

# ACCEPTANCE CRITERIA FOR QUALITY CONTROL OF CHEMICAL ADMIXTURES USED IN CONCRETE

## AC198

**Approved January 2008**

**Effective February 1, 2008**

**(Editorially revised April 2010)**

**Previously approved July 2002**

## PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard Codes. Section 104.11 of the *International Building Code*® reads as follows:

The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

This acceptance criteria has been issued to provide all interested parties with guidelines for demonstrating compliance with performance features of the applicable code(s) referenced in the acceptance criteria. The criteria was developed and adopted following public hearings conducted by the ICC-ES Evaluation Committee, and is effective on the date shown above. All reports issued or reissued on or after the effective date must comply with this criteria, while reports issued prior to this date may be in compliance with this criteria or with the previous edition. If the criteria is an updated version from the previous edition, a solid vertical line (|) in the margin within the criteria indicates a technical change, addition, or deletion from the previous edition. A deletion indicator (→) is provided in the margin where a paragraph has been deleted if the deletion involved a technical change. This criteria may be further revised as the need dictates.

ICC-ES may consider alternate criteria, provided the report applicant submits valid 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. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria set forth in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria 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 an evaluation report, if the product, material, or type 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 unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

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

# ACCEPTENCE CRITERIA FOR CHEMICAL ADMIXTURES USED IN CONCRETE (AC198)

## 1.0 INTRODUCTION

**1.1 Purpose:** The purpose of this acceptance criteria is to establish requirements for recognition of cementitious chemical admixtures, used in concrete, in ICC Evaluation Service, Inc. (ICC-ES), evaluation reports under the 2009 *International Building Code*<sup>®</sup>, the 2009 *International Residential Code*<sup>®</sup>, the 2006 *International Building Code*<sup>®</sup> (IBC), the 2006 *International Residential Code*<sup>™</sup> (IRC) and the 1997 *Uniform Building Code*<sup>™</sup> (UBC). This criteria addresses admixtures that comply with the requirements of the codes, and admixtures with initial set and final set times that exceed those allowed in code-specified standards (“extended-set admixtures”).

The reason for the development of this criteria is to provide a guideline for the evaluation of concrete admixtures, to comply with the provisions and requirements in Chapter 19 of the IBC or UBC and Chapters R4 and R5 of the IRC, and to address performance characteristics of water-reducing extended set admixtures.

**1.2 Scope:** The acceptance criteria is limited to recognition of cementitious chemical admixtures used in concrete under Section 1903.6 of the UBC, Section 1903 of the IBC, and Sections R402.2 of the IRC.

### 1.3 Referenced Documents:

**1.3.1** 2009 *International Building Code*<sup>®</sup> (2009 IBC), International Code Council.

**1.3.2** 2009 *International Residential Code*<sup>®</sup> (2009 IRC), International Code Council.

**1.3.3** 2006 *International Building Code*<sup>®</sup>, (2006 IBC), International Code Council.

**1.3.4** 2006 *International Residential Code*<sup>®</sup>, (2006 IRC), International Code Council.

**1.3.5** 1997 *Uniform Building Code*<sup>™</sup> (UBC).

**1.3.6** ACI 318-08 and 318-05, Building Code Requirements for Structural Concrete, American Concrete Institute.

**1.3.7** ASTM Standard C 494-05a, Standard Specification for Chemical Admixtures for Concrete, ASTM International.

**1.3.8** ASTM C 1017-03, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete, ASTM International.

**1.3.9** ASTM C 1218-99, Standard Test Method for Water Soluble Chloride in Mortar and Concrete, ASTM International.

## 2.0 BASIC INFORMATION AND REPORTS OF TESTS TO BE SUBMITTED

**2.1 Product Description:** Description of the product, including weight, packaging, labeling, and shelf life.

**2.2 Installation Instructions:** Installation instructions, including dosage rate, mixing instructions, and limitations on use. Installation instructions for extended-set admixtures complying with Section 3.2 of this criteria shall specify the minimum initial and final set times that shall be

allowed prior to concrete finishing procedures and removal of framework.

