# How to measure horizontal bends in cable trays



## Overview

Calculate electrical cable tray bend dimensions, centerline radius, arc length, setbacks, offset bend lengths, and recommended minimum cable bend radius.

## Key Takeaways

Horizontal bends in cable trays are measured using the centerline radius, bend angle, and offset distances to ensure proper cable routing and compliance with standards.

### Understanding Horizontal Bends

A horizontal bend (or horizontal elbow) is a pre-fabricated fitting used to change the direction of a cable tray in the horizontal plane while maintaining the same elevation. It is critical for navigating obstacles, following building perimeters, or routing cables within equipment rows without exceeding the minimum bending radius of the cables inside the tray. Common angles include 45° and 90°, but custom angles are also used for gradual directional shifts.

### Key Measurement Parameters

Centerline Radius (CLR): The radius along the centerline of the tray bend. Standard manufactured sizes are typically 12", 24", or 36" (300 mm, 600 mm, 900 mm).



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## The CL

R must meet or exceed the minimum bend radius required by the cable manufacturer to prevent damage. Bend Angle: The angle of the horizontal turn, usually 45° or 90°, but can be custom. The angle determines the arc length and the horizontal footprint of the bend.

Arc Length: The distance along the centerline of the bend. This is calculated based on the CLR and the bend angle. It represents the actual path the cable will follow through the bend.

Offset Distance: When a tray must bypass obstacles, two bends are used to create an offset. The horizontal run and lateral shift (rise) are measured to calculate the required bend lengths and cut marks. Chord Length: The straight-line distance between the start and end points of the bend.

This is useful for planning the tray footprint and ensuring proper alignment with other tray sections.

## Practical Calculation Steps

Select Bend Type: Choose between standard 90°/45° elbows, double-elbow offsets, or custom angles. Input Tray Dimensions: Enter the physical width of the tray and the thickest cable diameter to check bend radius compliance.

## Enter CL

R and Angle: Use the catalog or manufacturer-provided centerline radius and the desired bend angle. Calculate Arc and Chord: Determine the centerline arc length, chord, and setback distances to ensure proper installation. Offset Calculation: For offsets, measure the horizontal run and vertical/lateral shift, then calculate the required bend lengths and cut marks using a multiplier based on the bend angle.

## Safety and Compliance

Always verify that the bend radius meets the minimum requirements for the cables being installed.

## Follow NE

C, IEC, or NEMA standards to prevent cable damage, maintain fill capacity, and ensure safe installation. Factory-fabricated bends are preferred over field-bent sections to maintain certification and avoid sharp edges. By carefully measuring the centerline radius, bend angle, arc length, and offsets, installers can ensure that horizontal bends in cable trays are safe, compliant, and efficient for cable routing.

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## Article Content

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