Metric Slotted Cable Ladder

Galvanised and Stainless Steel Ladders and Accessories

CTMSCL-12

COOPER B-Line

About Cooper B-Line

Cooper B-Line is a global provider of innovative, labour-saving cable management systems, support systems, and enclosure solutions for engineered facility subsystem applications. We are a leader in cable support systems, with a full range of solutions designed to help provide the lowest lifetime cost of ownership.

Cooper B-Line's presence in the United Kingdom represents a continuation of the company's investment in worldwide cable management systems, particularly for heavy industrial projects. The United Kingdom is a key location in our global coverage area that already includes offices in South Korea, Houston, Calgary, and the Kingdom of Saudi Arabia. To support our customers, we offer best-in-class specification engineering services, which provide pre- and post-sale engineering and technical support.

In addition to cable ladder, Cooper B-Line also offers the FLEXTRAY™ wire mesh cable tray support system, fixings, and a full line of electronic enclosures from our facility in Highbridge, Somerset, United Kingdom.

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NOTICE

Cooper B-Line reserves the right to change the specifications, materials, equipment, prices or the availability of products at any time without prior notice. While every effort has been made to assure the accuracy of information contained in this catalogue at the time of publication, Cooper B-Line is not responsible for inaccuracies resulting from undetected errors or omissions.

Approvals

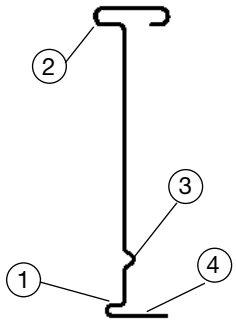
Cooper B-Line's Highbridge, Somerset facility is ISO Certified to ISO 9001:2008

Cooper B-Line's Cable Ladder System conforms to the requirements of IEC Standard 61537, 2006 Ed. Third-party certifications are available from DNV and Lloyd's Register.

Cable Ladder Construction - Side Rails

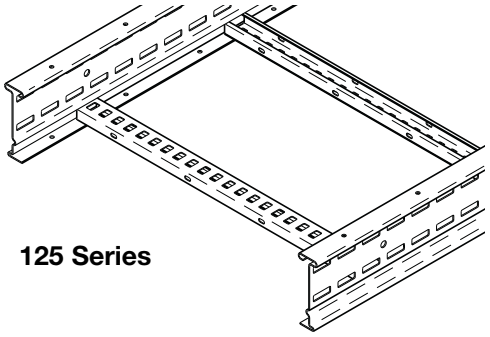
Cooper B-Line side rails have an engineered I-Beam shape to provide system integrity. The I-Beam is the most efficient structural shape, providing strength without increasing the weight of the side rail itself. This shape, in conjunction with the slots in the side rails, offers the optimum design.

In addition, the I-Beam shape has a number of other advantages:

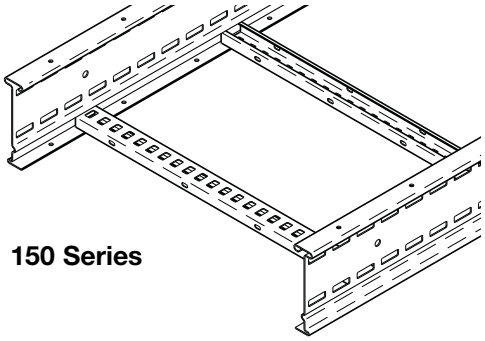


1) Roll-formed steel increases the strength of the steel itself
2) Enlarged top flange adds stiffness to the system
3) Bend in side rail to lock in rung position and provide more material for a solid weld
4) Bottom rail surface provides positive support for rungs
5) Slotted side rail design reduces installation time

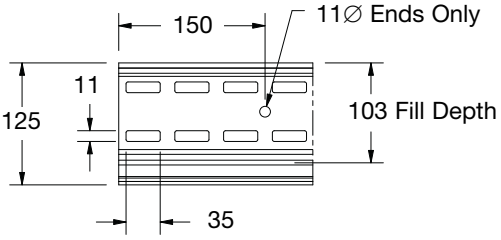
Profile Dimensions

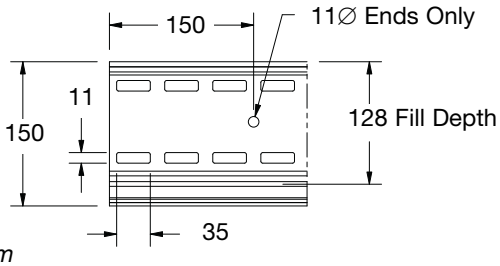


125 Series



150 Series





Dimensions are in mm

Side Rails: Strength and Safe Working Load

Side rails provide the strength of the ladder system. The load ratings for the side rails in this catalogue are based on testing to IEC 61537, 2006 Edition. Values in the catalogueue load charts are based upon allowable deflection and safe working loads calculated using a 1.7 factor of safety.

Product Traceability

Side rails are roll formed from traceable structural grade steel. All cable ladder side rails are numbered for material traceability.

Cable Ladder Construction - Rungs

Rungs are designed to maintain the system strength and provide a convenient place to affix cables. All rungs have slots on the upper surface, sized for M10 hardware, to allow for the attachment of banding or cleats. In addition, all rungs have holes on the sides to allow for drainage when ladders are installed on their sides. Rungs are manufactured from 1.5mm thick steel.

Rungs

Standard rungs have a profile as shown in the below diagram. Spacing is 300mm, measured centre-to-centre. The rungs are alternating in orientation, with the open surface on every other rung facing upward (and the other rungs having downward orientation). There are two profiles of rungs available as shown in the diagrams (A) below.

Rung Options

- **Rung Spacing:** Rungs can be spaced at intervals other than 300mm on straight sections only. To order an alternate rung spacing, change the default "300" value for the spacing (in mm) following the material type or finish. Non-standard rung spacing is not available on fittings.

  Example: *125G**200**CA15ILL-0600-3000 is a ladder with 125mm height, hot dip galvanised finish, 200mm rung spacing, 1.5mm side rail thickness, 600mm width, and a 3m length.*

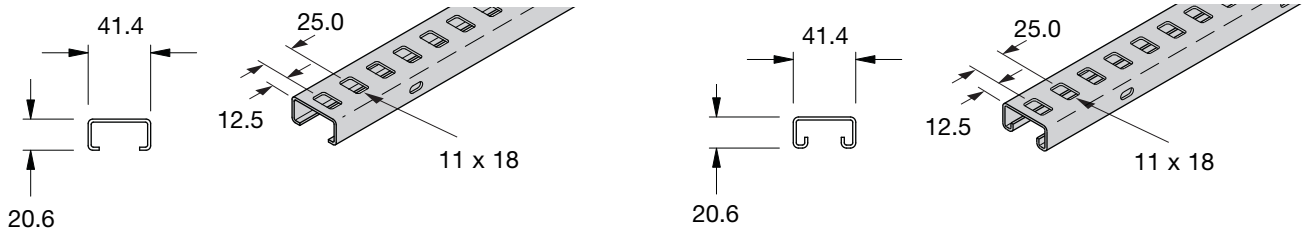
- **Strut Rung:** A strut-type profile can be ordered instead of the standard profile. To order a strut-type rung, change the default "C" value for standard rung to a "B" for strut-type rung.

  Example: *125G300**B**A15ILL-0600-3000 is a ladder with 125mm height, hot dip galvanised finish, 300mm rung spacing, strut type rung, 1.5mm side rail thickness, 600mm width, and a 3m length.*

- **Rung Orientation:** Rungs can be oriented with open side up or open side down, instead of the standard alternating orientation. To order rungs with all up or down orientation, change the default "A" value for alternating rungs to "U" for all rungs with open side up or "D" for all rungs with open side oriented downward.

  Example: *125G300C**U**15ILL-0600-3000 is a ladder with 125mm height, hot dip galvanised finish, 300mm rung spacing, standard rung, all rungs oriented with open side up, 1.5mm side rail thickness, 600mm width, and a 3m length.*

Rung Profile Dimensions (A)



Standard Rung

Dimensions are in mm

Strut Rung

Cable Ladder Construction - Fittings

Cooper B-Line fittings are designed to carry loads greater than the straight sections. The C-shape of the fitting side rails is designed with the same height and width for easy attachment to straight sections.

Fittings

All fittings have a straight tangent section at each end. The tangent allows the splice plate to be flush against both the straight section and the fitting when they are connected, increasing the contact surface area and the strength of the overall system.

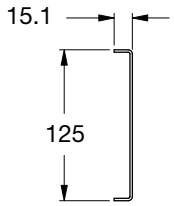
Standard rung spacing for fittings is 300mm, measured centre-to-centre, and the standard rung orientation is alternating. Different rung types and orientations are available (see “Cable Ladder Construction - Rungs” reference page 3).

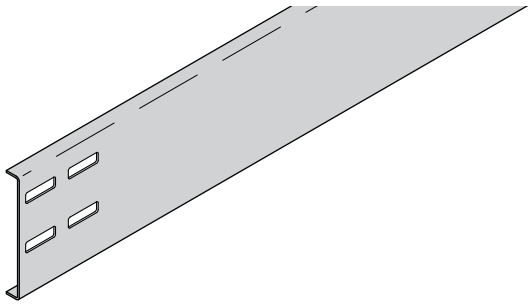
Fitting Options

- **Radius:** Alternate radiuses may be available on request. Please consult Cooper B-Line for applications where a radius other than 300mm or 600mm is required.

Profile Dimensions

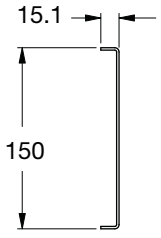
125mm Side Rail Height

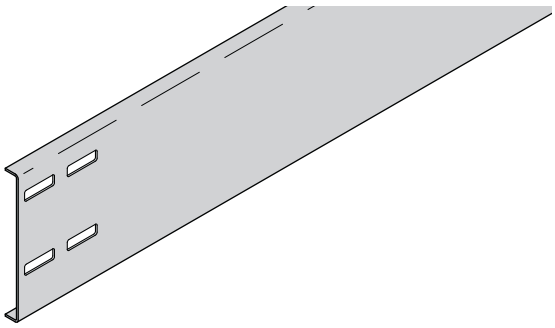




Dimensions are in mm

150mm Side Rail Height





Cable Ladder - Straight Sections

Cooper B-Line 125mm Cable Ladders are designed to support typical cable loads with minimum weight of the ladder itself. Slotted side rails are manufactured from 1.5mm or 2.0mm thick steel with standard 300mm rung spacing.

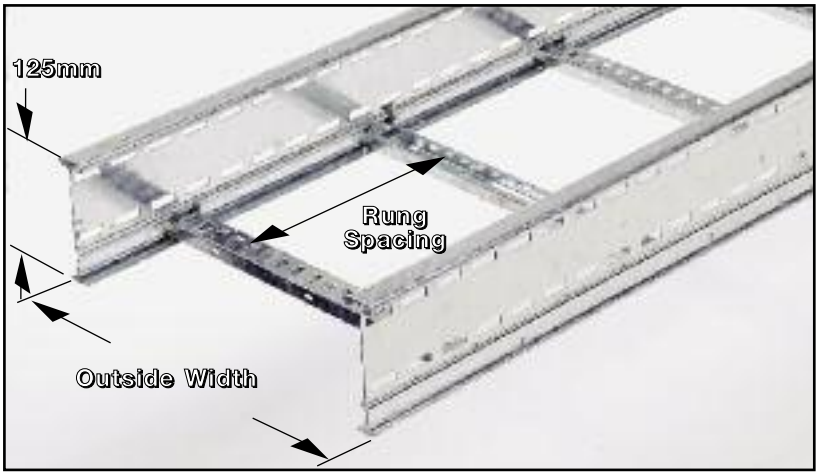
Straight Section Part Numbering

Example: **125 G 300 C A 15I LL - 0600 - 3000**

Height (mm)	Material	* Rung Spacing (mm)	* Rung Shape	* Rung Orientation	Side Rail Thickness	Ladder Straight Section	Width (mm)	Length (mm)
125	G = Galvanised Steel	300	C = Standard Profile	A = Alternating	15I = 1.5mm Slotted		0150	3000
	X = Stainless Steel 316				20I = 2.0mm Slotted		0300	6000
							0450	
							0600	
							0750	
							0900	

* Other Options Available
See "Cable Ladder Construction"

125mm Height



Outside Width

Thickness	Width
1.5 mm	33.2
2.0mm	34.2

Height 125mm

Material Thickness 1.5mm

Side Rail Thickness	Span m	Load kg/m
15I Steel	3	420
	4	310
	5	200
	6	90
15I Stainless Steel	3	441
	4	323
	5	206
	6	88

Height 125mm

Material Thickness 2.0mm

Side Rail Thickness	Span m	Load kg/m
20I Steel	3	442
	4	341
	5	241
	6	140
20I Stainless Steel	3	458
	4	340
	5	223
	6	105

All dimensions are in millimetres unless otherwise specified.

Cooper B-Line 150mm Cable Ladders are designed for applications with heavy cable loads or long support spans. The strength of these ladders allows them to be supported less frequently, saving material and labour on the support structure. Slotted side rails are manufactured from 1.5mm or 2.0mm thick steel with standard 300mm rung spacing.

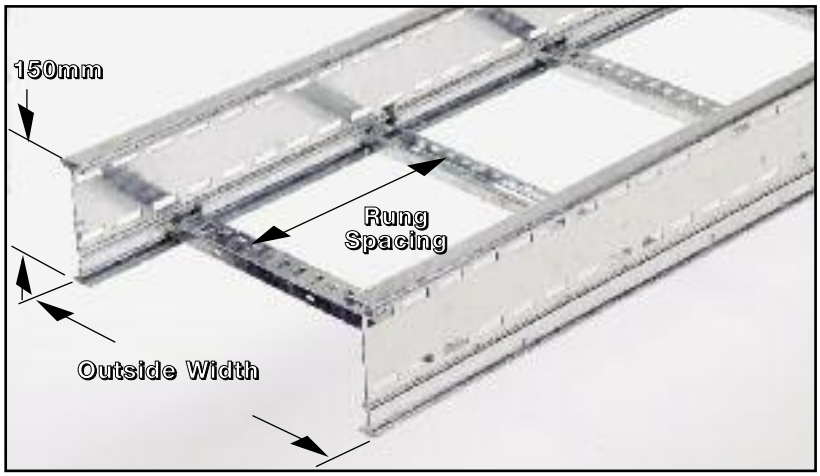
Straight Section Part Numbering

Example: **150 G 300 C A 15I LL - 0600 - 3000**

Height (mm)	Material	* Rung Spacing (mm)	* Rung Shape	* Rung Orientation	Side rail Thickness	Ladder Straight Section	Width (mm)	Length (mm)
150	G = Galvanised Steel	300	C = Standard Profile	A = Alternating	15I = 1.5mm Slotted		0150	3000
	X = Stainless Steel 316				20I = 2.0mm Slotted		0300	6000
							0450	
							0600	
							0750	
							0900	

* Other Options Available
See "Cable Ladder Construction"

150mm Height



Outside Width

Thickness	Width
1.5 mm	33.2
2.0mm	34.2

Height 150mm

Material Thickness 1.5mm

Side Rail Thickness	Span m	Load kg/m
15I Steel	3	525
	4	394
	5	263
	6	132
15I Stainless Steel	3	474
	4	356
	5	239
	6	121

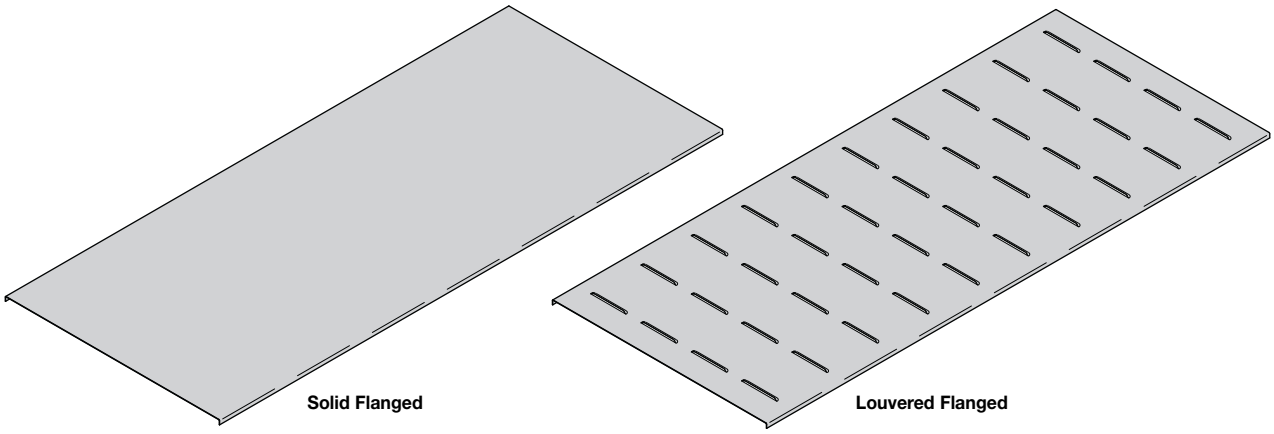
Height 150mm

Material Thickness 2.0mm

Side Rail Thickness	Span m	Load kg/m
20I Steel	3	577
	4	446
	5	315
	6	184
20I Stainless Steel	3	482
	4	368
	5	254
	6	140

All dimensions are in millimetres unless otherwise specified.

Covers



A full range of covers is available for straight sections and fittings.

Solid covers should be used when maximum enclosure of the cable is desired and no accumulation of heat is expected.

Louvered covers provide an overhead cable shield yet allow heat to escape.
Cooper B-Line recommends that covers be placed on vertical cable ladder runs to a height of 1.5m to 2.5m above the floor to isolate both cables and personnel.

Flanged covers have a 12mm flange.
Cover clamps are not included with the cover and must be ordered separately.

