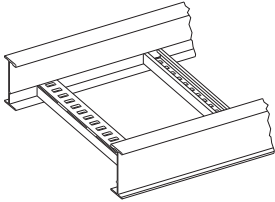


These options are in addition to the Standard Ladder Rungs, Ventilated Trough and Solid Trough type Cable Trays.

Marine Rung (Available in Aluminum, HDGAF Steel and Stainless Steel)



(Aluminum Shown)

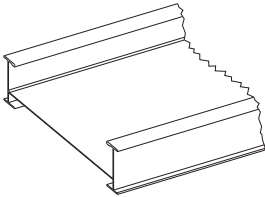
- Designed for Series 1 and Series 2-5 systems.
- Special rung design to accommodate stainless steel banding of cables (U.S. Coast Guard requirement) with .438" x .720" slots.
- Has applications on land, vertical installation, any location where extra cable positioning/attachment is required.
- Strut orientation may be channel opening up, channel opening down, or alternating - standard is alternating unless specified otherwise.
- New design provides combination of strut fastening and marine rung fastening.

Examples: 46A12MR-36-288 or 464G12MR-36-288

- "MR" Strut rung on 12" centers with channel opening down
(Note: replace "DN" with "UP" for channel opening up.)

Special Rung Spacings: 4" & 18" rung spacing available upon request.

Non-Ventilated



- Solid flat sheet welded into the Cable Tray above the rungs.
- Standard rung spacing is 12 inches.
- The flat sheet may be installed under the rungs, if preferred.
- The flat sheet may be installed over B54 rungs "slot down".

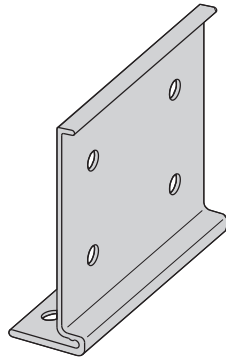
Examples: 24ASB-36-144

Flat sheet bottom over standard rung on 12" spacing.

24ASBB54-36-144

Flat sheet bottom over B54 strut rung slot down on 12" spacing.

9A-6006 and 9A-6007 Aluminum Mid-Span Splice



Features

- Standard for H46A, H47A and 57A straight sections.
- Allows random splice location.
- Six bolt design furnished with standard 1/2" Stainless Steel Type 316 hardware.
- Furnished in pairs.
- Available on ladder bottoms only.
- 09" and 12" rung spacing.

| Tray Series | Catalog No. |
|-------------|----------------|
| H46A | 9A-6006 |
| H47A | 9A-6007 |
| 57A | 9A-6007 |

Cable Tray:

H46A

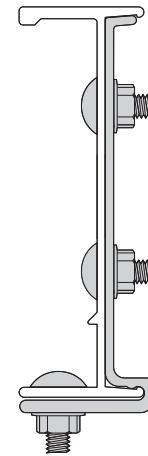
Tested to:

- 167 lbs/ft (safety factor 1.5)
- 125 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
- 12" rung spacing - 36" wide

H47A

Tested to:

- 149 lbs/ft (safety factor 1.5)
- 112 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
- 12" rung spacing - 36" wide



Splice:

9A-6006

Tested to:

- 135 lbs/ft (safety factor 1.5)
- 101 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
- mid-span splice

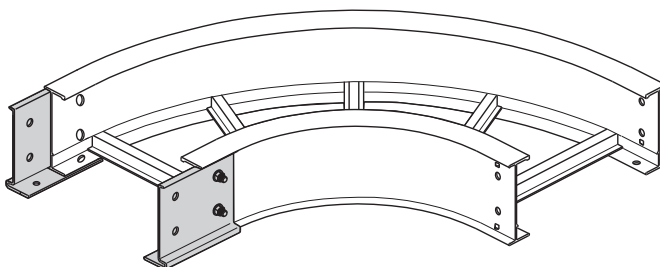
9A-6007

Tested to:

- 143 lbs/ft (safety factor 1.5)
- 107 lbs/ft (safety factor 2.0)
- 20 ft. simple beam test
- mid-span splice

Options: The 9A-6006 and 9A-6007 splice is also available with B-Line 46A and 47A series cable tray systems

- Available on ladder bottoms only (09" and 12" rung spacing).
- Available on 240" (20') or longer span straight sections.
- To order add MS* to part number: Ex. 46AMS09-24-288.
- For standard 6A or 7A fittings with H46A or H47A systems an additional pair of standard splice plates is required (9A-1006 or 9A-1007).



One pair 9A-6006 or 9A-6007 included.

Also available:

H6A and H7A Fittings

- Ladder bottom only (09" RS).
- Incorporates the 9A-6006 or 9A-6007 splice.
- Example: H6A-12-90HB24 or H7A-12-90HB24

* MS designates additional hole punches in side rail to accept mid-span splices.

Heavy Duty Expansion Splice Plates
9A-6016 and 9A-6017 (aluminum)
9G-6016 and 9G-6017 (HDG steel)
9SS6-6016 (stainless steel)

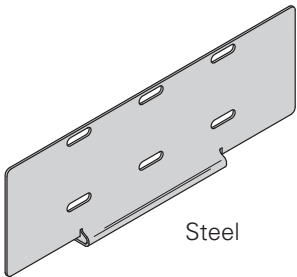
The Heavy Duty Expansion Splice Plate is engineered to eliminate the NEMA recommended additional supports at each expansion joint where expansion splice plates are utilized. Expansion splices are common in long-run outdoor applications, where temperature variations result in thermal expansion and contraction of the cable tray system. The installer using the traditional expansion splice would be required to install two supports, one on either side of the expansion splice. By utilizing the Heavy Duty Expansion Splice Plate, no additional supports are required when the splice is placed at quarter span.

- NEMA VE 2 Compliant
- Lowest total cost of installation solution
- “Wrap around” design that supports the side rail on the bottom of each tray section
- Available in lightweight, marine-grade 6063-T6 aluminum material, hot dip galvanized steel, and stainless steel 316 for easy installation in a variety of applications
- Visit www.cooperblinc.com/expansion for detailed installation instructions
- Splice plate hardware included
- Furnished in pairs
- Cannot be used with solid bottom or trough bottom styles of cable tray.

Heavy Duty Expansion Splice Plates are currently available with aluminum (H46A, H47A & 57A), steel (464, 476 & 574), and stainless steel (464) tray systems. These tray systems are heavy duty ladders that are ideal for long-span, outdoor applications.

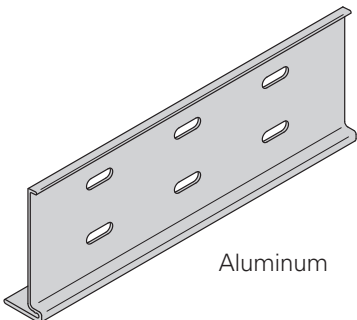
Patented: Partent No. US8459604 B2

Options: The 9A-6006 and 9A-6007 splice is also available
with B-Line 46A and 47A series cable tray systems



Steel

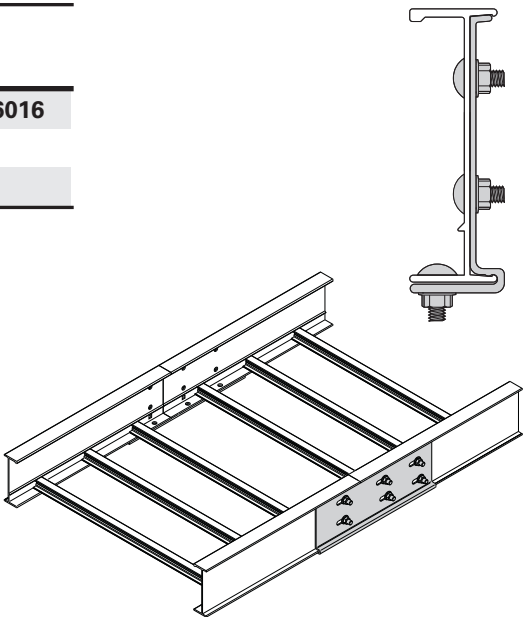
| Steel Tray Series | Catalog No. |
|----------------------|----------------------|
| 464 | 9G-6016 or 9SS6-6016 |
| 476 | 9G-6017 |
| 574 | 9G-6017 |



Aluminum

| Aluminum Tray Series | Catalog No. |
|-------------------------|-------------|
| 46A * | 9A-6016 |
| H46A | 9A-6016 |
| H47A | 9A-6017 |
| 57A | 9A-6017 |

* Additional field drilling is required

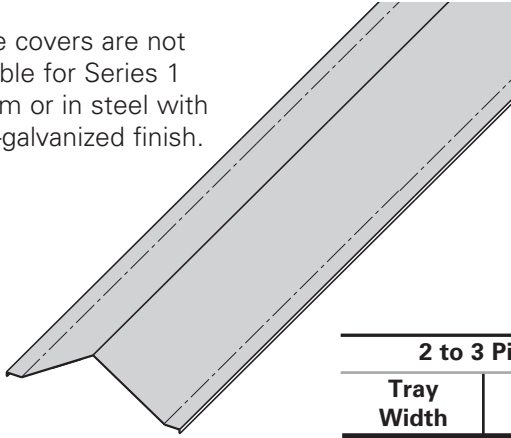


Aluminum heavy-duty expansion splice plates shown.

