THE Concrete DIFFERENCE

Concrete Information for the Owner, Designer, Contractor and Producer

Things to Know About CURING & SEALING Concrete

In order to produce concrete that is strong, durable and meets the owner's expectations, curing is essential. Once properly cured, protecting the concrete with a sealing compound is required to insure resistance to staining and premature degradation. Curing is a temperature and moisture-control process in concrete at early ages that ensures the proper development of properties the mixture was designed to achieve. Sealing, on the other hand, is a process in which compounds are applied to the surface of hardened concrete to reduce the penetration of water and contaminants into the concrete.

Freshly placed concrete normally contains more water than is necessary for the hydration of the cement particles. Without an adequate supply of moisture, the cementitious materials in concrete cannot react to form a quality product. Drying may remove the water needed for this chemical reaction, called hydration, and the concrete may not achieve its potential properties. Correctly cured concrete shrinks less, cracks less, and dusts less. It is stronger, more durable, and is more wear resistant. Loss of water will also cause the concrete to shrink, thus creating tensile stresses within the concrete matrix. If these stresses develop before the concrete has attained enough tensile strength cracking can result.

While being placed and finished, concrete should be protected from losing moisture using suitable methods such as wind breaks, fogger sprays or misters, or evaporation reducing products. After final finishing the concrete surface must be kept continuously wet or protected with a curing compound to prevent evaporation for a period of at least several days.

Example Minimum Curing Period to Achieve 50% of Specified Strength*		
Type I Cement	Type II Cement	Type III Cement
Ambient Temperature @ 50ºF (10ºC)		
6 days	9 days	3 days
Ambient Temperature @ 70ºF (21ºC)		
4 days	6 days	3 days

** Values are approximate based on cylinder strength tests. Specific values can be established for specific materials and mixtures.*

Exterior concrete in Pennsylvania should be sealed. Concrete is a porous material that readily absorbs liquids. In freeze-thaw climates, the expansion of frozen liquids can damage the surface of unsealed concrete. Oil, salt, fertilizer, and other household chemicals can discolor and damage unsealed concrete.

Sealing compounds are liquids applied to the surface of hardened concrete after the concrete is fully cured (generally 28 days). To repel water and deicing salts, use an acrylic-resin sealer or reactive penetrating sealers. Other types of sealers can provide protection from oil and chemical spills. Reactive penetrating sealers generally have little effect upon the concrete surface profile or traction. Because they penetrate the concrete, reactive chemical sealers will last the longest and generally only wear away if the substrate surface wears away, which may be 10 years of longer.

Concrete sealers are designed to supplement, not replace, the weathering characteristics of a durable, properly cured concrete surface. Best results will be obtained when applied to concrete surfaces proportioned, placed, and finished in accordance with standards defined in ACI Committee Report 201, Guide to Durable Concrete.

References:
NRMCA CIP 11 – Curing In-Place Concrete, NRMCA, Silver Spring, MD
Standard Practice for Curing Concrete, ACI 308, American Concrete Institute, Farmington Hills, MI
Guide to Durable Concrete, ACI Committee Report 201, American Concrete Institute, Farmington Hills, MI
PCA – Design and Control of Concrete Mixtures, Fourteenth Edition, Skokie, IL

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