IN-LB Inch-Pound Units

An ACI Standard

Code Requirements for Residential Concrete (ACI 332-20) and Commentary

Reported by ACI Committee 332

ACI 332-20

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Code Requirements for Residential Concrete and Commentary

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Reported by ACI Committee 332

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This code covers the design and construction of cast-in-place concrete for one- and two-family dwellings and multiple single-family dwellings (townhouses), and their accessory structures. Among the subjects covered are the design and construction requirements for plain and reinforced concrete footings; foundation walls; slabs-on-ground; and requirements for concrete, reinforcement, forms, and other related materials. The quality and testing of materials discussed in this document are covered by reference to the appropriate ASTM standards.

This code is written to allow for reference by adoption in a general building code without changing its language. Background details or suggestions for carrying out the requirements or intent of the code are provided in the commentary. The commentary discusses some of the considerations of the committee in developing the code with emphasis given to the explanation of provisions that may be unfamiliar to code users or where significant departure exists from other concrete codes.

Keywords: admixtures; aggregate; backfill; cement; compressive strength; cover; flexural strength; footings; formwork (construction); foundations; loads (forces); slabs; structural analysis; reinforcement.

ACI 332-20 supersedes ACI 332-14, was adopted July 6, 2020, and was published October 2020.

CONTENTS

PREFACE

The commentary of this code discusses some of the considerations of ACI Committee 332 in developing the provisions contained herein. Explanation of the departure of this code from ACI 318 is emphasized. Comments on specific provisions are made under the corresponding chapter and section numbers of this code.

The commentary is not intended to provide a complete historical background concerning the development of this code, nor is it intended to provide a detailed résumé of the studies and research data reviewed by the committee in formulating this document.

This code is meant to be used as part of a legally adopted building code and, as such, must differ in form and substance from documents that provide detailed specifications, recommended practices, or complete design procedures. This code was developed by an ANSI-approved consensus process.

This code is intended to cover all residential structures that fall within the scope of IRC-2018. Requirements more stringent than the code provisions may be desirable for large, complex, or irregular structures; high-hazard areas; and other unusual construction. This code cannot replace sound engineering knowledge, experience, and judgment.

A building code states only the minimum requirements necessary to provide for public health and safety; this code is based on that principle. For any structure, the owner or the designer may require the quality of materials and construction to be higher than the minimum requirements necessary to protect the public as stated herein. Lower standards, however, are not permitted. The commentary directs attention to other documents that provide suggestions for carrying out the requirements and intent of this code.

This code has no legal status unless adopted by government bodies having authority to regulate building design and construction. Where this code has not been adopted, it may serve as a reference to good practice even though it has no legal status.

This code provides a means of establishing minimum standards for acceptance of designs and construction by legally appointed building officials or their designated representatives. This document is not intended for use in settling disputes between the owner; engineer; architect; contractor; or their agents, subcontractors, material suppliers, or testing agencies. Therefore, this code cannot define the contract responsibility of each of the parties in construction. General references requiring compliance with this code in the project specifications should be avoided because the contractor is rarely in a position to accept responsibility for design details or construction requirements that depend on detailed knowledge of the design. Design-build construction contractors, however, typically combine the design and construction responsibility. Generally, the drawings, specifications, and contract documents should contain all the necessary requirements to ensure compliance with the code. In part, this can be accomplished by reference to specific code sections in the project specifications. Other ACI publications, such as ACI 301, are written specifically for use as contract documents for construction. Requirements for testing and certification programs should be provided for the individual parties involved with the execution of work performed in accordance with this code.

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CODE

CHAPTER 1—GENERAL

1.1—Scope

1.1.1 This chapter addresses (a) through (f):
(a) General requirements of this code
(b) Purpose of this code
(c) Applicability of this code
(d) Alternative systems
(e) Drawings and specifications
(f) Inspection

1.1.2 This code, when legally adopted as part of a general building code, provides minimum requirements for design and construction of residential concrete members. In areas without a legally adopted building code, this code defines minimum acceptable standards of design and construction practice.

1.1.3 This code supplements the general building code and governs matters pertaining to design and construction of cast-in-place concrete construction for one- and two-family dwellings and multiple single-family dwellings (townhouses), and their accessory structures, except wherever this code conflicts with requirements in the legally adopted general building code.

