Aluminium Cable Ladder (ACL)

Wherever severe corrosion conditions are present, or a long maintenance free life is required, Unistrut aluminium cable ladder systems are the obvious choice.

Unistrut manufactures a complete range of NEMA Aluminium cable ladder systems. These provide a wide range of load and span combinations to suit the requirements of almost any installation.

Most frequently, aluminium cable ladders are selected because of their excellent performance in marine environments where salt spray or salt laden atmosphere is present. Applications such as wharves, coal loader conveyors or similar port facilities as well as coal mines, smelters, chemical processing plants and refineries are all typical users of aluminium cable ladders.

Splice Plates

The unique Unistrut aluminium system splice plate is close fitting and shaped so that it is retained neatly and firmly between mating flanges incorporated in the ladder side-rails. Initial deflection or “take-up” of the joint under load is thereby minimised, resulting in a tidy and rigid installation, free from excessive sag at splice points.

The splice design also permits up to 20mm of expansion and contraction movement at each joint – an important consideration with aluminium cable ladders – eliminates the need to place special expansion splices at predetermined intervals. The installation procedure for the splice connection is fast and simple.

Notes

- To attain maximum working load of the system, the following recommendations should be adopted:
- Do not splice single spans of ladder.
- Avoid splice joints in the vicinity of the end supports on continuous runs.
- Avoid splice joints directly over intermediate supports on continuous runs.
- Locate splice joints at the quarter span point between supports on continuous runs.

If in doubt, please consult your Unistrut Service Centre.

Accessories

All aluminium cable ladder systems are complemented by a full range of standardised fabricated accessories & fittings which are readily available.

Built-in Splice

The principal feature of all Unistrut cable ladder accessories is the ‘built-in’ plate. A shaped extension of the accessory side-rail permits direct connection to the straight ladder, eliminating the need for a separate splice component. The advantages of this method are:

- Minimised fixing hardware and components.
- When joining to a cut ladder, the accessory end acts as a convenient drill template for bolt holes.
- Simplified pre-planning, quantity take-offs and ordering.
- No left-over components.
- Strong and rigid joint.
- Faster installation.

Accessories are attached with the same fasteners as used for straight splice plates.

Elongated slots allow easier fit-up and permit adjustments in alignment to be absorbed.

Hold-Down Brackets

The general purpose hold-down bracket can be positioned at any point along ladder length, even in the situation where a rung and support member coincide. The bracket provides a large bearing area for the side-rail and permits free expansion movement to occur.

For side mounted ladders, or where rigid fixing of ladder is required, the rigid clamping bracket can be used.

Construction

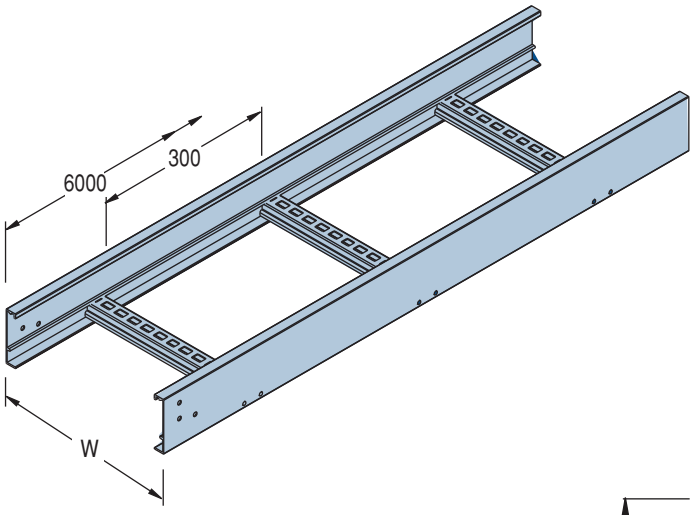
Unistrut aluminium cable ladder systems are manufactured from high strength alloy 6106-T6 for all extruded components and 5005 for sheet or plate components. These alloys are suitable for marine applications and offer excellent all round corrosion resistance. All fasteners are made from 300 series grade of stainless steel for optimum corrosion resistance.

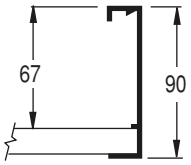
Each rung on 12A, 20A and 20C is attached to the side-rails with four stainless steel screws. In both assembly methods rung ends are held captive between flanges extruded into the side-rail, resulting in a strong and reliable connection.

C.K.D. Feature

Aluminium cable ladders with screwed rungs are also available in C.K.D. (completely knocked down) which provides a particular advantage when on-site assembly is necessary and in freight savings for remote areas.

NEMA 12A Straight Tray [AL]





