How to make trapezoidal bends in cable trays

Overview

The document provides instructions for forming various bends and joints in electrical trunking and cable trays.

Key Takeaways

Bends in trapezoidal cable trays can be made using pre-manufactured fittings, cable tray bending machines, or manual on-site techniques with simple tools like metal bars and bolt cutters.Pre-Manufactured Fittings

The easiest method is to use factory-made 90° bends, tees, or offsets that match the tray size. These fittings ensure proper bend radius and maintain structural integrity while complying with standards such as IEC 61537 and NEC 392, which require the tray bend radius to be at least equal to the minimum cable bend radius, calculated using the largest cable diameter in the tray .

Cable Tray Bending Machines

For on-site fabrication, a cable tray bending machine can create precise bends. The process involves:

- Marking the bend location on the tray.
- Positioning the tray in the bending machine.

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• Applying controlled force to form the desired angle (e.g., 45° or 90°). This method is suitable for steel or metallic trays and allows consistent, smooth bends without damaging the tray or cables .

Manual On-Site Bending

When a bending machine is unavailable, manual methods can be used:

• Metal Bar Technique: Insert a sturdy metal bar along the tray section to act as a lever. Gradually bend the tray to the desired angle while ensuring the bend radius meets cable requirements .

• Bolt Cutter Method: For wire mesh or perforated trays, partially cut the tray wires at the bend line using a bolt cutter. This allows the tray to flex and form a bend. After bending, file sharp edges and ensure the tray lip is supported to maintain strength .

Calculating Bend Radius

To maintain cable integrity:

• Identify the largest cable diameter in the tray.

• Multiply by the bending factor recommended for the cable type.

• Ensure the tray bend radius meets or exceeds this value. This prevents cable damage and ensures compliance with electrical standards .

Types of Bends

• Horizontal 90° Bend (Flat Bend): Used for turning the tray left or right.

• Vertical Bend (Up/Down): For changing elevation between levels.

• Tee (T-Junction) and Cross (4-Way): For branching or multi-direction routing.

• Offset Bend: To avoid obstacles or structural elements .

Safety and Best Practices

• Always mark the bend area before cutting or bending.

• Wear safety gloves and eye protection.

• Avoid sharp bends that exceed cable bend limits.

• Support the tray at the bend to prevent deformation.

• Use rubber caps or protective coatings on cut ends to prevent injury and corrosion .

By combining these methods, electricians and contractors can create precise, safe, and professional bends in trapezoidal cable trays directly on-site without relying solely on pre-fabricated fittings.

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