**2.3 Packaging and Identification:** A description of the method of packaging and field identification of the admixture shall be submitted. The labeling shall include the manufacturer's name and address, the product name and the ICC-ES evaluation report number. A copy of the installation instructions that are packaged with the product shall be submitted. Installation instructions for extended-set admixtures complying with Section 3.2 of this criteria shall specify the minimum initial and final set times that must be allowed prior to concrete finishing procedures and removal of framework. The installation instructions for extended-set admixtures shall also address the following:

1. The effects of temperature variances and other environmental conditions on the initial and final set times.

2. Considerations for adjustments to project schedules, labor and equipment allocation, finishing, curing and form removal due to the extended-set time.

### 2.4 Testing Laboratories, Reports of Tests and Product Sampling:

**2.4.1** 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.

**2.4.2** Test reports shall comply with AC85.

**2.4.3** Product sampling for the tests required in Section 3.0 of this criteria shall comply with Section 3.2 of AC85. The manufacturer must submit an affidavit certifying that the tested product is representative of the standard manufactured product for which recognition is being sought. Alternately, in lieu of the affidavit, a manufacturer may choose to have the product sampled independently in accordance with Section 3.1 of AC85 by the International Accreditation Service, Inc. (IAS), an accredited inspection agency or an accredited testing laboratory.

## 3.0 REQUIRED DATA

**3.1 Chemical Admixtures:** Reports of tests must demonstrate that the admixture will comply with the respective requirements for the types of admixture specified in ASTM C 494 or C 1017, as applicable.

**Exception:** For initial evaluations, submittal of the one-year compression strength tests may be supplied within six months of evaluation report issuance, provided reports of tests demonstrate provisional compliance with the alternative compressive strength requirements in Table 1 of ASTM C 494. Footnote C in Table 1 of ASTM C 494 describes additional details.

**3.2 Water-Reducing, Extended-set Chemical Admixtures:** Reports of tests must demonstrate that the admixture will comply with the requirements for a Type D admixture specified in ASTM C 494, with the following exceptions:

## ACCEPTENCE CRITERIA FOR CHEMICAL ADMIXTURES USED IN CONCRETE (AC198)

1. Initial set time: The initial set time shall be at least one hour later than the initial set time determined on the control specimens. The initial set time shall be reported in the evaluation report for the product.

2. Final set time: The final set time shall be determined without comparison to control specimens. The final set time shall be reported in the evaluation report for the product.

3. For the results of compressive and flexural strength, the specimens shall be tested at each time interval specified in Table 1 of ASTM C 494. The starting point (time zero) for each of these time intervals is the time at which the specimens are initially cast.

**3.3 Chemical Admixtures Used in Reinforced Concrete:** Admixtures shall comply with Section 3.1 or Section 3.2 of this criteria. Additionally, reports of tests in accordance with ASTM C 1218 shall demonstrate that the admixtures comply with Table 19-A-5 of the UBC, Section 1904.4 of the IBC or Table 4.3.1 of ACI 318-08 or Table 4.4.1 of ACI 318-05, as applicable, for maximum water-soluble chloride ion ( $Cl^-$ ) content in concrete.

### 4.0 QUALITY CONTROL

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

**4.2** Third-party follow-up inspections are not required under this acceptance criteria.

### 5.0 EVALUATION REPORT RECOGNITION

**5.1** The evaluation report will state that admixtures used in concrete under the UBC are subject to prior approval by the building official.

**5.2** The evaluation report will state that admixtures used in concrete under the IBC and IRC are subject to prior approval by the registered design professional.

**5.3** For admixtures containing calcium chloride or admixtures containing chloride from other than impurities in admixture ingredients, the evaluation report will state that the admixture shall not be used in prestressed concrete, in concrete containing embedded aluminum, or in concrete cast against stay-in-place steel forms.

**5.4** Unless it has been demonstrated that the admixtures comply with Section 3.3 of this acceptance criteria, the evaluation report will state that the admixtures shall not be used in reinforced concrete.■