

EnviroShield™ Type 3R

Wireway & Accessories
UL Listed and CSA Certified

ES3RWW-11



COOPER B-Line



EnviroShield™ Type 3R Wireway

The Solution to Protect Your Investments



Designed for speed of installation, the new EnviroShield NEMA Type 3R wireway is the industry's first UL listed and CSA certified Type 3R system available on the market today. The enclosed system protects wire and cable against even the most extreme outdoor conditions, while a pad-lock feature maximizes safety and theft protection.

Environmental Protection and Safety

The EnviroShield system helps prevent against cable degradation that can be caused by UV rays, wind, rain, sleet, snow, and salt spray, as well as protecting the cables from insects, rodents, and birds. In addition to environmental protection, this enclosed wireway provides a safe electrical system by eliminating exposed live cables.

Designed for Longer Outdoor Life

The EnviroShield system materials and finishes are designed to help provide a long life in outdoor environments. We offer two options:

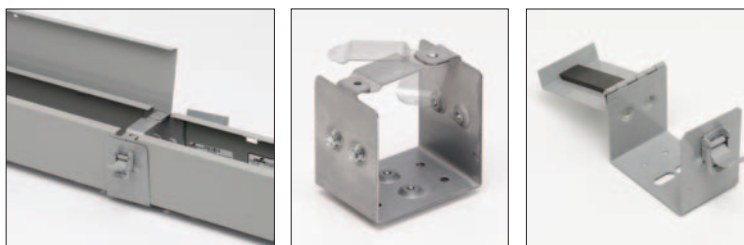
- Aluminum material with stainless steel hardware providing a light-weight solution with enhanced corrosion resistance
- Galvannealed steel with an ANSI 61 gray electro-coated paint and zinc plated hardware

Packed with Features and Benefits



A patented Z-slot design eliminates loose hardware - making installation a snap.

Wireway straight sections and fittings are joined together by sliding a connector, end cap, or end flange into place. Nuts are no longer required to join the system, instead our solution features pre-installed combo head bolts that are tightened from the outside of the wireway.

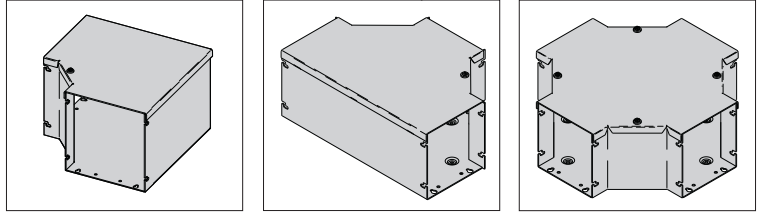


Gain quick access to cabling with our removable hinge cover and lay-in cabling system.

With a lay-in design, cable pulling and feeding is not required. Cable runs can be routed, terminated, and then lifted into place. Our swing-gate connectors and removable hinge cover allow for an interference free installation. Should you need to expand your power distribution system, our design makes future additions quick and easy.

Allows for quick and easy direction and size changes.

With pre-engineered fittings, such as 90 degree elbows, tees, crosses, reducers, end caps, and end flanges, installers can make direction and size changes without field fabrication or product modification. Pre-engineered fittings promote a consistent, robust, uniform wire management system without compromising the UL listing or environmental integrity.



An industry first, our specialized fittings allow for expansion and contraction.

Our specialized fittings allow our system to absorb the impacts of material expansion and contraction. Just leave a little cable slack, and let the EnviroShield Type 3R Wireway Systems take care of the rest.



Maximizes security and theft prevention.

The enclosed system and the integrated pad-lock features on our wrap-around connector provide increased levels of theft prevention and security.



Flexible cable management.

The system can be used to house various AC, DC and communication cables. Through use of a separation barrier, power and communication cables can be installed within the same wireway.

Stocked and available.

Common sizes are stocked and readily available from our Sherman, Texas facility.

Increases your return on investment.

While many of these benefits are difficult to quantify, we have quantitatively assessed the minimum benefits that should be expected from the quick-connect method. To determine this benefit, we conducted time studies to compare the quick-connect connection method to the industry standard wireway connectors and found the following results:

Wireway Size	Traditional Wireway Connector			Quick-Connect Method				
	RSMeans* Min/Piece	RSMeans* # Installers	Labor \$/Piece	Tested Min/Piece	Labor \$/Piece	Labor % Savings	Savings \$/Piece	Savings \$/100 Pieces
4" x 4"	12	1	12	10.3	10.3	14.2	1.70	170
6" x 6"	16	2	32	12.7	25.4	20.6	6.60	660
8" x 8"	24	2	48	19.8	39.6	17.5	8.40	840

* "Electrical Cost Data" RSMeans, 29th Annual Edition, 2006

EnviroShield™ Type 3R Wireway

Steel Wireway		Aluminum Wireway		Wireway Size Height x Depth x Length A x B x L (in.)	Bottom Mtg. Hole Spacing D (in.)	Material Thickness	
UPC Number	Catalog Number	UPC Number	Catalog Number			Steel Ga.	Alum in.
78205162735	4412-3RHS NK	78205172739	4412-3RAHS NK	4.0 x 4.0 x 12.0	2.50	16	0.080
78205166217	4460-3RHS NK	78205166177	4460-3RAHS NK	4.0 x 4.0 x 60.0	2.50	16	0.080
78205164074	44120-3RHS NK	78205164080	44120-3RAHS NK	4.0 x 4.0 x 120.0	2.50	16	0.080
78205165978	6612-3RHS NK	78205165979	6612-3RAHS NK	6.0 x 6.0 x 12.0	3.75	16	0.080
78205162737	6660-3RHS NK	78205162741	6660-3RAHS NK	6.0 x 6.0 x 60.0	3.75	16	0.080
78205164076	66120-3RHS NK	78205164082	66120-3RAHS NK	6.0 x 6.0 x 120.0	3.75	16	0.080
78205166229	8812-3RHS NK	78205166232	8812-3RAHS NK	8.0 x 8.0 x 12.0	5.75	16	0.080
78205165773	8860-3RHS NK	78205166233	8860-3RAHS NK	8.0 x 8.0 x 60.0	5.75	16	0.080
78205164078	88120-3RHS NK	78205164091	88120-3RAHS NK	8.0 x 8.0 x 120.0	5.75	16	0.080

