IN-LB Inch-Pound Units

An ACI Standard

Tightness Testing of Environmental Engineering Concrete Structures—Specification

Reported by ACI Committee 350

ACI SPEC-350.1-22

American Concrete Institute
Always advancing

First Printing
October 2022
ISBN: 978-1-64195-197-5

Tightness Testing of Environmental Engineering Concrete Structures—Specification

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://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 establish health and safety practices appropriate to the specific circumstances involved with its use. ACI does not make any representations with regard to health and safety issues and the use of this document. The user must determine the applicability of all 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.

Order information: ACI documents are available in print, by download, through electronic subscription, or reprint, and may be obtained by contacting ACI.

ACI codes, specifications, and practices are made available in the ACI Collection of Concrete Codes, Specifications, and Practices. The online subscription to the ACI Collection is always updated, and includes current and historical versions of ACI's codes and specifications (in both inch-pound and SI units) plus new titles as they are published. The ACI Collection is also available as an eight-volume set of books and a USB drive.

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331
Phone: +1.248.848.3700
Fax: +1.248.848.3701

www.concrete.org

ACI SPEC-350.1-22

Tightness Testing of Environmental Engineering Concrete Structures—Specification

An ACI Standard

Reported by ACI Committee 350

M. Reza Kianoush, Chair

Jon B. Ardahl*†, Vice Chair

Andrew K. Minogue, Secretary

Iyad M. Alsamsam
Kiran Chandran
Chuen-Shiow Chen
Steven R. Close*
Mark W. Cunningham
Ronald R. Fiore†
Anthony J. Galterio
Carl A. Gentry
Lisa G. Giroux
Ahmed Hafez
Kenneth Ryan Harvey
Keith W. Jacobson
Edwina S. Lui
Daniel J. McCarthy
Kevin H. Monroe
Khalid Motiwala
Jerry Parnes*
Risto Protic
Satish K. Sachdev
William C. Sherman
Manwendra Sinha
Patricles C. Stivaros
Shashiprakash Surali
Lawrence M. Tabat†
John M. Tehaney
Miroslav Vejvoda
William A. Wallace
Jeffrey S. Ward

Consulting Members

William H. Backous
John W. Baker
Patrick J. Creegan
Robert E. Doyle
Anthony L. Felder
Charles S. Hanskat
Jerry A. Holland*
David C. Kittridge*
Dennis C. Kohl
Nicholas A. Legatos
Kyle S. Loyd*
Carl H. Moon
Lawrence G. Mrazek
Javeed Munshi
Terry Patzias
Andrew R. Philip
Narayan M. Prachand
David M. Rogowsky

*Subcommittee members who produced this Specification.
†Deceased.

The committee would like to thank M. Mitchell, [illegible], P. Hedli, and J. Zanotti for their contributions to this Specification.

These test methods give procedures and criteria for tightness testing of environmental engineering concrete structures. They are applicable to liquid and gas containment structures constructed with concrete or a combination of concrete and other materials. This Specification includes hydrostatic, surcharged hydrostatic, and pneumatic tests.

These test methods may involve hazardous materials, operations, and equipment. This document does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this Specification to establish appropriate safety and health practices and determine the applicability of regulatory limitations before use.

Keywords: containment structures; hydrostatic; leakage; pneumatic; reservoirs; tests; tightness; tightness criteria.

CONTENTS

ACI SPEC-350.1-22 supersedes ACI 350.1-10 and was adopted and published in October 2022.

SECTION 1—GENERAL REQUIREMENTS

1.1—Scope

1.1.1 *Work specified*—This Specification covers tightness testing of liquid and gaseous environmental containment structures that are designed to resist liquid or gaseous loads and to meet the provisions of ACI 350. Unless otherwise specified, test containment structures after the structure is complete and concrete has attained its specified compressive strength. Provisions of this Specification govern except where other provisions are specified in Contract Documents.

1.1.1.1 Tests specified herein include:

(a) Hydrostatic tightness test for open or covered containment structures

(b) Surcharged hydrostatic tightness test for closed containment structures

(c) Pneumatic tightness test for closed containment structures

(d) Combination hydrostatic-pneumatic tightness test for closed containment structures

Do not substitute one type of test for another type of test without acceptance of the Architect/Engineer.

1.1.1.2 Unless otherwise specified, tightness testing procedures and requirements contained herein are applicable to reservoirs, basins, tanks, and open liquid transmission structures such as cast-in-place channels and conduits.

1.1.1.3 Unless otherwise specified, consider each cell of multicell containment structures as a single containment structure, and tested individually.

1.1.1.4 Unless otherwise specified, preparatory items indicated in 2.3.1 are required but waiving such items does not change the test acceptance criteria.

1.1.1.5 If specified, hydrostatically tightness test concrete paved structures, channels, and impoundments.

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 Unless otherwise specified, do not use this Specification in conjunction with ACI 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.

1.1.10 *Work not specified*—These provisions are not intended for structures such as hazardous material primary containment structures, cryogenic storage structures, high-pressure gas tanks, or miscellaneous precast concrete struc-