ICC EVALUATION SERVICE®

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March 28, 2025

TO: **PARTIES INTERESTED IN SEAWATER CONCRETE FOR USE IN PLAIN OR FRP REINFORCED CONCRETE MEMBERS**

SUBJECT: Proposed Acceptance Criteria for Seawater Concrete for Use in Plain or FRP Reinforced Concrete Members, Subject AC574-0625-R1 (MG/AV)

Hearing Information:
WebEx Event Meeting
Tuesday, June 24, 2025
8:00 am Pacific Daylight Time
Click the date above to register

Dear Colleague:

You are invited to comment on proposed Acceptance Criteria for Seawater Concrete for Use in Plain or FRP Reinforced Concrete Members (AC574), which will be discussed at the Evaluation Committee hearing noted above. This AC is developed with the support of members of ACI 243 Seawater Concrete Committee.

The proposed criteria is being developed to evaluate the use of seawater in concrete mixes under the 2024 and 2021 *International Building Code*® (IBC), 2024 and 2021 *International Residential Code*® (IRC), the 2021 *Dubai Building Code*® (DBC), and the 2018 *Saudi Building Code*® (SBC). The criteria contains provisions to evaluate the effect of seawater on the fresh and hardened properties of concrete, as well as the effect of seawater on FRP bars properties.

You are invited to submit written comments on this or any other agenda item and attend the Evaluation Committee hearing to support your written comments in person. If you wish to contribute to the discussion, please note the following:

1. Regarding written comments and presentations:

   a. You should submit these via e-mail to es@icc-es.org by the applicable due date.

   b. The deadline for submitting written comments is **April 25, 2025.** These comments will be forwarded to the committee and posted on the ICC-ES web site shortly after the deadline. Comments that are not submitted by this deadline will not be considered at the meeting.

c. The deadline for submitting rebuttal comments, from the proponent noted in this letter, is **May 14, 2025**. These comments will be forwarded to the committee and posted on the ICC-ES web site shortly after the deadline. Comments that are not submitted by the deadline will not be considered at the meeting.

d. The deadline for submitting a presentation is **May 29, 2025.** If a company wants to present a visual presentation at the hearing, it shall be received in PowerPoint format. These will be forwarded to the committee and posted on the ICC-ES web site approximately two weeks before the hearing. Presentations that are not submitted by the deadline cannot be presented at the meeting. **Note:** Videos will not be posted on the web site.

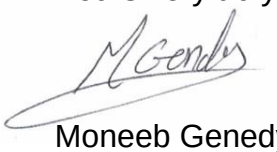
e. ICC-ES staff memo addressing public comments, rebuttal comments, and presentations (as deemed necessary) will be posted to the ICC-ES web site on **June 10, 2025**.

2. Keep in mind that all materials submitted for committee consideration are part of the public record and will not be treated as confidential. It is the presenter's responsibility to certify to ICC-ES staff that no materials infringe copyright.

3. Please do not communicate with committee members before the meeting about any items on the agenda.

We appreciate your interest in the work of the Evaluation Committee. If you have any questions, please contact me at (800) 423-6587, extension 5697, or Aileen Vandenberg, Ph.D., Evaluation Specialist, at extension 3256. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,



Moneeb Genedy, Ph.D., P.E.
Staff Engineer

MG/AV/ls

Encl.

cc: Evaluation Committee

ICC EVALUATION SERVICE, LLC, RULES OF PROCEDURE FOR THE EVALUATION COMMITTEE

1.0 PURPOSE

The purpose of the Evaluation Committee is to review and approve acceptance criteria on which evaluation reports may be based.

2.0 MEMBERSHIP

2.1 The Evaluation Committee has a membership of not fewer than nine, with one of the members named by the ICC-ES president each year to serve as the chairperson–moderator.

2.2 All members of the committee shall be representatives of a body enforcing regulations related to the built environment.

2.3 Persons are appointed to the committee by the ICC-ES president, from among individuals who have formally applied for membership.