NK = No Knockouts

Application

- Houses runs of power, control and communication cable
- Used for cable and wire junction, distribution and termination

Standards

- UL 870 listed, Type 3R
- CSA C22.2 No. 26 certified, Type 3R
- Conforms to NEMA standard for Type 3R
- IEC 60529, IP32

Material & Finish

- Galvanealed steel with ANSI 61 gray acrylic electrocoat finish and zinc plated hardware
- Aluminum with stainless steel hardware

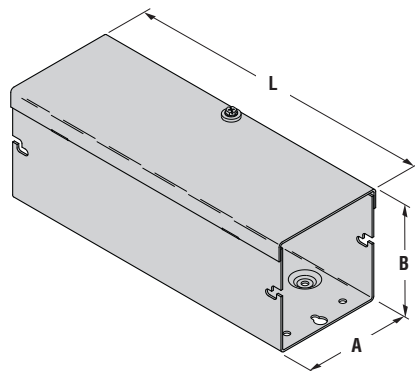
Protected by U.S. Patents:
7,525,044 and 7,762,042

Accessories

- Sealing devices
- Touch-up paint
- See Accessories (pages 4-7)

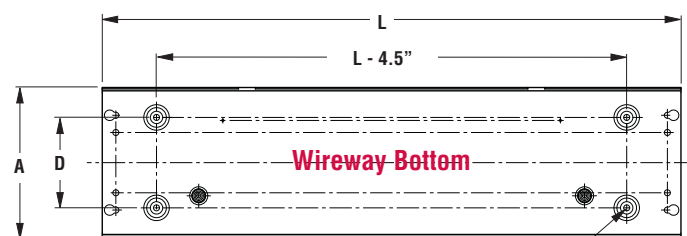
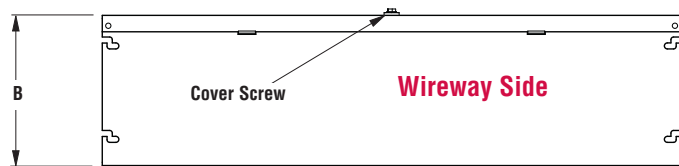
Construction

- Wireway body and cover are fabricated from code gauge steel or brushed aluminum, (see table above)
- Wireway body has mounting holes on the back
- Cover is secured to the body with gasketed retaining screw
- Variety of fittings allow runs which can change direction, size, junction and terminate, as well as, expansion and contraction
- Wireway connectors have a unique gate feature which can swing completely open allowing for lay-in installation of wire and cable
- Wireway connectors have a locking feature for optional pad-locking
- Removable hinge cover construction
- Z-slots for quick-connect connection method
- Wireways 120" in length have two overlapping covers



Wireway Section

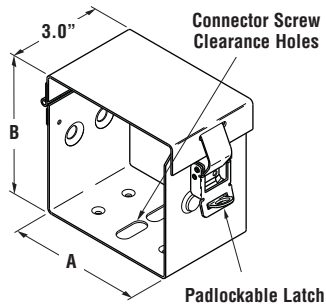
Lengths from 12.00" to 120.00".
Wireway exceeding 72.00" has two covers.



Mounting Embossment
with .25" Dia. Hole (4)

For millimeters (mm) multiply the inches (in.) times 25.4

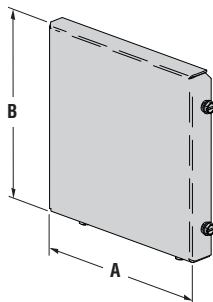
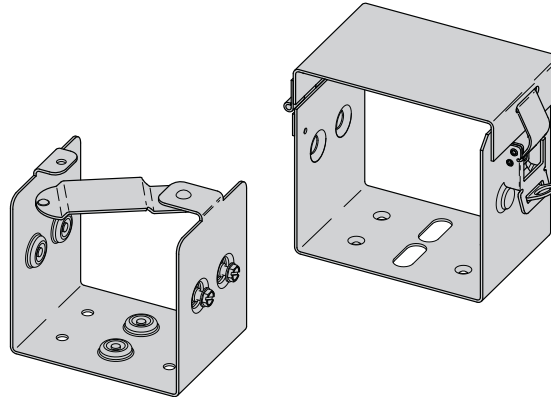
EnviroShield™ Type 3R Wireway Accessories



Steel Connector		Aluminum Connector		A (in.)	B (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number		
782051 62747	44-3RHSC	782051 62749	44-3RAHSC	4.00	4.00
782051 62748	66-3RHSC	782051 62750	66-3RAHSC	6.00	6.00
782051 64086	88-3RHSC	782051 64090	88-3RAHSC	8.00	8.00

Wireway Connectors

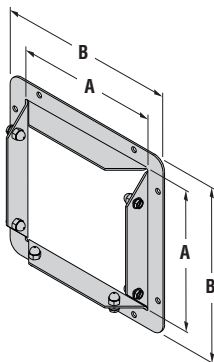
Swing gate allows for lay-in installation of wire and cable.
Wrap-around connector provides Type 3R rating and optional pad-locking.



