



AMERICAN SOCIETY OF
CONCRETE CONTRACTORS

TECHNICAL CHECKLIST F-NUMBER MEASUREMENT

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Checklist for Measurement of F-numbers using ASTM E 1155 Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers

Use and Misuse of ASTM E 1155 Test Method

Project specifications, including ACI 301 Specifications for Structural Concrete, require the Contractor to achieve certain F-numbers. These Contract Documents also indicate that measurements should be taken in accordance with ASTM E 1155. Therefore, only F-numbers taken in accordance with this ASTM standard can be used to assess specification compliance. Use this checklist to ensure that F-number measurements are taken in accordance with ASTM E 1155.*

“This test method provides statistical (and graphical) information concerning floor surface profiles. Results of this test method are used primarily to establish compliance of randomly trafficked floor surfaces with specified F_F Flatness and F_L Levelness tolerances...”

“Results of this test method shall not be used to enforce contract flatness and levelness tolerances on those floor installations primarily intended to support the operation of fixed path vehicle systems (for example, narrow aisle warehouse floors).”

* Use the most recent version of this ASTM Standard, which can be purchased at www.astm.org.

Record Project Information

- A. Project Name
- B. Client
- C. Location of Test Surface/Section: (building level and boundaries—
column lines, construction joints, other)
- D. Test Surface/Section Size (sq ft)
- E. Date of Concrete Placement
- F. Date of F-number Measurement
- G. Testing Agency
- H. Operator’s Name

Indicate Equipment Used

- A. Manufacturer of device
- B. Description of device (Dipstick, D-Meter, F-Meter, Floor Pro, other)
- C. Serial number of device
- D. Date of last calibration

Determine Test Surface

- A. Layout the test surface: [ASTM states: “on any one building level, the entire floor area of interest constitutes the test surface, with the limitations listed in 7.1”.]
- 7.1 Test surface limitations: “each portion of the surface which has a unique specified set of tolerances must be treated as a separate surface.”

Determine Test Section

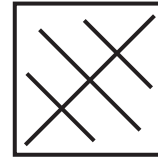
- A. Divide the test surface into test sections. Assign a different identification number to each test section, and record the locations of all test section boundaries. [ASTM states “a test section consists of any sub division of the test surface, within the limitations listed in 7.2.]
- 7.2 Test section limitations:
- 7.2.1 No test section shall measure less than 8 ft on a side, nor comprise an area less than 320 sq ft.
- 7.2.2 No portion of the test surface shall be associated with more than one test section.
- 7.2.3 When testing a concrete floor, no test section boundary shall cross any construction joint.

[Note: Typical testing laboratory practice is to divide a single floor into a test section for each concrete placement that the contractor makes. The minimum local values (MLV) are typically applied to each single placement (test section) and the specified overall values (SOV) are applied to the combined F-number values for the entire floor (test surface). If the entire floor is placed in one pour, a test section could be the same as a test surface. ASTM E 1155 however, also permits dividing that single floor placement into individual test sections.]

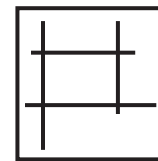
Determine the Number and Location of All Sample Measurement Lines

- A. Assign a different identification number to each sample measurement line.
- B. Record on a key plan the locations of all sample measurement-line starting and stopping points.
- C. Mark or otherwise physically delineate each sample measurement line on the test surface.
- D. Distribute the sample measurement lines uniformly across the entire test section and either:

- 1. Orient all lines at 45° to the longest construction joint abutting the test section, (not corner-to-corner diagonals) as shown below, or



- 2. Place *equal numbers of lines of equal aggregate length* both parallel to and perpendicular to the longest test section boundary as shown below.



- 3. When the short dimension (width) of the slab being measured is less than 25 ft, all measurement lines must be 45° diagonals.

Determine Number of Individual Measurements

- A. Collect test samples from each test section sufficient (in aggregate) to satisfy the minimum z_i reading [Note: z_i readings are for F_L which are 10 ft apart; thus a 50 ft measurement line has only 41 z_i readings] requirement as follows:
 - 1. Each test section shall be sufficient to yield (in aggregate) not less than N_{min} individual measurements of z_i , where N_{min} is calculated as follows:

$$N_{min} = 2\sqrt{A} \quad (320 \leq A \leq 1600)$$

$$N_{min} = \frac{A}{30} \quad (A > 1600)$$

where A = test section area, ft^2

Collection of Data

- A. Follow the manufacturer's instructions for the use of the equipment.
- B. The equipment typically calculates and provides the data in accordance with calculation procedures required by ASTM E 1155.

**Provide
Complete
Report**

Provide the following information so the client and others can follow and interpret the data provided and, when necessary, verify the F-numbers collected.

- A. Map showing location, orientation, and identification of all sample measurement lines in each test section; include project column lines for reference purposes
- B. Profile elevations, F_F , and F_L numbers for each sample measurement line
- C. F-numbers for each test section with the 90% confidence interval
- D. Calculated F-numbers for the entire test surface as of the report date

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