1.1.4 Where this code conflicts with requirements contained in other standards referenced in this code, this code shall govern.

1.1.5 This code is limited to design and construction of concrete footings, including thickened slab footings, wall footings, and isolated footings; concrete basement or foundation walls and above-grade walls constructed with removable forms or with flat insulating concrete forms; and concrete slabs-on-ground.

1.1.6 Where the scope of this code and the scope of ACI 318 coincide, design in accordance with ACI 318 shall be permitted for all buildings and structures, and all parts thereof, within the scope of this code.

1.1.7 *Seismic design*

1.1.7.1 The seismic risk level of a region, or seismic performance or design category of a structure, shall be regulated by the legally adopted general building code, of which this code forms a part, or determined by the local authority.

1.1.8 This code does not govern design and construction of insulating concrete form walls with a waffle or screen configuration; precast wall members; cantilevered walls or retaining walls; deep foundation systems, such as piles, drilled piers, or caissons; and elevated concrete slabs.

COMMENTARY

CHAPTER R1—GENERAL

R1.1—Scope

R1.1.1 This Code includes provisions for the design of residential concrete used for structural purposes, including plain concrete and concrete containing mild reinforcement.

This chapter includes numerous provisions that explain where this Code applies and how it is to be interpreted.

R1.1.2 The user of this code should consult the applicable general building code for all applied loads to determine the applicable values for design requirements. In the absence of a governing code, the user should consider the use of ASCE/SEI 7 to determine applicable loads.

R1.1.4 IRC-2018 references this code. Where the design of a member is initiated with this code from reference by the IRC, the entire design of the member must be completed using the provisions of this code.

R1.1.5 The design and construction requirements for footings, foundation walls, and slabs-on-ground are included in this code, together with requirements for concrete, reinforcement, forms, and other related materials.

R1.1.7 *Seismic design*

Provisions for application of precast wall members are found in IRC-2018. The provisions for above-grade concrete walls are currently available in IRC-2018 based on PCA 100.03.

R1.1.8 Guidance on the type and application of systems for drainage, waterproofing, dampproofing, and radon gas ventilation are commonly found in the general building code.

CODE

1.1.9 This code does not govern the design and application of methods for top lateral wall support, surface drainage, waterproofing, dampproofing, or the ventilation of radon gases.

1.1.10 When a building or structure contains concrete members that exceed the limits of this code or otherwise do not conform to this code, these concrete members shall be designed in accordance with ACI 318.

1.1.11 Where permitted by the statutes of the jurisdiction where the project is to be constructed, construction documents for residences designed by the provisions of this code need not be prepared by a licensed design professional. Where required by the statutes of the jurisdiction where the project is to be constructed, a licensed design professional shall prepare the construction documents for residences.

1.1.12 This code is intended to state only minimum requirements necessary to provide for public health and safety for the design of residences that fall within the scope of IRC-2018. The owner or the licensed design professional may require the quality of materials and construction to be higher than the minimum requirements stated in the code.

1.1.13 All references to minimum and maximum dimensions or values in the code refer to those dimensions or values as specified.

1.1.14 This code is not intended to define contractual responsibilities between all the parties involved in a project, nor is it intended to settle disputes regarding contractual responsibilities.

1.1.15 The commentary text, tables, figures, or illustrations shall not be used to interpret the code in a way that conflicts with the plain meaning of the code text, or to create ambiguity within the code that would not otherwise exist.

1.1.16 The English version in U.S. customary units is the official version of the code. In case of conflict between the official version and versions with SI units or in different languages, the official version governs.

1.2—Alternative systems

Sponsors of any system of design or construction or an alternative material to be applied within the scope of this code, the adequacy of which has been shown by successful use, analysis, or test, but which does not conform to or is not covered by this code, shall have the right to present the data on which their design is based to the building official or to a board of examiners appointed by the building official. This board shall have authority to investigate the data so submitted, to require tests, and to formulate rules governing design and construction of such systems to meet the intent of this code. These rules, if approved by the building official

COMMENTARY

R1.2—Alternative systems

New methods of design, materials, and uses of materials should undergo a period of development before being specifically covered in a code. Hence, acceptable systems or components might be excluded from use by implication if means were not available to obtain acceptance. For systems considered under this section, specific tests, load factors, deflection limits, and other pertinent requirements should be set by the board of examiners and should be consistent with the intent of this document.