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AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428

Standard Practice for Surface Cleaning Concrete for Coating[1]

This standard is issued under the fixed designation D 4258; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice includes surface cleaning of concrete to remove grease, dirt, and loose material prior to the application of coatings. Procedures include broom cleaning, vacuum cleaning, air blast cleaning, water cleaning, detergent water cleaning, and steam cleaning.

1.2 This practice is not intended to alter the surface profile of the concrete but to clean the surface.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Section 5.

2. Referenced Documents

2.1 *ASTM Standards:*

D 4259 Practice for Abrading Concrete[2]

D 4260 Practice for Acid Etching Concrete[2]

D 4262 Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces[2]

D 4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method[2]

D 4285 Test Method for Indicating Oil or Water in Compressed Air[2]

2.2 *Other Standard:*

ACI-308 Recommended Practice for Curing Concrete[3]

3. Summary of Practice

3.1 Surface cleaning is intended to provide a clean, contamination-free surface without removing concrete from intact, sound surfaces.

3.2 Acceptable surfaces shall be free of oil, grease, loosely adhering concrete, and other contamination. Fins and projections shall be corrected prior to surface cleaning.

3.3 Air, water cleaning, scrubbing, sweeping, or vacuuming are acceptable cleaning methods. Cleaning agents may also be used to remove oil and grease spots followed by a fresh water rinse.

3.4 Any one or a combination of the listed cleaning procedures may be used to achieve acceptably cleaned surfaces.

4. Significance and Use

4.1 Surface cleaning is used to prepare concrete surfaces for applying coatings intended for light-duty service.

4.2 Use of this practice alone is not intended where protective systems will be used for continuous or intermittent immersion, mechanical loading, or for protective systems needing optimum bond for satisfactory performance (see Practices D 4259 and D 4260).

5. Hazards

5.1 New concrete shall be cured according to ACI-308 and sufficient additional time allowed for drying.

5.2 Moisture in the concrete may be detrimental to coating adhesion. Moisture content shall be in compliance with coating manufacturer's recommendation (see Test Method D 4263).

5.3 Concrete cure compounds, form release materials, or concrete hardeners not compatible with the coating may require removal by other surface preparation methods as in Practice D 4259.

6. Procedures

6.1 *Broom Cleaning*:

6.1.1 This procedure is intended to remove most surface dust and other loosely adherent solid contaminants.

6.1.2 Broom cleaning shall consist of sweeping the surface with a clean industrial stiff-bristled broom or similar device. Sweepings shall be removed from the immediate work area.

6.1.3 Broom-cleaned surfaces require additional cleaning using one or more of the surface preparation procedures specified in 6.2-6.6.

6.2 *Vacuum Cleaning*:

6.2.1 This cleaning procedure is intended to remove surface dust and other debris.

6.2.2 Vacuum cleaning shall consist of vacuuming the surface with a heavy-duty type industrial vacuum to provide an essentially dust-free surface.

6.3 *Air Blast Cleaning*:

6.3.1 This procedure is intended to remove debris, dust, dirt, loosely adherent laitance, and concrete from walls and ceilings and to provide an essentially sound dust-free surface.

6.3.2 Air blast cleaning shall consist of cleaning the surface with a compressed air stream at 80 to 100 psi through a blasting nozzle held approximately 2 ft from the surface.

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[1] This practice is under the jurisdiction of ASTM Committee D-33 on Protective Coating and Lining Work for Power Generating Facilities and is the direct responsibility of Subcommittee D33.05 on Surface Preparation.

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[2] *Annual Book of ASTM Standards*, Vol 06.02.

[3] Available from American Concrete Institute, 22400 W. Seven Mile Rd., Detroit, MI 48219.

6.3.3 The air stream shall be free of oil. This may be verified using Test Method D 4285.

6.3.4 Surface cleanliness is dependent upon carrying off air-borne dust before it is redeposited. Vacuum cleaning may be required to remove redeposited dust.

6.4 *Water Cleaning*:

6.4.1 This procedure is intended to remove dust, dirt, and water-soluble surface contaminants.

6.4.2 Water cleaning shall consist of cleaning the surface with a stream of clean potable water having sufficient pressure to remove dust, dirt, and loose material. When necessary, hand scrub with a stiff-bristled brush.

6.4.3 Prior to water cleaning, provisions shall be made for the removal of wash water and contaminants generated by this cleaning method.

6.4.4 The cleaned surface may be tested for moisture content in accordance with Test Method D 4263 prior to applying coatings.

6.5 *Detergent Water Cleaning*:

6.5.1 This procedure is intended to remove water-soluble surface contaminants and oils, grease, and other emulsifiable materials on the surface.

6.5.2 Detergent water cleaning shall consist of scraping off heavy deposits of grease or oil and cleaning the surface with a stiff-bristled brush using an aqueous solution of detergent or nonsolvent emulsifier. Immediately after treatment, before the surface dries, residues of the cleaning agent shall be removed by thoroughly flushing the surface with clean potable water. Repeat flushing until the pH of the surface water meets the acceptance criteria of Test Method D 4262.

6.5.3 Trisodium phosphate at not less than 4 oz/gal, or proprietary products intended for cleaning concrete, may be used following manufacturers instructions. The effectiveness of trisodium phosphate may be improved with the use of hot water.

6.5.4 Repeat 6.5.2 until water does not bead on the surfaces.

6.5.5 Prior to detergent water washing, provisions shall be made for the removal of wash water and contaminants generated by this cleaning method.

6.5.6 The cleaned surface may be tested for moisture content in accordance with Test Method D 4263.

6.6 *Steam Cleaning*:

6.6.1 This cleaning procedure is similar to detergent water washing, but is more effective for the removal of heavy deposits of grease and oil.

6.6.2 Steam cleaning shall consist of cleaning the surface with a jet of high-pressure steam sufficient to remove contaminants.

6.6.3 Detergents or nonsolvent emulsifying agents intended for use with steam cleaning equipment may be added where required for removal of oil and grease.

6.6.4 When detergents or other emulsifying agents are used, after cleaning and before the surface dries, the surface shall be thoroughly flushed with potable water. Repeat flushing may be necessary to remove cleaning residues.

6.6.5 The surfaces cleaned with detergent or nonsolvent emulsifying agents shall be tested for pH in accordance with Test Method D 4262 and may be tested for moisture content in accordance with Test Method D 4263 prior to applying coatings.

6.6.6 Prior to steam cleaning, provisions shall be made for the removal of water and contaminants generated by this cleaning method.

7. Inspection

7.1 Visually examine the prepared surface for the presence of debris, dust, dirt, oil, grease, loosely adherent concrete, and other contaminants.

7.2 Test surfaces cleaned with detergent or nonsolvent emulsifying agents for pH following Test Method D 4262.

7.3 Moisture content may be determined following Test Method D 4263.

8. Acceptance

8.1 Acceptable surfaces shall be free of oil, grease, loosely adhering concrete, and other contamination.

9. Keywords

9.1 concrete; surface cleaning; surface profile