



ANSI C136.30-2015

American National Standard for Roadway and Area Lighting Equipment - Pole Vibration





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*American National Standard for
Roadway and Area Lighting Equipment—
Pole Vibration*

Secretariat:

National Electrical Manufacturers Association

Approved January 13, 2015

American National Standards Institute, Inc.

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Published by

**National Electrical Manufacturers Association
1300 North 17th Street, Suite 900, Rosslyn, Virginia 22209**

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Printed in the United States of America

Foreword

At the time this standard was approved, the ANSI C136 committee was composed of the following members:

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1 Scope

This guide covers the minimum vibration withstand requirements and testing procedures for poles used in roadway and area lighting. The guide is intended for poles of 50-ft mounting height and under.

2 Normative References

This standard incorporates by reference provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed below. For undated references, the latest edition of the publication referred to applies (including amendments).

ANSI C136.31-2010, *For Roadway and Area Lighting Equipment—Luminaire Vibration*

AASHTO LTS-5, *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*

FHWA NHI 05-036, *Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires, and Traffic Signals*

3 Definitions

Critical Damping: the minimum damping that will allow a displaced system to return to its initial position without oscillation.

Damping: any effect that reduces the amplitude of oscillations in a vibrating system. This is due to dissipation of energy with time (or number of cycles). Its magnitude is usually expressed as Damping Ratio or Percentage of Critical Damping. This ratio is often termed Damping Factor.

Damping Variables: Damping factors on a pole structure tend to increase as frequency increases and as amplitude of the vibration increases. The damping resistance occurs between several objects moving relative to each other.

EPA (Effective Projected Area): a calculated value based on the cross-sectional area of an object and its drag coefficient, used in determining loads on surfaces induced by winds. The drag coefficient is a function of the wind-facing surface contour for the object. The EPA can be calculated from the object's dimensions and applying an approximate drag coefficient based on its shape, or it can be calculated from load measurements made in a wind tunnel on the object.

Excitation: the external force that causes a system to respond. When the excitation frequency corresponds to a natural frequency, the system will vibrate at that frequency generally at an amplitude greater than that of the excitation.

Fatigue: the failure of materials due to alternating stress loads. Fatigue occurs over time when the amplitude and quantity of alternating stresses exceeds the endurance limit of the material.

Frequency: a single motion from one extreme position to an opposite position and back, passing through the neutral position twice, is called a cycle. The number of cycles per second is known as the frequency of oscillation. Frequency is expressed in Hertz (Hz); a frequency of 1 Hz means there is one cycle or oscillation per second.

Friction Damping: a rubbing action between the objects. The damping is relatively constant, except at some low force value where the relative motion will stop (breakaway force); the damping will then be zero.

Fundamental Mode of Vibration: The fundamental mode of vibration for a system is the mode having the lowest natural frequency.