlet for that information.

ACI committees, thus, have two available informational outputs, sessions, and documents.

1) Committee membership

The best way to include viewpoints from various global regions in ACI documents is to have experts from those regions join the committee as voting members, attend meetings, and contribute to the discussions. Recognizing this is not possible in all cases, international experts can also have limited involvement with the committee as associate members or liaison members. These memberships cannot vote and attendance is not required. Associate membership is only available to ACI members, and Liaison membership is only available if the individual represents an organization that has an established relationship with ACI. To determine if an outside organization is an established one with ACI, contact the Managing Director, Engineering.

2) Session sponsorship

Outside organizations can cosponsor a technical session at ACI conventions, or ACI can cosponsor an international symposium held outside the ACI convention. In either event, a technical committee(s) must request TAC approval for the session/symposium using the normal request procedure.

Archiving of presentations and papers can be achieved by an ACI SP (the default arrangement), or an alternate arrangement as agreed to by the cosponsoring organizations.

Summary

ACI technical committees are a diverse group. Some committees already have many active members from around the world, while others have a few, and some minimal contact with international experts. TAC encourages all committees to consider if international outreach would benefit the work of the committee.



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Summary of Revisions to the 2024 TCM

1. Section 2.3.4 was updated to include the current process for convention meetings.
2. Section 3.5 was updated to reflect the web balloting system.
3. Section 4.2.6 Coordination of ACI Standards was expanded to define and list core codes and non-core codes.
4. Section 6.2.6.1 was updated to address scopes in single-item specifications.