Cable Laying Depth: 67mm

Loading Data:
Basic Load Capacity
98kg/lin.m on 3.6m span

Length: 6m

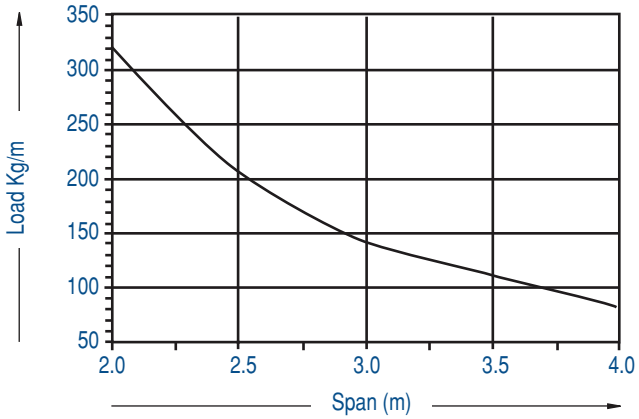
Rung Spacing: 300mm nominal

Standard Finish: Aluminium, Mill Finish

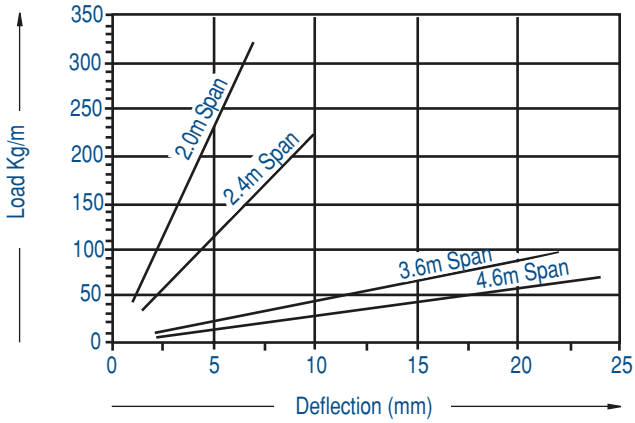
Dim "W"	Type	Part No.
150	12A	**LAD101**
300	12A	**LAD103**
450	12A	**LAD104**
600	12A	**LAD106**

• Splice plate & fixing screws are not included (order separately).

Allowable Load Graph



Deflection Graph



Allowable loads are determined generally in accordance with NEMA Standard VE1 and verified by testing.
Safety Factor = 1.5 on collapse load for single span.

Deflections shown apply to the end-bays (ie. worst case) of a continuous ladder run.
To find deflection of a single span, multiply by 2.5.

NEMA 20A Straight Tray [AL]

Cable Laying Depth: 96mm

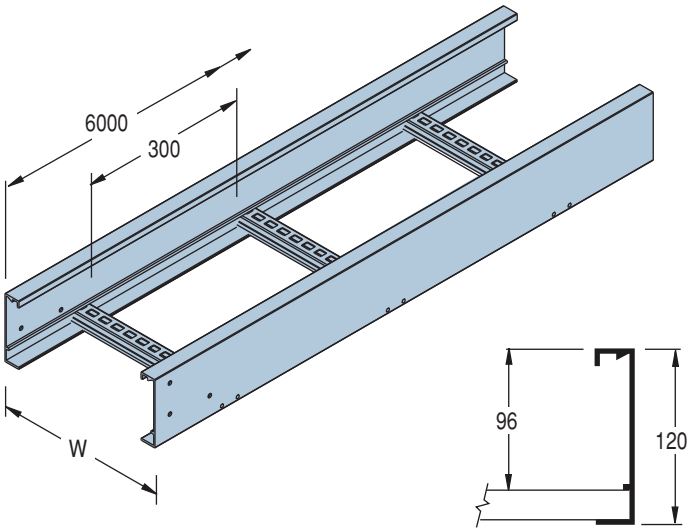
Loading Data:
Basic Load Capacity
95kg/lin.m on 6m span
352kg/lin.m on 3m span

Length: 6m

Rung Spacing: 300mm nominal

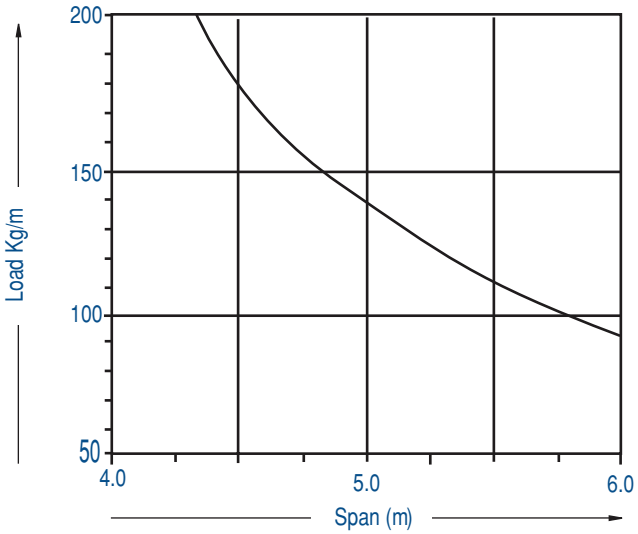
Standard Finish: Aluminium, Mill Finish

Dim "W"	Type	Part No.
150	20A	**LAJ101**
300	20A	**LAJ103**
450	20A	**LAJ104**
600	20A	**LAJ106**



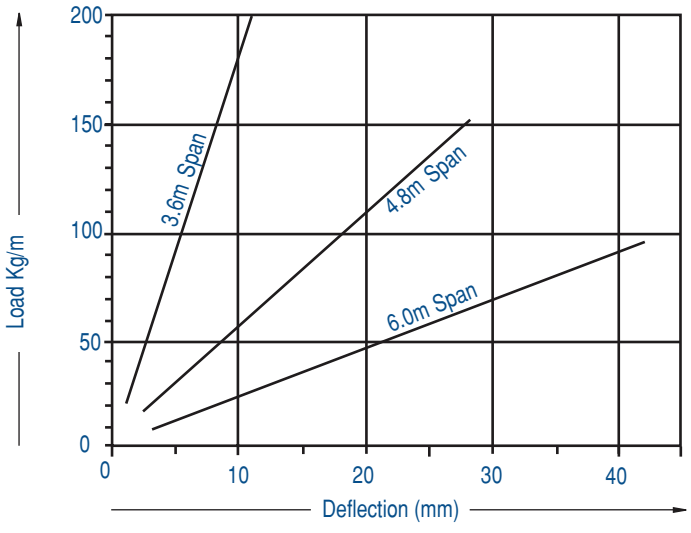
• Splice plate & fixing screws are not included (order separately).

