

Article Overview

Ladder-type cable trays support cable loads based on rung spacing, tray width, material, and span, with load capacity defined by NEMA and IEC standards.

Key Factors Affecting Load Capacity

1. **Tray Material and Construction** Ladder trays are typically made from steel, aluminum, or FRP (fiber-reinforced plastic). Steel provides the highest strength, while aluminum and FRP are lighter but may require shorter spans or closer support spacing to maintain load capacity. The side rail height and rung design directly influence the tray's structural integrity.

2. **Rung Spacing and Tray Width** Rung spacing commonly ranges from 6 to 18 inches, and tray widths from 6 to 48 inches. Wider trays or larger rung spacing reduce overall strength, requiring adjustments in support spacing or stronger rungs to maintain safe load capacity. For heavy power cables, 9-inch or wider rung spacing is recommended, while smaller control or instrumentation cables can use closer spacing (6-12 inches) to prevent drooping.

3. **Support Span** The distance between support brackets (span) is critical. Longer spans increase bending stress and reduce the maximum load the tray can safely carry. Manufacturers provide maximum span tables based on tray width, rung spacing, and material. Always verify that the total cable weight per meter does not exceed the tray's rated load for the given span.

4. **Load Classification Standards**

- o NEMA VE 1 defines ladder tray classes (NEMA 1-4) based on side rail height and load capacity. Higher NEMA classes (e.g., NEMA 4) have taller side rails (up to 150 mm) and can support heavier loads over longer spans.

- o IEC 61537 specifies safe working loads, mechanical strength, and fill factors for ladder trays, ensuring compliance with international standards.

5. **Safety Margins and Fill Ratios** Designers typically apply a safety margin of 20-50% above the calculated cable weight to account for dynamic loads, environmental factors, or future cable additions. Cable fill should not exceed 40-50% of the tray's internal area to allow proper ventilation and heat dissipation.

Practical Guidelines

- o Select the appropriate NEMA or IEC class based on expected cable weight and span.
- o Use closer rung spacing for heavy or large-diameter cables to prevent sagging.
- o Ensure support brackets are installed at intervals recommended by the manufacturer.
- o Consider environmental loads such as wind, snow, or seismic activity for outdoor or exposed installations.
- o Always consult the manufacturer's load charts for the specific tray model, as actual allowable loads vary with material, width, and rung design. By carefully considering these factors, ladder-type cable trays can safely support electrical cables while maintaining proper ventilation, mechanical integrity, and compliance with industry standards.

Load capacity of ladder-type cable trays

Ladder trays are among the most widely used cable tray systems in industrial and

Determine ladder tray types and sizes, rung spacing, covers if required, the span and support locations and types. If possible avoid

Calculate tray and ladder sizes by cable capacity with our IEC-compliant calculator for efficient and accurate electrical installations.

Cable ladder and cable tray systems The following recommendations are intended to be a practical guide to ensure

Our wind certification report provides you with list of acceptable B-Line series cable tray supports, fittings and covers based off of the

List cable types, diameters, and weights per metre. Group by power, control, and data. Plan 20-30% spare capacity

B. Cable tray systems are defined to include, but are not limited to straight sections of [ladder type] [trough type] [solid bottom type]

Explore various cable tray types and sizes for electrical installations. Learn about ladder, perforated, solid-bottom, wire mesh, and

Is your cable tray system optimized for safety, dependability, space and cost savings? Cable tray (or cable ladder) systems are a

The Wire Mesh / Cable Tray Fill table in below section shows the number of cables and the load in lbf/lineal foot

Cable tray system components and cable ladder tray system components have been declared electrically non conductive. An overall

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

SOLID-BOTTOM CABLE TRAY Providing additional cable protection, solid-bottom cable tray is sometimes preferred to support and



Load capacity of ladder-type cable trays

Worried about cable tray capacity? Learn simple cable tray load calculation steps. This

Professional recommendation: Start with the environment, then refine by span, load, and

Learn how Cable Tray Load Capacity is determined by tray type, span distance, material, and cable weight

Web: <https://www.in-au.co.za>