2.4 The ICC-ES Board of Managers, using simple majority vote, shall ratify the nominations of the president.

2.5 Committee membership is for one year, coinciding with the calendar year. Members may be renominated and reappointed.

2.6 In the event that a member is unable to attend a committee meeting or complete a term on the committee, the ICC-ES president may appoint a replacement to fill in at the meeting or for the remainder of the member's term. Any replacement appointed for only one meeting must have prior experience as a member of the Evaluation Committee. Appointments under this section (Section 2.6) are subject to ratification as noted in Section 2.4.

3.0 MEETINGS

3.1 The Evaluation Committee shall schedule meetings that are open to the public in discharging its duties under Section 1.0, subject to Section 3.0.

3.2 All scheduled meetings shall be publicly announced. There shall be three to six meetings per year (as necessary).

3.3 More than half of the Evaluation Committee members, counting the chairperson, shall constitute a quorum. A majority vote of members present is required on any action. To avoid any tie vote, the chairperson may choose to exercise or not exercise, as necessary, their right to vote.

3.4 In the absence of the chairperson–moderator, Evaluation Committee members present shall elect an alternate chairperson from the committee for that meeting. The alternate chairperson shall be counted as a voting committee member for purposes of maintaining a committee quorum and to cast a tie-breaking vote of the committee.

3.5 Minutes shall be kept and shall be the official record of each meeting.

3.6 An electronic record of meetings may be made by ICC-ES if deemed necessary; no other audio, video, electronic recordings of the meetings will be permitted. Visual aids (including, but not limited to, charts, slides, videos, or presentation software) viewed at meetings shall be permitted only if the presenter provides ICC-ES before the presentation with a copy of the visual aid in a medium which can be retained by ICC-ES with its record of the meeting and which can also be provided to interested parties requesting a copy.

3.7 Parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members regarding agenda items. All written communications and submissions regarding agenda items must be delivered to ICC-ES and shall be considered nonconfidential and available for discussion in open session of an Evaluation Committee meeting. Such materials will be posted on the ICC-ES web site (www.icc-es.org) prior to the meeting. Comments and submissions not meeting the following deadlines will not be considered at the meeting:

- Initial comments on agenda items shall be submitted at least 28 days before the scheduled meeting.
- A rebuttal comment period shall follow, whereby rebuttal comments to the initial comments may be submitted by the proponent at least 21 days before the scheduled meeting.
- Those planning on giving a visual presentation at the meeting must submit their presentation, in PowerPoint format only, at least 10 days before the scheduled meeting.

The committee reserves the right to refuse recognition of communications which do not comply with the provisions of this section.

4.0 CLOSED SESSIONS

Evaluation Committee meetings shall be open except that at the discretion of the chairperson, staff counsel may be necessary. Also, matters related to clients or potential clients covered by confidentiality requirements of ICC-ES Rules of Procedure for Evaluation Reports are discussed only during closed meetings.

5.0 ACCEPTANCE CRITERIA

5.1 Acceptance criteria are established by the committee to provide a basis for issuing ICC-ES evaluation reports on products and systems under codes referenced in Section 2.0 of the Rules of Procedure for Evaluation Reports. They also clarify conditions of acceptance for products and systems specifically regulated by the codes.

Acceptance criteria may involve a product, material, or method of construction. Consideration of any acceptance criteria must be in conjunction with a current and valid application for an ICC-ES evaluation report, an existing ICC-ES evaluation report, or as otherwise determined by the ICC-ES President.

EXCEPTIONS: The following acceptance criteria are controlled by the ICC-ES executive staff and are not subject to committee approval:

- The Acceptance Criteria for Quality Documentation (AC10)
- The Acceptance Criteria for Test Reports (AC85)
- The Acceptance Criteria for Inspections and Inspection Agencies (AC304)

5.2 Procedure:

5.2.1 Proposed acceptance criteria shall be developed by the ICC-ES staff and discussed in open session with the Evaluation Committee during a scheduled meeting, except as permitted in Section 4.0 of these rules.

5.2.2 Proposed acceptance criteria shall be available to interested parties at least 30 days before discussion at the committee meeting.