Steel Cover Part Numbering

Prefix

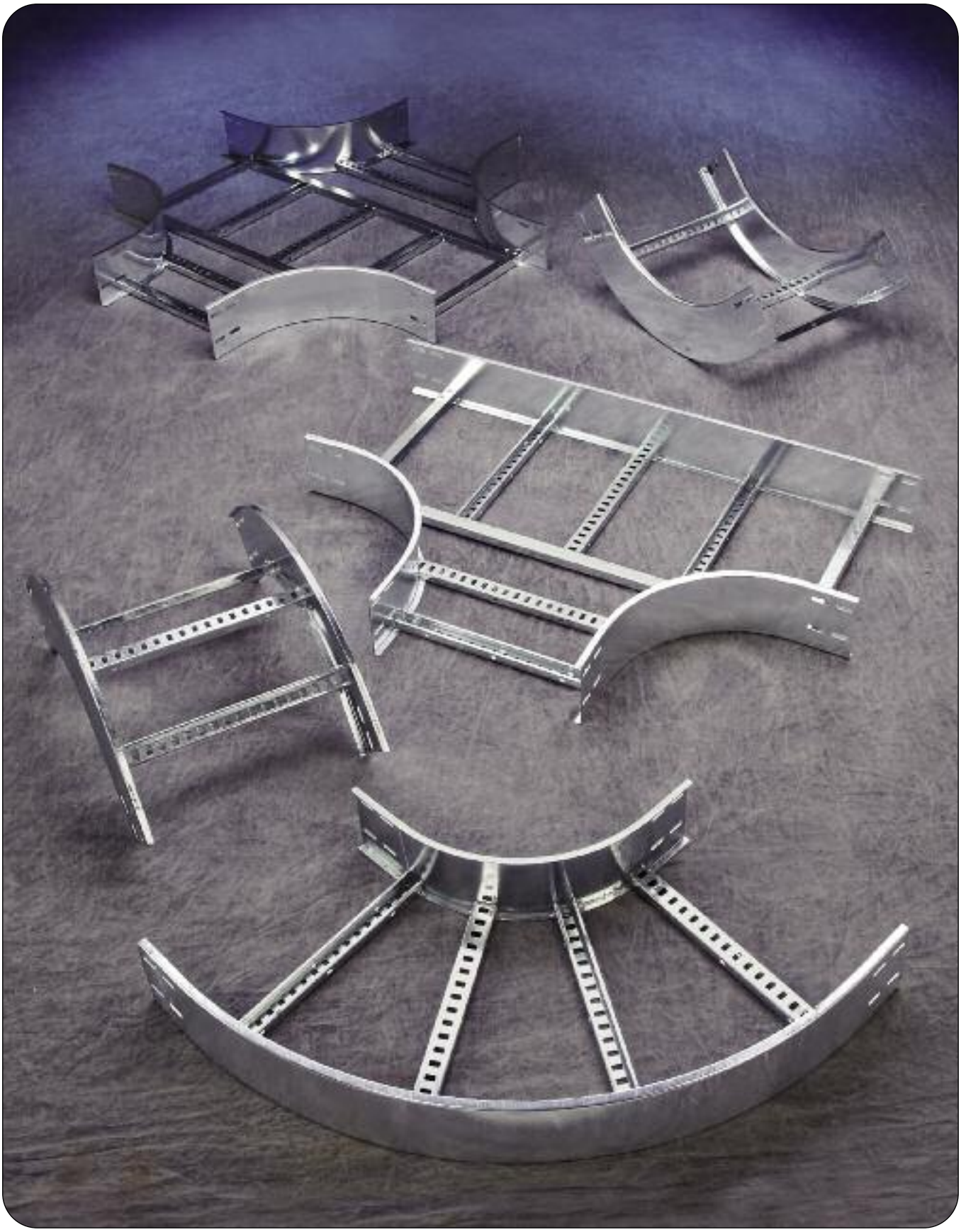
Example: **CIF S G 10 LL - 0600 - 3000**

Flanged Cover	Cover Type	Material	Cover Thickness	Ladder Straight Section	Width (mm)	Length *
	S = Solid	**G** = Galvanised Steel	**10** = 1.0mm		**0150** = 150mm	**1500** = 1.5m
			15 = 1.5mm		**0300** = 300mm	**3000** = 3.0m
	L = Louvered	**X** = Stainless Steel 316			**0450** = 450mm	
					0600 = 600mm	
					0750 = 750mm	
					0900 = 900mm	

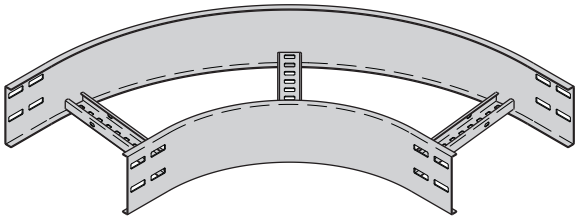
Covers 750mm and 900mm wide have reinforcing ridges.

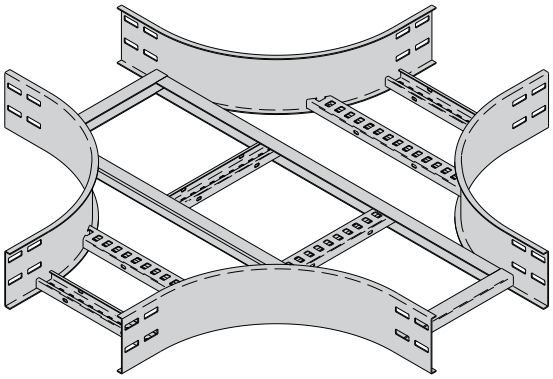
* All G (galvanised steel) covers only available in 1500 (1.5m) lengths.
750 (750mm) and 900 (900mm) widths only available in 1500 (1.5m) lengths.

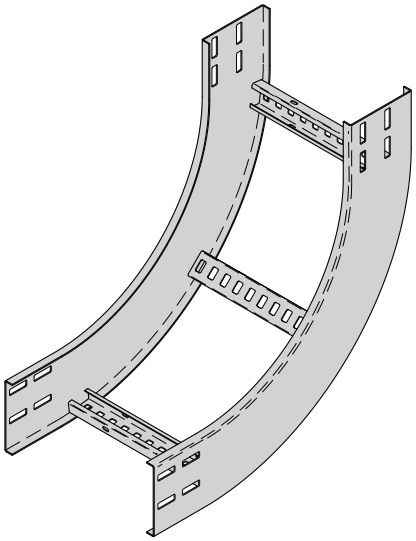
All dimensions are in millimetres unless otherwise specified.



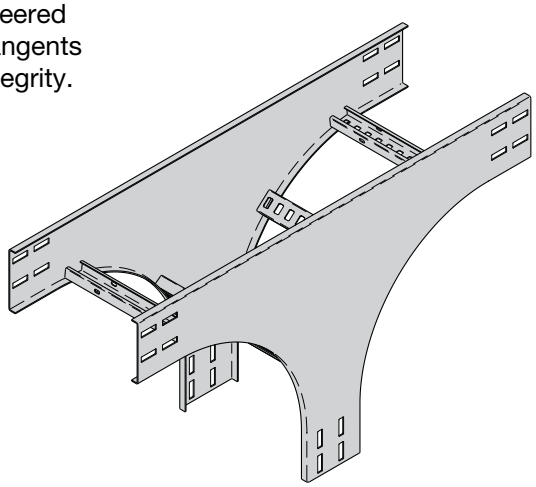
Cooper B-Line Cable Ladder Fittings are designed to support cables as they transition directions. Side rails are C-shaped with standard 300mm rung spacing.







Fittings engineered with 100mm tangents for splicing integrity.



Fittings Part Numbering

Prefix

Example: **125 G 300 C A 20C LVO - 0600 - 90 R0600**

Height (mm)	Material	Rung Spacing (mm)	* Rung Shape	* Rung Orientation	Side rail Thickness & Type	Ladder Fitting Type	Width (mm)	Angle † (°)	Radius (mm)
125 = 125mm	**G** = Galvanised Steel	**300** = 300mm	**C** = Standard Profile	**A** = Alternating	**15C** = 1.5mm solid	**LHB** = Horizontal Bend	**0150** = 150mm	**30**	**R0300** = 300mm
150 = 150mm	**X** = Stainless Steel 316				**20C** = 2.0mm solid	**LVI** = Vertical Inside Bend	**0300** = 300mm	**45**	
						LVO = Vertical Outside Bend	**0450** = 450mm	**60**	
						LHT = Horizontal Tee †	**0600** = 600mm	**90**	**R0600** = 600mm
						LHX = Horizontal Cross †	**0750** = 750mm		
						LVTD = Vertical Tee Down †	**0900** = 900mm		
						LVTU = Vertical Tee Up †			
						LCSF = Cable Support Fitting †			

*** Other Options Available**
See "Cable Ladder Construction"

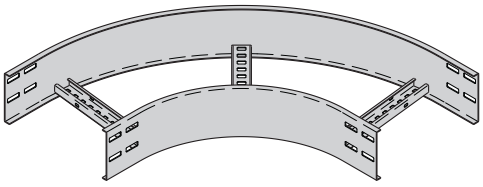
† No angle designation required on these fittings.
See fitting page when creating part numbers.

All dimensions are in millimetres unless otherwise specified.

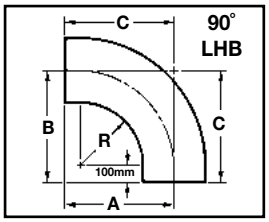
Horizontal Bends 90° (LHB)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.

Bend Radius R mm	Ladder Width mm	90° Horizontal Bend Dimensions			
		Catalogue No.	A mm	B mm	C mm
300	150	(Pre)LHB-0150-90R0300	475	475	475
	300	(Pre)LHB-0300-90R0300	550	550	550
	450	(Pre)LHB-0450-90R0300	625	625	625
	600	(Pre)LHB-0600-90R0300	700	700	700
	750	(Pre)LHB-0750-90R0300	775	775	775
	900	(Pre)LHB-0900-90R0300	850	850	850
600	150	(Pre)LHB-0150-90R0600	775	775	775
	300	(Pre)LHB-0300-90R0600	850	850	850
	450	(Pre)LHB-0450-90R0600	925	925	925
	600	(Pre)LHB-0600-90R0600	1000	1000	1000
	750	(Pre)LHB-0750-90R0600	1075	1075	1075
	900	(Pre)LHB-0900-90R0600	1150	1150	1150



90° Horizontal Bend

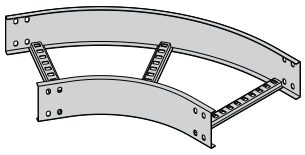


(Prefix) See page 10 for catalogue number prefix.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

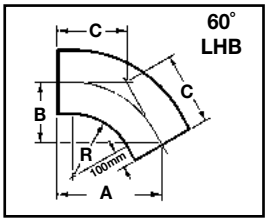
Horizontal Bends 60° (LHB)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.

Bend Radius R mm	Ladder Width mm	60° Horizontal Bend Dimensions			
		Catalogue No.	A mm	B mm	C mm
300	150	(Pre)LHB-0150-60R0300	476	275	317
	300	(Pre)LHB-0300-60R0300	541	312	360
	450	(Pre)LHB-0450-60R0300	606	350	404
	600	(Pre)LHB-0600-60R0300	670	387	447
	750	(Pre)LHB-0750-60R0300	735	425	490
	900	(Pre)LHB-0900-60R0300	800	425	534
600	150	(Pre)LHB-0150-60R0600	735	425	490
	300	(Pre)LHB-0300-60R0600	800	462	534
	450	(Pre)LHB-0450-60R0600	865	500	577
	600	(Pre)LHB-0600-60R0600	930	537	620
	750	(Pre)LHB-0750-60R0600	995	575	663
	900	(Pre)LHB-0900-60R0600	1060	612	707



60° Horizontal Bend

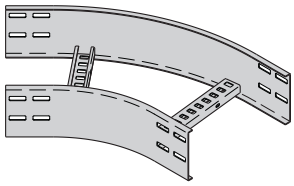


(Prefix) See page 10 for catalogue number prefix.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

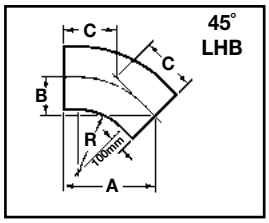
All dimensions are in millimetres unless otherwise specified.

Horizontal Bends 45° (LHB)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.



45° Horizontal Bend

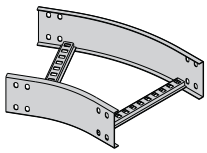


Bend Radius R mm	Ladder Width mm	45° Horizontal Bend Dimensions			
		Catalogue No.	A mm	B mm	C mm
300	150	(Pre)LHB-0150-45R0300	437	181	256
	300	(Pre)LHB-0300-45R0300	490	203	287
	450	(Pre)LHB-0450-45R0300	543	225	318
	600	(Pre)LHB-0600-45R0300	596	247	349
	750	(Pre)LHB-0750-45R0300	649	269	380
	900	(Pre)LHB-0900-45R0300	702	291	411
600	150	(Pre)LHB-0150-45R0600	649	269	380
	300	(Pre)LHB-0300-45R0600	702	291	411
	450	(Pre)LHB-0450-45R0600	755	313	443
	600	(Pre)LHB-0600-45R0600	809	335	474
	750	(Pre)LHB-0750-45R0600	862	357	505
	900	(Pre)LHB-0900-45R0600	915	379	536

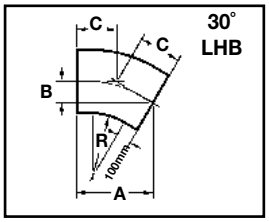
(Prefix) See page 10 for catalogue number prefix.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

Horizontal Bends 30° (LHB)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.



30° Horizontal Bend



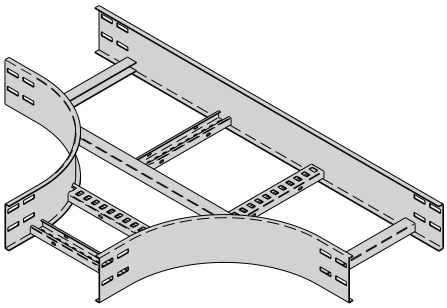
Bend Radius R mm	Ladder Width mm	30° Horizontal Bend Dimensions			
		Catalogue No.	A mm	B mm	C mm
300	150	(Pre)LHB-0150-30R0300	375	100	200
	300	(Pre)LHB-0300-30R0300	412	110	221
	450	(Pre)LHB-0450-30R0300	450	120	241
	600	(Pre)LHB-0600-30R0300	487	130	261
	750	(Pre)LHB-0750-30R0300	525	140	281
	900	(Pre)LHB-0900-30R0300	562	150	301
600	150	(Pre)LHB-0150-30R0600	525	140	281
	300	(Pre)LHB-0300-30R0600	562	150	301
	450	(Pre)LHB-0450-30R0600	600	160	321
	600	(Pre)LHB-0600-30R0600	627	170	341
	750	(Pre)LHB-0750-30R0600	675	180	361
	900	(Pre)LHB-0900-30R0600	712	190	381

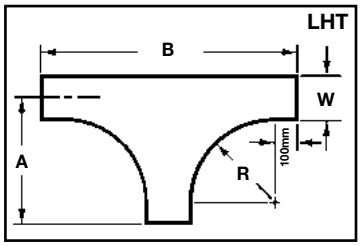
(Prefix) See page 10 for catalogue number prefix.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

All dimensions are in millimetres unless otherwise specified.

Horizontal Tee (LHT)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
Two (2) pair required to connect to system.



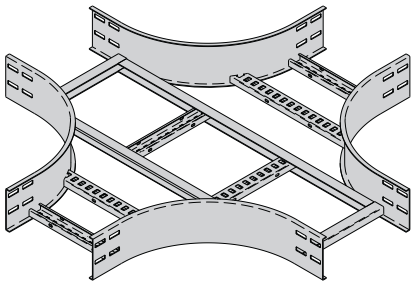


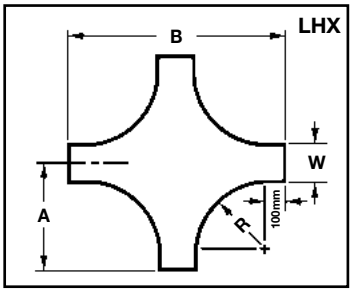
Bend Radius R mm	Ladder Width mm	Horizontal Cross Catalogue Number	Dimensions A mm	Dimensions B mm
300	150	(Pre)LHT-0150-R0300	475	950
	300	(Pre)LHT-0300-R0300	550	1000
	450	(Pre)LHT-0450-R0300	625	1250
	600	(Pre)LHT-0600-R0300	700	1400
	750	(Pre)LHT-0750-R0300	775	1500
	900	(Pre)LHT-0900-R0300	850	1700
600	150	(Pre)LHT-0150-R0600	775	1550
	300	(Pre)LHT-0300-R0600	850	1700
	450	(Pre)LHT-0450-R0600	925	1850
	600	(Pre)LHT-0600-R0600	1000	2000
	750	(Pre)LHT-0750-R0600	1075	2150
	900	(Pre)LHT-0900-R0600	1150	2300

(Prefix) See page 10 for catalogue number prefix.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

Horizontal Cross (LHX)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
Three (3) pair required to connect to system.





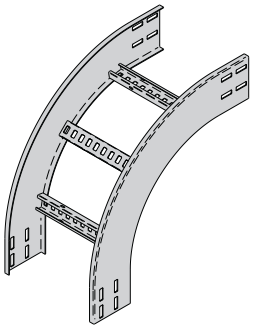
Bend Radius R mm	Ladder Width mm	Horizontal Cross Catalogue Number	Dimensions A mm	Dimensions B mm
300	150	(Pre)LHX-0150-R0300	475	900
	300	(Pre)LHX-0300-R0300	550	1100
	450	(Pre)LHX-0450-R0300	625	1250
	600	(Pre)LHX-0600-R0300	700	1400
	750	(Pre)LHX-0750-R0300	775	1550
	900	(Pre)LHX-0900-R0300	850	1700
600	150	(Pre)LHX-0150-R0600	775	1550
	300	(Pre)LHX-0300-R0600	850	1700
	450	(Pre)LHX-0450-R0600	925	1850
	600	(Pre)LHX-0600-R0600	1000	2000
	750	(Pre)LHX-0750-R0600	1075	2150
	900	(Pre)LHX-0900-R0600	1150	2300

(Prefix) See page 10 for catalogue number prefix.
Width dimensions are to inside wall. Manufacturing tolerances apply to all dimensions.