Note: 24" (609mm) bonding jumper (99-1620-24) available.

Special Purpose 2 to 3 Pitch Peaked Covers

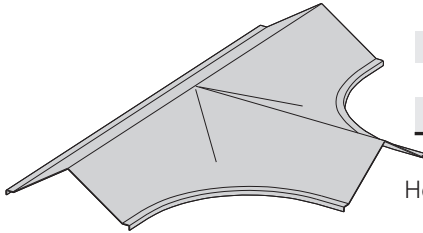
These covers are not available for Series 1 system or in steel with a pre-galvanized finish.



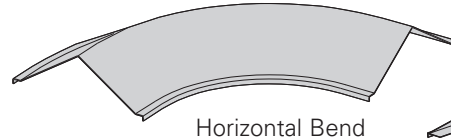
Features

- 33° slope to shed precipitants.
- Heavy construction - made for the industrial environment.
- Available in aluminum and steel; hot dip galvanized after fabrication (HDGAF ASTM A-123), 304 stainless and 316 stainless.
- Available in flanged design only.
- Fittings are in multiple piece welded construction.
- Expanding/Reducing HT and HX covers are not available.

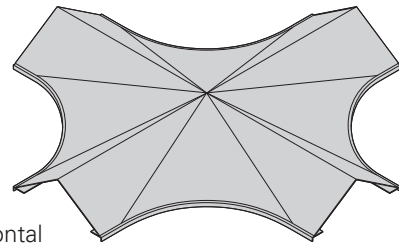
| 2 to 3 Pitch | |
|--------------|-------------|
| Tray Width | Peak Height |
| 6" | 2" |
| 9" | 3" |
| 12" | 4" |
| 18" | 6" |
| 24" | 8" |
| 30" | 10" |
| 36" | 12" |



Horizontal Tee

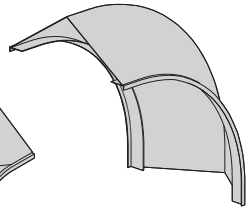


Horizontal Bend



Horizontal Cross

Vertical Outside Bend



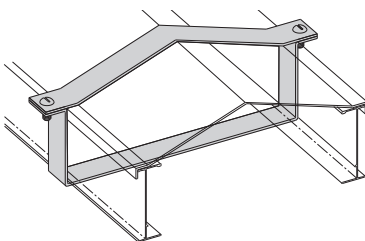
Catalog Number Selector

Example: **83** **7** **A** **80** - **24** - **144**

| Cover Type | Detail | Material | Material Thickness | Tray Width | Item Description |
|----------------------------|--|--|--|--|--|
| ● 83 = 2 to 3 Pitch Peaked | 7 = Flanged Aluminum 2 = Flanged Steel (248, 258, 268 straight sections & fittings) 3 = Flanged Steel (All straight sections except 248, 258, 268) | A = Aluminum G = HDGAF ASTM A-123 SS4 = 304 Stainless Steel SS6 = 316 Stainless Steel | 80 = .080 Aluminum straight section 125 = .125 Aluminum fittings 16 = 16 Ga. Steel straight sections. 18 = 16 Ga. Steel fittings. | 06 = 6" 09 = 9" 12 = 12" 18 = 18" 24 = 24" 30 = 30" 36 = 36" | 144 = 12 ft. (3.66 m) 120 = 10 ft. (3.05 m) 72 = 6 ft. (1.83 m) 60 = 5 ft. (1.52 m) |

2 to 3 Pitch Cover Clamp

- Recommended for outdoor service.



| Side Rail Height in. (mm) | Catalog No. Aluminum | Catalog No. Steel | Catalog No. Stainless Steel |
|------------------------------|-------------------------|----------------------|--------------------------------|
| 4 (101) | ● 9A-(#)-9P44 | ● 9G-(#)-9P44 | ● 9**-(#)-9P44 |
| 5 (127) | ● 9A-(#)-9P54 | ● 9G-(#)-9P54 | ● 9**-(#)-9P54 |
| 6 (152) | ● 9A-(#)-9P64 | ● 9G-(#)-9P64 | ● 9**-(#)-9P64 |
| 7 (178) | ● 9A-(#)-9P74 | ● 9G-(#)-9P74 | ● 9**-(#)-9P74 |

(#) Insert tray width

(**) Insert SS4 or SS6

● Green = Fastest shipped items ● Black = Normal lead-time items ● Red = Normally long lead-time items

Appendix - Reference Material - Methods Permitted

Wiring methods permitted in cable tray per the 2011 NEC®

1. Armored cable (Article 320)
2. Electrical metallic tubing (Article 358)
3. Electrical nonmetallic tubing (Article 362)
4. Fire alarm cables (Article 760)
5. Flexible metal conduit (Article 348)
6. Flexible metallic tubing (Article 360)
7. Instrumentation tray cable (Article 727)
8. Intermediate metal conduit (Article 342)
9. Liquidtight flexible metal conduit (Article 350)
10. Liquidtight flexible nonmetallic conduit (Article 356)
11. Metal-clad cable (Article 330)
12. Mineral-insulated, metal-sheathed cable (Article 332)
13. Multiconductor service-entrance cable (Article 338)
14. Multiconductor underground feeder and branch-circuit cable (Article 340)
15. Multipurpose and communications cables (Article 800)
16. Nonmetallic-sheathed cable (Article 334)
17. Power and control tray cable (Article 336)
18. Power-limited tray cable (Section 725.61(C) and 725.71(E))
19. Optical fiber cables (Article 770)
20. Other factory-assembled, multiconductor control, signal, or power
cables that are specifically approved for installation in cable trays
21. Rigid metal conduit (Article 344)
22. Rigid nonmetallic conduit (Article 352)

Appendix - Reference Material - Formulas

Formulas

• Allowable load: $w = \frac{F96Sx}{L^2}$

• Deflection: $\Delta = \frac{5wL^3}{384EIx}$

$$= \frac{5wL^4}{4608EIx}$$

• Stress: $F = \frac{wL^2}{96Sx}$

• Deflection Multiplier (K) = $\frac{\text{deflection}}{w}$

$$= \frac{5L^4}{4608EIx}$$

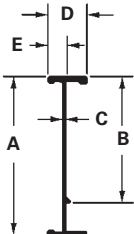
• Max. Working Load = $\frac{\text{Max. deflection}}{\text{Deflection Multiplier}}$

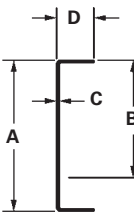
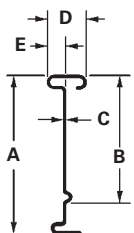
Legend

| | | |
|----|---|--|
| w | = | load (lbs/ft) |
| W | = | total load across span (lbs) |
| F | = | design stress (lbs/in ²) |
| L | = | span (inches) |
| Sx | = | section modulus for 2 rails (in ³) (see page APP-6 for Sx values) |
| E | = | 10 million for Alum. (lb/in. ²) 29 million for Steel (lb/in. ²) |
| Ix | = | moment of inertia for 2 rails (in ⁴) (see page APP-6 for Ix values) |