Steel End		Aluminum End		A (in.)	B (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number		
782051 62751	44-3RHSE NK	782051 62753	44-3RAHSE NK	4.00	4.00
782051 62752	66-3RHSE NK	782051 62754	66-3RAHSE NK	6.00	6.00
782051 65780	88-3RHSE NK	782051 66234	88-3RAHSE NK	8.00	8.00

Wireway End

Used to terminate wireway or fitting.



Steel End Flange		Aluminum End Flange		A (in.)	B (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number		
782051 65777	44-3RHFSF	782051 65778	44-3RAHFSF	4.00	5.50
782051 66230	66-3RHFSF	782051 65779	66-3RAHFSF	6.00	7.50
782051 65776	88-3RHFSF	782051 66235	88-3RAHFSF	8.00	9.50

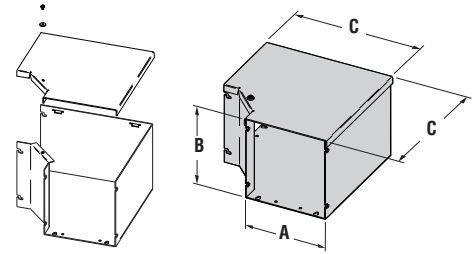
Wireway End Flange

Allows for a secure connection of wireway or fitting to an adjoining enclosure or wall.

For millimeters (mm) multiply the inches (in.) times 25.4

EnviroShield™ Type 3R Wireway Accessories

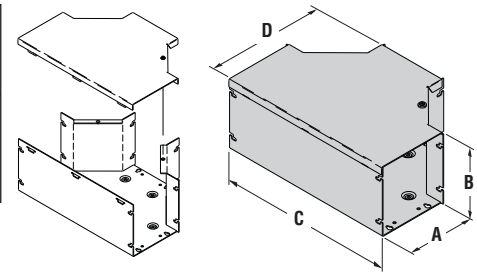
Steel Wireway 90° Elbow		Aluminum Wireway 90° Elbow		A (in.)	B (in.)	C (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number			
782051 62743	44-3RHSL SIDE	782051 64087	44-3RAHSL SIDE	4.00	4.00	8.84
782051 62744	66-3RHSL SIDE	782051 64088	66-3RAHSL SIDE	6.00	6.00	10.84
782051 64084	88-3RHSL SIDE	782051 64089	88-3RAHSL SIDE	8.00	8.00	12.84



Wireway 90° Elbow

Side opening hinge cover design for applications where a 90° turn is necessary.

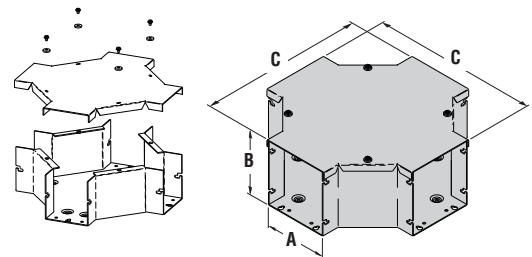
Steel Wireway Tee		Aluminum Wireway Tee		A (in.)	B (in.)	C (in.)	D (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number				
782051 62745	44-3RHST	782051 62746	44-3RAHST	4.00	4.00	13.84	9.04
782051 66207	66-3RHST	782051 65783	66-3RAHST	6.00	6.00	15.84	11.04
782051 65784	88-3RHST	782051 66236	88-3RAHST	8.00	8.00	17.84	13.04



Wireway Tee

Side opening hinge cover design for applications where a “T” junction is necessary.

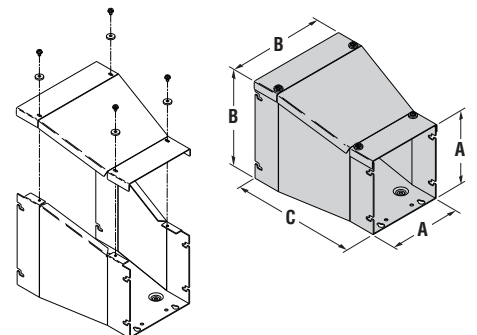
Steel Wireway Cross		Aluminum Wireway Cross		A (in.)	B (in.)	C (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number			
782051 65785	44-3RSCX	782051 65786	44-3RASCX	4.00	4.00	13.84
782051 66156	66-3RSCX	782051 65787	66-3RASCX	6.00	6.00	15.84
782051 65788	88-3RSCX	782051 66160	88-3RASCX	8.00	8.00	17.84



Wireway Crosse

Screw opening cover design for applications where a cross junction is necessary.

Steel Wireway Reducer		Aluminum Wireway Reducer		A (in.)	B (in.)	C (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number			
782051 65793	4466-3RSCR	782051 65795	4466-3RASCR	4.00	6.00	10.00
782051 65794	4488-3RSCR	782051 66241	4488-3RASCR	4.00	8.00	10.00
782051 66240	6688-3RSCR	782051 65796	6688-3RASCR	6.00	8.00	10.00

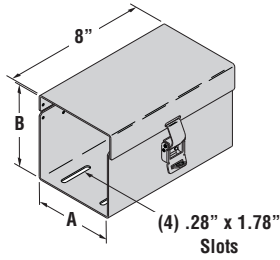


Wireway Reducer

Screw opening cover design for applications where a change in wireway cross-section (height x width) is necessary.