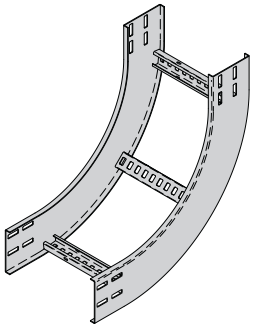
All dimensions are in millimetres unless otherwise specified.

Vertical Bends 90° & 60° (LVO, LVI)

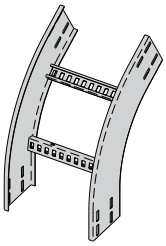
Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.



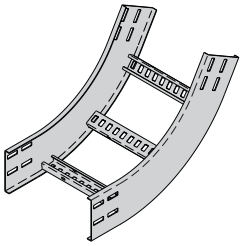
90° Vertical Outside



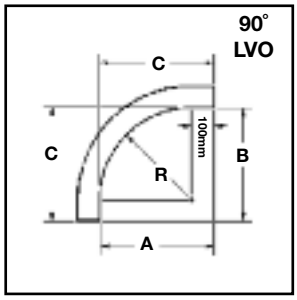
90° Vertical Inside

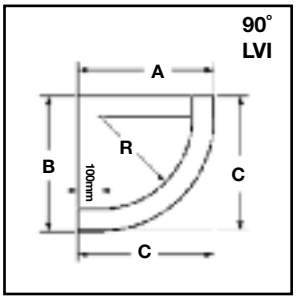


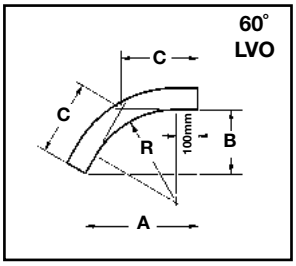
60° Vertical Outside

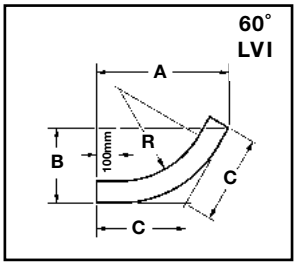


60° Vertical Inside









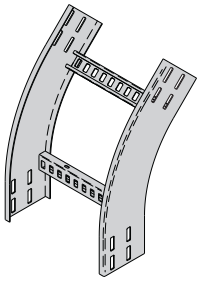
Bend Radius R mm	Ladder Width Insert mm	(*) Insert "VO" for Vert. Outside Bend "VI" for Vert. Inside Bend Catalogue No.	VO Side Rail Height 125mm - 150mm A mm	B mm	C mm	VI Side Rail Height 125mm A mm	B mm	C mm	150mm A mm	B mm	C mm
90°											
300	150	(Prefix)L(*)-0150-90R0300	400	400	400	525	525	525	550	550	550
	300	(Prefix)L(*)-0300-90R0300									
	450	(Prefix)L(*)-0450-90R0300									
	600	(Prefix)L(*)-0600-90R0300									
	750	(Prefix)L(*)-0750-90R0300									
	900	(Prefix)L(*)-0900-90R0300									
600	150	(Prefix)L(*)-0150-90R0600	700	700	700	825	825	825	850	850	850
	300	(Prefix)L(*)-0300-90R0600									
	450	(Prefix)L(*)-0450-90R0600									
	600	(Prefix)L(*)-0600-90R0600									
	750	(Prefix)L(*)-0750-90R0600									
	900	(Prefix)L(*)-0900-90R0600									
60°											
300	150	(Prefix)L(*)-0150-60R0300	410	237	273	518	300	345	540	312	360
	300	(Prefix)L(*)-0390-60R0300									
	450	(Prefix)L(*)-0450-60R0300									
	600	(Prefix)L(*)-0600-60R0300									
	750	(Prefix)L(*)-0750-60R0300									
	900	(Prefix)L(*)-0900-60R0300									
600	150	(Prefix)L(*)-0150-60R0600	670	386	446	778	449	519	780	462	533
	300	(Prefix)L(*)-0300-60R0600									
	450	(Prefix)L(*)-0450-60R0600									
	600	(Prefix)L(*)-0600-60R0600									
	750	(Prefix)L(*)-0750-60R0600									
	900	(Prefix)L(*)-0900-60R0600									

(Prefix) See page 10 for catalogue number prefix.
Manufacturing tolerances apply to all dimensions.

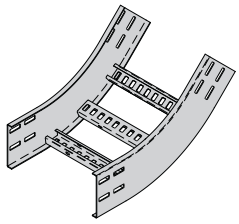
All dimensions are in millimetres unless otherwise specified.

Vertical Bends 45° & 30° (LVO, LVI)

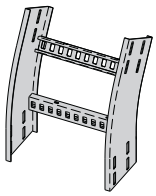
Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.



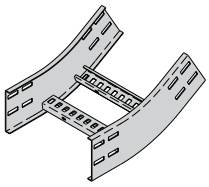
45° Vertical Outside



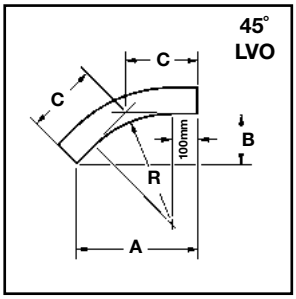
45° Vertical Inside

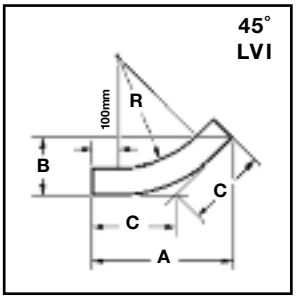


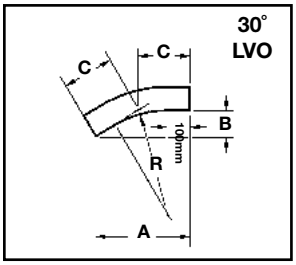
30° Vertical Outside

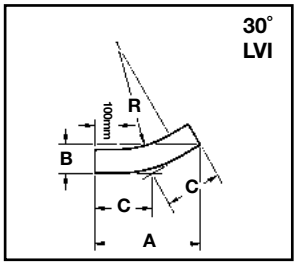


30° Vertical Inside









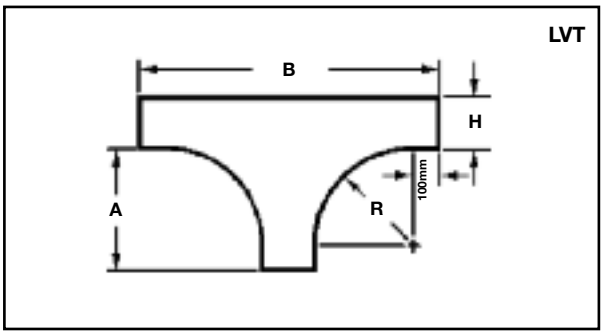
Bend Radius R mm	Ladder Width Insert mm	(*) Insert "VO" for Vert. Outside Bend "VI" for Vert. Inside Bend Catalogue No.	VO Side Rail Height 125mm - 150mm A mm	B mm	C mm	VI Side Rail Height 125mm A mm	B mm	C mm	150mm A mm	B mm	C mm
45°											
300	150	(Prefix)L(*)-0150-45R0300	383	159	226	469	195	276	681	283	400
	300	(Prefix)L(*)-0300-45R0300									
	450	(Prefix)L(*)-0450-46R0300									
	600	(Prefix)L(*)-0600-45R0300									
	750	(Prefix)L(*)-0750-45R0300									
	900	(Prefix)L(*)-0900-45R0300									
600	150	(Prefix)L(*)-0150-45R0600	595	246	373	487	203	286	699	290	411
	300	(Prefix)L(*)-0300-45R0600									
	450	(Prefix)L(*)-0450-45R0600									
	600	(Prefix)L(*)-0600-45R0600									
	750	(Prefix)L(*)-0750-45R0600									
	900	(Prefix)L(*)-0900-45R0600									
30°											
300	150	(Prefix)L(*)-0150-30R0300	337	90	180	399	107	214	417	110	221
	300	(Prefix)L(*)-0390-30R0300									
	450	(Prefix)L(*)-0450-30R0300									
	600	(Prefix)L(*)-0600-30R0300									
	750	(Prefix)L(*)-0750-30R0300									
	900	(Prefix)L(*)-0900-30R0300									
600	150	(Prefix)L(*)-0150-30R0600	487	130	261	549	147	294	562	150	301
	300	(Prefix)L(*)-0300-30R0600									
	450	(Prefix)L(*)-0450-30R0600									
	600	(Prefix)L(*)-0600-30R0600									
	750	(Prefix)L(*)-0750-30R0600									
	900	(Prefix)L(*)-0900-30R0600									

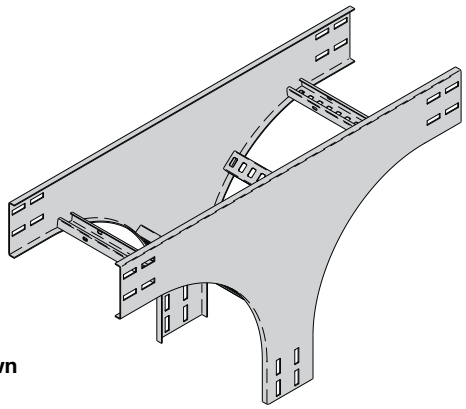
(Prefix) See page 10 for catalogue number prefix.
Manufacturing tolerances apply to all dimensions.

All dimensions are in millimetres unless otherwise specified.

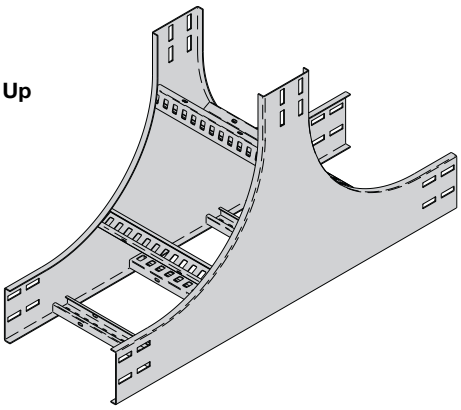
Vertical Tee Up/Down (LVTU/LVTD)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
Two (2) pair required to connect to system.





Down



Up

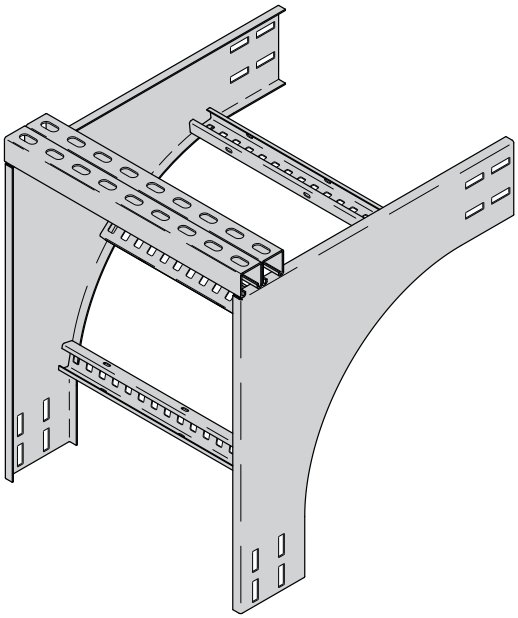
Bend Radius R mm	Ladder Width mm	Vertical Tee Down Catalogue No.	Vertical Tee Up Catalogue No.	Side Rail Height "H"			
				125mm		150mm	
				A mm	B mm	A mm	B mm
300	150	(Prefix)LVTD-0150-R0300	(Prefix)LVTU-0150-R0300	400	925	400	950
	300	(Prefix)LVTD-0300-R0300	(Prefix)LVTU-0300-R0300				
	450	(Prefix)LVTD-0450-R0300	(Prefix)LVTU-0450-R0300				
	00	(Prefix)LVTD-0600-R0300	(Prefix)LVTU-0600-R0300				
	750	(Prefix)LVTD-0750-R0300	(Prefix)LVTU-0750-R0300				
	900	(Prefix)LVTD-0900-R0300	(Prefix)LVTU-0900-R0300				
600	150	(Prefix)LVTD-0150-R0600	(Prefix)LVTU-0150-R0600	700	1525	700	1550
	300	(Prefix)LVTD-0300-R0600	(Prefix)LVTU-0300-R0600				
	450	(Prefix)LVTD-0450-R0600	(Prefix)LVTU-0450-R0600				
	600	(Prefix)LVTD-0600-R0600	(Prefix)LVTU-0600-R0600				
	750	(Prefix)LVTD-0750-R0600	(Prefix)LVTU-0750-R0600				
	900	(Prefix)LVTD-0900-R0600	(Prefix)LVTU-0900-R0600				

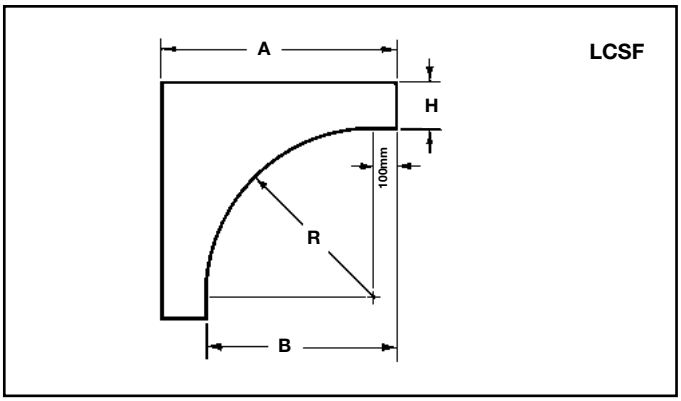
(Prefix) See page 10 for catalogue number prefix.
Manufacturing tolerances apply to all dimensions.

All dimensions are in millimetres unless otherwise specified.

Cable Support Fittings (LCSF)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.





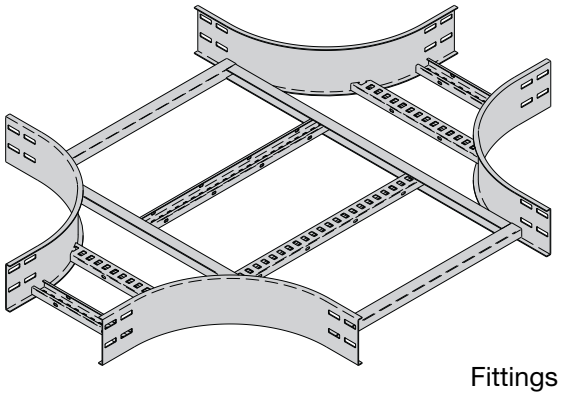
This fitting is recommended for use at the top of vertical runs to support the weight of the cables. The top cross brace is drilled for installing eyebolts, ordered separately.

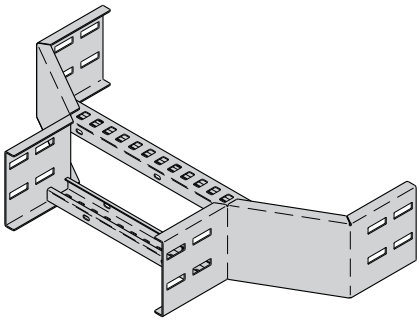
Bend Radius R mm	Ladder Width mm	Catalogue No. mm	Side Rail Height "H"			
			125mm		150mm	
			A mm	B mm	A mm	B
300	150	(Prefix)LCSF-0150-R0300	525	400	550	400
	300	(Prefix)LCSF-0300-R0300				
	450	(Prefix)LCSF-0450-R0300				
	600	(Prefix)LCSF-0600-R0300				
	750	(Prefix)LCSF-0750-R0300				
	900	(Prefix)LCSF-0900-R0300				
600	150	(Prefix)LCSF-0150-R0600	825	700	850	700
	300	(Prefix)LCSF-0300-R0600				
	450	(Prefix)LCSF-0450-R0600				
	600	(Prefix)LCSF-0600-R0600				
	750	(Prefix)LCSF-0750-R0600				
	900	(Prefix)LCSF-0900-R0600				

(Prefix) See page 10 for catalogue number prefix.
Manufacturing tolerances apply to all dimensions.

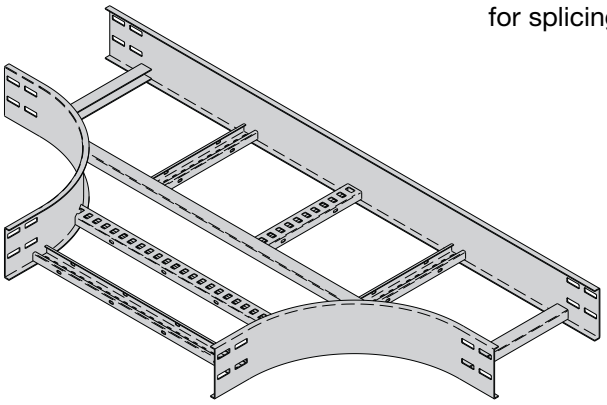
All dimensions are in millimetres unless otherwise specified.

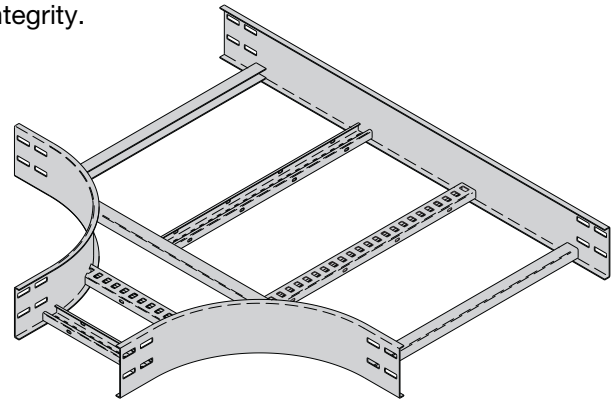
Cooper B-Line Cable Ladder Reducing and Expanding Fittings are designed to support cables as they transition directions. Side rails are C-shaped with standard 300mm rung spacing.





Fittings engineered with 100mm tangents for splicing integrity.