Cable Tray Side Rails

Design Data For One Rail

| Aluminum | B-Line Series | Side Rail Height | A (in.) | B (in.) | C (in.) | D (in.) | E (in.) | Sx (in. ³) | Ix (in. ⁴) | Area (in. ²) | Weight (lbs./ft.) |
|---|---------------|------------------|---------|---------|---------|---------|---------|------------------------|------------------------|--------------------------|-------------------|
|  | KSA4A | 4 | 3.86 | 2.970 | .059 | 1.36 | .750 | 0.450 | 0.895 | 0.400 | 0.467 |
| | KSA5A | 5 | 4.860 | 3.970 | .059 | 1.36 | .750 | 0.620 | 1.540 | 0.458 | 0.536 |
| | KSB4A | 4 | 3.880 | 2.950 | .067 | 1.36 | .750 | 0.535 | 1.160 | 0.494 | 0.578 |
| | KSB5A | 5 | 4.880 | 3.950 | .067 | 1.36 | .750 | 0.735 | 1.980 | 0.559 | 0.654 |
| | KSB6A | 6 | 5.880 | 4.950 | .067 | 1.36 | .750 | 0.955 | 3.080 | 0.624 | 0.730 |
| | RSI04 | 4 | 3.540 | 2.680 | .059 | 1.71 | .768 | 0.550 | 0.980 | 0.465 | 0.540 |
| | RSI05 | 5 | 4.530 | 3.660 | .061 | 1.71 | .770 | 0.750 | 1.760 | 0.540 | 0.630 |
| | RSI06 | 6 | 5.510 | 4.640 | .059 | 1.71 | .768 | 0.990 | 2.750 | 0.559 | 0.690 |
| | RSI07 | 7 | 6.50 | 5.630 | .075 | 1.71 | .784 | 1.340 | 4.390 | 0.750 | 0.880 |
| | 24 | 4 | 4.120 | 3.050 | .060 | 1.75 | .740 | 0.670 | 1.430 | 0.525 | 0.620 |
| | H24 | 4 | 4.185 | 3.105 | .070 | 1.75 | .750 | 0.785 | 1.845 | 0.640 | 0.745 |
| | 34 | 4 | 4.200 | 3.080 | .100 | 1.75 | .750 | 1.050 | 2.490 | 0.902 | 1.060 |
| | 25 | 5 | 5.000 | 3.930 | .068 | 1.75 | .748 | 0.900 | 2.310 | 0.620 | 0.720 |
| | 35 | 5 | 5.060 | 3.960 | .090 | 1.75 | .745 | 1.180 | 3.190 | 0.857 | 0.980 |
| | 26 | 6 | 6.120 | 5.040 | .065 | 2.00 | .745 | 1.260 | 3.950 | 0.698 | 0.820 |
| | 36 | 6 | 6.170 | 5.060 | .075 | 2.00 | .725 | 1.680 | 5.420 | 0.903 | 1.050 |
| | 46 | 6 | 6.190 | 5.080 | .085 | 2.00 | .650 | 1.790 | 6.090 | 0.989 | 1.170 |
| | H46 | 6 | 6.240 | 5.090 | .130 | 2.00 | .750 | 2.670 | 8.650 | 1.473 | 1.740 |
| | 27 | 7 | 7.140 | 6.058 | .075 | 2.00 | .725 | 1.465 | 5.640 | 0.810 | 0.943 |
| | 37 | 7 | 7.140 | 6.050 | .075 | 2.00 | .750 | 1.880 | 6.750 | 0.904 | 1.060 |
| | 47 | 7 | 7.240 | 6.130 | .100 | 2.00 | .675 | 2.470 | 8.940 | 1.189 | 1.400 |
| | H47 | 7 | 7.240 | 6.090 | .125 | 2.00 | .675 | 3.050 | 11.460 | 1.520 | 1.770 |
| | 57 | 7 | 7.400 | 6.230 | .160 | 2.00 | .875 | 3.860 | 16.430 | 2.114 | 2.460 |
| | S8A | 8 | 8.000 | 6.170 | .170 | 3.00 | 1.000 | 7.690 | 27.670 | 2.754 | 3.200 |

| Steel | B-Line Series | Side Rail Height | A (in.) | B (in.) | C (in.) | D (in.) | E (in.) | Sx (in. ³) | Ix (in. ⁴) | Area (in. ²) | Weight (lbs./ft.) |
|---|---------------|------------------|---------|---------|---------|---------|---------|------------------------|------------------------|--------------------------|-------------------|
|  <p>Series 148-176 Rail Only</p> | 148 | 4 | 3.625 | 3.125 | .048 | .875 | — | .250 | .450 | .251 | .840 |
| | 156 | 5 | 4.188 | 3.688 | .060 | .875 | — | .360 | .760 | .340 | 1.160 |
| | 166 | 6 | 5.188 | 4.688 | .060 | .750 | — | .460 | 1.200 | .385 | 1.310 |
| | 176 | 7 | 6.188 | 5.688 | .060 | .750 | — | .640 | 1.900 | .444 | 1.520 |
| | 248 | 4 | 4.188 | 3.140 | .048 | 1.000 | .392 | .320 | .720 | .313 | 1.170 |
| | 346 | 4 | 4.188 | 3.130 | .060 | 1.500 | .655 | .480 | 1.110 | .449 | 1.640 |
| | 444 | 4 | 4.188 | 3.110 | .075 | 1.500 | .670 | .640 | 1.470 | .561 | 2.020 |
| | 258 | 5 | 5.188 | 4.140 | .048 | 1.000 | .392 | .450 | 1.220 | .361 | 1.340 |
| | 356 | 5 | 5.188 | 4.130 | .060 | 1.500 | .655 | .660 | 1.860 | .509 | 1.860 |
| | 454 | 5 | 5.188 | 4.110 | .075 | 1.500 | .670 | .870 | 2.480 | .636 | 2.290 |
|  <p>All Other Steel Rails</p> | 268 | 6 | 6.188 | 5.140 | .048 | 1.000 | .392 | .590 | 1.900 | .409 | 1.520 |
| | 368 | 6 | 6.188 | 5.130 | .048 | 1.500 | .643 | .710 | 2.390 | .457 | 1.700 |
| | 366 | 6 | 6.188 | 5.140 | .060 | 1.500 | .655 | .850 | 2.870 | .569 | 2.080 |
| | 464 | 6 | 6.188 | 5.110 | .075 | 1.500 | .670 | 1.140 | 3.830 | .711 | 2.560 |
| | 378 | 7 | 7.188 | 6.140 | .048 | 1.500 | .643 | .890 | 3.450 | .505 | 1.880 |
| | 476 | 7 | 7.188 | 6.130 | .060 | 1.500 | .655 | 1.070 | 4.150 | .629 | 2.300 |
| | 574 | 7 | 7.188 | 6.110 | .075 | 1.500 | .670 | 1.430 | 5.550 | .792 | 2.830 |

A - Side Rail Height B - Loading Depth C - Web Thickness D - Flange Width
Design Factors: Ix = Moment of Inertia, Sx = Section Modulus

Appendix - Reference Material - Cable Tray Weights

Series 1

Steel Side Rail Weights

| Tray Series | | 148 | 156 | 166 | 176 |
|----------------------------|--------|------|------|------|------|
| Weight for 2 Side Rails | lbs/ft | 1.68 | 2.32 | 2.62 | 3.03 |
| | kg/m | 2.50 | 3.45 | 3.90 | 4.51 |

Example:
Weight for 148P09-12-144
= 1.68 lbs/ft + .51 lbs/ft = 2.19 lbs/ft
= (2.19 lbs/ft) (12 ft) = 26.28 lbs.