Allowable Load Graph



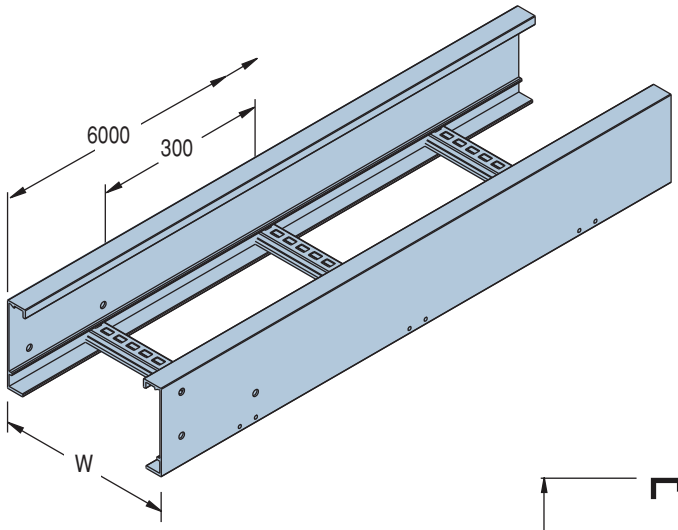
Allowable loads are determined generally in accordance with NEMA Standard VE1 and verified by testing.
Safety Factor = 1.5 on collapse load for single span.

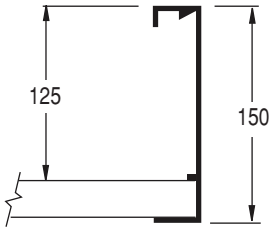
Deflection Graph



Deflections shown apply to the end-bays
(ie. worst case) of a continuous ladder run.
To find deflection of a single span, multiply by 2.5.

NEMA 20C Straight Tray [AL]





Cable Laying Depth: 125mm

Loading Data:
Basic Load Capacity
175kg/lin.m on 6m span

Length: 6m

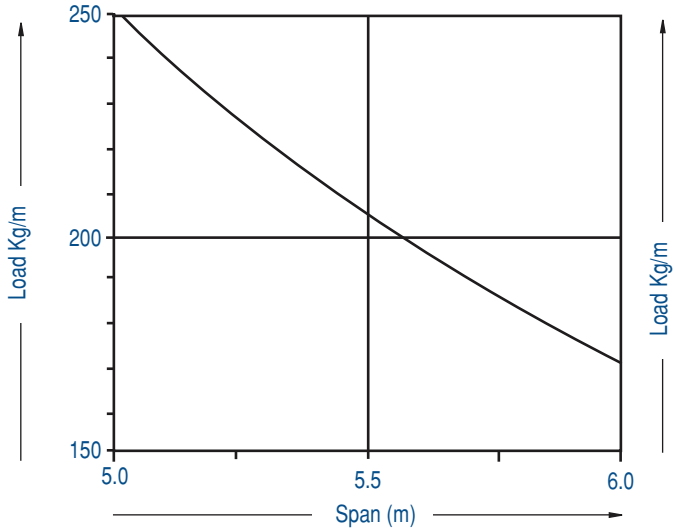
Rung Spacing: 300mm nominal

Standard Finish: Aluminium, Mill Finish

Dim "W"	Type	Part No.
150	20C	**LAL101**
300	20C	**LAL103**
450	20C	**LAL104**
600	20C	**LAL106**

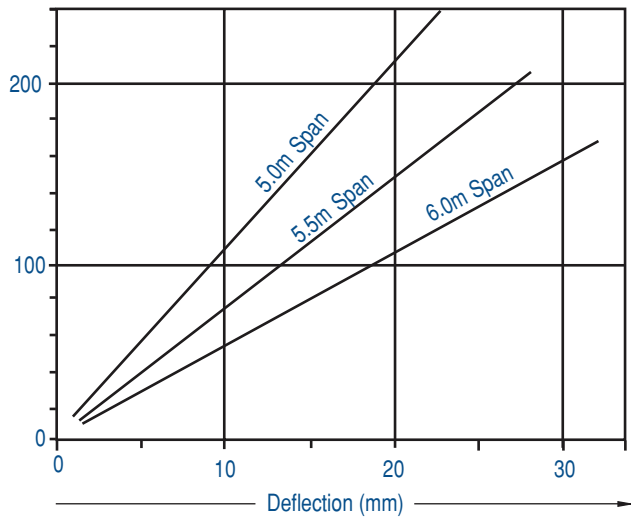
• Splice plate & fixing screws are not included (order separately).

Allowable Load Graph



Allowable loads are determined generally in accordance with NEMA Standard VE1 and verified by testing.
Safety Factor = 1.5 on collapse load for single span.

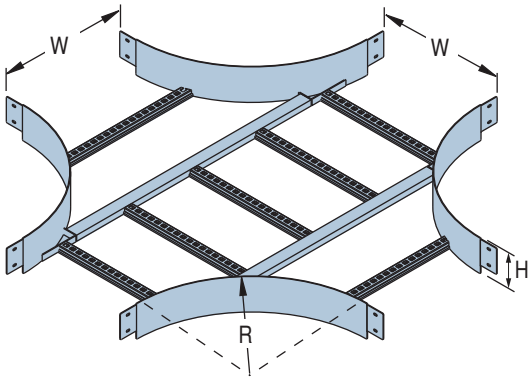
Deflection Graph



Deflections shown apply to the end-bays
(ie. worst case) of a continuous ladder run.
To find deflection of a single span, multiply by 2.5.