For millimeters (mm) multiply the inches (in.) times 25.4

EnviroShield™ Type 3R Wireway Accessories

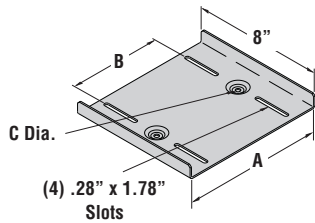


Steel Wireway Expansion Fitting		Aluminum Wireway Expansion Fitting		A (in.)	B (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number		
782051 66135	44-3RHSXJ	782051 65976	44-3RAHSXJ	4.00	4.00
782051 66137	66-3RHSXJ	782051 62951	66-3RAHSXJ	6.00	6.00
782051 66143	88-3RHSXJ	782051 65977	88-3RAHSXJ	8.00	8.00

Wireway Expansion Fittings

Side opening hinge cover design for applications where expansion and contraction are a concern. Wrap-around sleeve provides Type 3R rating and optional pad-locking tab.

Expansion Support Fitting - Steel		Expansion Support Fitting - Alum		A Inside Dim. (in.)	B (in.)	C (in.)	D (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number				
782051 66395	44-3RHSXS	782051 66401	44-3RAHSXS	4.562	2.50	1.12	12.00
782051 66396	66-3RHSXS	782051 66402	66-3RAHSXS	6.562	3.75	1.12	12.00
782051 66397	88-3RHSXS	782051 66403	88-3RAHSXS	8.620	5.75	1.12	12.00



Expansion Support Fittings

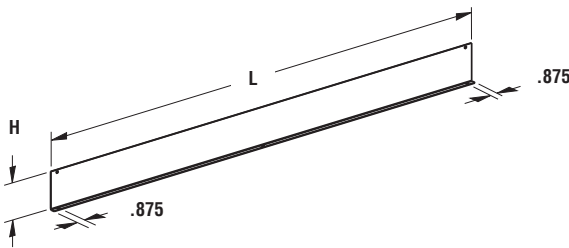
Designed for applications where expansion and contraction are a concern. One expansion support is required at each support location. Slots allow single axis expansion and contraction movement.

Bolt-On Barrier Steel		Bolt-On Barrier Aluminum		Wireway Size (in.)	L (in.)	H (in.)
UPC Number	Catalog Number	UPC Number	Catalog Number			
782051 40528	44-12BK*	782051 66554	44-3RBKA*	4.00 x 4.00	60.00	3.00
782051 40508	66-12BK*	782051 66555	66-3RBKA*	6.00 x 6.00	60.00	4.50
782051 40386	88-12BK*	782051 66556	88-3RBKA*	8.00 x 8.00	60.00	6.00

Bolt-On Barrier

For installations that require separated wiring compartments. An ideal solution for separating power from communication cables.

* Not UL or CSA listed fitting



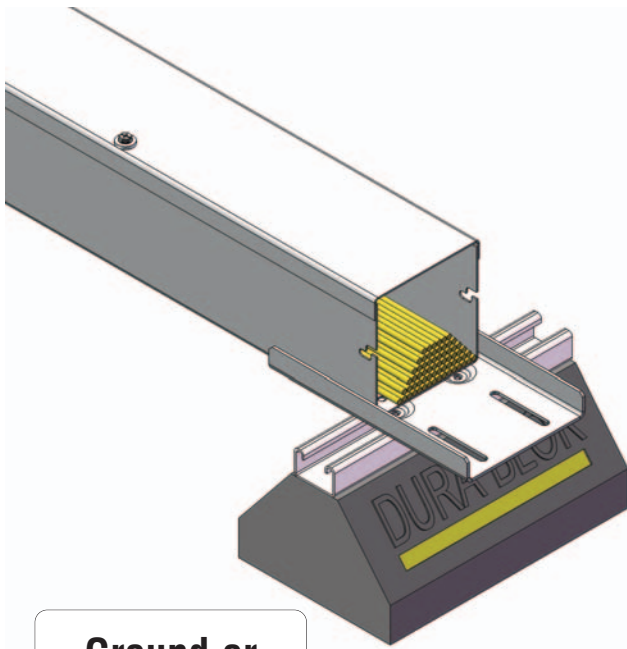
Touch-Up Paint UPC Number	Touch-Up Paint Catalog Number	List Price Dollars (each)	SD Code
782051 83012	84034	23.76	-