Tray Bottom Weights

| Tray Width (inches) | | | 6 | 9 | 12 | 18 | 24 | 30 | 36 |
|--------------------------------------|--------------------------|--------|------|------|------|------|------|------|------|
| All Series 1 Steel | 6" Spacing | lbs/ft | 0.38 | 0.57 | 0.76 | 1.14 | 1.52 | 2.25 | 2.70 |
| | Rung Weight | kg/m | 0.57 | 0.85 | 1.13 | 1.70 | 2.26 | 3.35 | 4.02 |
| | 9" Spacing | lbs/ft | 0.25 | 0.38 | 0.51 | 0.76 | 1.01 | 1.50 | 1.80 |
| | Rung Weight | kg/m | 0.38 | 0.57 | 0.75 | 1.13 | 1.51 | 2.23 | 2.68 |
| | 12" Spacing | lbs/ft | 0.19 | 0.29 | 0.38 | 0.57 | 0.76 | 1.13 | 1.35 |
| | Rung Weight | kg/m | 0.29 | 0.43 | 0.57 | 0.85 | 1.13 | 1.68 | 2.01 |
| Series 148 Steel | Vented Trough Weight | lbs/ft | 0.48 | 0.72 | 0.95 | 1.43 | 1.91 | 2.39 | 2.86 |
| | | kg/m | 0.71 | 1.06 | 1.42 | 2.13 | 2.84 | 3.55 | 4.26 |
| | Solid Trough Weight | lbs/ft | 0.60 | 0.90 | 1.20 | 1.80 | 2.39 | 2.99 | 3.59 |
| | | kg/m | 0.89 | 1.34 | 1.78 | 2.67 | 3.56 | 4.45 | 5.34 |
| Series 156, 166 & 176 Steel | 4" Vented Rung Weight | lbs/ft | 0.57 | 0.86 | 1.14 | 1.71 | 2.28 | 3.37 | 3.42 |
| | | kg/m | 0.85 | 1.27 | 1.70 | 2.54 | 3.39 | 5.02 | 5.09 |
| | Solid Bottom Weight | lbs/ft | 1.01 | 1.51 | 2.01 | 3.02 | 4.02 | 5.20 | 6.25 |
| | | kg/m | 1.50 | 2.24 | 2.99 | 4.49 | 5.98 | 7.74 | 9.29 |

When using steel tray that is hot dip galvanized after fabrication add 9.6% to weights.

Series 2, 3, 4 or 5

Aluminum Side Rail Weights

| Tray Series | | 24 | H24 | 34 | 25 | 35 | 26 | 36 | 46 | H46 | 27 | 37 | 47 | H47 | 57 |
|----------------------------|--------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|
| Weight for 2 Side Rails | lbs/ft | 1.23 | 1.49 | 2.12 | 1.44 | 1.96 | 1.64 | 2.09 | 2.33 | 3.47 | 1.88 | 2.12 | 2.80 | 3.54 | 4.92 |
| | kg/m | 1.83 | 2.22 | 3.15 | 2.14 | 2.92 | 2.44 | 3.11 | 3.47 | 5.16 | 2.806 | 3.15 | 4.16 | 5.27 | 7.32 |

Steel Side Rail Weights

| Tray Series | | 248 | 346 | 444 | 258 | 356 | 454 | 268 | 368 | 366 | 464 | 378 | 476 | 574 |
|----------------------------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Weight for 2 Side Rails | lbs/ft | 2.34 | 3.28 | 4.04 | 2.68 | 3.72 | 4.58 | 3.04 | 3.40 | 4.16 | 5.12 | 3.76 | 4.60 | 5.66 |
| | kg/m | 3.48 | 4.88 | 6.01 | 3.99 | 5.54 | 6.82 | 4.52 | 5.06 | 6.19 | 7.62 | 5.59 | 6.84 | 8.42 |

Series 2, 3, 4 or 5 weights continued on page 387.

Appendix - Reference Material - Cable Tray Weights

Series 2, 3, 4 or 5

Tray Bottom Weights

| Tray Width (inches) | | | 6 | 9 | 12 | 18 | 24 | 30 | 36 | 42 |
|---------------------------|-------------------------|--------|------|------|------|------|------|------|------|------|
| All Series 2,3,4 Aluminum | 6" Spacing Rung Weight | lbs/ft | 0.30 | 0.44 | 0.59 | 0.89 | 1.18 | 1.70 | 2.04 | 2.38 |
| | | kg/m | 0.44 | 0.66 | 0.88 | 1.32 | 1.76 | 2.53 | 3.04 | 3.54 |
| | 9" Spacing Rung Weight | lbs/ft | 0.20 | 0.29 | 0.39 | 0.59 | 0.78 | 1.13 | 1.36 | 1.58 |
| | | kg/m | 0.29 | 0.44 | 0.58 | 0.87 | 1.16 | 1.68 | 2.02 | 2.35 |
| | 12" Spacing Rung Weight | lbs/ft | 0.15 | 0.22 | 0.29 | 0.44 | 0.58 | 0.85 | 1.02 | 1.19 |
| | | kg/m | 0.22 | 0.32 | 0.43 | 0.65 | 0.86 | 1.26 | 1.52 | 1.77 |
| | 18" Spacing Rung Weight | lbs/ft | 0.10 | 0.15 | 0.20 | 0.30 | 0.40 | 0.57 | 0.68 | 0.80 |
| | | kg/m | 0.15 | 0.22 | 0.30 | 0.45 | 0.60 | 0.85 | 1.02 | 1.19 |
| | Vented Trough Weight | lbs/ft | 0.25 | 0.38 | 0.50 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 |
| | | kg/m | 0.37 | 0.56 | 0.74 | 1.12 | 1.49 | 1.86 | 2.23 | 2.60 |
| | Solid Trough Weight | lbs/ft | 0.31 | 0.46 | 0.61 | 0.92 | 1.22 | 1.53 | 1.83 | 2.14 |
| | | kg/m | 0.45 | 0.68 | 0.91 | 1.36 | 1.82 | 2.27 | 2.72 | 3.18 |
| All Series 2,3,4,5 Steel | 6" Spacing Rung Weight | lbs/ft | 0.62 | 0.92 | 1.23 | 1.85 | 2.46 | 3.67 | 4.40 | 5.14 |
| | | kg/m | 0.92 | 1.37 | 1.83 | 2.75 | 3.66 | 5.46 | 6.55 | 7.65 |
| | 9" Spacing Rung Weight | lbs/ft | 0.41 | 0.62 | 0.82 | 1.23 | 1.64 | 2.45 | 2.94 | 3.43 |
| | | kg/m | 0.61 | 0.92 | 1.22 | 1.83 | 2.44 | 3.65 | 4.37 | 5.10 |
| | 12" Spacing Rung Weight | lbs/ft | 0.31 | 0.47 | 0.62 | 0.93 | 1.24 | 1.84 | 2.21 | 2.58 |
| | | kg/m | 0.46 | 0.69 | 0.92 | 1.38 | 1.85 | 2.74 | 3.29 | 3.83 |
| | 18" Spacing Rung Weight | lbs/ft | 0.21 | 0.31 | 0.41 | 0.62 | 0.82 | 1.22 | 1.46 | 1.71 |
| | | kg/m | 0.31 | 0.46 | 0.61 | 0.92 | 1.22 | 1.82 | 2.18 | 2.54 |
| | Vented Trough Weight | lbs/ft | 0.53 | 0.80 | 1.06 | 1.59 | 2.12 | 2.65 | 3.18 | 3.71 |
| | | kg/m | 0.79 | 1.18 | 1.58 | 2.37 | 3.15 | 3.94 | 4.73 | 5.52 |
| | Solid Trough Weight | lbs/ft | 0.67 | 1.00 | 1.33 | 2.00 | 2.66 | 3.33 | 3.99 | 4.66 |
| | | kg/m | 0.99 | 1.48 | 1.98 | 2.97 | 3.96 | 4.95 | 5.94 | 6.93 |

When using steel tray that is hot dip galvanized after fabrication add 9.6% to weights.