Reducing & Expanding Fittings Part Numbering

Prefix

Example: **125 G 300 C A 15C LRR - 0600 - 0300 R0300**

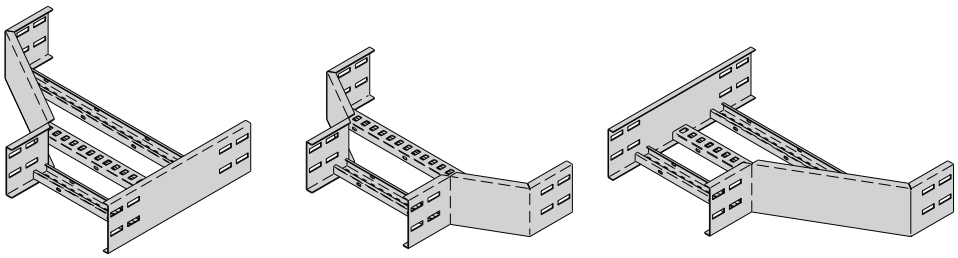
Height	Material	Rung Spacing (mm)	* Rung Shape	* Rung Orientation	Side rail Thickness	Ladder Fitting Type	Width 1	Width 2	Radius
125 = 125mm	**G** = Galvanised Steel	**300** = 300mm	**C** = Standard Profile	**A** = Alternating	**15C** = 1.5mm solid	**LRR** = Right Reducer	**0150** = 150mm	**0150** = 150mm	**R0300** = 300mm
150 = 150mm	**X** = Stainless Steel 316				**20C** = 2.0mm solid	**LLR** = Left Reducer	**0300** = 300mm	**0300** = 300mm	**R0600** = 600mm
						LSR = Straight Reducer	**0450** = 450mm	**0450** = 450mm	
						LET = Horizontal Expanding Tee	**0600** = 600mm	**0600** = 600mm	
						LRT = Horizontal Reducing Tee	**0750** = 750mm	**0750** = 750mm	
						LRX = Horizontal Expanding/Reducing Cross	**0900** = 900mm	**0900** = 900mm	

*** Other Options Available**
See "Cable Ladder Construction"

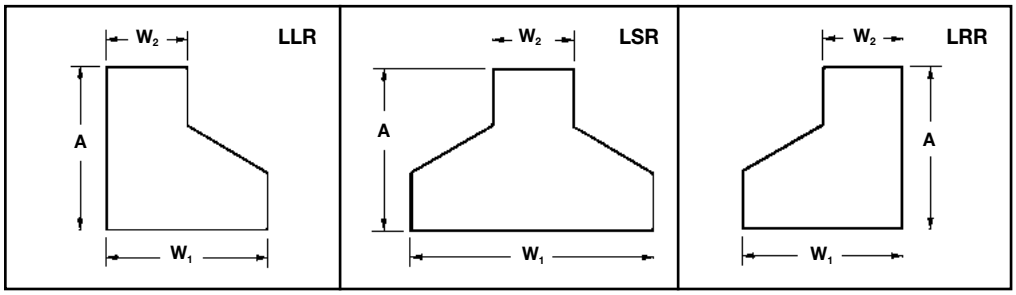
All dimensions are in millimetres unless otherwise specified.

Reducers (LLR, LSR, LRR)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
One (1) pair required to connect to system.



Left Reducer | Straight Reducer | Right Reducer



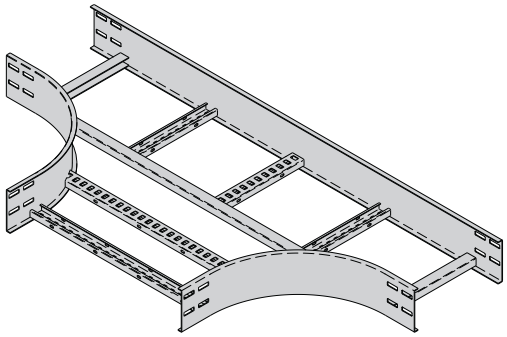
Ladder Width		Left Hand Reducer		Straight Reducer		Right Hand Reducer	
W_1 mm	W_2 mm	Catalogue No.	A mm	Catalogue No.	A mm	Catalogue No.	A mm
300	150	(Prefix)LLR-0300-0150	337	(Prefix)LSR-0300-0150	293	(Prefix)LRR-0300-0150	337
450	150	(Prefix)LLR-0450-0150	423	(Prefix)LSR-0450-0150	337	(Prefix)LRR-0450-0150	423
	300	(Prefix)LLR-0450-0300	337	(Prefix)LSR-0450-0300	293	(Prefix)LRR-0450-0300	337
600	150	(Prefix)LLR-0600-0150	510	(Prefix)LSR-0600-0150	380	(Prefix)LRR-0600-0150	510
	300	(Prefix)LLR-0600-0300	423	(Prefix)LSR-0600-0300	337	(Prefix)LRR-0600-0300	423
	450	(Prefix)LLR-0600-0450	337	(Prefix)LSR-0600-0450	293	(Prefix)LRR-0600-0450	337
750	150	(Prefix)LLR-0750-0150	596	(Prefix)LSR-0750-0150	423	(Prefix)LRR-0750-0150	596
	300	(Prefix)LLR-0750-0300	510	(Prefix)LSR-0750-0300	380	(Prefix)LRR-0750-0300	510
	450	(Prefix)LLR-0750-0450	423	(Prefix)LSR-0750-0450	337	(Prefix)LRR-0750-0450	423
	600	(Prefix)LLR-0750-0600	337	(Prefix)LSR-0750-0600	293	(Prefix)LRR-0750-600	337
900	150	(Prefix)LLR-0900-0150	683	(Prefix)LSR-0900-0150	467	(Prefix)LRR-0900-0150	683
	300	(Prefix)LLR-0900-0300	596	(Prefix)LSR-0900-0300	423	(Prefix)LRR-0900-0300	596
	450	(Prefix)LLR-0900-0450	510	(Prefix)LSR-0900-0450	380	(Prefix)LRR-0900-0450	510
	600	(Prefix)LLR-0900-0600	423	(Prefix)LSR-0900-0600	337	(Prefix)LRR-0900-0600	423

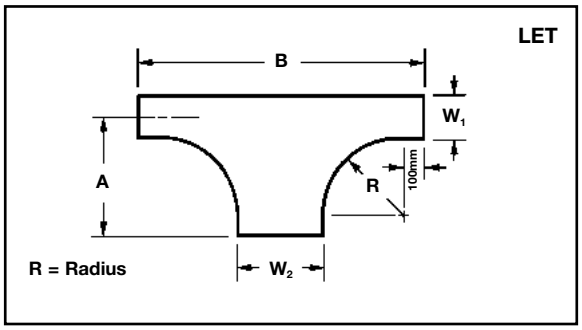
(Prefix) See page 18 for catalogue number prefix.
Width dimensions are to inside wall.
Manufacturing tolerances apply to all dimensions.

All dimensions are in millimetres unless otherwise specified.

Horizontal Expanding Tee (LET)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
Two (2) pair required to connect to system.





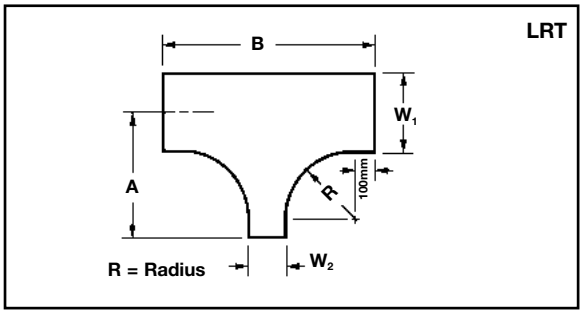
Bend Radius	Ladder Width		Horizontal Expanding Tee		
				Dimensions	
R mm	W_1 mm	W_2 mm	Catalogue Number	A mm	B mm
300	150	300	(Pre)LET-0150-0300-R0300	475	1100
		450	(Pre)LET-0150-0450-R0300	475	1250
		600	(Pre)LET-0150-0600-R0300	475	1400
		750	(Pre)LET-0150-0750-R0300	475	1550
		900	(Pre)LET-0150-0900-R0300	475	1700
	300	450	(Pre)LET-0300-0450-R0300	550	1250
		600	(Pre)LET-0300-0600-R0300	550	1400
		750	(Pre)LET-0300-0750-R0300	550	1550
		900	(Pre)LET-0300-0900-R0300	550	1700
	450	600	(Pre)LET-0450-0600-R0300	625	1400
		750	(Pre)LET-0450-0750-R0300	625	1550
		900	(Pre)LET-0450-0900-R0300	625	1700
	600	750	(Pre)LET-0600-0750-R0300	700	1550
		900	(Pre)LET-0600-0900-R0300	700	1700
	750	900	(Pre)LET-0750-0900-R0300	775	1700
600	150	300	(Pre)LET-0150-0300-R0600	775	1700
		450	(Pre)LET-0150-0450-R0600	775	1850
		600	(Pre)LET-0150-0600-R0600	775	2000
		750	(Pre)LET-0150-0750-R0600	775	2150
		900	(Pre)LET-0150-0900-R0600	775	2300
	300	450	(Pre)LET-0300-0450-R0600	850	1850
		600	(Pre)LET-0300-0600-R0600	850	2000
		750	(Pre)LET-0300-0750-R0600	850	2150
		900	(Pre)LET-0300-0900-R0600	850	2300
	450	600	(Pre)LET-0450-0600-R0600	925	2000
		750	(Pre)LET-0450-0750-R0600	925	2150
		900	(Pre)LET-0450-0900-R0600	925	2300
	600	750	(Pre)LET-0600-0750-R0600	1000	2150
		900	(Pre)LET-0600-0900-R0600	1000	2300
	750	900	(Pre)LET-0750-0900-R0600	1075	2300

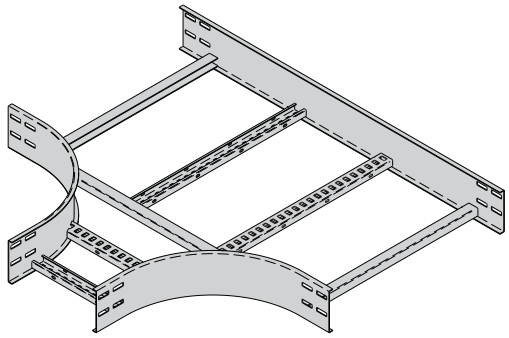
(Prefix) See page 18 for catalogue number prefix.
Width dimensions are to inside wall.
Manufacturing tolerances apply to all dimensions.

All dimensions are in millimetres unless otherwise specified.

Horizontal Reducing Tee (LRT)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
Two (2) pair required to connect to system.





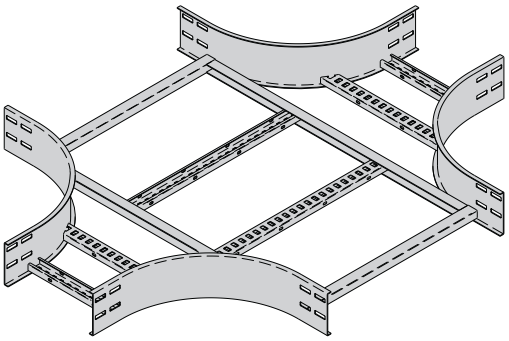
Bend Radius	Ladder Width		Horizontal Reducing Tee		
				Dimensions	
R mm	W_1 mm	W_2 mm	Catalogue Number	A mm	B mm
300	300	150	(Pre)LRT-0300-0150-R0300	550	950
	450	150	(Pre)LRT-0450-0150-R0300	625	950
		300	(Pre)LRT-0450-0300-R0300	625	1100
	600	150	(Pre)LRT-0600-0150-R0300	700	950
		300	(Pre)LRT-0600-0300-R0300	700	1100
		450	(Pre)LRT-0600-0450-R0300	700	1250
	750	150	(Pre)LRT-0750-0150-R0300	775	950
		300	(Pre)LRT-0750-0300-R0300	775	1100
		450	(Pre)LRT-0750-0450-R0300	775	1250
		600	(Pre)LRT-0750-0600-R0300	775	1400
	900	150	(Pre)LRT-0900-0150-R0300	850	950
		300	(Pre)LRT-0900-0300-R0300	850	1100
		450	(Pre)LRT-0900-0450-R0300	850	1250
		600	(Pre)LRT-0900-0600-R0300	850	1400
		750	(Pre)LRT-0900-0750-R0300	850	1550
600	300	150	(Pre)LRT-0300-0150-R0600	830	1550
	450	150	(Pre)LRT-0450-0150-R0600	925	1550
		300	(Pre)LRT-0450-0300-R0600	925	1700
	600	150	(Pre)LRT-0600-0150-R0600	1000	1550
		300	(Pre)LRT-0600-0300-R0600	1000	1700
		450	(Pre)LRT-0600-0450-R0600	1000	1850
	750	150	(Pre)LRT-0750-0150-R0600	1075	1550
		300	(Pre)LRT-0750-0300-R0600	1075	1700
		450	(Pre)LRT-0750-0450-R0600	1075	1850
		600	(Pre)LRT-0750-0600-R0600	1075	2000
	900	150	(Pre)LRT-0900-0150-R0600	1150	1550
		300	(Pre)LRT-0900-0300-R0600	1150	1700
		450	(Pre)LRT-0900-0450-R0600	1150	1850
		600	(Pre)LRT-0900-0600-R0600	1150	2000
		750	(Pre)LRT-0900-0750-R0600	1150	2150

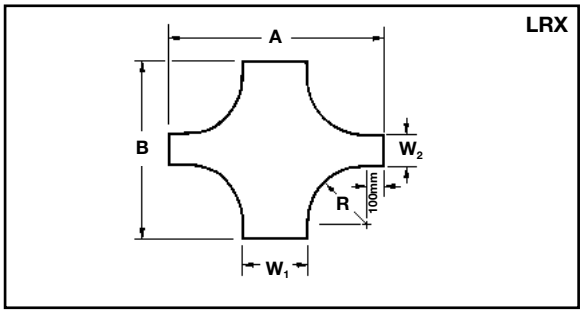
(Prefix) See page 18 for catalogue number prefix.
Width dimensions are to inside wall.
Manufacturing tolerances apply to all dimensions.

All dimensions are in millimetres unless otherwise specified.

Horizontal Expanding/Reducing Cross (LRX)

Splice plates not supplied with fittings.
Order standard splice plates separately from page 25.
Three (3) pair required to connect to system.



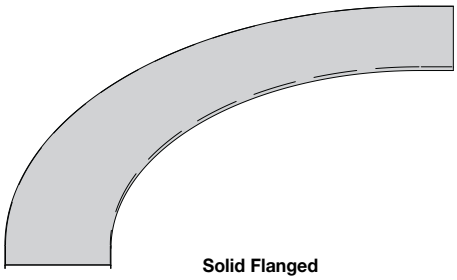


Bend Radius	Ladder Width		Horizontal Expanding/Reducing Cross		
			Catalogue Number	Dimensions	
R mm	W_1 mm	W_2 mm		A mm	B mm
300	300	150	(Pre)LRX-0300-0150-R0300	1100	950
	450	150	(Pre)LRX-0450-0150-R0300	1250	950
		300	(Pre)LRX-0450-0300-R0300	1250	1100
	600	150	(Pre)LRX-0600-0150-R0300	1400	950
		300	(Pre)LRX-0600-0300-R0300	1400	1100
		450	(Pre)LRX-0600-0450-R0300	1400	1250
	750	150	(Pre)LRX-0750-0150-R0300	1550	950
		300	(Pre)LRX-0750-0300-R0300	1550	1100
		450	(Pre)LRX-0750-0450-R0300	1550	1250
		600	(Pre)LRX-0750-0600-R0300	1550	1400
	900	150	(Pre)LRX-0900-0150-R0300	1700	950
		300	(Pre)LRX-0900-0300-R0300	1700	1100
		450	(Pre)LRX-0900-0450-R0300	1700	1250
		600	(Pre)LRX-0900-0600-R0300	1700	1400
		750	(Pre)LRX-0900-0750-R0300	1700	1550
600	300	150	(Pre)LRX-0300-0150-R0600	1700	1550
	450	150	(Pre)LRX-0450-0150-R0600	1850	1550
		300	(Pre)LRX-0450-0300-R0600	1850	1700
	600	150	(Pre)LRX-0600-0150-R0600	2100	1550
		300	(Pre)LRX-0600-0300-R0600	2100	1700
		450	(Pre)LRX-0600-0450-R0600	2100	1850
	750	150	(Pre)LRX-0750-0150-R0600	2150	1550
		300	(Pre)LRX-0750-0300-R0600	2150	1700
		450	(Pre)LRX-0750-0450-R0600	2150	1850
		600	(Pre)LRX-0750-0600-R0600	2150	2000
	900	150	(Pre)LRX-0900-0150-R0600	2300	1550
		300	(Pre)LRX-0900-0300-R0600	2300	1700
		450	(Pre)LRX-0900-0450-R0600	2300	1850
		600	(Pre)LRX-0900-0600-R0600	2300	2000
		750	(Pre)LRX-0900-0750-R0600	2300	2150

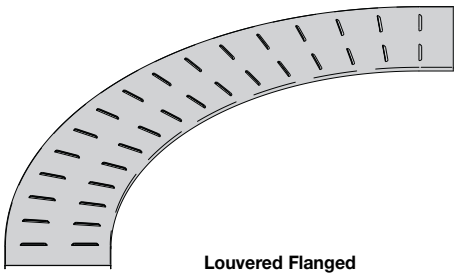
(Prefix) See page 18 for catalogue number prefix.
Width dimensions are to inside wall.
Manufacturing tolerances apply to all dimensions.

All dimensions are in millimetres unless otherwise specified.

Fitting Covers



Solid Flanged



Louvered Flanged

A full range of covers are available for fittings.

Solid covers should be used when maximum enclosure of the cable is desired and no accumulation of heat is expected.

Louvered covers provide an overhead cable shield yet allow heat to escape.
Cooper B-Line recommends that covers be placed on vertical cable ladder runs to a height of 1.5m to 2.5m above the floor to isolate both cables and personnel.

Flanged covers have a 12mm flange. Cover clamps are not included with the cover and must be ordered separately.