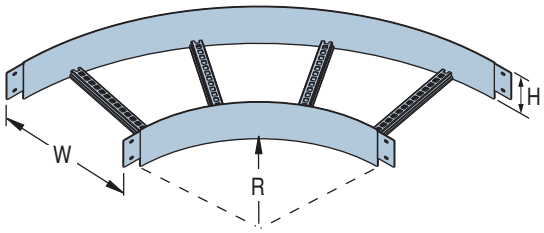
Cross [AL]

Type	Radius"R"	Width"W"	Height"H"	Part No.
12A	300	150	93	**LAD181**
12A	300	300	93	**LAD183**
12A	300	450	93	**LAD184**
12A	300	600	93	**LAD186**
20A	450	150	120	**LAH181**
20A	450	300	120	**LAH183**
20A	450	450	120	**LAH184**
20A	450	600	120	**LAH186**
20C	600	150	150	**LAL181**
20C	600	300	150	**LAL183**
20C	600	450	150	**LAL184**
20C	600	600	150	**LAL186**



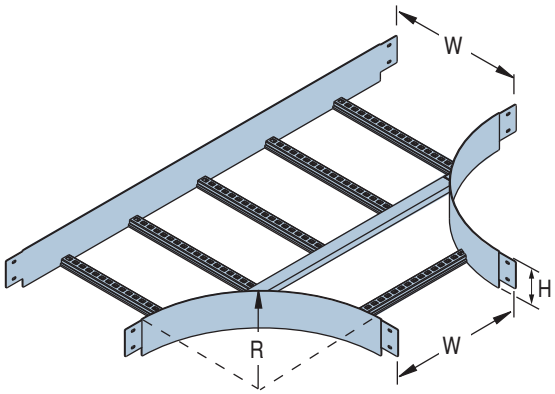
Flat Bend – 90° [AL]

Type	Radius"R"	Width"W"	Height"H"	Part No.
12A	300	150	93	**LAD111**
12A	300	300	93	**LAD113**
12A	300	450	93	**LAD114**
12A	300	600	93	**LAD116**
20A	450	150	120	**LAH111**
20A	450	300	120	**LAH113**
20A	450	450	120	**LAH114**
20A	450	600	120	**LAH116**
20C	600	150	150	**LAL111**
20C	600	300	150	**LAL113**
20C	600	450	150	**LAL114**
20C	600	600	150	**LAL116**



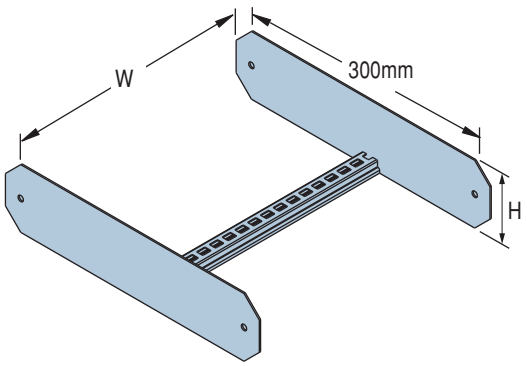
Tee [AL]

Type	Radius"R"	Width"W"	Height"H"	Part No.
12A	300	150	93	**LAD191**
12A	300	300	93	**LAD193**
12A	300	450	93	**LAD194**
12A	300	600	93	**LAD196**
20A	450	150	120	**LAH191**
20A	450	300	120	**LAH193**
20A	450	450	120	**LAH194**
20A	450	600	120	**LAH196**
20C	600	150	150	**LAL191**
20C	600	300	150	**LAL193**
20C	600	450	150	**LAL194**
20C	600	600	150	**LAL196**



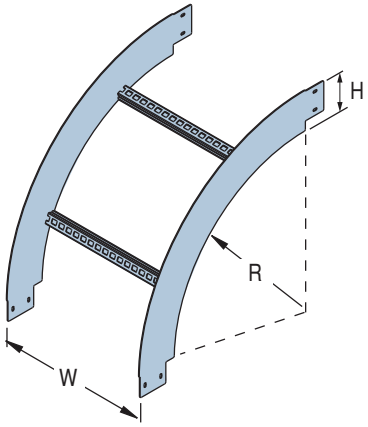
• Fixing Hardware for all cable ladder systems must be ordered separately.

Adjustable Riser [AL]



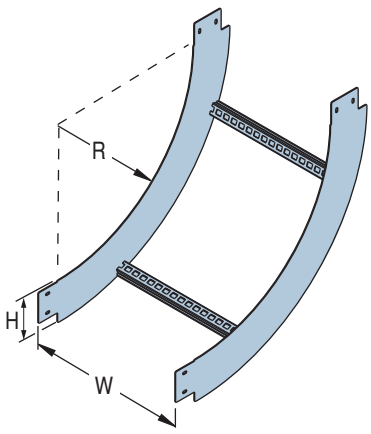
Type	Width"W"	Height"H"	Part No.*
12A	150	93	LAD141
12A	300	93	LAD143
12A	450	93	LAD144
12A	600	93	LAD146
20A	150	120	LAH141
20A	300	120	LAH143
20A	450	120	LAH144
20A	600	120	LAH146
20C	150	150	LAL141
20C	300	150	LAL143
20C	450	150	LAL144
20C	600	150	LAL146

External Riser – 90° [AL]



Type	Radius"R"	Width"W"	Height"H"	Part No.*
12A	300	150	93	LAD131
12A	300	300	93	LAD133
12A	300	450	93	LAD134
12A	300	600	93	LAD136
20A	450	150	120	LAH131
20A	450	300	120	LAH133
20A	450	450	120	LAH134
20A	450	600	120	LAH136
20C	600	150	150	LAL131
20C	600	300	150	LAL133
20C	600	450	150	LAL134
20C	600	600	150	LAL136