5.2.3 The committee shall be informed of all pertinent written communications received by ICC-ES.

5.2.4 Attendees at Evaluation Committee meetings shall have the opportunity to speak on acceptance criteria listed on the meeting agenda, to provide information to committee members. In the interest of fairness, each speaker requesting to testify on a proposed acceptance criteria or proposed changes to an existing acceptance criteria will be given the same amount of time, as follows:

a. A 10-minute time limit applies to speakers giving their first testimony on any item, which applies to both verbal testimony and/or visual presentations.

b. A 5-minute time limit applies to speakers returning to the microphone to offer additional testimony and/or to rebut testimony given by others.

c. A 2-minute time limit applies to speakers offering testimony on the staff recommendation to criteria.

Should a company have multiple speakers, the speaker time limits above apply the company, in that multiple speakers from the same company shall share the testimony time, i.e., multiple speakers from the same company shall not each get their own testimony times. Time limits do not include time needed to answer questions from the staff and/or committee members. The chairperson–moderator shall have limited authority to modify time limitations on testimony. The chairperson–moderator shall also have the authority to adjust time limits as necessary in order to get through the hearing agenda.

An automatic timing device shall keep time for testimony and shall provide the time remaining to the speaker testifying. Interruptions during testimony will not be tolerated. It is the responsibility of the chairperson–moderator to maintain decorum and order during all testimony.

5.3 Approval of any action on an acceptance criteria shall be as specified in Section 3.3 of these rules. Possible actions made by the Evaluation Committee include: Approval; Approval with Revisions; Disapproval; or Further Study. The Evaluation Committee must give the reason(s) for any Disapproval or Further Study actions with specific recommendations.

5.4 Actions of the Evaluation Committee may be appealed in accordance with the ICC-ES Rules of Procedure for Appeal of Acceptance Criteria or the ICC-ES Rules of Procedure for Appeals of Evaluation Committee Technical Decisions.

6.0 COMMITTEE BALLOTING FOR ACCEPTANCE CRITERIA

6.1 Acceptance criteria may be revised without a public hearing following a 30-day public comment period and a majority vote for approval by the Evaluation Committee (i.e., alternative criteria development process), when at the discretion of the ICC-ES executive staff, the subject is a revision that requires formal action by the Evaluation Committee.

6.2 Negative votes must be based upon one or more of the following, for the ballots to be considered valid and require resolution:

a. *Lack of clarity*: There is insufficient explanation of the scope of the acceptance criteria or insufficient description of the intended use of the product or system; or the acceptance criteria is so unclear as to be unacceptable. (The areas where greater clarity is required must be specifically identified.)

b. *Insufficiency*: The criteria is insufficient for proper evaluation of the product or system. (The provisions of the criteria that are in question must be specifically identified.)

c. *The subject of the acceptance criteria is not within the scope of the applicable codes*: A report issued by ICC-ES is intended to provide a basis for approval under the codes. If the subject of the acceptance criteria is not regulated by the codes, there is no basis for issuing a report, or a criteria. (Specifics must be provided concerning the inapplicability of the code.)

d. *The subject of the acceptance criteria needs to be discussed in public hearings*. The committee member requests additional input from other committee members, staff or industry.

6.3 An Evaluation Committee member, in voting on an acceptance criteria, may only cast the following ballots:

- Approved
- Approved with Comments
- Negative: Do Not Proceed

7.0 COMMITTEE COMMUNICATION

Direct communication between committee members, and between committee members and an applicant or concerned party, with regard to the processing of a particular acceptance criteria or evaluation report, shall take place only in a public hearing of the Evaluation Committee. Accordingly:

7.1 Committee members receiving an electronic ballot should respond only to the sender (ICC-ES staff). Committee members who wish to discuss a particular

matter with other committee members, before reaching a decision, should ballot accordingly and bring the matter to the attention of ICC-ES staff, so the issue can be placed on the agenda of a future committee meeting.

7.2 Committee members who are contacted by an applicant or concerned party on a particular matter that will be brought to the committee will refrain from private communication and will encourage the applicant or concerned party to forward their concerns through the ICC-ES staff in writing, and/or make their concerns known by addressing the committee at a public hearing, so that their concerns can receive the attention of all committee members.■

Revised May 2024

ICC EVALUATION SERVICE

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PROPOSED ACCEPTANCE CRITERIA FOR SEAWATER CONCRETE FOR USE IN PLAIN OR FRP-REINFORCED CONCRETE MEMBERS (AC574)

AC574

Proposed June 2025

PREFACE

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes, and may include other codes, as applicable.