Fitting Covers Part Numbering

Example: **CCF S G 10 LVO - 0600 - 90 R0600**

Flanged Cover	Cover Type	Material	Cover Thickness	Ladder Fitting Type	Width	Angle † (°)	Radius
	S = Solid	**G** = Galvanised Steel	**10** = 1.0mm	**LHB** = Horizontal Bend	**0150** = 150mm	**30**	**R0300** = 300mm
				LVI = Vertical Inside Bend	**0300** = 300mm	**45**	
				LVO = Vertical Outside Bend	**0450** = 450mm	**60**	
	L = Louvered	**X** = Stainless Steel 316	**15** = 1.5mm	**LHT** = Horizontal Tee †	**0600** = 600mm	**90**	**R0600** = 600mm
				LHX = Horizontal Cross †	**0750** = 750mm		
				LVTD = Vertical Tee Down †	**0900** = 900mm		
				LVTU = Vertical Tee Up †			
				LCSF = Cable Support Fitting †			

† No angle designation required on these fitting covers.

Expanding & Reducing Fitting Covers Part Numbering

Example: **CCF S G 10 LRR - 0600 - 0300 R0300**

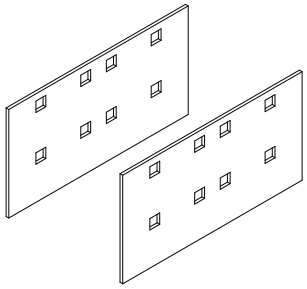
Flanged Cover	Cover Type	Material	Cover Thickness	Ladder Fitting Type	Width 1	Width 2	Radius
	S = Solid	**G** = Galvanised Steel	**10** = 1.0mm	**LRR** = Right Reducer	**0150** = 150mm	**0150** = 150mm	**R0300** = 300mm
				LLR = Left Reducer	**0300** = 300mm	**0300** = 300mm	
				LSR = Straight Reducer	**0450** = 450mm	**0450** = 450mm	
	L = Louvered	**X** = Stainless Steel 316	**15** = 1.5mm	**LRX** = Expanding & Reducing Cross	**0600** = 600mm	**0600** = 600mm	**R0600** = 600mm
					0750 = 750mm	**0750** = 750mm	
				LET = Expanding Tee	**0900** = 900mm	**0900** = 900mm	
				LRT = Reducing Tee			

All dimensions are in millimetres unless otherwise specified.

All dimensions are in millimetres unless otherwise specified.

Standard Splice Plates

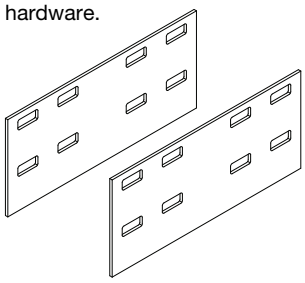
- Not included with straight sections or fittings.
- Standard 8-slot pattern for all steel splice plates.
- Supplied in pairs with hardware.
- (*) Insert G or SS6



Ladder Height mm	Catalogue No.
125	**LSP125(*)**
150	**LSP150(*)**

Expansion Splice Plates

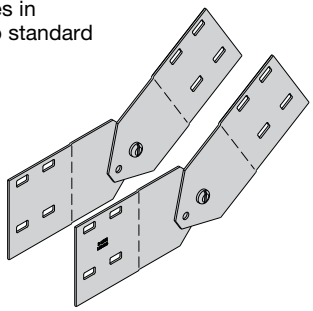
- Expansion plates allow for one inch expansion or contraction of the cable ladder, or where expansion joints occur in the supporting structure.
- Supplied in pairs with expansion hardware.
- (*) Insert G or SS6



Ladder Height mm	Catalogue No.
125	**LES125(*)**
150	**LES150(*)**

Vertical Adjustable Splice Plates

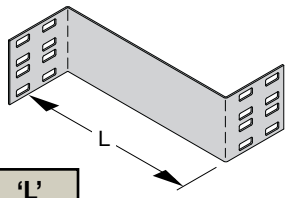
- These plates provide for changes in elevation that do not conform to standard vertical fittings.
- Supplied in pairs with hardware.
- **Earth Continuity Connectors are not required.**
- (*) Insert G or SS6



Ladder Height mm	Catalogue No.
125	**LVA125(*)**
150	**LVA150(*)**

Reducing Coupler Plate

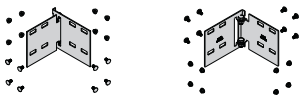
- For offset transitions.
- Supplied as one plate with hardware.
- (*) Insert G or SS6



Ladder Height mm	Catalogue No.	'L' mm
125	**LSR125(*)150**	150
	LSR125(*)300	300
	LSR125(*)450	450
	LSR125(*)600	600
	LSR125(*)750	750
150	**LSR150(*)150**	150
	LSR150(*)300	300
	LSR150(*)450	450
	LSR150(*)600	600
	LSR150(*)750	750

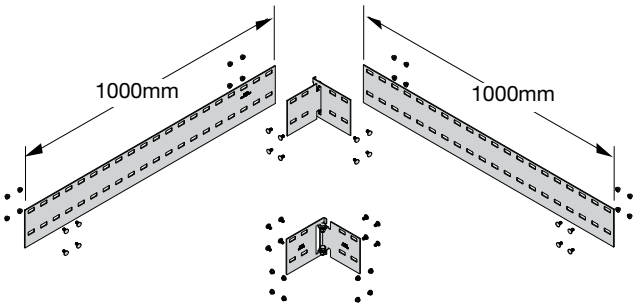
Horizontal Adjustable Splice Plates

- Offered to adjust a cable tray run for changes in direction in a horizontal plane that do not conform to standard horizontal fittings.
- Supplied in pairs with hardware.
- Rail extensions 1000mm length standard.
- (*) Insert G or SS6



Splice Kit

Ladder Height mm	Catalogue No.
125	**LHA125(*)**
150	**LHA150(*)**



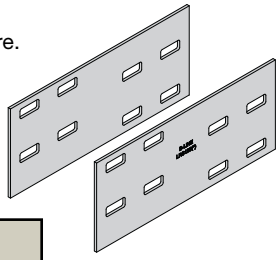
Rail Extension

Ladder Height mm	Catalogue No.
125	**LRE125(*)-1000**
150	**LRE150(*)-1000**

All dimensions are in millimetres unless otherwise specified.

Reversing Splice Plates

- For reversing ladder orientation.
- Supplied as one pair with hardware.
- (*) Insert G or SS6

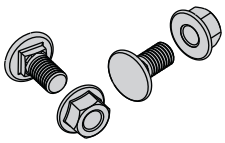


Ladder Height mm	Catalogue No.
125	**LRS125(*)**
150	**LRS150(*)**

Splice Hardware

Catalogue No. M10x20 SNCB(*)
Square Neck Coach Bolt

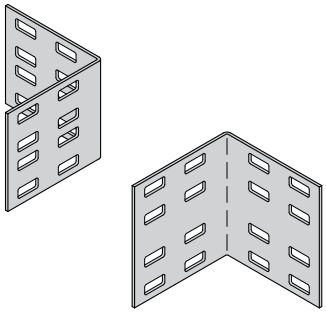
Catalogue No. M10 SFHN(*)
Serrated Flange Hex Nut



Finish (*): HDG = Hot Dipped Galvanised
SS6 = Stainless Steel 316

Tee/Wall Connector

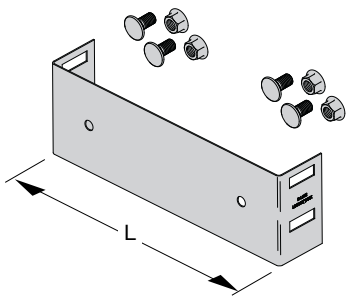
- For field connecting ladder to a wall or to another ladder as a tee.
- Supplied in pairs with M10 hardware.
- (*) Insert G or SS6



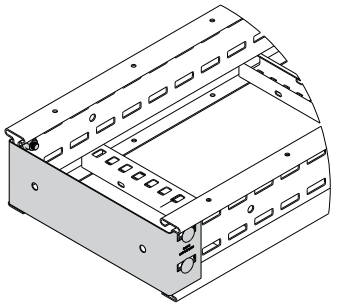
Ladder Height mm	Catalogue No.
125	**LTC125(*)**
150	**LTC150(*)**

Blind End

- For finished look to end of ladder.
- Supplied as one plate with hardware.
- (*) Insert G or SS6

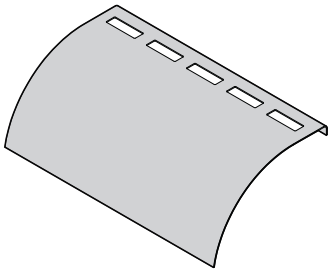


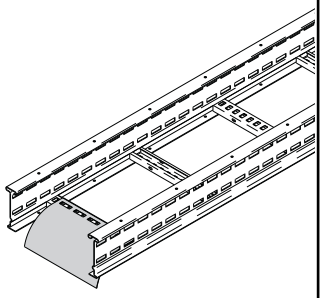
Ladder Height mm	Catalogue No.	'L' mm
125	**LBE125(*)150**	150
	LBE125(*)300	300
	LBE125(*)450	450
	LBE125(*)600	600
	LBE125(*)750	750
	LBE125(*)900	900
150	**LBE150(*)150**	150
	LBE150(*)300	300
	LBE150(*)450	450
	LBE150(*)600	600
	LBE150(*)750	750
	LBE150(*)900	900



Ladder Drop-Out

- Specially-designed Ladder Drop-Outs provide a rounded surface with 100mm radius to protect cable as it exits from the cable ladder, preventing damage to insulation. The drop-out will attach to any desired rung.
- (*) Insert G or SS6





Catalogue No.	Ladder Width mm
LDO(*)150	150
LDO(*)300	300
LDO(*)450	450
LDO(*)600	600
LDO(*)750	750
LDO(*)900	900

All dimensions are in millimetres unless otherwise specified.

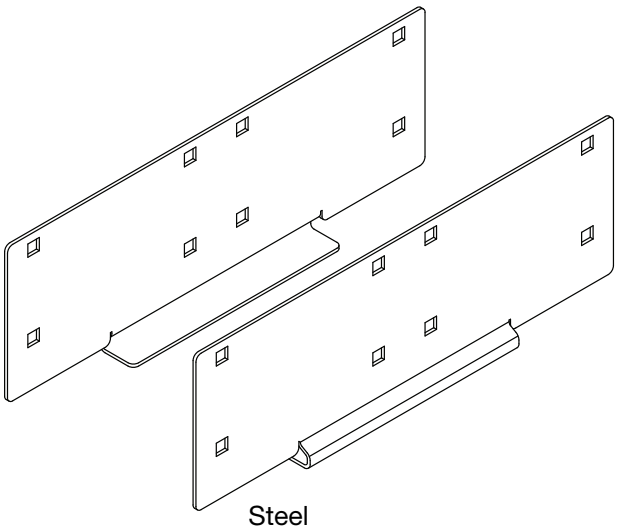
Heavy Duty Expansion Splice Plates

Heavy Duty Expansion Splice Plates are engineered to eliminate the recommended additional support at each expansion joint where cable ladder systems are utilized. They allow installers to support an expansion joint by using only one support per joint versus the traditional two supports.

Expansion joints 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 joint. By utilizing the Cooper B-Line Heavy Duty Expansion Splice Plate, the installer is only required to use one support.

- NEMA VE 2 Compliant
- Lowest total cost of installation solution
- Wrap-around design supports the side rail on bottom of each ladder section
- Available Offering:
    - o Hot dip galvanised steel
    - o Stainless steel 316
- Designed for easy installation in a variety of applications
- Splice plate hardware included
- Utilize with Cooper B-Line Cable Ladder System
    - o Steel System(125G, 150G)
    - o Stainless Steel System (125X, 150X)

Heavy Duty Expansion Splice Plates are one of five key attributes of Cooper B-Line's metallic cable ladder system that combine to yield significant opportunities to reduce structural steel supports in heavy industrial applications by up to 66%. To learn more, visit **www.cooperbline.com/oil-gas**.

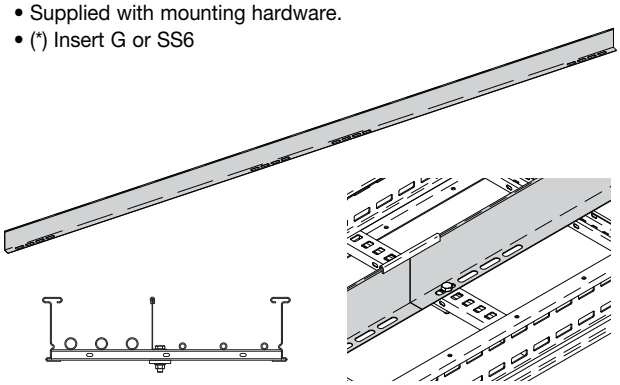


Steel

Steel Ladder Height	Catalogue No. HDG	SS6
125	**LHE125G**	**LHE125SS6**
150	**LHE150G**	**LHE150SS6**

Straight Divider

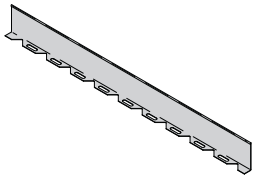
- Standard length: 3000mm (3m) or 1000mm (1m).
- Order catalogue number based on loading depth.
- Supplied with mounting hardware.
- (*) Insert G or SS6



Catalogue No.	Side Rail Height mm	Length mm
LSD125(*)-3000	125	3000
LSD150(*)-3000	150	3000

Bendable Divider

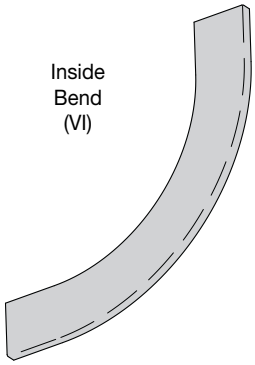
- Horizontal Bend Barriers are flexible in order to conform to any horizontal fitting radius. Cut to length.
- Order catalogue number based on loading depth.
- Supplied with mounting hardware.
- Standard length is 1000mm (1m), sold individually.
- (*) Insert G or SS6

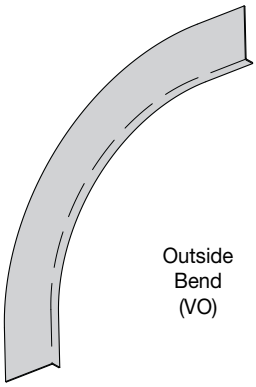


Catalogue No.	Side Rail Height mm	Length mm
LBD125(*)-1000	125	1000
LBD150(*)-1000	150	1000

Vertical Dividers

- Vertical Bend Barriers are preformed to conform to a specific vertical fitting.
- Supplied with mounting hardware and a 99-9982 Divider Splice.
- (*) Insert G or SS6
- (**) Insert 30, 45, 60 or 90 for degrees
- (***) Insert 300mm or 600mm for radius

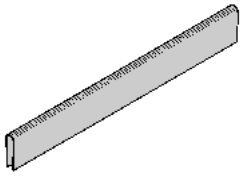


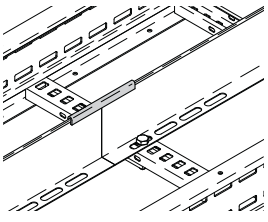


Side Rail Height	Catalogue No.		Divider Height mm
	Inside Bend	Outside Bend	
125	LID125(*)(**)(***)	LOD125(*)(**)(***)	100
150	LID150(*)(**)(***)	LOD150(*)(**)(***)	125

Divider Splice

- Plastic splice holds adjoining barrier strips in straight alignment.





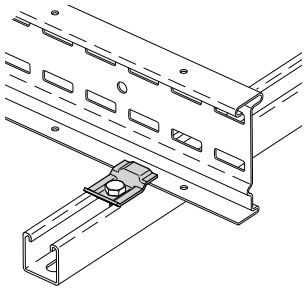
Catalogue No.	99-9982

All dimensions are in millimetres unless otherwise specified.

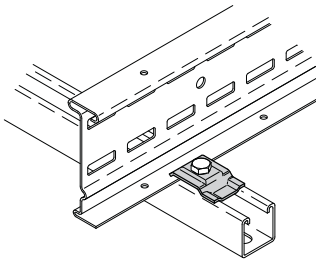
Cable Ladder Clamp/Guide

- Features a no-twist design.
- Has four times the strength of the traditional design.
- Each side is labelled to ensure proper installation.
- Supplied in pairs without hardware.
- (*) Insert G or SS6

Patent # RE35479



Installed as a guide.



Installed as a clamp.

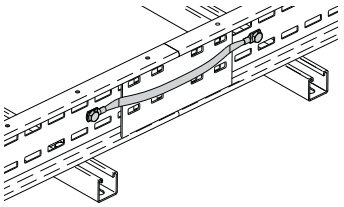
Catalogue No.	Overall Length	Hardware Size
9(*)-1204	38mm	M6
9(*)-1208	57mm	M10
9(*)-1205	57mm	M12

When installing this device as an expansion guide on the outside flange of *Steel Side Rail*, use the Catalogue No. **B202** Square Washer (see page 33) in order to properly elevate the guide.

Earth Continuity Connector

Use at each expansion splice and where the cable tray is not mechanically/electrically continuous to ground.

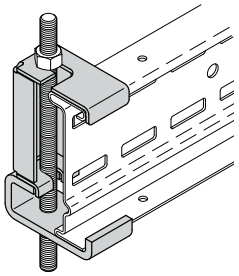
- Sold individually.
- Hardware included.
- 200 amp rating.
- Bonding jumper is 350mm long.
- Braided design



Catalogue No.	Cross-Sectional Area	Ampacity
LBJ16-M10	16mm^2	200

Rod Hanger

- For M10 threaded rod.
- Supplied in pairs.
- Order threaded rod and hex nuts separately.
- Two piece "J"-hanger design.
- 6.67kN per pair capacity safety factor 3.
- (*) Insert G or SS6

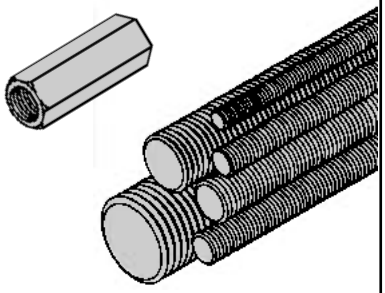


Side Rail Height	Catalogue No.
125	**LRH125(*)**
150	**LRH150(*)**

Threaded Rod (ATR) & Rod Coupling

Loading based on safety factor 5.

See Cooper B-Line Strut Systems Catalogue for other size and finish options.