Fiberglass

Fiberglass Side Rail Weights

| Tray Series | | 13 | 24 | 36 | 46 | H46 | 48 |
|-------------------------|--------|------|------|------|------|------|------|
| Weight for 2 Side Rails | lbs/ft | 1.40 | 1.78 | 2.82 | 3.72 | 3.72 | 4.66 |
| | kg/m | 2.08 | 2.65 | 4.20 | 5.54 | 5.54 | 6.93 |

Fiberglass Bottom Weights

| Tray Width (inches) | | | 6 | 9 | 12 | 18 | 24 | 30 | 36 |
|-----------------------|-----------------------------|--------|------|------|------|------|------|------|------|
| All Series Fiberglass | 6" Spacing Rung Weight | lbs/ft | 0.54 | 0.81 | 1.08 | 1.62 | 2.16 | 2.70 | 3.23 |
| | | kg/m | 0.80 | 1.20 | 1.60 | 2.41 | 3.21 | 4.01 | 4.81 |
| | 9" Spacing Rung Weight | lbs/ft | 0.35 | 0.53 | 0.70 | 1.05 | 1.40 | 1.75 | 2.10 |
| | | kg/m | 0.52 | 0.78 | 1.04 | 1.56 | 2.09 | 2.61 | 3.13 |
| | 12" Spacing Rung Weight | lbs/ft | 0.27 | 0.40 | 0.54 | 0.81 | 1.08 | 1.35 | 1.62 |
| | | kg/m | 0.40 | 0.60 | 0.80 | 1.20 | 1.60 | 2.01 | 2.41 |
| | 18" Spacing Rung Weight | lbs/ft | 0.19 | 0.28 | 0.38 | 0.57 | 0.75 | 0.94 | 1.13 |
| | | kg/m | 0.28 | 0.42 | 0.56 | 0.84 | 1.12 | 1.40 | 1.68 |
| | 6" Spacing Marine Rung Wt. | lbs/ft | 0.75 | 1.12 | 1.49 | 2.24 | 2.98 | 3.73 | 4.48 |
| | | kg/m | 1.11 | 1.67 | 2.22 | 3.33 | 4.44 | 5.55 | 6.66 |
| | 9" Spacing Marine Rung Wt. | lbs/ft | 0.48 | 0.73 | 0.97 | 1.45 | 1.94 | 2.42 | 2.91 |
| | | kg/m | 0.72 | 1.08 | 1.44 | 2.16 | 2.89 | 3.61 | 4.33 |
| | 12" Spacing Marine Rung Wt. | lbs/ft | 0.37 | 0.56 | 0.75 | 1.12 | 1.49 | 1.87 | 2.24 |
| | | kg/m | 0.56 | 0.83 | 1.11 | 1.67 | 2.22 | 2.78 | 3.33 |
| | 18" Spacing Marine Rung Wt. | lbs/ft | 0.26 | 0.39 | 0.52 | 0.78 | 1.04 | 1.31 | 1.57 |
| | | kg/m | 0.39 | 0.58 | 0.78 | 1.17 | 1.55 | 1.94 | 2.33 |

Appendix - Reference Material - Metric Conversion

Metric Conversion Chart

| To Convert From | To | Multiply By |
|--|--------------------------------|--|
| Angle | | |
| degree | radian (rad) | 0.01745329 |
| radian (rad) | degree | 57.295780 |
| Area | | |
| foot ² | square meter (m ²) | 0.09290304 |
| inch ² | square meter (m ²) | 0.0064516 x 10 ⁻² |
| circular mil | square meter (m ²) | 0.00005067075 x 10 ⁻⁵ |
| sq. centimeter (cm ²) | square inch (in ²) | 0.15500030 |
| square meter (m ²) | foot ² | 10.763910 |
| square meter (m ²) | inch ² | 1550.0030 |
| square meter (m ²) | circular mil | 1973523000.0 |
| Temperature | | |
| degree Fahrenheit | degree Celsius | $t^{\circ}\text{C} = (t^{\circ}\text{F} - 32) / 1.8$ |
| degree Celsius | degree Fahrenheit | $t^{\circ}\text{F} = 1.8t^{\circ}\text{C} + 32$ |
| Force | | |
| pounds - force (lbf) | newtons (N) | 4.4482220 |
| Length | | |
| foot (ft) | meter (m) | 0.30480 |
| inch (in) | meter (m) | 0.02540 |
| mil | meter (m) | 0.002540 x 10 ⁻³ |
| inch | micrometer (μm) | 25400.0 |
| millimeters | inch (in) | 0.039370 |
| meter (m) | foot (ft) | 3.280840 |
| meter (m) | inch (in) | 39.370080 |
| meter (m) | mil | 39370.0080 |
| micrometer (μm) | inch (in) | 0.039370080 x 10 ⁻³ |
| Volume | | |
| foot ³ | cubic meter (m ³) | 0.028316850 |
| inch ³ | cubic meter (m ³) | 0.016387060 x 10 ⁻³ |
| cubic centimeter (cm ³) | cubic inch (in ³) | 0.061023740 |
| cubic meter (m ³) | foot ³ | 35.314660 |
| cubic meter (m ³) | inch ³ | 61023.760 |
| gallon (U.S. liquid) | cubic meter (m ³) | 0.0037854120 |
| Section Properties | | |
| section modulus S (in ³) | S (m ³) | 0.016387060 x 10 ⁻³ |
| moment of inertia I (in ⁴) | I (m ⁴) | 0.00041623140 x 10 ⁻³ |
| modulus of elasticity E (psi) | E (Pa) | 6894.7570 |
| section modulus S (m ³) | S (in ³) | 61023.740 |
| moment of inertia I (m ⁴) | I (in ⁴) | 2402510.0 |
| modulus of elasticity E (Pa) | E (psi) | 0.014503770 x 10 ⁻² |

Metric Conversion Chart (Cont.)

| To Convert From | To | Multiply By |
|---|--|---------------------------------|
| Bending Moment or Torque | | |
| lbf • ft | newton meter (N•m) | 1.3558180 |
| lbf • in | newton meter (N•m) | 0.11298480 |
| N•m | lbf • ft | 0.73756210 |
| N•m | lbf • in | 8.8507480 |
| Mass | | |
| ounce (avoirdupois) | kilogram (kg) | 0.028349520 |
| pound (avoirdupois) | kilogram (kg) | 0.45359240 |
| ton (short, 2000 lb) | kilogram (kg) | 907.18470 |
| ton (long, 2240 lb) | kilogram (kg) | 1016.0470 |
| kilogram (kg) | ounce (avoirdupois) | 35.273960 |
| kilogram (kg) | pound (avoirdupois) | 2.2046220 |
| kilogram (kg) | ton (short, 2000 lb) | 0.0011023110 |
| kilogram (kg) | ton (long, 2240 lb) | 0.98420640 x 10 ⁻³ |
| Mass Per Unit Length | | |
| lb/ft | kilogram per meter (kg/m) | 1.4881640 |
| lb/in | kilogram per meter (kg/m) | 17.857970 |
| kilogram per meter (kg/m) | lb/ft | 0.67196890 |
| kilogram per meter (kg/m) | lb/in | 0.55997410 |
| Mass Per Unit Volume | | |
| lb/ft ³ | kilogram per cubic meter (kg/m ³) | 16.018460 |
| lb/in ³ | kilogram per cubic meter (kg/m ³) | 27679.90 |
| kilogram per cubic meter (kg/m ³) | lb/ft ³ | 0.062427970 |
| kilogram per cubic meter (kg/m ³) | lb/in ³ | 0.03612730 x 10 ⁻³ |
| lb/ft ³ | lb/in ³ | 1728.0 |
| Mass Per Unit Area | | |
| lb/ft ² | kilogram per square meter (kg/m ²) | 4.8824280 |
| kg/m ² | pound per square foot (lb/ft ²) | 0.20481610 |
| Pressure or Stress | | |
| lbf/in ² (psi) | pascal (Pa) | 6894.7570 |
| kip/in ² (ksi) | pascal (Pa) | 6894757.0 |
| lbf/in ² (psi) | megapascals (MPa) | 0.0068947570 |
| pascal (Pa) | pound-force per square inch (psi) | 0.0014503770 x 10 ⁻¹ |
| pascal (Pa) | kip per square inch (ksi) | 0.0014503770 x 10 ⁻⁴ |
| megapascals (MPa) | lbf/in ² (psi) | 145.03770 |
| Metric Symbols | | |
| m = meter | N = newton | |
| cm = centimeter | kN = kilonewton | |
| mm = millimeter | Pa = pascal | |
| µm = micrometer | MPa = megapascal | |
| kg = kilogram | | |

SECTION 16114 CABLE TRAYS

PART I - GENERAL

1.01 SECTION INCLUDES

- A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, tests and services to install complete cable tray systems as shown on the drawings.
- B. Cable tray systems are defined to include, but are not limited to straight sections of [ladder type] [trough type] [solid bottom type] [channel type] cable trays, bends, tees, elbows, drop-outs, supports and accessories.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.
- B. ASTM A123 - Specification for Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.
- C. ASTM A653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process, Structural (Physical) Quality.
- D. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High Strength Low Alloy with Improved Formability.
- E. ASTM A1008 - Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- F. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- G. NEMA VE 1 - Metallic Cable Tray Systems.
- H. NEMA VE 2 - Cable Tray Installation Guidelines.