For alternative materials, design and methods of construction and equipment, see Section 104.2.3 of the 2024 *International Building Code*® (IBC), Section R104.2.2 of the 2024 *International Residential Code*® (IRC), Section 104.11 of the 2021 IBC and earlier editions, and Section R104.11 of the 2021 IRC and earlier editions.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause injury or unreasonable damage.

Acceptance criteria are developed for use solely by ICC-ES for purposes of issuing ICC-ES evaluation reports

PROPOSED ACCEPTANCE CRITERIA FOR SEAWATER CONCRETE FOR USE IN PLAIN OR FRP REINFORCED CONCRETE MEMBERS (AC574)

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for the evaluation of concrete made with seawater, in ICC Evaluation Service, LLC (ICC-ES), evaluation reports under the code editions indicated in Section 1.3.

The reason for the development of this criteria is to provide guidelines for the evaluation of concrete made with seawater, because the codes do not provide requirements for testing and the use of seawater as mixing water in structural or non-structural concrete.

1.2 Scope: The acceptance criteria is limited to the use of seawater as mixing water for the production of hydraulic cement concrete, used only in applications as plain concrete or when FRP rebars are used as the reinforcement. The seawater evaluated in this criteria is an alternative to code specified ASTM C1602 potable mixing water, as required by Section 26.4.1.4 of ACI 318-19, which is referenced by Chapter 19 of the 2024 and 2021 IBC.

The FRP reinforcing bars used in structural seawater concrete applications must comply with ACI CODE 440.11 as referenced by Chapter 19 of the 2024 IBC, or have an evaluation report under the ICC-ES Acceptance Criteria AC454. For nonstructural seawater concrete applications where FRP reinforcing bars are used as temperature and shrinkage reinforcement, FRP reinforcing bars must have an evaluation report under the ICC-ES Acceptance Criteria AC521.

Use of seawater as mixing water for concrete where conventional steel reinforcing bars or steel anchorage inserts are used is outside the scope of this criteria.

1.3 Codes and Referenced Standards: Where standards are referenced in this criteria, these standards must be applied consistently with the code upon which compliance is based. Where standards and code editions are not listed in this section, Table 1 summarizes the specific date applicable to each code.

1.3.1 2024 and 2021 *International Building Code*® (IBC), International Code Council.

1.3.2 2024 and 2021 *International Residential Code*® (IRC), International Code Council.

1.3.3 2021 *Dubai Building Code*® (DBC), Government of Dubai.

1.3.4 2018 *Saudi Building Code*® (SBC), Saudi Building Code National Committee.

1.3.5 ACI 318, Building Code Requirements for Structural Concrete, American Concrete Institute.

1.3.6 ACI 440.11, Building Code Requirements for Structural Concrete Reinforced with Glass Fiber-Reinforced Polymer (GFRP) Bars, American Concrete Institute