Internal Riser – 90° [AL]

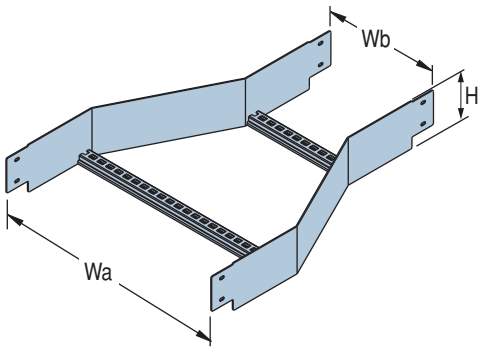


Type	Radius"R"	Width"W"	Height"H"	Part No.*
12A	300	150	93	LAD121
12A	300	300	93	LAD123
12A	300	450	93	LAD124
12A	300	600	93	LAD126
20A	450	150	120	LAH121
20A	450	300	120	LAH123
20A	450	450	120	LAH124
20A	450	600	120	LAH126
20C	600	150	150	LAL121
20C	600	300	150	LAL123
20C	600	450	150	LAL124
20C	600	600	150	LAL126

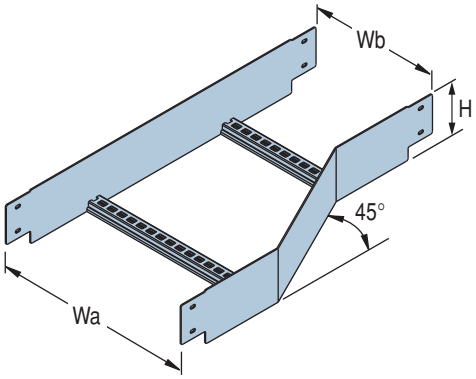
• Fixing Hardware for all cable ladder systems must be ordered separately.

Straight Reducer [AL]

Type	Width "Wa"	Width "Wb"	Height "H"	Part No.
12A	600	450	93	**LAD1564**
12A	600	300	93	**LAD1563**
12A	600	150	93	**LAD1561**
12A	450	300	93	**LAD1543**
12A	450	150	93	**LAD1541**
12A	300	150	93	**LAD1531**
20A	600	450	120	**LAH1564**
20A	600	300	120	**LAH1563**
20A	600	150	120	**LAH1561**
20A	450	300	120	**LAH1543**
20A	450	150	120	**LAH1541**
20A	300	150	120	**LAH1531**
20C	600	450	150	**LAL1564**
20C	600	300	150	**LAL1563**
20C	600	150	150	**LAL1561**
20C	450	300	150	**LAL1543**
20C	450	150	150	**LAL1541**
20C	300	150	150	**LAL1531**

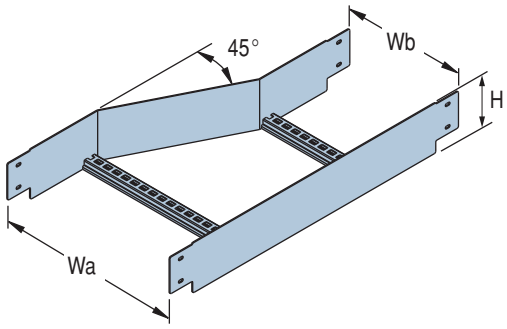


Offset Reducer – Left Hand [AL]



Type	Width "Wa"	Width "Wb"	Height "H"	Part No.
12A	600	450	93	**LAD1764**
12A	600	300	93	**LAD1763**
12A	600	150	93	**LAD1761**
12A	450	300	93	**LAD1743**
12A	450	150	93	**LAD1741**
12A	300	150	93	**LAD1731**
20A	600	450	120	**LAH1764**
20A	600	300	120	**LAH1763**
20A	600	150	120	**LAH1761**
20A	450	300	120	**LAH1743**
20A	450	150	120	**LAH1741**
20A	300	150	120	**LAH1731**
20C	600	450	150	**LAL1764**
20C	600	300	150	**LAL1763**
20C	600	150	150	**LAL1761**
20C	450	300	150	**LAL1743**
20C	450	150	150	**LAL1741**
20C	300	150	150	**LAL1731**

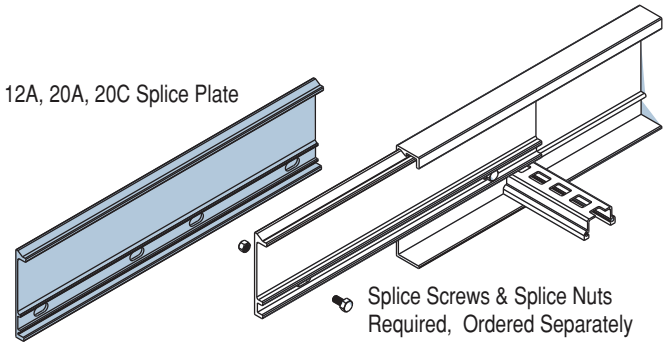
Offset Reducer – Right Hand [AL]



Type	Width "Wa"	Width "Wb"	Height "H"	Part No.
12A	600	450	93	**LAD1664**
12A	600	300	93	**LAD1663**
12A	600	150	93	**LAD1661**
12A	450	300	93	**LAD1643**
12A	450	150	93	**LAD1641**
12A	300	150	93	**LAD1631**
20A	600	450	120	**LAH1664**
20A	600	300	120	**LAH1663**
20A	600	150	120	**LAH1661**
20A	450	300	120	**LAH1643**
20A	450	150	120	**LAH1641**
20A	300	150	120	**LAH1631**
20C	600	450	150	**LAL1664**
20C	600	300	150	**LAL1663**
20C	600	150	150	**LAL1661**
20C	450	300	150	**LAL1643**
20C	450	150	150	**LAL1641**
20C	300	150	150	**LAL1631**

• Fixing Hardware for all cable ladder systems must be ordered separately.