1.03 DRAWINGS

- A. The drawings which constitute a part of these specifications indicate the general route of the cable tray systems. Data presented on these drawings is as accurate as preliminary surveys and planning can determine until final equipment selection is made. Accuracy is not guaranteed and field verification of all dimensions, routing, etc., is required.
- B. Specifications and drawings are for assistance and guidance, but exact routing, locations, distances and levels will be governed by actual field conditions. Contractor is directed to make field surveys as part of his work prior to submitting system layout drawings.

1.04 SUBMITTALS

- A. Submittal Drawings: Submit drawings of cable tray and accessories including clamps, brackets, hanger rods, splice plate connectors, expansion joint assemblies, and fittings, showing accurately scaled components.
- B. Product Data: Submit manufacturer's data on cable tray including, but not limited to, types, materials, finishes, rung spacings, inside depths and fitting radii. For side rails and rungs, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).

1.05 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of cable trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. NEMA Compliance: Comply with NEMA Standards Publication Number VE 1, "Cable Tray Systems".
- C. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 392, NEC).
- D. UL Compliance: Provide products which are UL classified and labeled.
- E. NFPA Compliance: Comply with NFPA 70B, "Recommended Practice for Electrical Equipment Maintenance" pertaining to installation of cable tray systems.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver cable tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.
- B. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with these specifications, Eaton's B-Line series cable tray and cable channel, systems to be installed shall be as manufactured by Eaton.

2.02 CABLE TRAY SECTIONS AND COMPONENTS

- A. General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features.
- B. Materials and Finish: Material and finish specifications for each tray type are as follows:
 - 1. Aluminum: Straight section and fitting side rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052.
 - 2. Pre-Galvanized Steel: Straight sections, fitting side rails, rungs, and covers shall be made from structural quality steel meeting the minimum mechanical properties and mill galvanized in accordance with ASTM A653 SS, Grade 33, coating designation G90. Covers for all steel trays will also be furnished from mill galvanized steel in accordance with ASTM A653 G90.
 - 3. Hot Dip Galvanized Steel: Straight section and fitting side rails and rungs shall be made from structural quality steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 for 14 gauge and heavier, ASTM A1008, Grade 33, Type 2 for 16 gauge and lighter, and shall be hot dip galvanized after fabrication in accordance with ASTM A123. All covers and splice plates must also be hot dip galvanized after fabrication; mill galvanized covers are not acceptable for hot dipped galvanized cable tray. All hot dip galvanized after fabrication steel cable trays must be returned to point of manufacture after coating for inspection and removal of all icicles and excess zinc. Failure to do so can cause damage to cables and/or injury to installers.
 - 4. Stainless Steel: Straight section and fitting side rails and rungs shall be made of AISI Type 304 or Type 316 stainless steel. Transverse members (rungs) shall be welded to the side rails with Type 316 stainless steel welding wire.

2.03 TYPE OF TRAY SYSTEM

- A. Ladder type trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced [6] [9] [12] inches on center. Spacing in radiused fittings shall be 9 inches and measured at the center of the tray's width. Rungs shall have a minimum cable bearing surface of $\frac{7}{8}$ " with radiused edges. No portion of the rungs shall protrude below the bottom plane of the side rails.** Each rung must be capable of supporting the cable load, with a safety factor of 1.5, and a 200 lb. concentrated load when tested in accordance with NEMA VE 1, section 5.4.
***Omit text for Series 1 cable tray systems.*
- B. Ventilated trough type trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2\frac{3}{4}$ " and shall be spaced on 6" centers. To provide ventilation in the tray, the valleys of the corrugated bottom shall have $2\frac{1}{4}$ " x 4" rectangular holes punched along the width of the bottom.

Appendix - Full Cable Tray Systems Specification

- C. Non-Ventilated bottom trough type trays shall consist of two longitudinal members (side rails) with a corrugated bottom welded to the side rails. The peaks of the corrugated bottom shall have a minimum flat cable bearing surface of $2\frac{3}{4}$ " and shall be spaced on 6" centers.
- D. Tray Sizes shall have [3] [4] [5] [6] inch minimum usable load depth, or as noted on the drawing.
- E. Straight tray sections shall have side rails fabricated as I-Beams. All straight sections shall be supplied in standard [10] [12] [20] [24] foot lengths, except where shorter lengths are permitted to facilitate tray assembly lengths as shown on drawings.
- F. Tray widths shall be [6] [9] [12] [18] [24] [30] [36] inches or as shown on drawings.
- G. All fittings must have a three inch tangent and a minimum radius of [12] [24] [36] [48] inches.
- H. Splice plates shall be the bolted type made as indicated below for each tray type. The resistance of fixed splice connections between an adjacent section of tray shall not exceed .00033 ohm. Splice plate construction shall be such that a splice may be located anywhere within a continuously supported span without diminishing rated loading capacity of the cable tray.
 - 1. Aluminum Tray - Splice plates shall be made of 6063-T6 aluminum, using four square neck carriage bolts and serrated flange locknuts. Hardware shall be zinc plated in accordance with ASTM B633, SC1. If aluminum cable tray is to be used outdoors, then hardware shall be Type 316 stainless steel.
 - 2. Steel (including Pre-Galvanized and Hot Dip Galvanized) - Splice plates shall be manufactured of high strength steel, meeting the minimum mechanical properties of ASTM A1011 HSLAS, Grade 50, Class 1. Each splice plate shall be attached with ribbed neck carriage bolts and serrated flange locknuts. Hardware shall be zinc plated in accordance with ASTM B633 SC1 for pre-galvanized cable trays, or Chromium Zinc in accordance with ASTM F-1136-88 for hot dip galvanized cable trays.

Splice plates shall be furnished with straight sections and fittings.

- I. Cable Tray Supports: Shall be placed so that the support spans do not exceed the maximum span indicated on drawings. Supports shall be constructed from 12 gauge steel formed shape channel members $1\frac{5}{8}$ " x $1\frac{5}{8}$ " with necessary hardware such as Trapeze Support Kits (9G-55XX-22SH) as manufactured by Eaton [or engineer approved equal]. Cable trays installed adjacent to walls shall be supported on wall mounted brackets such as B409 as manufactured by B-Line [or engineer-approved equal].
- J. Trapeze hangers and center hung supports shall be supported by $\frac{1}{2}$ " (minimum) diameter rods.
- K. Barrier Strips: Shall be placed as specified on drawings and be fastened into the tray with self drilling screws.
- L. Accessories: Special accessories shall be furnished as required to protect, support, and install a cable tray system. Accessories shall consist of, but are not limited to; section splice plates, expansion plates, blind-end plates, specially-designed ladder drop-outs, barriers, etc.

2.04 LOADING CAPACITIES

- A. Cable tray shall be capable of carrying a uniformly distributed load of _____ lbs./ft. on a _____ ft. support span with a safety factor of 1.5 when supported as a simple span and tested per NEMA VE 1, section 5.2. **In addition to the uniformly distributed load the cable tray shall support 200 lbs. concentrated load at mid-point of span.** Load and safety factors specified are applicable to both the side rails and rung capacities. Cable tray shall be made to manufacturing tolerances as specified by NEMA.

***Omit text for Series 1 cable tray systems.*

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install cable trays as indicated; in accordance with equipment manufacturer's instructions, and with recognized industry practices (NEMA VE 2), to ensure that the cable tray equipment complies with requirements of NEC, and applicable portions of NFPA 70B and NECA's "Standards of Installation" pertaining to general electrical installation practices.
- B. Coordinate cable tray with other electrical work as necessary to properly interface installation of cable tray work with other work.
- C. Provide sufficient space encompassing cable trays to permit access for installing and maintaining cables.