1.3.7 ASTM C31/C31M, Practice for Making and Curing Concrete Test Specimens in the Field, ASTM International.

1.3.8 ASTM C33/C33M, Standard Specification for Concrete Aggregates, ASTM International.

1.3.9 ASTM C39/C39M, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens, ASTM International.

1.3.10 ASTM C78/C78M, Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading), ASTM International.

1.3.11 ASTM C138/C138M, Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete, ASTM International.

1.3.12 ASTM C143/C143M, Standard Test Method for Slump of Hydraulic-Cement Concrete, ASTM International.

1.3.13 ASTM C150/C150M, Standard Specification for Portland Cement, ASTM International.

1.3.14 ASTM C157/C157M, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete, ASTM International.

1.3.15 ASTM C192/C192M, Practice of Making and Curing Concrete Test Specimens in the Laboratory, ASTM International.

1.3.16 ASTM C231/C231M, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM International.

1.3.17 ASTM C232/C232M, Standard Test Method for Bleeding of Concrete, ASTM International.

1.3.18 ASTM C330/C330M, Standard Specification for Lightweight Aggregate for Structural Concrete, ASTM International.

1.3.19 ASTM C403/C403M, Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance, ASTM International.

1.3.20 ASTM C666/C666M, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing, ASTM International.

1.3.21 ASTM C1012/C1012M, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution, ASTM International.

1.3.22 ASTM C1260, Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method), ASTM International.

1.3.23 ASTM C1602/C1602M, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete, ASTM International.

1.3.24 C1778 Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete ASTM International.

1.3.25 ASTM E119, Standard Test Method for Fire Tests of Building Construction and Materials, ASTM International.

1.3.26 ASTM E136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, ASTM International.

1.3.27 ICC-ES Acceptance Criteria for Fiber-reinforced Polymer (FRP) Bars for Internal Reinforcement of Concrete Members (AC454).

1.3.28 ICC-ES Acceptance Criteria for Proprietary Hydraulic Cement (AC459).

1.3.29 ICC-ES Acceptance Criteria for Fiber–reinforced Polymer (FRP) Bars and Meshes for Internal Reinforcement of Non-structural Concrete Members (AC521).

1.3.30 ICC-ES Acceptance Criteria for Low-carbon Alternative Cements for Use in Concrete (AC529).

1.3.31 UL 263, Standard for Fire Tests of Building Construction and Materials, UL, LLC.

1.3.32 ISO 21930-17, Sustainability in Buildings and Civil Engineering Works – Core Rules for Environmental product Declarations of Construction Products and Services, International Organization of Standardization (ISO).

1.4 Definitions:

1.4.1 Compressive Strength Ratio: Compressive strength ratio is the ratio between the compressive strength of the seawater concrete sample and the compressive strength of the reference sample.

1.4.2 Flexural Strength Ratio: Flexural strength ratio is the ratio between the flexural strength of the seawater concrete sample and the flexural strength of the reference sample.

1.4.3 Initial/Final Setting time deviation: Initial/Final setting time deviation is the difference between initial/final setting time of the seawater concrete sample and the initial/final setting time of the reference sample.

1.4.4 Length Change Ratio: Length change ratio is the ratio between the length change of the seawater concrete sample and the length change of the reference sample.

1.4.5 Major Environmental Event: Major environmental event is an event that can affect the chemical composition of the water at seawater source (e.g., a hurricane or an oil spill).

1.4.6 Reference Samples: Reference samples are concrete samples that are made with potable mixing water in accordance with ASTM C1602.

1.4.7 Relative Durability Factor Ratio: Relative durability factor ratio is the ratio between the relative durability factor of the seawater concrete sample and the relative durability factor of the reference sample.

1.4.8 Seawater Concrete: Seawater concrete is concrete that is mixed with seawater.

1.4.9 Standard Curing: Moisture curing of concrete samples in accordance with ASTM C192.

2.0 BASIC INFORMATION

2.1 Seawater composition: The chemical composition of the seawater used in seawater concrete mixing must be submitted to ICC-ES.

2.2 Concrete Mix Design: The mix design of all seawater concrete mixes to be evaluated must be submitted.

2.3 Reference Cement Type: The Cement used in seawater concrete, information showing compliance with Section 26.4.1.1.1 (a) of ACI-318 as referenced by Section 19 of the IBC or an evaluation report under the ICC-ES Acceptance Criteria AC459 or ICC-ES Acceptance Criteria AC529 must be submitted.

2.4 FRP Reinforcing Bars: For FRP reinforcing bars used in structural seawater concrete applications, information showing compliance with ACI CODE 440.11 as referenced by Chapter 19 of the 2024 IBC or an evaluation report under the ICC-ES Acceptance Criteria AC454 must be submitted. For nonstructural seawater concrete applications where FRP reinforcing bars are used as temperature and shrinkage reinforcement, an evaluation report under the ICC-ES Acceptance Criteria AC521 must be submitted.

