



CONCRETE FLOOR FLATNESS

The surface rating for a concrete slab-on-grade or elevated floor within a warehouse or industrial facility is determined by measuring the surface flatness (roughness, wash boarding, or bumpiness) and levelness (tilt, pitch, or slope) using the F-numbering system in lieu of the former straightedge (1/8-of-an-inch-in-10-feet) method. The F-numbering system or Face Floor Profile Numbers was developed by the Edward W. Face Company in conjunction with ACI Committee 117. By profiling the floor surface, both a flatness value, F_F , and a levelness value, F_L , are determined.

The surface rating for a slab-on-grade is written in the form $F_F 25/F_L 20$; whereas for an elevated slab, only the flatness value is specified since the levelness is controlled by the floor framing and it is written as just F25. The unitless values are linear so that an $F_L 20$ would be twice as flat as an $F_L 10$. The project specifications for a new warehouse slab-on-grade with random travel aisles (general use) will typically have only a local and an overall flatness and levelness requirement with the local being within 2/3 of the overall.

For specific-use floors with defined traffic aisles, tighter floor tolerances may be required. Defined traffic aisles with tight tolerances and super-flat floors should use the F_{min} system which differs from the standard F-numbering system. For the F_{min} system, an $F_{min} 100$ corresponds to a floor flatness of 1/8" in 10' and is equivalent to $F_F 140/F_L 100$ [.045"/.080"].

For the standard F-numbering system, an $F_F 25$ flatness is roughly equivalent to a single +/- 1/4" defect in 10'; an $F_F 50$ flatness, a +/- 1/8" defect in 10'; and an $F_F 100$ flatness, a +/- 1/16" defect in 10'. Prior to the F-numbering system, most floors had a flatness rating of $F_F 15$ to $F_F 35$. The average industrial floor has a flatness/levelness reading of $F_F 20 / F_L 15$.