3.02 TESTING

- A. Test cable trays to ensure electrical continuity of bonding and grounding connections, and to demonstrate compliance with specified maximum grounding resistance. See NFPA 70B, Chapter 18, for testing and test methods.
- B. Manufacturer shall provide test reports witnessed by an independent testing laboratory of the "worst case" loading conditions outlined in this specification and performed in accordance with the latest revision of NEMA VE 1.

END OF SECTION

Appendix - Additional Cable Tray Sizing Requirements

AMPACITY:

Multiconductor Cables (2000 Volts or Less)

Cable ampacities shall comply with Tables 310.16 and 310.18 of the NEC® subject to the provisions below:

1. If there are more than 3 current carrying conductors in a cable, derate cable ampacity per section 310.15(B)(2)(A).
2. If tray has solid covers, use 95% of the ampacity values shown in Tables 310.16 and 310.18.
3. If cables are placed in a single layer, with a maintained spacing of not less than 1 cable diameter between cables, the ampacity of the cables shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables with not more than 3 insulated conductors in free air in accordance with Section 310.15(C) and Table B.310.3. You must use the ambient ampacity correction factors, found below Table B.310.3, for ambient temperatures other than 40°C (104°F).

Multiconductor Cables (2001 Volts and over) Type MV and Type MC Cables

1. Where cable trays are covered for more than 6 ft. with solid, unventilated covers, use not more than 95% of the ampacity values of Tables 310.75 and 310.76.
2. Where cables are installed in a single layer in uncovered trays with a maintained spacing of not less than one cable diameter between cables, you can use the ampacity values listed in Tables 310.71 and 310.72.

Single Conductor Cables

Ampacity of Cables Rated 2000 Volts or Less
in Cable Tray (single conductor cables)

| Cable Sizes | Solid Unventilated Cable Tray Cover ? | Applicable Ampacity Tables (*) | Mult. Amp. Table Values By | Special Conditions |
|--|---------------------------------------|------------------------------------|----------------------------|---|
| 600 kcmil and Larger | No (**) | 310.17 and 310.19 | 0.75 | |
| 600 kcmil and Larger | Yes | 310.17 and 310.19 | 0.70 | |
| 1/0 AWG through 500 kcmil | No (**) | 310.17 and 310.19 | 0.65 | |
| 1/0 AWG through 500 kcmil | Yes | 310.17 and 310.19 | 0.60 | |
| 1/0 AWG & Larger In Single Layer | No (**) | 310.17 and 310.19 | 1.00 | Maintained Spacing Of One Cable Diameter |
| Single Conductors In Triangle Config. 1/0 AWG and Larger | No (**) | 310.20 [See NEC Section 310.15(B)] | 1.00 | Spacing Of 2.15 x One Conductor O.D. Between Cables |

Ampacity of Type MV and Type MC Cables
(2001 Volts or over) in Cable Trays (single conductor cables)

| Cable Sizes | Solid Unventilated Cable Tray Cover ? | Applicable Ampacity Tables (*) | Mult. Amp. Table Values By | Special Conditions |
|--|---------------------------------------|--------------------------------|----------------------------|---|
| 1/0 AWG and Larger | No (**) | 310.69 and 310.70 | 0.75 | |
| 1/0 AWG and Larger | Yes | 310.69 and 310.70 | 0.70 | |
| 1/0 AWG & Larger In Single Layer | No (**) | 310.69 and 310.70 | 1.00 | Maintained Spacing Of One Cable Diameter |
| Single Conductors In Triangle Config. 1/0 AWG and Larger | No (**) | 310.67 and 310.68 | 1.05 | Spacing Of 2.15 x One Conductor O.D. Between Cables |

(*) The ambient ampacity correction factors must be used.

(**) At a specific position, where it is determined that the tray cables require mechanical protection, a single cable tray cover of six feet or less in length can be installed.

Cable Fill in Hazardous (Classified) Locations:

Section 392.3 of the NEC regulates the use of cable tray wiring systems in hazardous (classified) locations. This section states that if cable tray wiring systems are installed in hazardous (classified) locations, the cables that they support must be suitable for installation in those hazardous (classified) locations. The cable carries the installation restriction, not the cable tray except that the cable tray installation must comply with Section 392.4.

Some hazardous (classified) locations require special spacing of the cables. When installing Type MC, MI & TC cables in cable tray in Class II, Division 2 Hazardous (classified) areas, (combustible dusts), the cables are limited to a single layer with spacing between cables equal to the diameter of the largest adjacent cable. This is the only hazardous (classified) location where the spacing of the cables is required although it is recommended that this wiring method also be employed in Class III, Division I, and Class III, Division 2 (Ignitable Fibers & Flyings). Please note that this will alter the cable tray sizing information obtained from the sizing flow chart on page C-20 & C-21 of this catalog.

Please reference **NEMA VE 2**, metal cable tray installation guideline, for more complete information.
www.cabletrays.com

Supports - Eaton's B-Line cable tray shall be sized and installed as a complete cable support system appropriate for the cable types installed. Recommended cable tray support locations are as shown below. Do not exceed the maximum support spacing and design load as printed on the side rail label. Refer to Canadian Electrical Code (CEC) section 12-2202 for minimum cable tray clearances.

Splice Plates - Use factory supplied splice plates only. Splice plates located at the quarter span between supports are preferred. Avoid placing splices at midspan and directly above supports. Torque all splice plate fasteners to 19 ft. - lbs. for $\frac{3}{8}$ " and 50 ft. - lbs. for $\frac{1}{2}$ ". Expansion splice plate fasteners should be loosened $\frac{1}{2}$ turn after reaching full torque to allow for travel. Set the side rail gap for expansion plates according to the chart on page C-8 and ensure that a support is located within 2 feet on each side of the expansion splice.

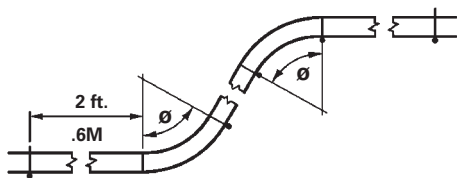
Conductors - The Cable Tray system installation shall be completed prior to pulling conductors. Cable support distances for conductor size should be referenced in CEC Part 1, Table 21. Single conductor cables placed one diameter or more apart in ventilated or ladder type tray are allowed to use the free air rating per the CEC. Any conductor in vertical runs of cable tray and all single conductor cables must be fastened to the rungs with nylon cable ties or stainless steel clamps. Carbon steel cable clamps should not be used due to induction heating, per CEC section 12-2204 (5).

Covers - Vertical cable trays which penetrate dry floors must be covered for 2m (two meter) above the floor level. All cable tray dead ends must be closed with blind ends per CEC section 12-2202.

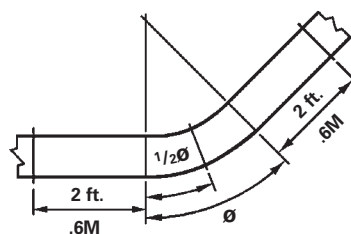
Handling - Cable tray is shipped without exterior crating, therefore careful material handling practices should be used. Cable tray straight sections should be lifted with wide slings and an overhead crane. If a crane is not available and a fork lift is to be used, only single bundles should be lifted. Ensure that each bundle is properly centered. Cable tray fittings that are not crated should be unbanded and off-loaded by hand.

Storage - All cable tray materials are subject to storage stain (white rust) if improperly stored. If cable tray is stored as shipped, it must be stored indoors. If the cable tray material must be stored outside, it must be unbanded and loosely stacked on an angle to minimize the components' contact area as well as provide for adequate drainage.