2.5 Packaging and Identification: A description of the method of seawater source labeling (i.e. transportation truck bill) shall be submitted. Product labeling shall include the evaluation report number. Product Identification shall be in accordance with the product identification provisions of the ICC-ES Rules of Procedure for Evaluation Reports. The ICC-ES mark of conformity, electronic labeling, and/or the evaluation report number (ICC-ES ESR-XXXX) along with the name, registered trademark, or registered logo of the report holder [and/or listee] must be included in the product label.

2.6 Testing Laboratories, Reports of Tests and Product Sampling:

2.6.1 Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.6.2 Test reports shall comply with AC85.

2.6.3 Sampling of the seawater concrete for the tests under this criteria shall comply with Section 3.2 of AC85. The preparation of the test specimens for the tests required under this criteria shall be completed by the testing laboratory.

2.7 Qualification Test Plan: A qualification test plan shall be submitted to and approved by ICC-ES staff prior to any testing being conducted.

3.0 REQUIRED DATA TEST AND PERFORMANCE REQUIREMENTS

3.1 General: The seawater concrete shall be tested in accordance with Sections 3.2, 3.3, and 3.4. Testing shall also comply with Sections 3.1.1 to 3.1.4 of this section.

3.1.1 Each seawater source shall be tested separately for concrete tests in Sections 3.2, 3.3, and 3.4. Chemical composition of seawater from the source can be used for quality control purposes.

3.1.2 Reference cement type must be reported in the final test report, to be included in the ICC-ES evaluation report.

3.1.3 Tests shall be conducted using concrete mixtures prepared with normal weight aggregates meeting the applicable requirements of ASTM C33. Optionally, when use of the seawater in lightweight concrete is desired, lightweight aggregates meeting the applicable requirements of ASTM C330 shall be used.

3.1.4 Tests shall be conducted using concrete mixtures prepared with the maximum water-to-cement ratio (0.45 – 0.50).

3.1.5 Due to being limited to FRP reinforcing bars only, the limits on fly ash as given in Section 26.4.2.2(b)(1) of ACI 318 are allowed to be exceeded for seawater concrete evaluated in accordance with this criteria, when Section 3.2 requirements of this criteria are met.

3.1.6 If applicable, placement technique considerations for the seawater concrete shall be reported by the testing laboratory, and concrete placement instructions from the manufacturer shall be included in the ICC Evaluation Service evaluation report, including specific instructions for project adjustments of workability and setting time, if necessary.

3.1.7 If applicable, any treatment for seawater used in the seawater concrete shall be reported by the testing laboratory, and the treatment process from the manufacturer shall be included in the ICC Evaluation Service evaluation report

3.2 Physical Properties of Concrete: The purpose of this section is to evaluate effect of seawater on the fresh and hardened properties of concrete.

3.2.1 Physical requirements specified in Table 2 shall be evaluated. Test specimens shall be prepared and tested in accordance with the ASTM standards or alternative test standards specified in Table 3.

Exception: The relative durability factor measured by the freezing and thawing test per ASTM C666 as specified in Table 2 is applicable only if the admixture is intended for use in air-entrained concrete that may be exposed to freezing and thawing while wet.

3.2.2 For the results of compressive and flexural strength, the specimens shall be tested for compliance at each time interval specified by the physical requirements of ASTM C260 and C494, as applicable, and shall be determined in comparison to reference samples. The starting point (time zero) for each of these time intervals is the time at which the test specimens are initially cast.

Exception: For initial evaluation, submittal of the six months and one-year compression strength tests may be supplied within nine months of evaluation report issuance, provided reports of tests demonstrate provisional compliance with the alternative compressive strength requirements in Table 2.

3.3 Use in Fire-resistance Rated Construction (Optional): When evaluation is sought for use on assemblies required to be of fire-resistance-rate construction, reports of tests in accordance with ASTM E119 or UL 263 must be submitted for each assembly to be included in the evaluation report. Additionally, the aggregate type used in fire-resistance tests must be reported in the ICC Evaluation service report.

3.3.1 Conditions of Acceptance: The conditions of acceptance must comply with ASTEM E119 or UL263, as applicable.

3.4 Use in Buildings of Types I, II, III, and IV Construction (Optional): When evaluation is sought for use in Types I, II, III, or IV construction where the assembly must be constructed of non-combustible materials, the seawater concrete must be tested in accordance with ASTM E136.