Catalogue No.	Max. Load kN	Size x Length mm	Finish	Coupling Cat. No.
BRT-06-100 ZN	0.9	M6 x 1m	E-ZINC	**BCN-6 ZN**
BRT-06-100 SS6	0.9	M6 x 1m	SS6	**BCN-6 SS6**
BRT-06-100 HDG	0.9	M6 x 1m	HDG	**BCN-6 HDG**
BRT-06-300 ZN	0.9	M6 x 3m	E-ZINC	**BCN-6 ZN**
BRT-06-300 SS6	0.9	M6 x 3m	SS6	**BCN-6 SS6**
BRT-08-100 ZN	1.7	M8 x 1m	E-ZINC	**BCN-8 ZN**
BRT-08-100 SS6	1.7	M8 x 1m	SS6	**BCN-8 SS6**
BRT-08-100 HDG	1.7	M8 x 1m	HDG	**BCN-8 HDG**
BRT-08-300 ZN	1.7	M8 x 3m	E-ZINC	**BCN-8 ZN**
BRT-08-300 SS6	1.7	M8 x 3m	SS6	**BCN-8 SS6**
BRT-10-100 ZN	2.6	M10 x 1m	E-ZINC	**BCN-10 ZN**
BRT-10-100 SS6	2.6	M10 x 1m	SS6	**BCN-10 SS6**
BRT-10-100 HDG	2.6	M10 x 1m	HDG	**BCN-10 HDG**
BRT-10-300 ZN	2.6	M10 x 3m	E-ZINC	**BCN-10 ZN**
BRT-10-300 SS6	2.6	M10 x 3m	SS6	**BCN-10 SS6**

All dimensions are in millimetres unless otherwise specified.

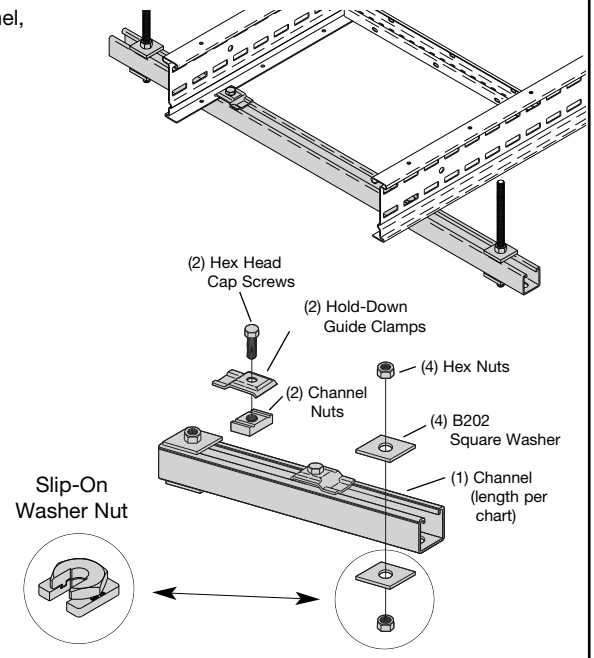
Trapeze Support Kit

Cooper B-Line's trapeze kits provide the components required for a single trapeze support in one package. These kits are available in hot dip galvanised steel or 316 stainless steel.

The slotted channel provides the convenience of pre-punched slots, which eliminate the need for field drilling.

The illustrated hardware is sealed in a plastic bag and boxed with the channel, which is pre-cut to the appropriate length as shown in the chart.

Designed for use with M10 or M12 threaded rod. Order rod separately.

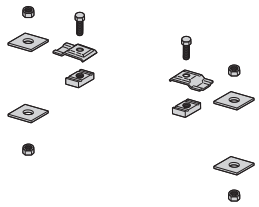


Catalogue No.	Rod Size mm	Ladder Width mm	Channel Length mm	Uniform Load kN
LTS(*)150M10	M10	150	400	7.1
LTS(*)150M12	M12	150	400	7.1
LTS(*)300M10	M10	300	550	5.0
LTS(*)300M12	M12	300	550	5.0
LTS(*)450M10	M10	450	700	3.8
LTS(*)450M12	M12	450	700	3.8
LTS(*)600M10	M10	600	850	3.1
LTS(*)600M12	M12	600	850	3.1
LTS(*)750M10	M10	750	1000	2.6
LTS(*)750M12	M12	750	1000	2.6
LTS(*)900M10	M10	900	1150	2.3
LTS(*)900M12	M12	900	1150	2.3

(*) Insert G or SS6 Safety factor of 3.0 on all loads.

To replace square washers and hex nuts with Slip-On Washer Nuts add **SLWN** to part number.

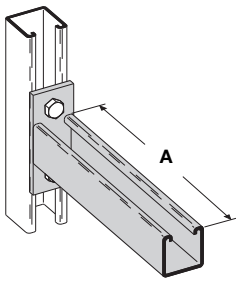
Trapeze Hardware Kit



Catalogue No.	LTHGM10	LTHSS6M10	LTHGM12	LTHSS6M12
Parts Packed In Plastic Bag	(1) pr. 9G-1208	(1) pr. 9SS6-1208	(1) pr. 9G-1205	(1) pr. 9SS6-1205
	(2) M10 x 22 SS6 HHCS		(2) M12 x 22 SS6 HHCS	
	(2) BMS-10 HDG	(2) BMS-10 SS6	(2) BMS-12 HDG	(2) BMS-12 SS6
	(4) B201HDG	(4) B201SS6	(4) B202HDG	(4) B202SS6
	(4) M10 HN SS6	(4) M10 HN SS6	(4) M12 HN SS6	(4) M12 HN SS6

Cantilever Bracket

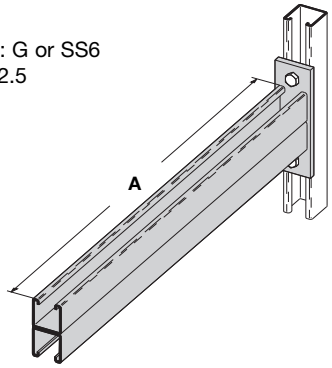
- (*) Finishes available: G or SS6
- Safety Load Factor 2.5



Catalogue No.	Uniform Load kN	Ladder Width mm	'A' mm
LBC(*)-150	4.27	150	300
LBC(*)-300	2.84	300	450
LBC(*)-450	2.13	450	600

Cantilever Bracket

- (*) Finishes available: G or SS6
- Safety Load Factor 2.5

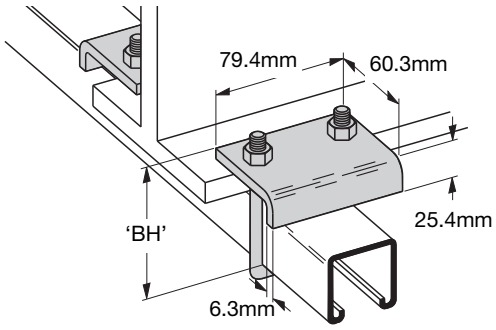


Catalogue No.	Uniform Load kN	Ladder Width mm	'A' mm
LBCA(*)-150	7.37	150	300
LBCA(*)-300	4.88	300	450
LBCA(*)-450	3.71	450	600
LBCA(*)-600	2.95	600	750
LBCA(*)-750	2.44	750	900
LBCA(*)-900	2.06	900	1050

All dimensions are in millimetres unless otherwise specified.

Beam Clamps

- Finishes available: * Insert HDG or SS6
- Recommended Load: 5.34 kN (1200 lbs.)
- Safety Load Factor 5.0
- Sold in pairs



Catalogue No.	Channel Height	Max. Flange Thickness	'BH' Bolt Height
LCB441-20-22(*)	41.3mm	20mm	85.7mm
LCB441-20-22A(*)	82.6mm	20mm	127.0mm

Quantity of Standard Cover Clamps Required

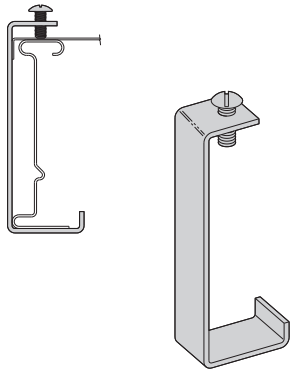
Straight Section 1.5M .....4 pcs.
Straight Section 3.0M .....6 pcs.
Horizontal/Vertical Bends .....4 pcs.
Tees .....6 pcs.
Crosses .....8 pcs.

Note: When using the Heavy Duty Cover Clamp, only one-half the number of clamps stated above is required.

Standard Cover Clamp

- For indoor service only.
- Sold per piece.

(*) Finish: Insert G or SS6

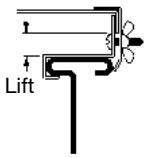


Ladder Height	Catalogue No.
125	**LCL125(*)**
150	**LCL150(*)**

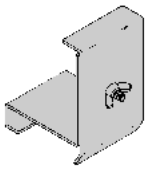
Raised Cover Clamp

- For use with flanged covers only.

(*) Finish: Insert G or SS6

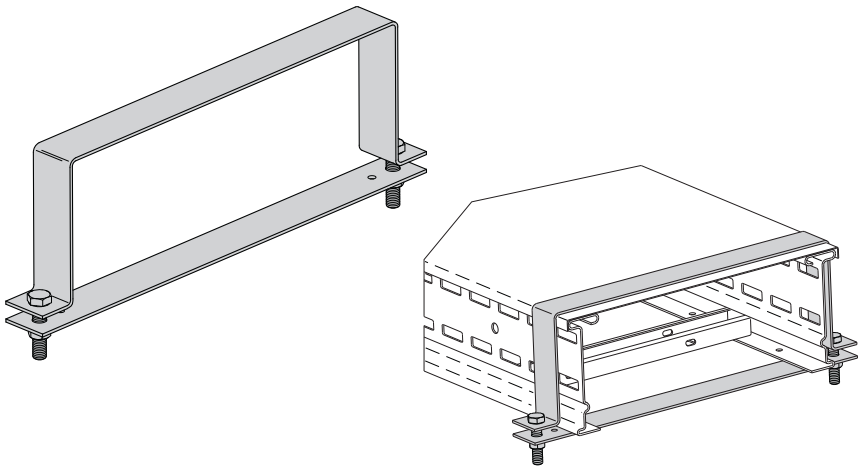


Type	Catalogue No.	Lift mm
Straight Section Clamp	**9(*)-9115-1-M6**	25
	9(*)-9115-2-M6	50
	9(*)-9115-3-M6	75
	9(*)-9115-4-M6	100
Fitting Clamp	**9(*)-9101-M6**	25
	9(*)-9102-M6	50
	9(*)-9103-M6	75
	9(*)-9104-M6	100



Heavy Duty Cover Clamp

- Recommended for outdoor service.
- (*) Finishes available: G or SS6
- (xx) Insert tray width - 150 to 900

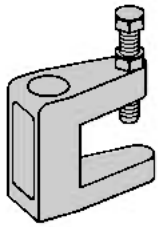


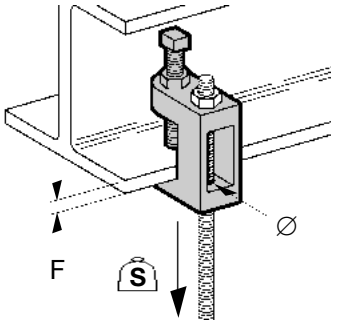
Ladder Height mm	Catalogue No.
125	**LCH125(*)(xx)**
150	**LCH150(*)(xx)**

All dimensions are in millimetres unless otherwise specified.

Beam Clamp

- Finish: Electroplated Zinc
  Other finishes available upon request

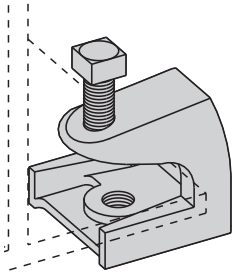


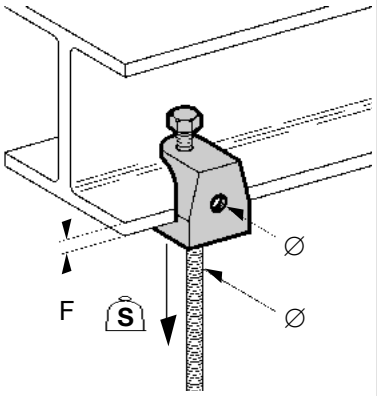


Catalogue No.	Hole/Rod Size Ø	Max. Flange Thickness 'F'	Design Load kg (S)	lbs.
BC08	9mm	≤18mm	120	260
BC10	11mm	≤19mm	240	520
BC12	13mm	≤23mm	340	740
BMC-06	M6	≤18mm	100	220
BMC-08	M8	≤18mm	120	260
BMC-10	M10	≤19mm	240	520
BMC-12	M12	≤23mm	340	740

Beam Clamp

- Finish: Electroplated Zinc
  Other finishes available upon request

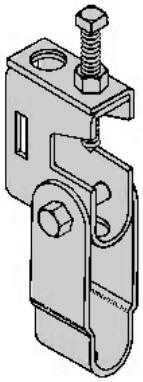


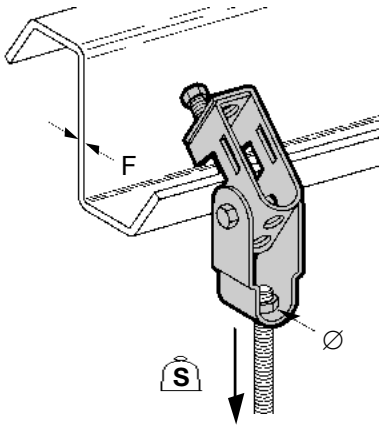


Catalogue No.	Hole/Rod Size Ø	Max. Flange Thickness 'F'	Design Load kg (S)	lbs.
B444-M6	M6	≤13mm	145	300
B444-M8	M8	≤13mm	145	300
B444-M10	M10	≤13mm	145	300

Beam Clamp with Swivel

- Finish: Electroplated Zinc
  Other finishes available upon request



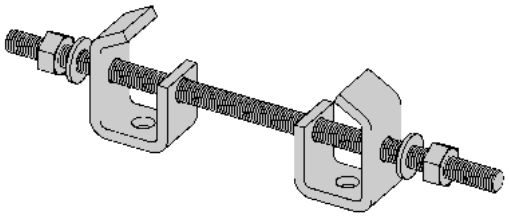


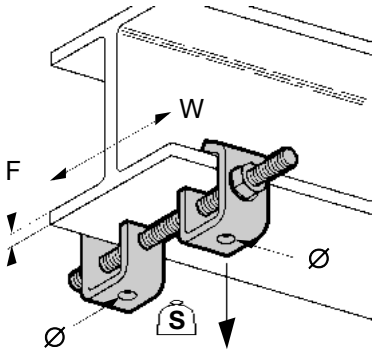
Catalogue No.	Hole/Rod Size Ø	Max. Flange Thickness 'F'	Design Load kN (S)	lbs.
B751-M10	11mm	≤19mm	220	475

All dimensions are in millimetres unless otherwise specified.

Double Rod Hanger - Under Beam Clamp

- Finish: Electroplated Zinc
  Other finishes available upon request
- Safety Load Factor 5.0

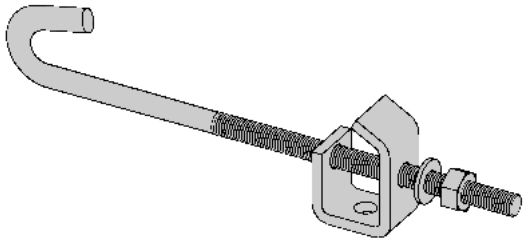


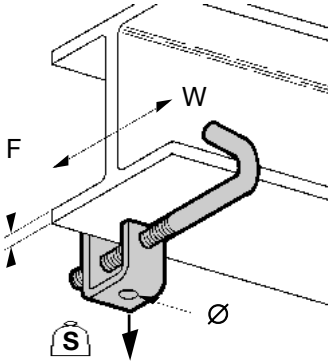


Catalogue No.	Hole/Rod Size Ø	Max. Flange Thickness 'F'	Design Load kN (S)	lbs.
BBC1-175	11mm	≤13mm x 175mm	240	520
BBC1-275	11mm	≤13mm x 275mm	240	520
BBC1-375	11mm	≤13mm x 375mm	240	520

Single Rod Hanger - Under Beam Clamp

- Finish: Electroplated Zinc
  Other finishes available upon request
- Safety Load Factor 5.0

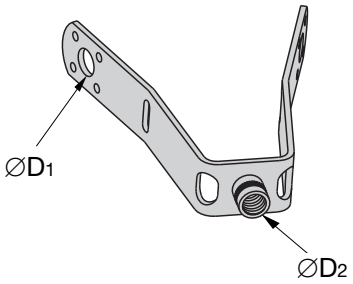


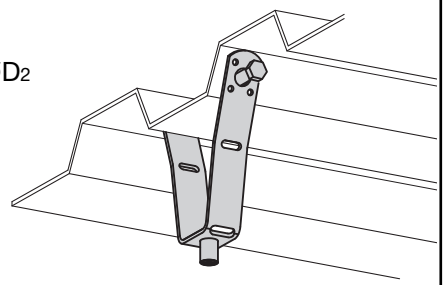


Catalogue No.	Hole/Rod Size Ø	Flange 'F' x 'W'	Design Load kg (S)	lbs.
BBC1-J125	11mm	≤13mm x 125mm	240	520
BBC1-J175	11mm	≤13mm x 175mm	240	520
BBC1-J225	11mm	≤13mm x 225mm	240	520
BBC1-J275	11mm	≤13mm x 275mm	240	520

Ceiling Purlin Rod Hanger

- Finish: Chromium Zinc
  Other finishes available upon request





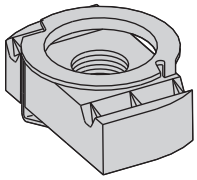
Catalogue No.	ØD1	ØD2
BHT	14mm	10.5mm
BHT-8	14mm	M8
BHT-10	14mm	M10

All dimensions are in millimetres unless otherwise specified.

