Methods for measuring cable tray deflection

Article Overview

Cable tray deflection is typically measured as the vertical displacement under load, with a common guideline of 1/200 of the support span for aesthetic and structural purposes.

Understanding Cable Tray Deflection

Cable tray deflection refers to the bending or sagging of a tray under its own weight and the weight of installed cables. It is influenced by the span between supports, material properties, tray depth, and applied loads. Deflection is primarily a concern for visual appearance and structural safety, especially in prominent installations .

Allowable Deflection Guidelines

o Simple Beam Deflection: For a single straight section supported but not fastened at the ends, the maximum deflection is often limited to 1/200 of the support span. For example, a 10-foot span allows a deflection of 0.6 inches, a 12-foot span 0.72 inches, and a 20-foot span 1.2 inches .
o Continuous Beam Deflection: Continuous spans with intermediate supports experience reduced deflection due to negative bending moments at support points. This configuration is stiffer than simple beams .

Factors Affecting Deflection
o Material: Steel trays deflect less than aluminum trays because steel has a modulus of elasticity nearly three times higher than aluminum .
o Tray Depth and Cross-Section: Increasing the depth or cross-sectional area of the tray reduces deflection efficiently .
o Support Span: Shorter spans between supports reduce deflection. Using unspliced straight sections helps maintain rigidity .
o Load Types: Deflection depends on uniformly distributed loads (cables, wind, snow, ice) and concentrated loads. Calculations should include all anticipated load factors .

Measurement and Calculation

o Deflection Measurement: Measure the vertical displacement at the midpoint of the span under the expected load.
o Calculation Methods: Use simple beam analysis for worst-case scenarios, which simplifies calculations and aligns with NEMA and CSA standards . For more precise design, continuous beam analysis can be applied.
o Standards: IEC 61537, NEMA VE 1-1998, and CSA C22.2 No. 126.1 provide guidelines for testing and allowable deflection .

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Practical Tips

o Minimize deflection by reducing support spacing, choosing stronger or deeper trays, and selecting appropriate materials.
o For installations above eye level, slightly higher deflection may be acceptable to reduce costs without compromising safety .
o Always consider environmental loads such as wind, ice, and seismic activity when calculating deflection .
By following these guidelines, cable tray systems can maintain both structural integrity and aesthetic appearance while accommodating the expected loads.

Deflection is the vertical sag of the tray at its mid point and is at right angles to the tray"s longitudinal axis. The issue of deflection is

EXAMPLE a) cable tray length or cable ladder length, b) cable tray fitting or cable ladder fitting, c) coupler, d) support device, e)

IEC 61537:2023 classifies cable tray and ladder by Safe Working Load in Newtons at a stated span, with a deflection

This guide covers cable ladder systems, cable tray systems, channel support systems and associated supports intended for the

B) DEFLECTION All profiles deflect when a load is imposed. The deflection of cable tray is related to applied load, support span, size

A practical guide to product selection and installation This guide for engineers and installers has been developed by ABB as a

CABLOFIL is the world"s leading wire cable tray and the preferred cable routing method of the major players in the food industry. It

Use this checklist to verify cable tray load capacity, span conditions, and deflection performance before installation or project

Where necessary, cable tray systems and cable ladder systems can be used for the arrangement of cables into groups. This

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IEC 61537 does not specify exact load-bearing values for cable trays. Instead, it defines a standardized load-testing methodology

NEMA VE 1-2017 Specifies requirements for metal cable trays and associated fittings designed for use in accordance with the rules

A guide to cable tray selection, focusing on strength, deflection, load capacity, and beam configurations. Ideal for engineering

Cable tray Safe Working Load Test (SWL) Cable tray/ Protective castings must be designed to the below said ambient

It applies to cable tray systems and cable ladder systems designed for the support and accommodation of cables and

Cable Tray Systems Guide HUBBELL Hubbell Wiring Device-Kellems and Hubbell Premise Wiring are divisions of Hubbell

The document discusses load testing standards for cable trays according to IEC 61537 and NEMA VE 1-2002. Key points include: 1)

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