3.4.1 Conditions of Acceptance: The specimens of seawater concrete must comply with the requirements of IBC Section 703.4. Otherwise, use shall be limited to Type V construction only.

4.0 QUALITY CONTROL

4.1 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

4.2 A qualifying inspection shall be conducted at each manufacturing facility in accordance with the requirements of the ICC-ES Acceptance Criteria for Inspections and Inspection Agencies (AC304).

4.3 An annual inspection shall be conducted at each manufacturing facility in accordance with AC304.

4.4 Seawater must be free of any foreign impurities visible at a magnification of 5X as addressed in the quality control program. For additional requirements, see Sections 2.1, 3.1.1, 3.1.7, and 3.2 of this criteria.

4.5 The chemical composition of seawater must be tested monthly and after each major environmental event at the seawater source as addressed in the quality control program. The chemical composition of the seawater shall be in compliance with ICC-ES evaluation report with maximum variability of 10 percent.

4.6 Special inspection shall be required in accordance with Sections 1705.1.1 and 1705.3 of the IBC during the mixing and placing of the seawater concrete. In addition, the report applicant shall submit inspection procedures to verify proper usage. The inspection shall include verification that the chemical composition of the seawater and the concrete compressive strength are in compliance with the ICC-ES evaluation report. Concrete cylinders are to be field cured in accordance with ASTM C31 and tested in accordance with ASTM C39 with maximum variability of 10 percent.

5.0 EVALUATION REPORT REQUIREMENTS

5.1 The evaluation report shall state that seawater concrete used under the IBC, DBC, or SBC is subject to approval by the registered design professional.

5.2 The evaluation report shall state the source geographical location of seawater used as mixing water in seawater concrete.

5.3 The evaluation report shall include a statement that the seawater recognized in this evaluation report can be used in lieu of ASTM C1602 specified potable water for structural or nonstructural concrete production in which FRP rebars are used as reinforcement.

5.4 The evaluation report shall include a statement that the FRP reinforcing bars used in structural seawater concrete applications must comply with ACI CODE 440.11 as referenced by Chapter 19 of the 2024 IBC or have an evaluation report under the Acceptance Criteria AC454.

5.5 The evaluation report shall include a statement that for nonstructural seawater concrete applications where FRP reinforcing bars are used as temperature and

shrinkage reinforcement only, FRP reinforcing bars must have an evaluation report under the Acceptance Criteria AC521.

5.6 The evaluation report shall state whether the seawater concrete is evaluated for the use in air-entrained concrete that may be exposed to freezing and thawing while wet.

5.7 The initial setting time deviation, final setting time deviation, compressive strength ratio, flexural strength ratio, length change ratio, and relative durability factor of the seawater concrete as determined in accordance with Section 3.2 shall be reported in the evaluation report for consideration by the registered design professional, as applicable.

5.8 Use in fire-resistance rated construction as determined in accordance with Section 3.3 shall be described in the evaluation report. The assembly or assemblies qualified in accordance with Section 3.4 shall be described in the evaluation report.

5.9 Use in buildings of Types I, II, III, and IV construction as determined in accordance with Section 3.4 shall be described in the evaluation report.

6.0 ENVIRONMENTAL PRODUCT DECLARATION (Optional)

Environmental impacts shall be assessed via an Environmental Product Declaration (EPD) based on a Life Cycle Assessment (LCA). The LCA and EPD shall be conducted in accordance with ISO 21930 and the appropriate Product Category Rule(s) for the product type.■

TABLE 1 – 2024 IBC, 2021 IBC, 2021 DBC, and 2018 SBC APPLICABLE EDITIONS OF REFERENCED STANDARDS[1]