Touch-Up Paint

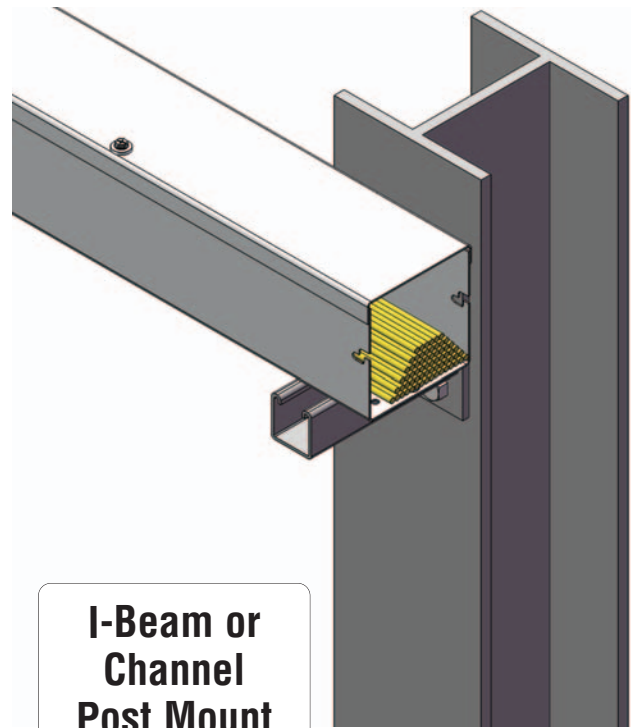
ANSI 61 gray enamel 12 oz. spray can

For millimeters (mm) multiply the inches (in.) times 25.4

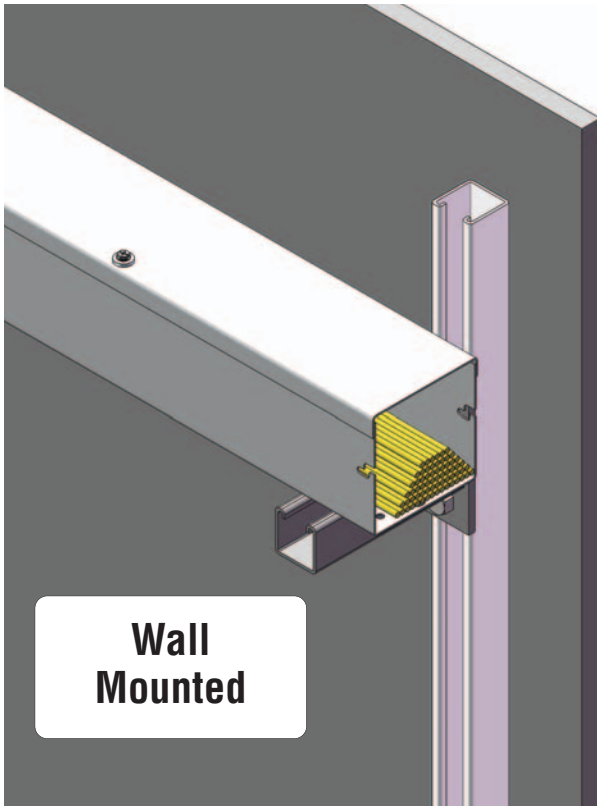
EnviroShield™ Type 3R Wireway - Illustrations



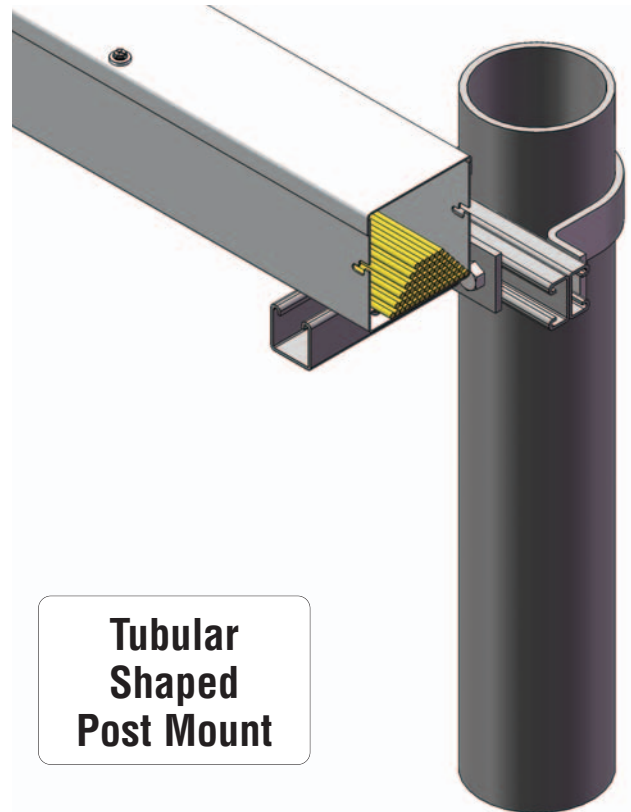
**Ground or
Roof Mount**



**I-Beam or
Channel
Post Mount**



**Wall
Mounted**



**Tubular
Shaped
Post Mount**

For application assistance contact Cooper B-Line's Sales Engineering Group at 1-800-851-7415.

For more information on Dura-Blok™: A Complete Rooftop Support Solution: www.cooperblineline.com/dura-blok.index.asp
For more information on Strut System & Bolted Framing: Engineered Support Systems: www.cooperblineline.com/product/strut/index.asp

SECTION 16128

EnviroShield™ Type 3R Wireway System

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the EnviroShield Type 3R Wireway System as described in this specification and as shown on the drawings.

1.02 REFERENCES

- A. UL 870 Listed, Type 3R - Underwriters Laboratories for wireways, auxiliary gutters, and associated fittings
- B. CSA C22.2 No. 26 certified, Type 3R - Canadian Standards Association for construction and testing of wireways, auxiliary gutters, and associated fittings
- C. NEMA Standards Publication No. 250, Type 3R - National Electrical Manufacturers Association for enclosures for electrical equipment (1000 Volts Maximum)
- D. ANSI/NFPA 70 - National Electrical Code
- E. ASTM A653 - Standard specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
- F. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

1.03 DRAWINGS

- A. The drawings, which constitute a part of these specifications, indicate the general route of the wireway 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; 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 QUALITY ASSURANCE

- A. Wireway systems shall be of uniform quality and appearance.