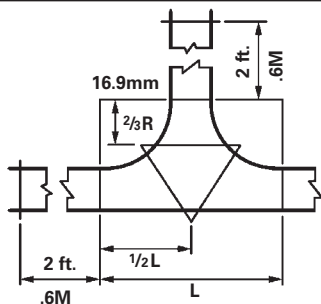
NEMA RECOMMENDED SUPPORT LOCATIONS FOR FITTINGS



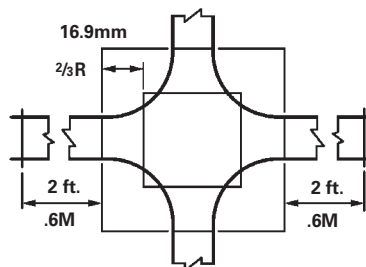
Vertical Elbows



Horizontal Elbows





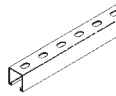
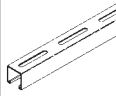
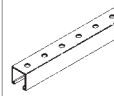
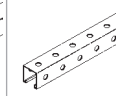
Horizontal Tee



Horizontal Cross

Appendix - Support Channels & Channel Nuts

Channel Sizes & Hole Patterns Selection Chart

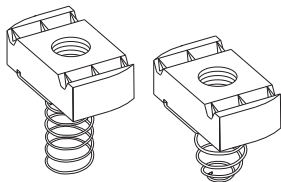
| Channel Type | Channel Dimensions | | Material & Thickness | | | | Channel Hole Patterns ** | | | |
|--------------|---|---|----------------------|---------------|---------------|---------------|--|---|---|---|
| | Height | Width | Stainless Steel | | | | SH | S | H17/8 | TH |
| |  |  | 1 Steel | 2 Aluminum | 3 Type 304 | 4 Type 316 |  |  |  |  |
| B11 | 3 ¹ / ₄ " | 1 ⁵ / ₈ " | 12 Ga. | — | — | — | 1 | 1 | 1 | — |
| B12 | 2 ⁷ / ₁₆ " | 1 ⁵ / ₈ " | 12 Ga. | .105 | — | — | 1,2 | 1 | 1,2 | — |
| B22 | 1 ⁵ / ₈ " | 1 ⁵ / ₈ " | 12 Ga. | .105 | 12 Ga. | 12 Ga. | 1,2,3,4 | 1 | 1,2,3,4 | 1 |
| B24 | 1 ⁵ / ₈ " | 1 ⁵ / ₈ " | 14 Ga. | .080 | 14 Ga. | 14 Ga. | 1,2,3,4 | 1 | 1,2,3,4 | — |
| B26 | 1 ⁵ / ₈ " | 1 ⁵ / ₈ " | 16 Ga. | — | — | — | 1 | 1 | 1 | — |
| B32 | 1 ³ / ₈ " | 1 ⁵ / ₈ " | 12 Ga. | — | 12 Ga. | — | 1,3 | 1 | 1,3 | — |
| B42 | 1 " | 1 ⁵ / ₈ " | 12 Ga. | — | 12 Ga. | — | 1,3 | 1 | 1,3 | — |
| B52 | 1 ³ / ₁₆ " | 1 ⁵ / ₈ " | 12 Ga. | — | 12 Ga. | — | 1,3 | 1 | 1,3 | — |
| B54 | 1 ³ / ₁₆ " | 1 ⁵ / ₈ " | 14 Ga. | .080 | 14 Ga. | 14 Ga. | 1,2,3,4 | 1 | 1,2,3,4 | — |
| B56 | 1 ³ / ₁₆ " | 1 ⁵ / ₈ " | 16 Ga. | — | — | — | 1 | 1 | 1 | — |

Available Finishes on Steel: Plain (Oil Coated), Dura-Green Epoxy, Pre-Galvanized, and Hot Dip Galvanized are standard.

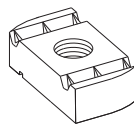
** 1 - Steel
2 - Aluminum
3 - Type 304 Stainless Steel
4 - Type 316 Stainless Steel

Channel Nuts

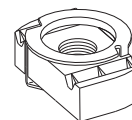
| With Spring | | | Without Spring | | Twirl Nut | | Thread Size | Thickness |
|-------------|-------------------|-------------------|---------------------------|-------------------|---------------------------|-------------------|-------------|---|
| B11 B12 | B22 B24 B32 | B42 B52 B54 | B11 B22 B12 B24 B32 | B42 B52 B54 | B11 B22 B12 B24 B32 | B42 B52 B54 | | |
| N728 | N228 | N528 | N228WO | N228WO | TN228 | TN228 | 3/8"-16 | 3/8" for all nuts |
| N725 | N225 | N525 | N225WO | N525WO | TN225 | TN525 | 1/2"-13 | 1/2" for N725,N225,N225WO,TN225 3/8" for N525,N525WO,TN525 |
| N755 | N255 | N555 | N255WO | N555WO | -- | -- | 5/8"-11 | 1/2" for N755,N255,N255WO 3/8" for N555,N555WO |



Channel Nut With Spring



Channel Nut Without Spring



Twirl Nut

For other channels, channel nuts, and fittings see B-Line Strut Systems Catalog.

Continuous Concrete Insert

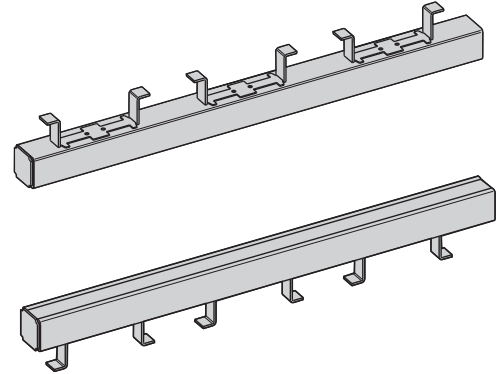
| Catalog Number for Channel | | Channel Size | Maximum Depth | Load |
|----------------------------|-----------------|--------------|----------------------------------|---------------|
| 120" (10 ft.) | 240" (20 ft.) | | | |
| B22I-120 | B22I-240 | B22 | 1 ⁵ / ₈ " | 2000 lbs./ft. |
| B32I-120 | B32I-240 | B32 | 1 ³ / ₈ " | 2000 lbs./ft. |
| B52I-120 | B52I-240 | B52 | 1 ³ / ₁₆ " | 1500 lbs./ft. |

Safety factor of 3 on loading.

Other lengths available upon request.

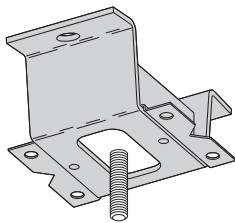
Furnished with end caps and styrofoam filler installed.

Standard finishes:
 Plain (Oil Coated)
 Dura Green Epoxy
 Pre-Galvanized
 Hot Dip Galvanized

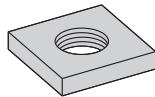


B2500 Spot Insert & N2500 Insert Nut

Standard Finish: Zinc Plated



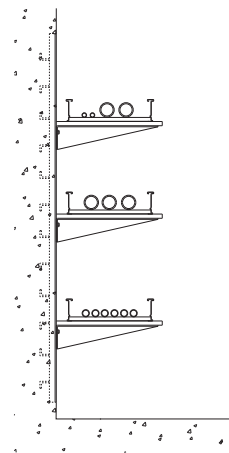
B2500 Insert



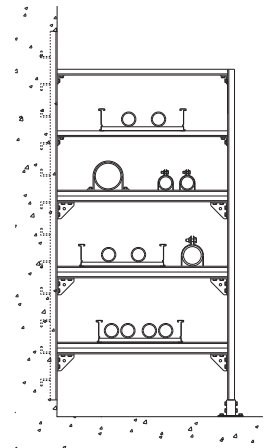
N2500 Insert Nut
 Insert rod size behind part number.

Square Nuts for Spot Inserts

Concrete Insert Applications



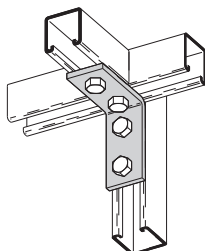
Continuous inserts used vertically are ideal mounting bases for cable tray brackets.



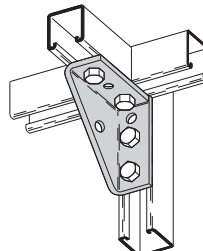
For multi-tiered tray assemblies, inserts function as the anchors for each stanchion.

Appendix

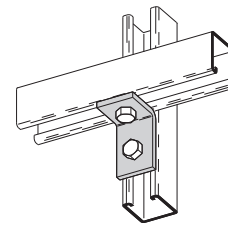
Angle Fittings



B104



B844



B101

