



American Concrete Institute®
Advancing concrete knowledge

ERRATA
ACI 515.1R-79 (Revised 1985)
Manual of Concrete Practice 1999

The following page (515.1R-2) was inadvertently replaced with an incorrect page (506.1R-2). The correct page should read as follows:

515.1R-2

MANUAL OF CONCRETE PRACTICE

Chapter 4—Waterproofing barrier systems,
page 515.1R-18

- 4.1—Characteristics of waterproofing
- 4.2—Guide to selection
- 4.3—Design and application
- 4.4—Inspection and sampling
- 4.5—Preconstruction conference checklist

Chapter 5—Dampproofing barrier systems,
page 515.1R-29

- 5.1—Characteristics of dampproofing
- 5.2—Guide to selection of dampproofing barriers
- 5.3—Application

Chapter 6—Protective barrier systems,
page 515.1R-30

- 6.1—Characteristics of a protective barrier system
- 6.2—Elements of a protective barrier system
- 6.3—Guide for selection of protective barrier systems
- 6.4—Description of barrier materials
- 6.5—Special composite barriers
- 6.6—Testing of completed barrier systems

Chapter 7—Decorative paint barrier systems,
page 515.1R-38

- 7.1—Characteristics of decorative paint systems
- 7.2—Guide to selection of decorative paints
- 7.3—Types of paints
- 7.4—Painting procedures
- 7.5—Repainting procedures

CHAPTER 1—INTRODUCTION

1.1—General discussion

Many concrete structures are designed and built to (1) contain water within the structure, or (2) maintain dry conditions within the structure when it is subject to water conditions on the outside. Since concrete is not always completely impervious to water and since concrete may sometimes develop cracks after placement, it is sometimes necessary to cover the surface with a barrier material to meet these requirements. In this Guide, they will be identified as waterproofing barrier systems (Chapter 4) and dampproofing barrier systems (Chapter 5). See definitions in Sections 2.1.1 and 2.1.2 and discuss-

All the barrier systems discussed in this Guide will be limited to those that are made up of polymeric cementitious and ceramic materials.

1.2—The systems concept for barriers

To understand the factors affecting the performance of the various barrier systems, it is necessary to consider them not isolated but as part of a whole. As an example, consider a protective coating system for a concrete structure below grade: the specific elements are: the barrier material, the interface of the barrier and concrete surface, concrete to a depth of $\frac{1}{4}$ in. (6 mm), the remainder of the concrete, the stability of the ground supporting it, and the ground water pressures (see Section 6.2 for more details).

Awareness of the systems concept will make one appreciate that selection of a barrier material is only one of many interrelated steps necessary to insure satisfactory performance. Equally important are placement, consolidation, curing of the concrete, surface cleanliness, surface preparation, application procedures, and inspection.

A decision whether to use a barrier and its selection should be made when the concrete structure is being designed. Configuration of the structure, construction methods, and job sequencing can affect barrier installation and quality. Barrier penetrations can be minimized and the barrier aspects of the job will be better planned.

Placement and curing of the concrete should be in accordance with ACI 304 and ACI 308.^{1,2} This should be followed by the appropriate surface preparation to remove any weak concrete, laitance, and foreign material.

This Guide will provide the best available information to assist in the selection, placement, installation and inspection of these barrier systems. Suggestions for the design and fabrication of the concrete structures that are to receive a barrier system will also be included. The goal of this Guide is to make the reader aware of the factors insuring satisfactory barrier performance.

sion in Sections 2.2 and 2.3.

Some concrete structures may be subjected to chemical attack on one or more surfaces by water, acids, alkalis, salt solutions, or a wide variety of organic chemicals. Damage may be merely surface discoloration or surface roughening, or it may be as catastrophic as acid attack with the resulting loss of structural integrity. The affected surfaces are generally covered with barrier materials. These materials with the supporting concrete are designated in Chapter 6 of this Guide as protective barrier systems. See discussion in Sections 1.2, 2.4, and 2.5.

Some concrete surfaces require a change in color for esthetic reasons. A wide variety of paints are commercially available for this purpose. In this Guide they will be called decorative paint barrier systems (Chapter 7). See Sections 2.1.4 and 2.6.

1.3—Barrier performance difficult to define

There are no formulae, such as those available to designers of concrete structures, that can be used in the selection, placement, application, and inspection of barrier systems because many of the factors affecting barrier performance are difficult to define and are intangible factors. Structural engineers introduce strength reduction factors, load factors, and factors of safety into their design formulae to allow for variations in manufacturing or construction, and to compensate for those aspects of the design that cannot be precisely predicted.

Surface cleanliness is a major factor affecting adhesion and subsequent performance of the barrier system, and yet we are unable to quantify it. The reader should be aware that the application of a barrier system is really an art not a science. Once this is