1.05 SUBMITTALS

- A. Submit product data on EnviroShield Type 3R Wireway Systems. Product data to include, but not limited to materials, finishes, dimensional information, listings, and certifications.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver wireway systems carefully to avoid breakage, bending and scoring finishes. Do not install damaged equipment.
- B. Store wireway systems in original packaging in a clean dry space; protect from weather and construction traffic. Wet materials should be unpacked and dried before storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with these specifications, EnviroShield Type 3R Wireway Systems shall be as manufactured by Cooper B-Line Inc. [or engineered approved equal].

2.02 ENVIROSHIELD TYPE 3R WIREWAY SYSTEMS

- A. General: Except as otherwise indicated, provide wireway Systems, of types, sizes, NEMA rating, and UL listing as indicated.
- B. Material and finish specifications are as follows:
 - 1. Wireway system straight sections and fittings shall be constructed from [16 gauge galvannealed steel (ASTM A653, A60)] [[13 gauge, 0.08" minimum][11 gauge, 0.10" minimum] aluminum (ASTM B209)].
Note: 4" x 4" and 6" x 6" sizes are constructed from 13 gauge aluminum, 8" x 8" sizes are constructed from 11 gauge aluminum

Technical Specifications

2. Wireway straight section height shall be [4] [6] [8] inches.
 3. Wireway straight section width shall be [4] [6] [8] inches.
 4. Wireway straight section length shall be [12] [60] [120] inches.
 5. Wireway fittings and accessories shall conform to [4 x 4] [6 x 6][8 x 8] inch cross sections.
 6. Wireway straight sections shall provide a removable hinge cover with a gasketed screw down fastening connection opposite the hinge. The gasketed screw shall retain in the cover when unfastened from the wireway body.
- C. Finishes
1. Wireway systems shall be [ANSI 61 gray electro-coated painted finish] [aluminum]

1.03 ACCESSORIES

- A. Connectors, Ends, and End Flanges
1. Shall be of the quick-connect type providing manufacturer installed fastening hardware that need not be removed in the field when making joining connections
 2. A tool-less gasketed padlockable wrap around exterior sealing connector shall be provided by the manufacturer with each internal mechanical connector. The wrap around connectors shall be installed at each wireway system joint to maintain the Type 3R integrity of the system.
- B. Expansion Fittings and Expansion Supports
1. To account for expansion and contraction, installers shall use expansion fittings and supports provided by the manufacturer. Installation method, location, and frequency shall be in accordance to manufacturer's recommendations.
- C. Elbows, Tees, Crosses, and Reducers
1. Direction and size changes shall be completed through the use of pre-fabricated fittings provided by the manufacturing. To maintain Type 3R listing field modification of manufactured parts shall be reviewed and approved by the engineering of record.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation and configuration shall be in accordance to the requirements of NFPA 70 (National Electrical Code), and applicable local codes.
1. Wireway sections 60" or less shall be supported on a maximum 5 ft. support span.
 2. 120" wireway sections may be supported on a maximum 10 ft. support span.

END OF SECTION

Industry Standards

Enclosure Ratings

Third party certifiers, such as UL & CSA, have adopted most of the enclosure ratings from the ANSI /NEMA 250 standard for electrical enclosures. These ratings identify the environmental capabilities of enclosures based on specified performance criteria. Thus, the type of enclosure can be selected as deemed appropriate for the application.

These enclosures are intended to house electrical equipment rated at no more than 1000 volts for use in non-hazardous locations. Enclosures do not protect devices against conditions such as condensation, icing, corrosion or contamination which may occur within the enclosure or may enter via the conduit or unsealed openings, and are not intended to prevent entry or operation by unauthorized personnel.

Sources of Standards

**NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION**

1300 North 17th Street
Suite 1847
Rosslyn, VA 22209

- NEMA Standards Publication No. 250, Enclosures for Electrical Equipment (1000 Volts Maximum)
- NEMA Standards Publication No. ICS6, Enclosures for Industrial Controls and Systems

**ELECTRICAL/ELECTRONIC MANUFACTURERS ASSOCIATION OF CANADA**

10 Carlson Court, Suite 500
Rexdale (Toronto), Ontario
Canada, M9W 6L2

**UNDERWRITERS LABORATORIES INC.**

333 Pfingsten Road
Northbrook, IL 60062

- UL 50, Enclosures for Electrical Equipment
- UL 508, Industrial Control Equipment
- UL 870, Wireway, Auxiliary Gutters and Associated Fittings
- UL 414, Meter Sockets

**JOINT INDUSTRY COUNCIL**

7901 Westpark Drive
McLean, VA 22101

- EMP-1, Electrical Standards for Mass Production Equipment
- EGP-1, Electrical Standards for General Purpose Machine Tools

**CANADIAN STANDARDS ASSOCIATION**

178 Rexdale Boulevard
Rexdale (Toronto), Ontario
Canada, M9W 1R3

- CSA Standard C22.2 No. 94-M91, Industrial Control Equipment for use in Ordinary (Nonhazardous) locations.
- CSA Standard C22.2 No. 40 M1989, Cutout, Junction & Pull Boxes
- CSA Standard C22.2 No. 26 1952, Wireways, Auxiliary Gutters & Associated Fittings
- CSA Standard C22.1, 1990, Canadian Electrical Code

**NATIONAL FIRE PROTECTION ASSOCIATION**

Batterymarch Park
Quincy, MA 02269

- NFPA 70 National Electrical Code (1999)

Industry Standards

An enclosure is a surrounding case constructed to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection to the enclosed equipment against specified environmental conditions.

