



Designation: E 1486 – 98

Standard Test Method for Determining Floor Tolerances Using Waviness, Wheel Path and Levelness Criteria¹

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1. Scope

1.1 This test method covers data collection and analysis procedures to determine surface flatness and levelness by calculating waviness indices for survey lines and surfaces, elevation differences of defined wheel paths, and levelness indices using the inch-pound system of units.

NOTE 1—This test method is the companion to SI Test Method E 1486M; therefore, no SI equivalents are shown in this test method.

NOTE 2—This test method was not developed for, and does not apply to, clay or concrete paver units.

1.1.1 The purpose of this test method is to provide the user with floor tolerance estimates as follows:

1.1.1.1 Local survey line waviness and overall surface waviness indices for floors based on deviations from the midpoints of imaginary chords as they are moved along a floor elevation profile survey line. End points of the chords are always in contact with the surface. The imaginary chords cut through any points in the concrete surface higher than the chords.

1.1.1.2 Defined wheel path criteria based on transverse and longitudinal elevation differences, change in elevation difference, and root mean square (RMS) elevation difference.

1.1.1.3 Levelness criteria for surfaces characterized by either of the following methods: the conformance of elevation data to the test section elevation data mean or the conformance of the RMS slope of each survey line to a specified slope for each survey line.

1.1.2 The averages used throughout these calculations are RMS (that is, the quadratic means). This test method gives equal importance to humps and dips, measured up (+) and down (–), respectively, from the imaginary chords.

1.1.3 Appendix X1 is a commentary on this test method. Appendix X2 provides a computer program for waviness index calculations based on this test method.

1.2 *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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Document

2.1 *ASTM Standards:*

E 1486M Test Method for Determining Floor Tolerances Using Waviness, Wheel Path, and Levelness Criteria (Metric)²

3. Terminology

3.1 *Descriptions of Terms Specific to This Standard:*

3.1.1 *Waviness Index Terms:*

3.1.1.1 *chord length*—the length of an imaginary straight-edge (chord) joining the two end points at j and $j+2k$. This length is equal to $2ks$ (see Fig. 1) where the survey spacing s is equal to 1 ft and where k is equal to 1, 2, 3, 4, and 5 to define chord lengths of 2, 4, 6, 8, and 10 ft, respectively, unless values for s and k are otherwise stated.

3.1.1.2 *deviation (D_{kj})*—the vertical distance between the surface and the mid-point, $j+ks$, of a chord of length $2ks$ whose end points are in contact with the surface.

3.1.1.3 *length adjusted RMS deviation (LAD_k)*—calculated for a reference length L_r of 10 ft, unless otherwise stated, in order to obtain deviations that are independent of the various chord lengths, $2ks$.

3.1.1.4 *waviness*—the relative degree to which a survey line deviates from a straight line.

3.1.2 *defined wheel path traffic*—traffic on surfaces, or specifically identifiable portions thereof, intended for defined linear traffic by vehicles, with two primary axles and four primary load wheel contact points on the floor and with corresponding front and rear primary wheels in approximately the same wheel paths.

3.1.3 *levelness*—described in two ways: the conformance of surface elevation data to the mean elevation of a test section (elevation conformance) and as the conformance of survey line slope to a specified slope (RMS levelness).

3.1.3.1 *elevation conformance*—the percentage of surface elevation data, h_i , that lie within the tolerance specified from the mean elevation of a test section. The absolute value of the distance of all points, h_i , from the test section data mean is

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² *Annual Book of ASTM Standards*, Vol 04.11.