

Class of track	The deviation from uniformity of the mid-chord offset for a 31-foot chord may not be more than— (inches)	The deviation from uniformity of the mid-chord offset for a 62-foot chord may not be more than— (inches)	The deviation from uniformity of the mid-chord offset for a 124-foot chord may not be more than— (inches)
7	3/8	3/8	7/8
8	3/8	3/8	1/2
9	3/8	3/8	1/2

§ 213.329 Curves, elevation and speed limitations.

(a) The maximum crosslevel on the outside rail of a curve may not be more than 7 inches. The outside rail of a curve may not be more than 1/2 inch lower than the inside rail.

(b) (1) The maximum allowable operating speed for each curve is determined by the following formula:

$$V_{\max} = \sqrt{\frac{E_a + 3}{0.0007D}}$$

Where—

V_{\max} = Maximum allowable operating speed (miles per hour).

E_a = Actual elevation of the outside rail (inches)⁴.

D = Degree of curvature (degrees)⁵.

3 = 3 inches of unbalance.

(2) Appendix A includes tables showing maximum allowable operating speeds computed in accordance with this formula for various elevations and degrees of curvature for track speeds greater than 90 m.p.h.

(c) For rolling stock meeting the requirements specified in paragraph (d) of this section, the maximum operating speed for each curve may be determined by the following formula:

$$V_{\max} = \sqrt{\frac{E_a + E_u}{0.0007D}}$$

Where—

V_{\max} = Maximum allowable operating speed (miles per hour).

E_a = Actual elevation of the outside rail (inches)⁴.

D = Degree of curvature (degrees)⁵.

E_u = Unbalanced elevation (inches).

(d) Qualified equipment may be operated at curving speeds determined by the formula in paragraph (c) of this section, provided each specific class of equipment is approved for operation by the Federal Railroad Administration and the railroad demonstrates that—

(1) When positioned on a track with uniform superelevation, E_a , reflecting the intended target cant deficiency, E_u , no wheel of the equipment unloads to a value of 60 percent or less of its static value on perfectly level track and, for passenger-carrying equipment, the roll angle between the floor of the vehicle and the horizontal does not exceed 5.7 degrees.

(2) When positioned on a track with a uniform 7-inch superelevation, no wheel unloads to a value less than 60% of its static value on perfectly level track and, for passenger-carrying equipment, the angle, measured about the roll axis, between the floor of the vehicle and the horizontal does not exceed 8.6 degrees.

(e) The track owner shall notify the Federal Railroad Administrator no less than thirty calendar days prior to any proposed implementation of the higher curving speeds allowed when the “ E_u ” term, above, will exceed three inches. This notification shall be in writing and shall contain, at a minimum, the following information:

⁴Actual elevation for each 155 foot track segment in the body of the curve is determined by averaging the elevation for 10 points through the segment at 15.5 foot spacing. If the curve length is less than 155 feet, average the points through the full length of the body of the curve. If E_u exceeds 4 inches, the V_{\max} formula applies to the spirals on both ends of the curve.

⁵Degree of curvature is determined by averaging the degree of curvature over the same track segment as the elevation.

(1) A complete description of the class of equipment involved, including schematic diagrams of the suspension system and the location of the center of gravity above top of rail;

(2) A complete description of the test procedure⁶ and instrumentation used to qualify the equipment and the maximum values for wheel unloading and roll angles which were observed during testing;

(3) Procedures or standards in effect which relate to the maintenance of the suspension system for the particular class of equipment;

(4) Identification of line segment on which the higher curving speeds are proposed to be implemented.

(f) A track owner, or an operator of a passenger or commuter service, who provides passenger or commuter service over trackage of more than one track owner with the same class of equipment, may provide written notification to the Federal Railroad Administrator with the written consent of the other affected track owners.

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§ 213.331 Track surface.

(a) For a single deviation in track surface, each owner of the track to which this subpart applies shall maintain the surface of its track within the limits prescribed in the following table:

Track surface	Class of track			
	6 (inches)	7 (inches)	8 (inches)	9 (inches)
The deviation from uniform ¹ profile on either rail at the midordinate of a 31-foot chord may not be more than	1	1	¾	½
The deviation from uniform profile on either rail at the midordinate of a 62-foot chord may not be more than	1	1	1	¾
The deviation from uniform profile on either rail at the midordinate of a 124-foot chord may not be more than	1¾	1½	1¼	1¼
The difference in crosslevel between any two points less than 62 feet apart may not be more than ²	1½	1½	1½	1½

¹ Uniformity for profile is established by placing the midpoint of the specified chord at the point of maximum measurement.
² However, to control harmonics on jointed track with staggered joints, the crosslevel differences shall not exceed 1¼ inches in all of six consecutive pairs of joints, as created by 7 joints. Track with joints staggered less than 10 feet shall not be considered as having staggered joints. Joints within the 7 low joints outside of the regular joint spacing shall not be considered as joints for purposes of this footnote.

(b) For three or more non-overlapping deviations in track surface occurring within a distance equal to five times the specified chord length, each of which exceeds the limits in the fol-

lowing table, each owner of the track to which this subpart applies shall maintain the surface of the track within the limits prescribed for each deviation:

Track surface	Class of track			
	6 (inches)	7 (inches)	8 (inches)	9 (inches)
The deviation from uniform profile on either rail at the midordinate of a 31-foot chord may not be more than	¾	¾	½	⅜
The deviation from uniform profile on either rail at the midordinate of a 62-foot chord may not be more than	¾	¾	¾	½
The deviation from uniform profile on either rail at the midordinate of a 124-foot chord may not be more than	1¼	1	⅞	⅞

⁶The test procedure may be conducted in a test facility whereby all wheels on one side (right or left) of the equipment are raised or lowered by six and then seven inches, the

vertical wheel loads under each wheel are measured and a level is used to record the angle through which the floor of the vehicle has been rotated.