A brief description of the more common types of enclosures used by the electrical industry relating to their environmental capabilities follows:

 NEMA	 UL (UL 50)	 CSA 22.2 No. 94-M91
Type 1 Enclosures are intended for indoor use primarily to provide a degree of protection against limited amounts of falling dirt.	Type 1 Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.	Type 1 General purpose enclosure. Protects against accidental contact with live parts.
Type 3 Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet, wind blown dust and damage from external ice formation.	Type 3 Outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust and damage from external ice formation.	Type 3 An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, and windblown dust; undamaged by the external formation of ice on the enclosure.
Type 3R Enclosures are intended for outdoor use primarily to provide a degree of protection against rain, sleet and damage from external ice formation.	Type 3R Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.	Type 3R An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, and snow, undamaged by the external formation of ice on the enclosure.
Type 4 Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water and damage from external ice formation.	Type 4 Indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water and damage from external ice formation.	Type 4 An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure.
Type 4X Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water and damage from external ice formation.	Type 4X Indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water and damage from external ice formation.	Type 4X An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure; resists corrosion.
Type 12 Enclosures are intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt and dripping noncorrosive liquids.	Type 12/12K Indoor use primarily to provide a degree of protection against circulating dust, falling dirt and dripping noncorrosive liquids.	Type 12 An enclosure for indoor use, constructed so as to provide a degree of protection against circulating dust, lint, fibres, and flyings; dripping and light splashing of noncorrosive liquids; not provided with knockouts.
Type 12K Enclosures with knockouts are intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt and dripping noncorrosive liquids.		Type 12K An enclosure for indoor use, constructed so as to provide a degree of protection against circulating dust, lint, fibres, and flyings; dripping and light splashing of noncorrosive liquids; and provided with knockouts.
Type 13 Enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant.	Type 13 Indoor use primarily to provide a degree of protection against dust, spraying of water, oil and noncorrosive coolant.	Type 13 An enclosure for indoor use, constructed so as to provide a degree of protection against circulating dust, lint, fibres, and flyings; seepage and spraying of noncorrosive liquids including oils and coolants.

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Wireway Selection

(Reference NFPA 70, National Electrical Code)

Definition

Wireways are troughs with hinged or removable covers for housing and protecting electric wires and cable. Conductors are laid into the wireway after the wireway has been installed as a complete system.

Uses

The use of wireways are permitted as follows:

1. For exposed work in dry locations. For outdoor or wet locations, use Type 3R wireway.
2. If installed in non-accessible spaces, the use of wireway is permitted only for use with audio signal conductors (per NEC® 376.10).
3. In hazardous locations as permitted by NEC® sections 501, 502 and 504.
4. For extensions through walls, if the length passing through the wall is unbroken and access to conductors can be maintained from both sides.

The use of wireways is not permitted where there is a risk of severe physical damage or severe corrosive environments.

Size of Conductors

Table I shows maximum allowable cable sizes for varying wireway sizes. (Based on UL 870 Table 7.1)

Table I

Wireway Size Inches	Maximum Cable Size AWG or kcmil
2.5x2.5	2
3x3	1
4x4	4/0
4x6	4/0
6x6	500
12x6	500
8x8	900
10x10	1250
12x12	2000

Conductors entering the wireway only at the ends of runs are limited in size only by the 20 percent fill requirement of the NEC®. However, it is recommended that wire sizes not exceed those in Table I above.

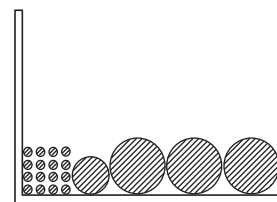
Number of Conductors

Wireways which contain no more than 30 current-carrying conductors at any cross section, and for which the sum of the cross-sectional areas of all contained conductors at any cross section does not exceed 20% of the interior cross-sectional area of the wireway, require no derating of cables. (Refer to Table II below)

Table II

Wireway Size Inches	Allowable Cable Area sq. in.
2.5x2.5	1.2
3x3	1.8
4x4	3.2
4x6	4.8
6x6	7.2
8x8	12.8
12x6	14.4
10x10	20.0
12x12	28.8

Cross sectional area of conductors
≤ 20% of cross sectional
area of wireway.

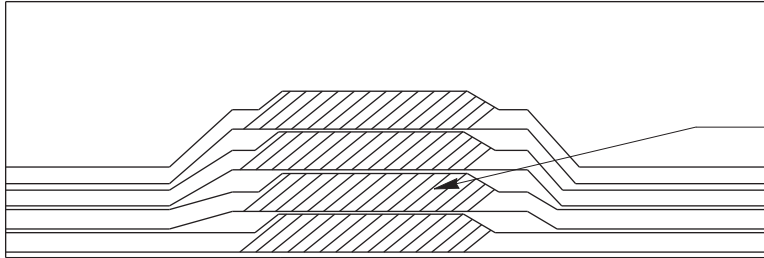


For exceptions allowing more
conductors, see NEC® 376.22(8).

Wireway Selection

Splices and Taps

Splices and taps are permitted within a wireway, provided they are accessible. The conductors, including splices and taps, shall not fill the wireway to more than 75 percent of its area at the point of a splice or tap.