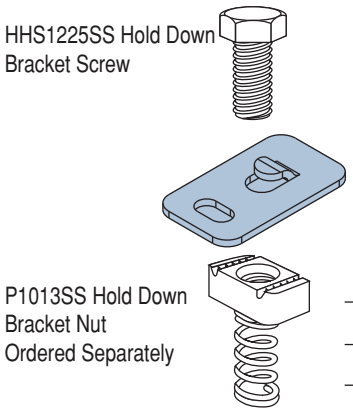
Splice Plate



Type	Part No.	Pairs of Splice Nuts and Splice Screws Required
12A	**LAD30**	2 Pairs of LAD42/LAD41
20A	**LAH30**	2 Pairs of LAD42/LAD41
20C	**LAL30**	4 Pairs of LAL42/LAL41

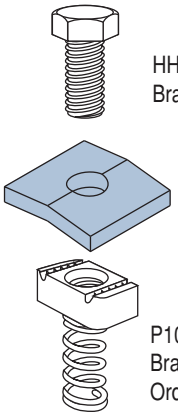
The unique Unistrut aluminium splice plate is close fitting and shaped so that it is retained neatly and firmly between mating flanges incorporated in the ladder-side rails.

General Hold Down Bracket



Type	Part No.
12A, 20A	**LAD50**
20C	**LAL50**

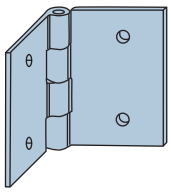
Rigid Hold Down Bracket



Type	Part No.
All Aluminium Systems	**LAM50AL**

General purpose hold-down bracket can be positioned at any point along ladder length, even in the situation where a rung and support member coincide. The bracket provides a large bearing area for the side-rail and permits free expansion movement to occur. For side mounted ladders, or where rigid fixing of ladder is required, the rigid clamping bracket can be used.

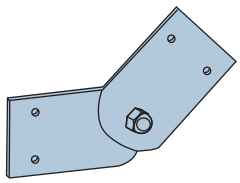
Hinged Horizontal Splice



Type	Part No.
12A	**LAD35**
20A	**LAH35**
20C	**LAL35**

A fast and economical method of changing ladder direction where exact site dimensions must be met. Especially suitable where the angle is less that 45°, or larger angles where the cable bending radius is not important. Also provides a flexible alternative to standard accessory sizes and radii. Suits all Unistrut aluminium cable ladder systems.

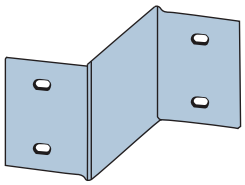
Hinged Vertical Splice



Type	Part No.
12A	**LAD36**
20A	**LAH36**
20C	**LAL36**

Ideal for making changes in vertical level or direction. Easily adapts to exact site dimensions which may otherwise be difficult to achieve with fixed risers. Cables form their own bending radius spanning between adjacent end-rungs. Also used to form adjustable risers providing flexibility to adjust to any site restrictions.

Reducer Splice

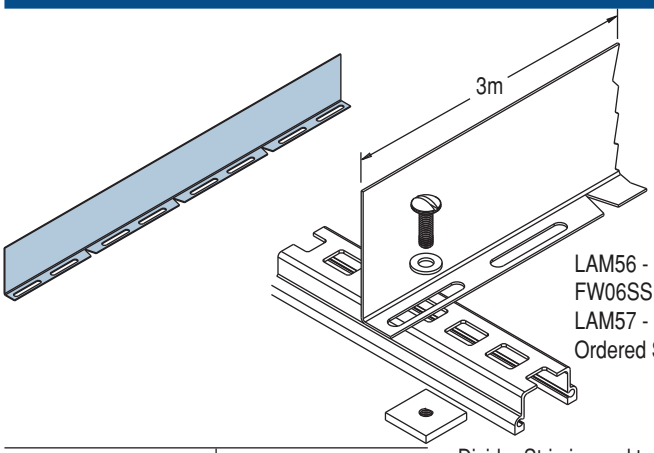


Type	Width (mm)	Part No.
12A	75W	**LAD380**
12A	150W	**LAD381**
12A	300W	**LAD383**
20A	75W	**LAH380**
20A	150W	**LAH381**
20A	300W	**LAH383**
20C	75W	**LAL380**
20C	150W	**LAL381**
20C	300W	**LAL383**

Reduction of ladder width is normally carried out using straight or offset reducers. Reducer splice plates are a flexible, cost effective alternative which bolt directly to the ladder side-rails. Available for all aluminium cable ladder systems.

• Fixing Hardware for all cable ladder systems must be ordered separately.

Divider Strip

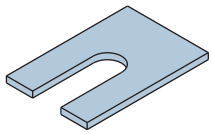


LAM56 - Divider Strip Screw,
FW06SS - Divider Strip Washer
LAM57 - Divider Strip Nut
Ordered Separately

Type	Part No.
All Aluminium Systems	**LAM55**

Divider Strip is used to separate cables of different voltages or circuits. The notched base permits forming to the required shape.

Interface Spacer



Type	Part No.
PVC White	**LAM54**
PVC Black	**LAM54UV**

Used to separate cable ladder and supports in corrosive environments.

