SI International System of Units

Post-Installed Reinforcing Bar Systems in Concrete—Qualification Requirements and Commentary

Reported by ACI Committee 355

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American Concrete Institute
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(SI Units)

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An ACI Standard

Reported by ACI Committee 355

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This Code prescribes testing programs and evaluation requirements for post-installed reinforcing bars intended for use in concrete under the straight-bar development and splice length design provisions of ACI CODE-318. Testing and assessment criteria are provided for various conditions of use, including seismic loading, sustained loading, aggressive environments, and reduced and elevated temperatures. Criteria are provided for establishing the required characteristic bond strength, reductions for adverse conditions, and associated job-site quality control requirements.

Keywords: post-installed reinforcing bars; qualification procedures.

CONTENTS

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CODE

CHAPTER 1—INTRODUCTION

1.1—Introduction

This Code prescribes testing and evaluation requirements for post-installed reinforcing bar systems intended for use in structural concrete under the provisions of ACI CODE-318. Inspection is required during reinforcing bar installation as noted in 15.3.

1.2—Scope

This Code applies only to post-installed reinforcing bars as defined herein.

1.2.1 This Code applies to reinforcing bar diameters No. 10 through No. 43 installed in drilled holes with flowable grout.

1.2.2 Grouts shall be classified as either Type A or Type B as defined in 5.5 and evaluated in accordance with Tables 3.3 and 3.4, respectively.

1.2.3 This Code does not address the following systems and use conditions:

1. Grouts used to adhere reinforcing elements to concrete surfaces outside of a drilled hole

COMMENTARY

CHAPTER R1—INTRODUCTION

R1.1—Introduction

This Code prescribes the testing programs required to qualify post-installed reinforcing bar systems for design in accordance with the reinforcing bar provisions of ACI CODE-318. For a discussion of issues associated with the qualification and design of systems for post-installed reinforcing bars, refer to Mahrenholtz et al. (2020).

The use of post-installed reinforcing bar systems qualified in accordance with this Code may also be used in conjunction with other documents and standards addressing the modification, repair, or strengthening of structures, provided that the provisions for development and splicing of reinforcing bars are compatible with the provisions of ACI CODE-318.

R1.2—Scope

Post-installed reinforcing bars resist tension loads through mechanical bond (micro-interlock) and, to a lesser degree, chemical adhesion. Organic binders and hydraulic cements used for securing reinforcing bars in drilled holes (herein referred to as "grouts") may exhibit a range of performance characteristics associated with the drilling method, hole diameter, and hole cleaning procedures. The criteria provided in this Code evaluate the ability of the grout to be installed and to perform reliably at the embedment depths associated with the development and splice length provisions of ACI CODE-318. Design of post-installed reinforcing bars in existing structures using ACI CODE-562 and other design standards should be based on equivalent nominal strength in place of specified concrete strength, defined according to the target reliability level, and use development and splice length equations from the design-basis code.

R1.2.1 Use of the term "flowable" is intended to refer to grouts that are placed into holes before the reinforcing bar is installed and subsequently flow around the reinforcing bar once it is installed into the hole. This differentiation is made to set flowable grouts apart from dry-pack grouts, which are specifically excluded from this Code in 1.2.3. Flowable grouts may also be formulated to have properties that allow them to both flow around the reinforcing bar during installation and possess a high viscosity once the installation is complete such that the grout does not run out of a horizontal or upwardly inclined hole.

R1.2.2 Grouts used for post-installed reinforcing bars include organic (polymer) binders, hydraulically activated binders (cements), and combinations of polymers and hydraulically activated binders.

R1.2.3 Correct proportioning (metering) and mixing of grout components are important to good performance. For hydraulically activated grouts mixed in open containers and poured or injected into drilled holes, control of the water-cement ratio (w/c) is critical and, therefore, enhanced levels