Cross sectional area of splices and taps is less than 75% of wireway's cross sectional area

Cross Sectional Area of Conductors

Single Conductor Cable 600V

SIZE	Cross Sectional Area of Conductors (sq. in.)							
	XXHW, XXHW-2, XHH		THHN, THWN THWN-2		THW, THW-2, TTHW		RHH*, RHW* RHW-2*	
	Diameter in.	Area in. ²	Diameter in.	Area in. ²	Diameter in.	Area in. ²	Diameter in.	Area in. ²
14	0.1330	1.0139	0.1110	0.0097	0.1630	0.0209	0.1930	0.0293
12	0.1520	1.0181	0.1300	0.0133	0.1820	0.0260	0.2120	0.0353
10	0.1760	0.0243	0.1640	0.0211	0.2060	0.0333	0.2360	0.0437
8	0.2360	0.0437	0.2160	0.0366	0.2660	0.0556	0.3260	0.0835
6	0.2740	0.0590	0.2540	0.0507	0.3040	0.0726	0.3640	0.1041
4	0.3220	0.0814	0.3240	0.0824	0.3520	0.0973	0.4120	0.1333
3	0.3500	0.0962	0.3520	0.0973	0.3800	0.1134	0.4400	0.1521
2	0.3820	0.1146	0.3840	0.1158	0.4120	0.1333	0.4720	0.1750
1	0.4420	0.1534	0.4460	0.1562	0.4920	0.1901	0.5850	0.2688
1/0	0.4820	0.1825	0.4860	0.1855	0.5320	0.2223	0.6220	0.3039
2/0	0.5280	0.2190	0.5320	0.2223	0.5780	0.2624	0.6680	0.3505
3/0	0.5800	0.2642	0.5840	0.2679	0.6300	0.3117	0.7200	0.4072
4/0	0.6380	0.3197	0.6420	0.3237	0.6880	0.3718	0.7780	0.4754
250	0.7050	0.3904	0.7110	0.3970	0.7650	0.4596	0.8950	0.6291
300	0.7600	0.4536	0.7660	0.4608	0.8200	0.5281	0.9500	0.7088
350	0.8110	0.5166	0.8170	0.5242	0.8710	0.5958	1.0010	0.7870
400	0.8580	0.5782	0.8640	0.5863	0.9180	0.6619	1.0480	0.8626
500	0.9430	0.6984	0.9490	0.7073	1.0030	0.7901	1.1330	1.0082
600	1.0530	0.8790	1.0510	0.8676	1.1130	0.9729	1.2430	1.2135
700	1.1240	0.9923	1.1220	0.9887	1.1840	1.1010	1.3140	1.3561
750	1.1580	1.0532	1.1560	1.0496	1.2180	1.1652	1.3480	1.4272
800	1.1900	1.1122	1.1880	1.1085	1.2500	1.2272	1.3800	1.4957
900	1.2540	1.2351	1.2520	1.2311	1.3140	1.3561	1.4440	1.6377
1000	1.3120	1.3519	1.3100	1.3478	1.3720	1.4784	1.5020	1.7719
1250	1.4790	1.7180	-	-	1.5390	1.8602	1.7290	2.3479
1500	1.6020	2.0156	-	-	1.6620	2.1695	1.8520	2.6938
1750	1.7160	2.3127	-	-	1.7760	2.4773	1.9660	3.0357
2000	1.8220	2.6073	-	-	1.8820	2.7818	2.0720	3.3719

* RHH, RHW and RHW-2 without covering have the same dimension as THW.

Wireway Selection

Calculation Example

1. List cables by size and types.
2. List cable cross sectional areas.
3. List the number of each size of cable.
4. Multiply cable cross sectional areas by number of each cable.
5. Sum the total cross sectional areas of each cable type to obtain the total cross sectional areas for the conductors.

List Cable Sizes and Types	List Cable Cross Sectional Areas (A) sq. in.		List Number of Cables (N)		Multiply (A) x (N) = Total Cross Sectional Area for Each Size sq. in.
2 AWG-XXHW	0.1182	x	4	=	0.4728
2/0-TW	0.2290	x	2	=	0.4580
750 kcmil-RHH	1.1300	x	2	=	2.2600

Sum of the total cross sectional areas = 3.1908

6. The wireway must first meet the dimensional requirements for the largest conductor. In the example above, the largest conductor is 750 kcmil. The minimum wireway cross section based on the largest conductor size requirements is 8" x 8", as shown in Table I on page 13.
7. The wireway dimensions must meet 20% fill requirements. Based on the sum of the total conductor cross sectional areas (3.19 sq. in.), the minimum wireway cross section, based on the 20% fill requirements is 4" x 4" as shown in Table II on page 13.
8. In this example, the wireway dimensions must be the larger of the two cross sections obtained in steps 6 and 7. In this case, 8 x 8 wireway is required.

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Service Facility - United States:

Cooper B-Line - USA

509 West Monroe Street
Highland, IL 62249
United States
Phone: (800) 851-7415
Fax: (800) 356-1438
Email: blineus@cooperindustries.com

Service Facility - Canada:

Cooper B-Line - Canada

Div. of Cooper Ind. Canada, Inc.
5925 McLaughlin Road
Mississauga, ON L5R 1B8
Canada
Phone: (800) 569-3660
Fax: (888) 753-3355
Email: blinecanada@cooperindustries.com

Service Facility - Europe:

Cooper B-Line, Ltd. - UK

Walrow, Highbridge
Somerset, TA9 4AQ
United Kingdom
Phone: + 44 (0) 1278 783371
Fax: + 44 (0) 1278 789037
Email: sales@cooperbline.co.uk

Cooper B-Line - Saudi Arabia:

PO Box 70160 - Al Khobar - 31952
Kingdom of Saudi Arabia
Phone: 00966 3 812 2236
Fax: 00966 3 812 1291
Email: blineme@cooperindustries.com

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Highland, IL 62249
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