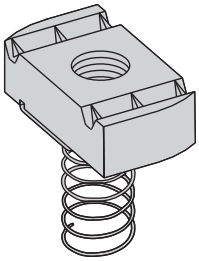
Channel Nuts

- Fits 41mm wide channels
- Finish: Electroplated Zinc
  Other finishes available upon request
- Safety Load Factor 5.0

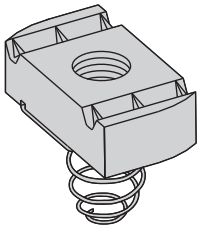
Catalogue No.	Rod Size mm
BMT-6	M6
BMT-8	M8
BMT-10	M10
BMS-6M	M6
BMS-8M	M8
BMS-10M	M10
BMS-6S	M6
BMS-8S	M8
BMS-10S	M10
BMS-12S	M12
BMS-6	M6
BMS-8	M8
BMS-10	M10
BMS-12	M12



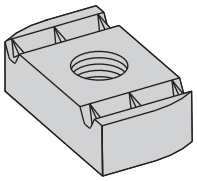
BMT Series



BMS-_M Series



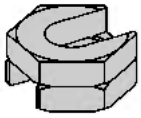
BMS-_S Series



BMS Series

Slip-On Lock Nut

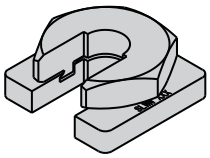
- Finish: Electroplated Zinc
  Other finishes available upon request



Catalogue No.	Rod Size mm
BSLN-6	M6
BSLN-8	M8
BSLN-10	M10
BSLN-12	M12

BUZZNUT™ Washer & Nut Combo

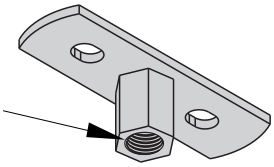
- Finish: ZN or SS6
  Other finishes available upon request



Catalogue No.	Rod Size mm
SLWNM6	M6
SLWNM8	M8
SLWNM10	M10
SLWNM12	M12

Ceiling Threaded Rod Plate

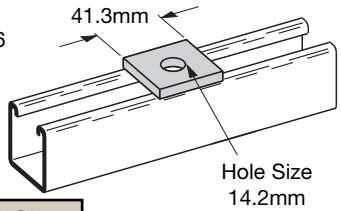
- Finish: Electroplated Zinc
  Other finishes available upon request



Catalogue No.	Rod Size mm
BFB-810	M8/M10

Square Washer

(*) Finish: Insert HDG or SS6



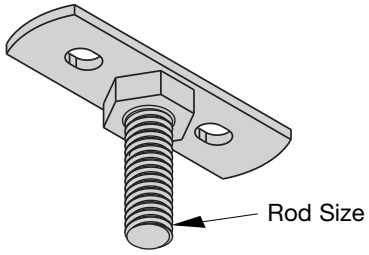
Catalogue No.	Rod Size mm
B201 (*)	M10
B202 (*)	M12

All dimensions are in millimetres unless otherwise specified.

Ceiling Stud Plate

- Finish: Electroplated Zinc
  Other finishes available upon request

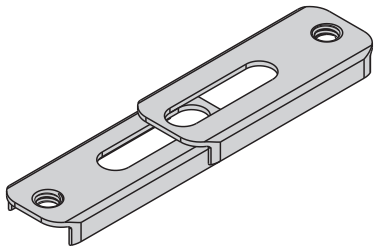
Catalogue No.	Rod Size & Length
BMB-8	M8 x 30mm
BMB-810	M10 x 30mm



Adjustable Threaded Rod Hanger Plate

- Finish: Electroplated Zinc
  Other finishes available upon request

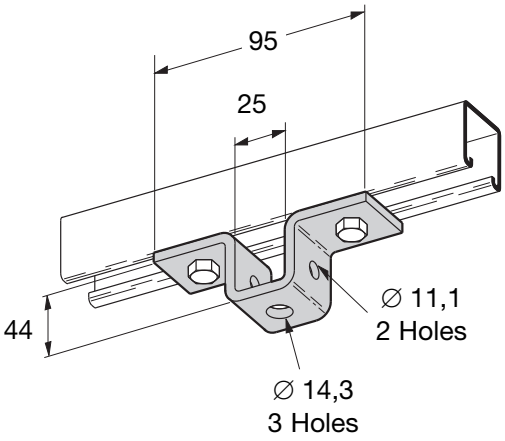
Catalogue No.	Span mm
BDS-8	50 - 94



5-Hole U-Support

- Finish: Electroplated Zinc
  Other finishes available upon request

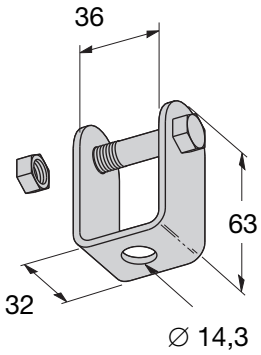
Catalogue No.
B107A

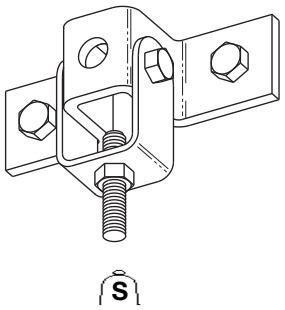


U-Support Swivel Hanger

- Finish: Electroplated Zinc
  Other finishes available upon request

Catalogue No.
B593





400kg
assembly only

All dimensions are in millimetres unless otherwise specified.

Metric Cable Ladder Technical Guide

The technical data contained within this guide is intended to provide the engineer with adequate information to design and specify an efficient and robust cable ladder system. Cooper B-Line recommends that the engineer considers the following subjects when designing the cable ladder system which are detailed within the corresponding sections of this guide:

1. Side Rail and Rung Design
2. Materials
3. Finish
4. Corrosion
5. Load Performance Type Tests
6. Environmental Loads
7. Impact
8. Electrical Continuity
9. Free Base Area
10. Thermal Contraction and Expansion
11. Support and Installation Recommendations
12. Cable Restraint

1. Side Rail and Rung Design

Cooper B-Line cable ladder side rail uses a high performance rolled I-Beam profile. The more complex the structural profile, the higher the strength yielded by the profile. The rolled I-Beam profile therefore, provides greater performance than standard C-section and complex C-section profiles commonly used in cable ladder designs. Due to the higher performance provided by the I-Beam it allows for a reduced material gauge thickness, reducing product weight.

The slotted side rail is designed to provide equally spaced slots along the entire length. These allow for the installer to field cut and modify the standard length and connect new lengths and/or fittings with a standard splice plate without the need for on-site drilling. The slots also allow the designer and installer to use the slots for the attachment of additional accessories and equipment, again without the need to drill the cable ladder. In addition, the slots result in a lighter weight ladder with increased ventilation. Holes on the top and bottom of the side rails allow for drainage.

All rungs have slots on the upper surface, sized for M10 hardware, to allow for the attachment of banding or cleats.

In addition, holes on the sides of the rungs allow for drainage when tray are installed on their sides.

2. Materials

MATERIAL	STANDARD	GRADE
Steel	BS EN 10025-2 : 2004	S275
Stainless Steel	BS EN 10088-2 : 2005	1.4404 (AISI 316)

Steel Grade S275:

Cooper B-Line cable ladder is manufactured from continuously roll formed Grade S275 structural steel. Use of a structural grade of steel guarantees the material to meet the minimum structural and chemical properties specified in the BS EN 10025-2 : 2004 standard. All cable ladder side rails are number stamped to ensure full material traceability.

Steel Grade S275:

Typical Chemical Composition												
Name	Number	Deoxidation Method	C % For thickness range			Si max	Mn max	P max	S max	N max	Cu max	Other
			=< 16	> 16 =<40	>40	%	%	%	%	%	%	%
S275	1.0145	FF	0,21	0,21	0,21	-	1,6	0,035	0,035	-	0,60	-

Typical Mechanical Properties														
Name	Number	ReH Minimum Yield strength (MPa) for nominal thickness(mm)									R m (MPa) for nominal thickness (mm)				
		<16	=>16 =< 40	>40 =< 63	>63 =< 80	>80 =< 100	>100 =< 150	>150 =< 200	>200 =< 250	>250 =< 400	<3	=>3 =< 100	>100 =< 150	>150 <= 250	>250 =< 400
S275	1.0145	275	265	255	245	235	225	215	205	195	430-580	410-560	400-540	380-540	380-540

Stainless Steel Grade 1.4404 (AISI 316L):

Cooper B-Line cable ladder is manufactured from continuously roll formed Grade 1.4404 (AISI 316L) stainless steel. Grade 1.4404 is a non-magnetic stainless steel and part of the “austenitic” group of stainless steels. It is designed to withstand corrosive atmospheres, low and high ambient and operating temperatures. Grade 1.4404 is a superior grade of stainless steel due to it containing molybdenum. This enhances its resistance to corrosion and makes it appropriate for use in marine salt laden saliferous environments. The importance of using Grade 1.4404 (AISI 316L) relates to the corrosion resistance of the steel after welding. Stainless steel resists corrosion because it forms an impervious passive oxide layer on its surface which forms when oxygen is present. When stainless steel is welded it may lead to a chromium carbide to precipitate at the grain boundaries, depleting the chromium within the austenite and preventing the passive oxide layer from forming. Due to the grain boundaries being small and highly anodic, a rapid corrosion can occur. This process can be prevented by using stainless steels with a carbon content of less than 0.03%. Grade 1.4044 typically has less than 0.03% carbon content.

There are a number of important factors that can make the use of stainless steel imperative. These factors can include long term maintenance costs, corrosion resistance, aesthetic appearance, and ambient operating temperature. Grade 1.4404 stainless steel exhibits stable structural properties such as yield strength and high creep strength at lowered and elevated ambient operating temperatures.

Cooper B-Line cable ladder is welded using a stainless steel welding wire to ensure each weldment exhibits the same corrosion resistance as the base metal. Localised staining in the weld area/heat effected zone may occur when exposed to severe corrosive environments. The shielding gases and low carbon materials used in our welding processes minimise carbon contamination during welding to reduce staining and stress corrosion.

To improve the aesthetic finish, minimise or remove staining, and improve corrosion resistance by chemically reforming the passive oxide layer, we recommend the engineer specify passivation after manufacture.

Stainless Steel Grade 1.4404 (AISI 316L):

Typical Chemical Composition													
Name	Number	C	Si	Mn	P max.	S	N	Cr	Cu	Mo	Nb	Ni	Others
Standard Grades													
X2CrNiMo17-12-2	1.4404	≤0,030	≤1,00	≤2,00	0,045	≤0,015	≤0,11	16,5-18,5	-	2,00-2,50	-	10,0-13,0	-

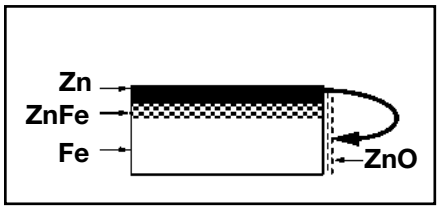
Austenitic steels in solution annealed condition

Typical Mechanical Properties						
Name	Number	Product Form	Thickness max	$R_{p0,2}$	R_m	A
			mm	MPa	MPa	%
Standard grades						
X2CrNiMo17-12-2	1.4404	C	8	240	530-680	40
		H	13,5	220	530-680	40
		P	75	220	520-670	45
		H	13,5	220	530-730	35
		P	75	220	520-720	35

3. Finish

Zinc Coatings

Zinc protects steel in two ways. First it protects the steel as a coating and second as a sacrificial anode to repair bare areas such as cut edges, scratches, and gouges. The corrosion protection of zinc is directly related to its thickness and the environment. This means a .2 mil coating will last twice as long as a .1 mil coating in the same environment.



Galvanizing also protects cut and drilled edges.

Hot Dip Galvanised After Fabrication

(Hot dip galvanised or batch hot dip galvanised)

Hot Dip Galvanised After Fabrication cable ladder products are fabricated from steel and then completely immersed in a bath of molten zinc. A metallic bond occurs resulting in a zinc coating that completely coats all surfaces, including edges and welds.

Another advantage of this method is coating thickness. Cable ladders hot dip galvanised after fabrication to provide an average minimum zinc coating thickness in accordance with BS EN ISO 1461.

The zinc thickness is controlled by the amount of time each part is immersed in the molten zinc bath as well as the speed at which it is removed. The term "double dipping" refers to parts too large to fit into the galvanizing kettle and, therefore, must be dipped one end at a time. It does not refer to extra coating thickness.

The layer of zinc which bonds to steel provides a dual protection against corrosion. It protects first as an overall barrier coating. If this coating happens to be scratched or gouged, zinc's secondary defence is called upon to protect the steel by galvanic action.

Hot dip galvanizing after fabrication is recommended for prolonged outdoor exposure and will protect steel for many years in most outdoor environments and in many aggressive industrial environments .

4. Corrosion

IEC 61357 : 2006 section 6.5.2, Table 1 “classification for resistance against corrosion” defines the classification class of various materials and finishes used in the manufacture and supply of cable ladder systems against resistance to corrosion.

In accordance with this classification table Cooper B-Line cable ladder can be supplied as to meet the following classifications:

Steel HDG : Class 6

Stainless Steel 1.4404 : Class 9B

Stainless Steel 1.4404 : Class 9D

Stainless Steel

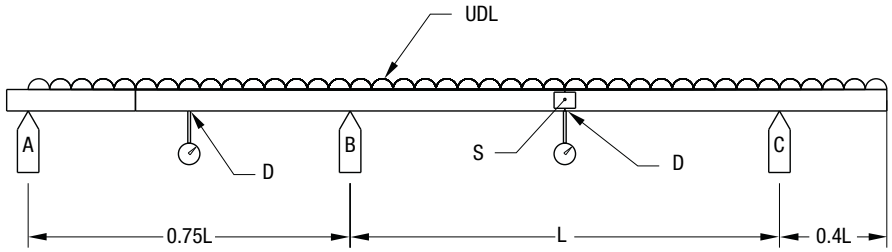
Several important conditions could make the use of stainless steel imperative. These include long term maintenance costs, corrosion resistance, appearance and locations where product contamination is undesirable. Stainless steel exhibits stable structural properties such as yield strength and high creep strength at elevated temperatures.

Cooper B-Line’s stainless steel cable ladder is welded using stainless steel welding wire to ensure each weldment exhibits the same corrosion resistant characteristic as the base metal. Localized staining in the weld area or heat affected zone may occur in severe environments. Specialized shielding gases and low carbon materials are used to minimize carbon contamination during welding and reduce staining and stress corrosion. Specify passivation after fabrication to minimise staining, improve aesthetics and further improve corrosion resistance.

5. Load Performance Type Tests

Cooper B-Line cable ladder has been performance load tested in full compliance with the requirements of IEC 61537 : 2006 standard titled “Cable Management - Cable Tray Systems and Cable Ladder Systems” and load and deflection results published within this catalogue are based upon these tests. Type load tests have been witnessed by DNV and Lloyd’s independent third party inspectorates. We recommend that the specifying engineer insists upon independent third party certificates confirming compliance to the IEC standard and published load tables within the manufacturer's catalogue. Cooper B-Line has tested our cable ladder to the following type tests detailed within the IEC 61537 standard:

Type Test - II



L = Intermediate Span

S = Splice Location (Mid-span)

UDL = Uniform Distributed Load

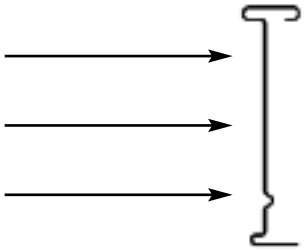
A,B,C = Support Positions

D = Deflection Measuring Point (Mid-span)

6. Environmental Loads

Wind Loads

Wind loads need to be considered for all outdoor cable ladder installations. The most severe loading to be considered is impact pressure normal to the cable ladder side rails.



The impact pressure corresponding to several wind velocities are given below in Table 1.

Table 1
Impact Pressures

V (km/h)	P (kg/m^2)	V (km/h)	P (kg/m^2)	V (km/h)	P (kg/m^2)
24	2.83	104	52.70	184	164.94
32	4.98	112	61.00	192	179.58
40	7.81	120	70.27	200	195.20
48	11.22	128	80.03	208	211.30
56	15.27	136	90.28	216	227.41
64	19.96	144	101.02	224	244.49
72	25.28	152	112.73	232	262.54
80	31.18	160	124.93	240	281.09
88	37.72	168	137.62		
96	44.94	176	150.79		

V= Wind Velocity P= Impact Pressure

Note: These values are for an air density of 16.02 kg/m^3 corresponding to a temperature of 15.5° C and barometric pressure of 10,355 kg/m^2.

Example Calculation: Side load for 150mm side rail with 160 km/h wind

$$\frac{124.93 \times 150}{1000} = 18.74 \text{ kg/m}$$

When covers are installed on outdoor cable ladders, another factor to be considered is the aerodynamic effect which can produce a lift strong enough to separate a cover from a ladder. Wind moving across a covered ladder (see detail 2) creates a positive pressure inside the ladder and a negative pressure above the cover. This pressure difference can lift the cover off the ladder.

Detail 2

Cooper B-Line recommends the use of heavy duty wrap-around cover clamps when covered ladders are installed in an area where strong winds occur.

Ice Loads

Glaze ice is the most commonly seen form of ice build-up. It is the result of rain or drizzle freezing on impact with an exposed object. Generally, only the top surface (or the cover) and the windward side of a cable ladder system is significantly coated with ice. The maximum design load to be added due to ice should be calculated as follows:

$$LI = \left(\frac{W \times TI}{1{,}000{,}000} \right) \times DI \quad \text{where;}$$

LI= Ice Load (kg/m)
W= Cable Tray Width (mm)
TI= Maximum Ice Thickness (mm)
DI= Ice Density = 913 kg/m^3
the maximum ice thickness will vary depending on location. A thickness of 12mm can be used as a conservative standard.

Example Calculation:

Ice Loads for 600mm wide tray with 12mm thick ice;

$$\frac{600 \times 12}{1{,}000{,}000} \times 913 = 6.57 \text{ kg/m}$$

Snow Loads

Snow is measured by density and thickness. The density of snow varies almost as much as its thickness. The additional design load from snowfall should be determined using the building codes which apply for each installation.

7. Impact

Cooper B-Line cable ladder conforms to an Impact Test Value of 50J based on the IEC 61537:2006, Section 10.9.

8. Electrical Continuity

Electrical continuity testing of Cooper B-Line cable ladder was conducted in accordance with IEC 61357 : 2006, section 11.1.2 and results in an electrical impedance less than 50milli ohms across the joint and 5 milli ohms per metre without a joint.