Ladder Covers

Covers are normally specified where protection is required:

1. To safeguard against damage to cables and insulation from falling objects - dropped tools, discarded cigarettes, sparks or solid materials.
2. Covers protect cable insulation and fixings (plastic ties etc.) from harmful effects of ultra-violet light and/or weathering deterioration.
3. In areas where high levels of airborne particles are present, covers prevent accumulation of dust or other debris on cables which may cause heat build up, fire hazards or absorb moisture, which may shorten the life of the installation.

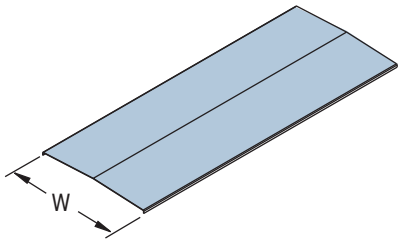
Availability

Standard flat covers are available for all Unistrut cable ladder systems. Standard length is 3 metres. Straight, peaked or ventilated covers are available to special order.

Material

Steel Systems: Galvabond, hot-dip galvanised steel sheet to AS1397.
Aluminium Systems: Aluminium Alloy 5005. Suitable for marine applications and compatible with the 6106-T6 alloy used in ladders.

Standard Cover



The most common type used because they afford maximum protection to cables at the lowest cost.

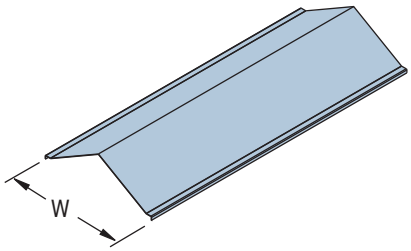
Alum. Covers - Standard

Type	Nominal Width	Width "W"	Part No.
12A/20A/20C	150	154	**LAM6013**
12A/20A/20C	300	304	**LAM6033**
12A/20A/20C	450	454	**LAM6043**
12A/20A/20C	600	604	**LAM6063**

Steel Covers - Standard

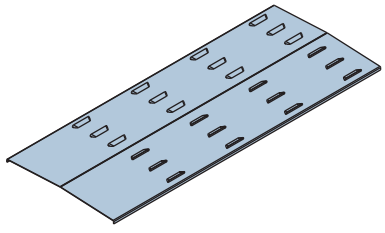
Type	Nominal Width	Width "W"	Part No.
12B	150	176	**LEE6013**
12B	300	326	**LEE6033**
12B	450	476	**LEE6043**
12B	600	626	**LEE6063**
16A	150	201	**LEG6013**
16A	300	351	**LEG6033**
16A	450	501	**LEG6043**
16A	600	651	**LEG6063**
20B/20C	150	215	**LEK6013**
20B/20C	300	365	**LEK6033**
20B/20C	450	515	**LEK6043**
20B/20C	600	665	**LEK6063**
20B-RI/20C-RI	150	154	**LEM6013**
2OB-RI/20C-RI	300	304	**LEM6033**
2OB-RI/20C-RI	450	454	**LEM6043**
2OB-RI/20C-RI	600	604	**LEM6063**

Peaked Cover



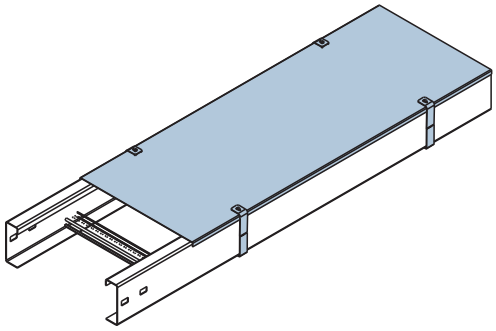
Used in very dusty situations where the self-cleaning effect of sloping sides prevents excessive dust accumulations. The larger air-space above the cables also assists with the dissipation of heat.

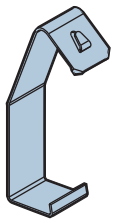
Ventilated Cover



Should be used wherever reasonable protection for cables is required and where there is also a primary requirement to allow for the escape of heat generated by cables.

Cable Ladder Cover Fixings





Covers are retained in position by means of cover clips as illustrated. Manufactured from high strength stainless steel, these unique clips, which have no thread components to freeze up, are very quickly installed and are also easily removed or replaced at a later date.

One size of clip for each ladder system suits both straight and accessory covers.

Recommended Spacing For Cover Clips

Service conditions	Design Wind velocity, Vz (AS1170)	Ladder Width, mm 600	450	300	150
Up to and including exposed external locations	50m/s	1.2m	1.2m	1.2m	1.2m
Cyclonic Areas	65m/s	0.6m	0.8m	1.2m	1.2m

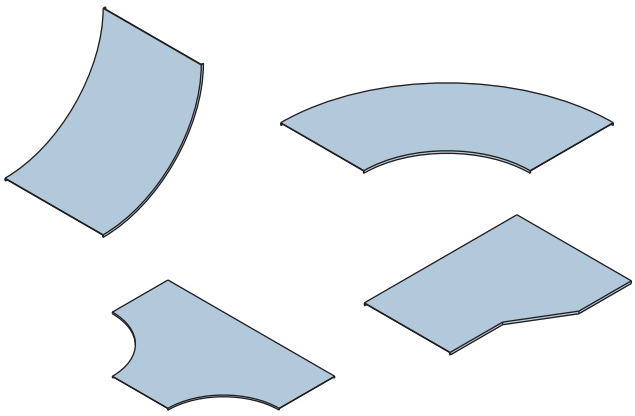
SS Clips For Steel Covers

Type	Part No.
12B	**LEE90**
16A	**LEG90**
20B	**LEK90**
20C	**LEL90**

SS Clips For Aluminum Covers

Type	Part No.
12A	**LAD90**
16A	**LAH90**
20C	**LAL90**

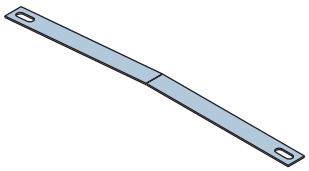
Accessory Covers



Flat Covers are available to match shaped accessories of all Unistrut Cable Ladder Systems, in both steel and aluminium. Materials are the same as for straight covers.

