

Floor Finishing Specifications

ASCC Position Statement #25

Floor finish requirements are often included in the project specifications. This position statement presents issues for specifiers to consider before such issues cause a conflict on the job site. Addressing these issues in the specifications, or at the preconstruction meeting, will help the design professional and concrete contractor to satisfy the owner's expectations.

Specifiers often reference ACI 301-99, "Specifications for Structural Concrete," which contains default flatness specifications. Unless otherwise specified, flatness and levelness F-numbers for floor installations exceeding 10,000 ft² (1000 m²) in total project area are to be measured in accordance with ASTM E 1155 and must meet the F-number tolerances in ACI 117. ASCC concrete contractors concur with this requirement, and believe it to be superior to requirements using the gap under a 10 ft (3 m) straightedge method.

ACI 301 also has a default floor-finish tolerance requirement for a troweled and floated finish. The default is a finish that meets conventional straight-edge tolerances specified in ACI 117. Unless the specifier states a floor finish tolerance, ACI 301 defaults to an overall 20/15 and a local 15/10 for flatness and levelness numbers, respectively. These tolerances may be too low to provide the needed flatness and levelness, and the specifier should consider specifying F-numbers that are more appropriate for the floor's use.

There are at least two situations for which higher specified F-numbers are not feasible—floors with multiple obstructions to finishing operations and floors with small cover over the top reinforcing bars. For some projects, floor penetrations and projections are too numerous and too concentrated to permit use of:

- Conventional straightedge strikeoff methods with vibratory truss or hand screed resting on pipe rails;
- 10 ft (3 m) scraping straightedges; or
- Ride-on power trowels. Sometimes such areas are so congested that a walk-behind power trowel has limited access.

Such projects require strikeoff, floating, and subsequent troweling to be done by hand.

Flatness measurements made in accordance with ASTM E 1155 must be taken along lines no closer than 2 ft (0.6 m) from any penetration. Measuring lines can still be snaked through the areas with multiple penetrations, but F-numbers are nearly always low in areas where this is done because of the hand work that produced the surface flatness. In areas with multiple penetrations that restrict the use of strikeoff equipment, 10 ft (3 m) straightedges, and ride-on power trowels, specifiers should limit maximum F-numbers to those typically produced with conventional bullfloats (see ACI 117).

Occasionally, designers specify heavy reinforcement with tight concrete cover; for example, two layers of No. 6 bars at 6 in. on-center (two layers of 20M bars at 150 mm on-center) both ways, with a 3/4 in. (20 mm) top-bar concrete cover. The bars closest to the top surface can create waves in the fresh concrete during strikeoff and finishing, thus decreasing F-numbers.

ASCC concrete contractors recommend reducing the minimum specified F-numbers in such cases, or increasing the specified concrete cover to 1-1/2 in. (40 mm). The choice depends on the relative importance of floor flatness and reinforcing bar cover.

There may be other situations that limit the contractor's ability to use normal placing and finishing equipment and build a floor that meets specified surface tolerances. ASCC concrete contractors will work with all parties in dealing with these situations and producing a floor surface that meets the owner's needs. If you have any questions, contact your ASCC concrete contractor or the ASCC Technical Hotline at (800) 331-0668.

Update: ACI 301-10 now defaults to conventional tolerances of overall 20/15 and a local 12/9 for flatness and levelness numbers respectively. For industrial floors however, the default values are overall 35/25 and local 23/17 for flatness and levelness numbers respectively. All references to ACI 117 and ASTM E1155 refer to the latest version.

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