9. Free Base Area

In accordance with IEC 61537; 2006, section 6.8, Table 5 “Free Base Area Classification” Cooper B-Line cable ladder has a classification of ‘Y’ on standard 300mm rung spacing and a calculated free base area of 86%.

10. Thermal Contraction and Expansion

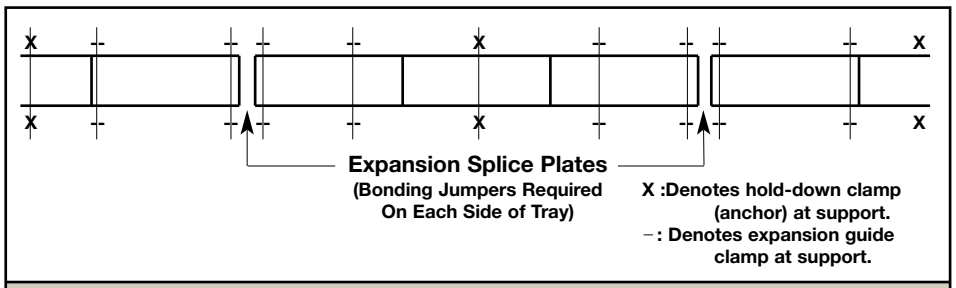
It is important that thermal contraction and expansion be considered when installing cable ladder systems. The length of the straight cable tray runs and the temperature differential govern the number of expansion splice plates required (see Table 2 below).

The cable ladder should be anchored at the support nearest to its midpoint between the expansion splice plates and secured by expansion guides at all other support locations (see Figure 1). The cable ladder should be permitted longitudinal movement in both directions from that fixed point. When used, covers should be overlapped at expansion splices.

Accurate gap settings at the time of installation are necessary for the proper operation of the expansion splice plates. The following procedure should assist the installer in determining the correct gap: (see Figure 2)

1. Plot the highest expected metal temperature on the maximum temperature line.
2. Plot the lowest expected metal temperature on the minimum temperature line.
3. Draw a line between the maximum and minimum points.
4. Plot the metal temperature at the time of installation to determine the gap setting.

Figure 1



Typical Cable Ladder Installation

Figure 2

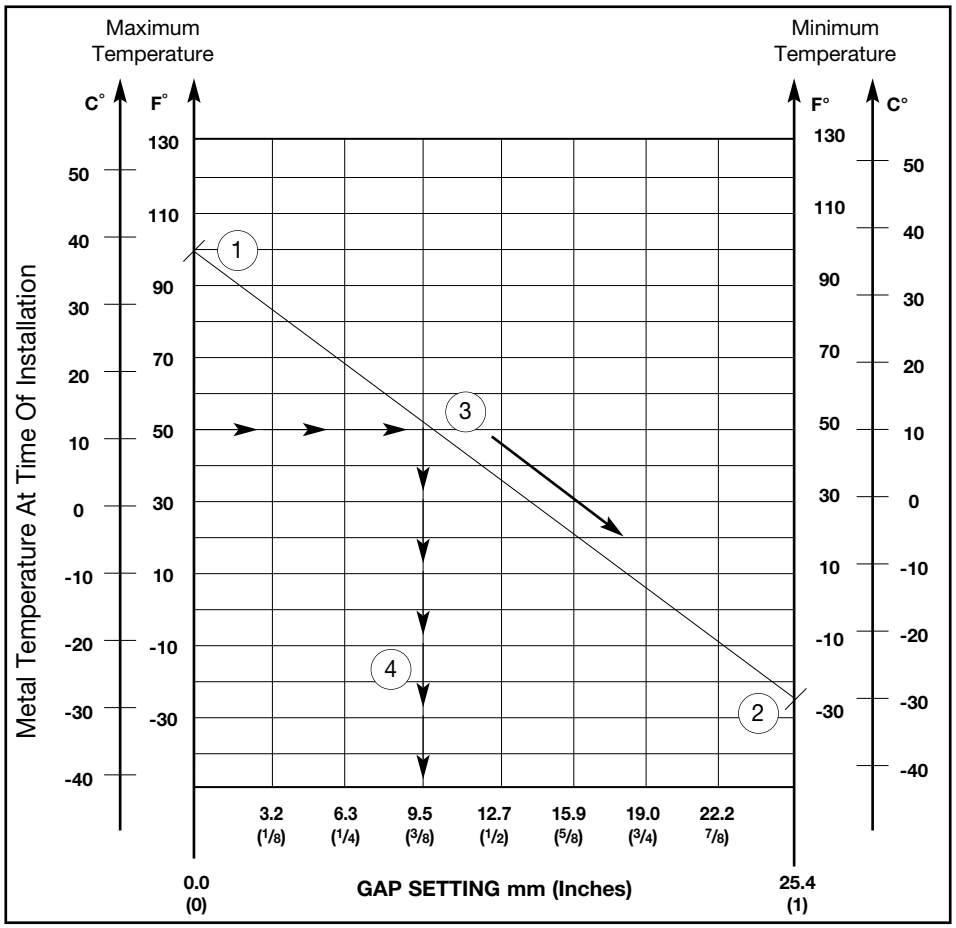


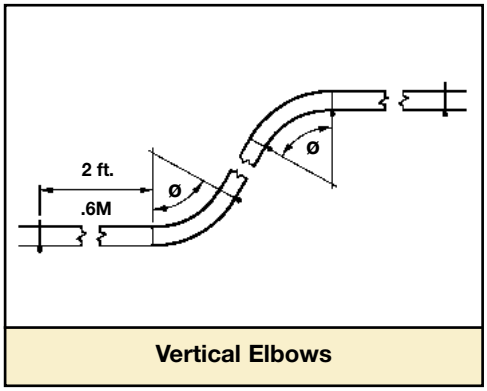
Table 2

Maximum Spacing Between Expansion Joints For 25mm Movement							
Temperature Differential		Steel		Stainless Steel 304		316	
˚C	˚F	m	Feet	m	Feet	m	Feet
13.9	25	156.0	512	105.7	347	115.5	379
27.8	50	78.0	256	53.0	174	57.6	189
41.7	75	52.1	171	35.4	116	38.4	126
55.6	100	39.0	128	26.5	87	29.0	95
69.4	125	31.1	102	21.0	69	23.2	76
83.3	150	25.9	85	17.7	58	19.2	63
97.2	175	22.2	73	15.2	50	16.4	54

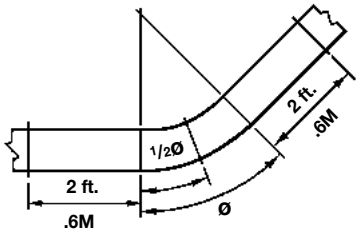
Note: every pair of expansion splice plates requires two earth continuity connectors for grounding continuity.

11. Support and Installation Recommendations

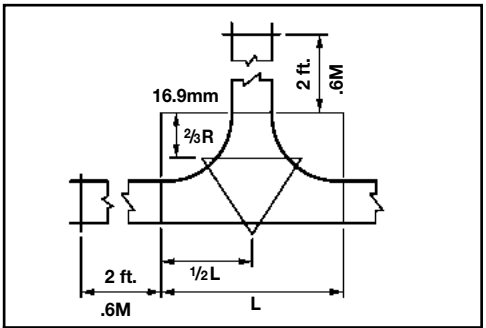
RECOMMENDED SUPPORT LOCATIONS FOR FITTINGS



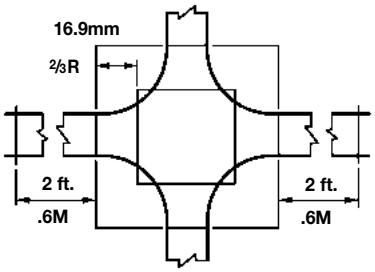
Vertical Elbows



Horizontal Bends



Horizontal Tee



Horizontal Cross

Deflection

Deflection in a cable ladder system is primarily an aesthetic consideration. When a cable ladder system is installed in a prominent location, a maximum simple beam deflection of 1/100 of support span can be used as a guideline to minimize visual deflection.

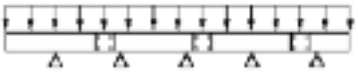
There are two typical beam configurations, simple beam and continuous beam.

A good example of a simple beam is a single straight section of cable ladder supported, but not fastened at either end. When the tray is loaded the cable ladder is allowed to flex. Simple beam support is seldom used in field installations.

Simple Beam

Continuous beam is the beam configuration most commonly used in cable ladder installations. An example of this configuration is where cable ladders are installed across several supports to form a number of spans. The continuous beam possesses traits of both simple and fixed beams. When equal loads are applied to all spans simultaneously, the counterbalancing effect of the loads on both sides of a support restricts the movement of the cable ladder at the support. The effect is similar to that of a fixed beam. The end spans behave substantially like simple beams. When cable ladders of identical design are compared, the continuous beam installation will typically have approximately half the deflection of a simple beam of the same span. The following factors should be considered when addressing cable ladder deflection:

Continuous Beam



1. Deflection in a cable ladder system can be reduced by decreasing the support span, or by using a taller or stronger cable ladder.

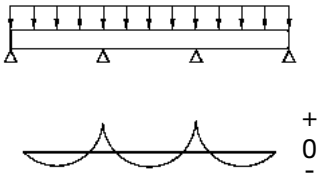
2. Economic consideration must be given when addressing cable deflection criteria. Eliminating deflection can mean purchasing a stronger ladder ar higher cost.

3. The location of splices in a continuous span will affect the deflection of the cable ladder system. The splices should be located at points of minimum stress whenever practical. Cooper B-Line recommends the following for splice installation:

   Straight section lengths should be equal to or greater than the span length to ensure not more than one splice between supports.

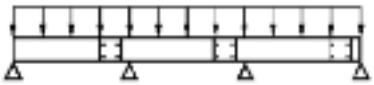
See the figures below for splicing configuration samples.

Typical Continuous Span Configuration



+ Maximum Positive Moment
- Maximum Negative Moment

Preferred Splice Plate Locations



Undesirable Splice Plate Locations

Future Expansion Requirements

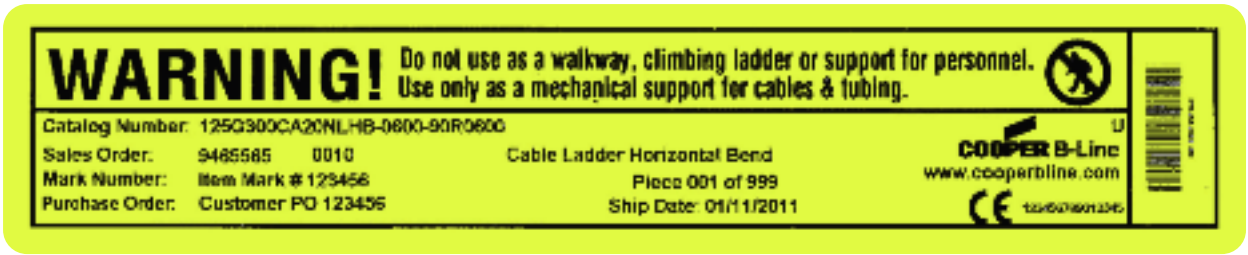
One of the many features of cable ladder is the ease of adding cables to an existing system. Future expansion should always be considered when selecting a cable ladder, and allowance should be made for additional fill area and load capacity. A minimum of 50% expansion allowance is recommended.

Transit Limitations

Consideration should be given to the space available for moving the cable ladder from delivery to it's final installation location. Obviously, shorter cable ladder allows for more manoeuvrability in tight spaces.

Installation

Shorter cable ladder lengths are typically easier to manoeuvre on the job site during installation. Two people may be needed to manipulate longer cable ladder sections, while shorter sections might be handled by one person. Although longer cable ladder lengths are more difficult to manoeuvre, they can reduce installation time due to the fact that there are fewer splice connections. This trade-off should be evaluated for each set of job site restrictions.



12. Cables and Cable Restraint

Type of Cable

In general, small, highly flexible cables should be installed in cable ladders with close rung spacing of 200mm or less. Larger, less flexible cables are typically installed in cable ladders having 300mm rung spacing. Cable ladders having rung spacing greater than 300mm should be used for very large, stiff cables to reduce cost and facilitate cable drop-outs.

Cable Exposure

Many cable jackets are manufactured to withstand the environment without additional protection, favouring the use of the cable ladder. Cable jackets should be evaluated during project design for suitability in the project application.

Cable Attachment

A major advantage of cable ladder is the freedom of entry and exit of the cables. Another advantage of cable ladder is the ability to secure cables in the cable ladder. With standard rungs, the cables may be attached with either cable ties or cable clamps. Cable attachment is particularly important on vertical runs or when the ladder is installed on its side. Ladder rung spacing should be chosen to provide adequate cable attachment points while allowing the cables to exit the system.

Cable Flexibility

The proper bend radius for cable ladder fittings is usually determined by the bend radius and stiffness of the cables to be installed. Typically, the cable manufacturer will recommend a minimum bend allowance for each cable. The fitting radius should be equal to or larger than the minimum bend radius of the largest cable which may ever be installed in the system. When several cables are to be installed in the same cable ladder, a larger bend radius may be desirable to ease cable installation.

Space Limitations

The overall dimensions for a cable ladder fitting will increase as the bend radius increases. Size and cost make the smallest acceptable fitting radius most desirable. When large radius fittings are required, the system layout must be designed to allow adequate space.

The following factors should be considered when determining the appropriate cable tray system.

Material & Finish

- Standards Available
- Corrosion
- Thermal Contraction and Expansion
- Installation Considerations and Electrical Grounding Capacity

Strength

- Environmental Loads
- Concentrated Loads
- Support Span
- Deflection
- Rung/Trough Data
- Load Capacity
- Cable Data

Width & Available Loading Depth

- Cable Diametre
- Allowable Cable Fill
- Barrier Requirements
- Future Expansion Requirements
- Space Limitations

Length

- Lengths Available
- Support Spans (Not to exceed the length of straight sections)
- Space Limitations
- Installation

Loading Possibilities

- Power Application
- Data/Communication Cabling
- Other Factors to Consider

Bottom Type

- Type of Cable
- Cost vs. Strength
- Cable Exposure
- Cable Attachment

Fitting Radius

- Cable Flexibility
- Space Limitations

Metric Conversion Chart

To Convert From	To	Multiply By
Angle		
degree	radian (rad)	0.01745329
radian (rad)	degree	57.295780
Area		
sq. centimetre (cm^2)	square inch (in^2)	0.15500030
square metre (m^2)	$foot^2$	10.763910
square metre (m^2)	$inch^2$	1550.0030
square metre (m^2)	circular mil	1973523000.0
circular mil	square metre (m^2)	$0.00005067075 \times 10^{-5}$
$foot^2$	square metre (m^2)	0.09290304
$inch^2$	square metre (m^2)	0.0064516×10^{-2}
Temperature		
degree Celsius	degree Fahrenheit	$t°F = 1.8t°C + 32$
degree Fahrenheit	degree Celsius	$t°C = (t°F - 32) / 1.8$
Force		
newtons (N)	pounds - force (lbf)	0.22481
pounds - force (lbf)	newtons (N)	4.4482220
Length		
millimetres	inch (in)	0.039370
metre (m)	foot (ft)	3.280840
metre (m)	inch (in)	39.370080
metre (m)	mil	39370.0080
micrometre (μm)	inch (in)	$0.039370080 \times 10^{-3}$
foot (ft)	metre (m)	0.30480
inch (in)	metre (m)	0.02540
mil	metre (m)	0.002540×10^{-3}
inch	micrometre (μm)	25400.0
Volume		
cubic centimetre (cm^3)	cubic inch (in^3)	0.061023740
cubic metre (m^3)	$foot^3$	35.314660
cubic metre (m^3)	$inch^3$	61023.760
$foot^3$	cubic metre (m^3)	0.028316850
$inch^3$	cubic metre (m^3)	$0.016387060 \times 10^{-3}$
gallon (U.S. liquid)	cubic metre (m^3)	0.0037854120
Section Properties		
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)	$0.014503770 \times 10^{-2}$
section modulus S (in^3)	S (m^3)	$0.016387060 \times 10^{-3}$
moment of inertia I (in^4)	I (m^4)	$0.00041623140 \times 10^{-3}$
modulus of elasticity E (psi)	E (Pa)	6894.7570

Metric Conversion Chart (Cont.)

To Convert From	To	Multiply By
Bending Moment or Torque		
N•m	lbf • ft	0.73756210
N•m	lbf • in	8.8507480
lbf • ft	newton metre (N•m)	1.3558180
lbf • in	newton metre (N•m)	0.11298480
Mass		
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)	$0.98420640 \times 10^{-3}$
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
Mass Per Unit Length		
kilogram per metre (kg/m)	lb/ft	0.67196890
kilogram per metre (kg/m)	lb/in	0.55997410
lb/ft	kilogram per metre (kg/m)	1.4881640
lb/in	kilogram per metre (kg/m)	17.857970
Mass Per Unit Volume		
kilogram per cubic metre (kg/m^3)	lb/ft^3	0.062427970
kilogram per cubic metre (kg/m^3)	lb/in^3	$0.03612730 \times 10^{-3}$
lb/ft^3	kilogram per cubic metre (kg/m^3)	16.018460
lb/in^3	kilogram per cubic metre (kg/m^3)	27679.90
lb/ft^3	lb/in^3	1728.0
Mass Per Unit Area		
kg/m^2	pound per square foot (lb/ft^2)	0.20481610
lb/ft^2	kilogram per square metre (kg/m^2)	4.8824280
Pressure or Stress		
pascal (Pa)	pound-force per square inch (psi)	$0.0014503770 \times 10^{-1}$
pascal (Pa)	kip per square inch (ksi)	$0.0014503770 \times 10^{-4}$
megapascals (MPa)	lbf/in^2 (psi)	145.03770
lbf/in^2 (psi)	pascal (Pa)	6894.7570
kip/in^3 (ksi)	pascal (Pa)	6894757.0
lbf/in^2 (psi)	megapascals (MPa)	0.0068947570

Metric Symbols

m = metre	N = newton
cm = centimetre	kN = kilonewton
mm = millimetre	Pa = pascal
µm = micrometre	MPa = megapascal
kg = kilogram	

Global Locations

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