Note: *Flat covers are available to match accessories of all Unistrut NEMA Cable Ladders in both steel and aluminum material and are the same as for the straight covers.*

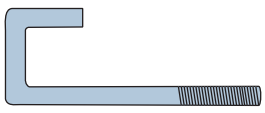
Cover Straps [HG]



Type	Ladder Width	Part No.
16A	150	**LEG931**
16A	300	**LEG933**
16A	450	**LEG934**
16A	600	**LEG936**
20B	150	**LEK931**
20B	300	**LEK933**
20B	450	**LEK934**
20B	600	**LEK936**

Hook Bolt & Wing Nut [MG]

Note: *Two pair of hook bolts and wing nuts are used to attached the Cover Straps. Hook bolt and wing nut sold separately.*



Part No.	Description
LEK8873MG	Hook Bolt
WN10MG	Wing Nut M10

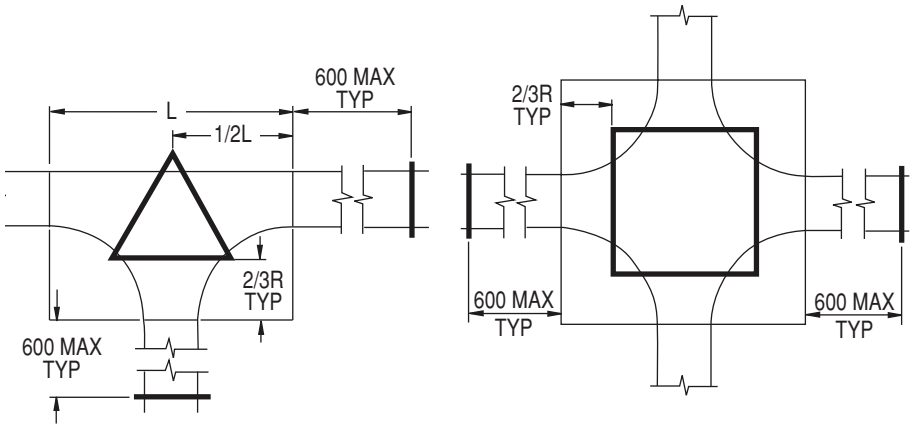
Accessories for all Unistrut cable ladder systems are available in the four standard widths - 150, 300, 450 or 600mm.

System	Std. Radius
12B SCL and 12A ACL	300mm
16A SCL and 20A ACL	450mm
20B, 20C SCL and 20C ACL	600mm

Fixed bends and Internal or External Risers are readily available with a 90° angle. Other angles (30°, 45° or 60°) and other radii (300, 450, 600 or 900mm) can be supplied on special request. The radii also applies to Tees and Crosses.

All support locations below are in accordance with NEMA standard VE 1.

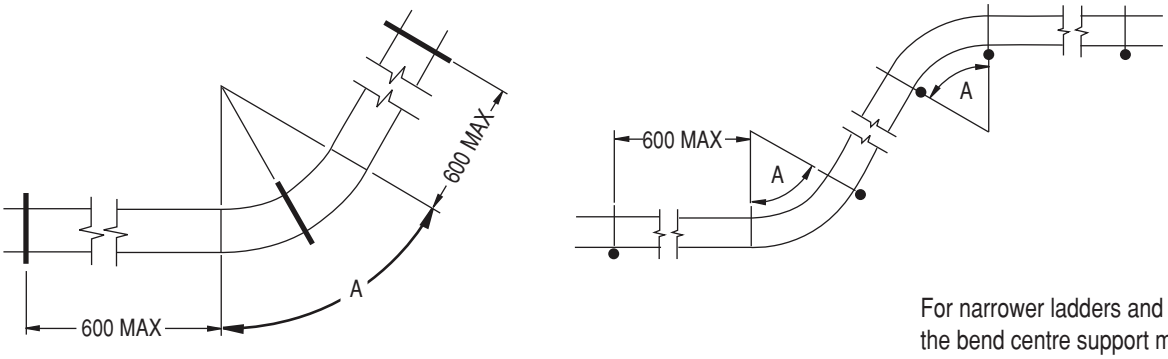
Tees & Crosses



For smaller radius accessories and / or lightly loaded ladders, the support methods shown may be reduced or even eliminated.

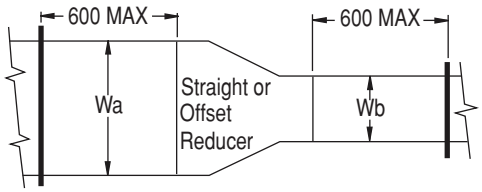
This is best determined at the point of installation or consult your local Unistrut Service Centre.

Risers & Bends



For narrower ladders and smaller angles, the bend centre support may be deleted.

Straight or Offset Reducers



Straight Reducer plus left and right hand offset reducers are available for all Unistrut Cable Ladder systems.

Major Width: Wa 300, 450, 600, 450, 600, 600

Minor Width: Wb 150, 150, 150, 300, 300, 450

Reducer splice plates are also available for all ladder systems.