

Add expansion joints to cable trays



Overview

Managing Thermal Expansion and Contraction in Cable Learn how to manage thermal expansion and contraction in cable tray systems with expert Cable Tray Inst.

Key Takeaways

Expansion joints in cable trays are installed using splice plates, expansion guides, and calculated gaps to accommodate thermal expansion and contraction, ensuring structural integrity and compliance with NEC and NEMA standards. Understanding Thermal Expansion in Cable Trays

Cable trays, especially metal ones, expand and contract with temperature changes. For example, a 100-foot aluminum tray can expand about 2 inches with a 100°F temperature change, while steel expands less but still requires consideration . Without proper expansion joints, trays can bend, shear bolts, or damage electrical continuity .

Components of an Expansion Joint

- Expansion Splice Plates: These connect two tray sections while allowing movement. Plates are typically installed on the outside of the tray, with bolt heads inside, and should not be fully tightened to allow sliding .
- Expansion Guides: Installed at supports other than the fixed point, these allow the tray to slide longitudinally while keeping it aligned .
- Hold-Down Clamps: Used at the midpoint between expansion joints to anchor the tray securely while permitting movement at other points .

Calculating the Gap

The expansion gap depends on:

- Material of the tray (aluminum expands more than steel)
- Temperature differential between installation and maximum expected temperature
- Length of the tray run For example, NEMA VE 1 recommends an expansion joint every 128 feet for steel and every 65 feet for aluminum with a 100°F differential . The gap is calculated using a nomograph or formula that considers the highest and lowest expected temperatures and the installation temperature .

Installation Steps

- Determine Placement: Install expansion joints at intervals based on material and temperature differential. Avoid placing joints only at structural expansion points, as tray and structure materials expand differently .
- Attach Splice Plates: Place splice plates across the tray ends, using slotted holes to allow sliding. Tighten bolts finger-tight, then back off ½ turn .
- Install Expansion Guides: At all supports except the fixed midpoint, install guides to allow smooth longitudinal movement .
- Anchor Midpoint: Secure the tray at the midpoint between expansion joints with hold-down clamps to maintain stability .
- Check Bonding: Ensure bonding jumpers are taut but not overstressed, as expansion can snap them if improperly installed .

Best Practices

- Use the correct material for splice plates and guides compatible with the tray.
- Avoid over-tightening bolts at expansion joints.
- Consider environmental conditions, such as outdoor temperature extremes, when calculating gaps.
- Follow NEC Section 300-7(b) and NEMA VE 1 guidelines for compliance and safety . By following these steps, expansion joints will allow cable trays to safely expand and contract, preventing structural damage and maintaining electrical integrity.

Article Content

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392.44 Expansion Splice Plates.

A bonding jumper is required where cable tray systems are mechanically discontinuous. Code Change Summary: New code section

Thermal Contraction and Expansion of Cable Tray

The cable tray needs to be anchored at the support closest to the midpoint between the expansion joints with hold down clamps and

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At the midpoint between two expansion joints the tray should be secured (no longitudinal movement). At all other support locations,

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Expansion splice joints should be designed and placed so as to maximize the rigidity of the cable tray, unless expansion splice plates

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A cable tray system may be affected by thermal expansion and contraction, which must be taken into account during installation. To

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