STANDARDS INCLUDED IN CRITERIA	2024 IBC	2021 IBC	2021 DBC	2018 SBC
ACI 318	-19	-19	-19	-14
ACI 440	-19	-	-	-
ASTM C33	-18	-18	-18	-13
ASTM C39	-18	-18	-18	-14a
ASTM C78	-22	-22	-22	-22
ASTM C138	-17a	-17a	-17a	-17a
ASTM C143	-20	-20	-20	-20
ASTM C157	24e1	24e1	24e1	24e1
ASTM C192	-18	-18	-18	-18
ASTM C231	-17a	-17a	-17a	-14
ASTM C232	-21	-21	-21	-21
ASTM C330	17a	17a	17a	-09
ASTM C403	-23	-23	-23	-23
ASTM C666	-15	-15	-15	-15
ASTM C1012	-18b	-18b	-18b	-13
ASTM C1567	-23	-23	-23	-23
ASTM C1602	-18	-18	-18	-12
ASTM E119	-20	-18b	-18b	-12a
ASTM E136	-22	-19	-19	-12
UL 263	-11	-11	-11	-11

[1]When a specific edition of a standard is referenced in this table under a specific edition of the code, products must be shown to comply with the specified edition of the standard.

PROPOSED ACCEPTANCE CRITERIA FOR SEAWATER CONCRETE FOR USE IN PLAIN OR FRP REINFORCED CONCRETE MEMBERS (AC574)

TABLE 2–REQUIRED PHYSICAL PROPERTIES OF CONCRETE

PROPERTY	TEST METHOD	NUMBER OF TEST AGES	NUMBER OF SPECIMENS PER MIX	ACCEPTANCE CRITERIA
Slump	ASTM C143	1[1]	3 (one per batch)	+- 1 inch of reference mixture
Fresh Density	ASTM C138	1[1]	3 (one per batch)	+- 5 percent of reference mixture
Air content	ASTM C231	1[1]	3 (one per batch)	+- 1 percent of reference mixture-
Initial Time of setting	ASTM C403	1[1]	3 (one per batch)	Not 1:00 earlier nor 1:30 later
Final Time of setting	ASTM C403	1[1]	3 (one per batch)	Not 1:00 earlier nor 1:30 later
Bleeding	ASTM C232	1[1]	3 (one per batch)	Max. 2% over reference sample
Compressive strength	ASTM C39	6[2]	9 (three per test age from 3 separate batches)	Min. 90% of reference sample
Flexural strength	ASTM C78	3[3]	9 (three per test age from 3 separate batches)	Min. 90% of reference sample
Length change	ASTM C157	1	3 (one per batch)	Same as reference mixture length change or less
Freezing and Thawing[4]	ASTM C666	1	3 (one per batch)	Min. 90% of reference Sample
Sulfate attack resistance	ASTM C1012	1[5]	6 (two per batch)	Must be within permitted level in accordance with ACI 318 - Table 26.4.2.2(c)
Alkali silica reaction	ASTM C1260	1[6]	3 (one per batch)	Must be class R0 in accordance with ASTM C1778 (i.e., <0.10% expansion)

[1]Fresh Concrete
[2]Test shall be conducted at 3 days, 7 days, 28 days, 90 days, 6 months, and 1 year.
[3]Test shall be conducted at 3, 7, and 28 days.
[4]Applicable only if the admixture is intended for use in air-entrained concrete that may be exposed to freezing and thawing while wet.
[5]Test shall be conducted in accordance with ASTM C1012.
[6]Test shall be conducted in accordance with ASTM C1260.

TABLE 3– TEST STANDARDS FOR REQUIRED PHYSICAL PROPERTIES OF CONCRETE

PHYSICAL PROPETIES	ASTM STANDARD	ALTERNATIVE STANDARD[2]
Slump	ASTM C143	BS EN 12350-2
Fresh Density	ASTM C138	BS EN 12350-6
Air content	ASTM C231	BS EN 12350-7
Time of setting	ASTM C403	BS EN 196-3
Compressive strength	ASTM C39	BS EN 12390-3
Flexural strength	ASTM C78	BS EN 12390-5
Length change	ASTM C157	BS EN 12390-16
Freezing and Thawing[1]	ASTM C666	-
Bleeding	ASTM C232	-

[1]Applicable only if the admixture is intended for use in air-entrained concrete that may be exposed to freezing and thawing while wet.
[2] Evaluation report shall state the EN standard for any reported value in evaluation report if EN standard is used in lieu of ASTM standard during the qualification tests. (Note: unless they are exactly the same).