

Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials

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This guide contains materials, design, and construction recommendations for concrete slabs-on-ground and suspended slabs that are to receive moisture-sensitive flooring materials. These flooring materials include sheet rubber, epoxy coatings, vinyl composition tile, sheet vinyl, carpet, athletic flooring, laminates, and hardwood. Chapters 1 through 8 provide an understanding of concrete moisture behavior and drying, and show how recommended construction practices can contribute to successful performance of floor covering materials. This background provides a basis for the recommendations in Chapter 9 to improve performance of floor covering materials in contact with concrete moisture and alkalinity.

Because this guide is specific to floor moisture problems and solutions, refer to the most current editions of both ACI 302.1R, "Guide for Concrete Floor and Slab Construction," and ACI 360R, "Design of Slabs-on-Ground," for general information. These two documents contain guidance on floor design and construction that is needed to achieve successful floor covering performance.

Keywords: admixtures; cracking; curing; curling; drying; mixture proportioning; moisture movement; moisture test; relative humidity; slab-on-ground; specifications; vapor retarder/barrier.

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CHAPTER 1—INTRODUCTION AND BACKGROUND**1.1—Introduction**

Delamination, blistering, staining, mold growth, and other problems related to the installation and performance of moisture-sensitive flooring materials on concrete slabs are common. The problems include claims for total failure of the flooring system, construction-schedule delays caused by slow concrete drying, and lawsuits involving indoor air quality. It is currently up to architects, engineers, floor covering installers, flooring and adhesive manufacturers, concrete contractors, and concrete producers to solve these problems.

The objective of this document is to reduce the potential for moisture-related problems in both slabs-on-ground and suspended slabs. It provides basic information on the concrete drying process, moisture behavior in concrete, testing for pH and moisture, and vapor retarders/barriers. Based on this information, recommendations for the design and construction of concrete slabs that will receive moisture-sensitive or pH-sensitive flooring materials or coatings are presented.

1.2—Flooring moisture issues

Figures 1.1 to 1.4 show typical problems that can occur in concrete slabs covered with flooring materials. These problems include debonding, adhesive bleed, blistering, mold growth, and adhesive degradation.

1.3—Concrete slabs that receive flooring materials

This document focuses on the behavior of moisture in concrete slabs, and the effect of the concrete moisture condition on the performance of applied flooring materials. Reaching a desired moisture state, however, should not be the only acceptance criterion for a concrete slab that will be coated or covered. Floor flatness, surface texture, cracking, curling, structural capacity, jointing requirements, and the potential for the slab to stay acceptably dry should also be considered. The goal is installation of a flooring system—subgrade, subbase, vapor retarder/barrier, concrete slab (and possibly reinforcement), coating or flooring adhesive, and floor covering—that satisfies performance requirements.

ACI 360R and 302.1R provide recommendations for designing and building concrete slab-on-ground substrates that are suitable for receiving flooring materials. This document supplements information contained in the ACI 360R and 302.1R guides and also applies to suspended slabs. When designing and building suspended slabs, this guide should be used in conjunction with ACI 318 and 302.1R.

1.4—Changes in construction methods and materials that affect floor systems

In the last 10 to 15 years, there has been an increase in the number of reported flooring problems—for example, blisters, debonding, staining, and mold growth—caused by moisture originating within or moving through concrete slabs. Some