

ELLIS

Holding Power



ELLIS

Holding Power

HOLDING POWER

– TRIED, TESTED,

TRUSTED AND

RELIED UPON

We are widely recognised as the global leader in the design and manufacture of safety critical electrical cable cleats and fixing solutions.

- ▶ Our products are used by customers in over 40 countries to protect the electrical supply to vital operations and ensure systems keep running safely and securely in the event of a short circuit.
- ▶ Our products are specified and installed across a broad spectrum of industries and installation types, from nuclear power plants to oil rigs, city centre substations to major rail, road and air transport infrastructure projects.
- ▶ Our in-house engineering capabilities allow for constant product development, innovation and the creation of bespoke solutions for individual project specifications.
- ▶ Our manufacturing headquarters in North Yorkshire, England are ISO9001 and 14001 certified and all our cable cleats are manufactured to IEC61914 and short circuit tested as standard prior to being brought to the market. We also offer project specific short circuit testing.
- ▶ Our brand is built upon a culture of trust and integrity, and our reputation reflects this.
- ▶ We are an equal opportunities employer and are committed to reducing our environmental impact and carbon footprint in every aspect of our business.



(American Bureau of Shipping) Type Approval.

Our Cable cleats are compliant with the requirement of London Underground Standard 1-085, Product Register No. 361.



Cert no. 21876

| | |
|----|------------------------------------|
| 12 | Alpha™ |
| 14 | Vulcan+™ |
| 16 | Vulcan+™ Quad |
| 18 | Vulcan+™ Twist Foot |
| 20 | Emperor™ Trefoil |
| 22 | Emperor™ Single |
| 24 | Emperor™ Twist Foot Single |
| 25 | Emperor™ Twist Foot Trefoil |
| 26 | Flexi-Strap™ |
| 28 | Protect™ |
| 30 | Trident® |
| 32 | Trident® with Spacer |
| 34 | Colossus™ |
| 36 | Centaur® |
| 38 | Centaur® Trefoil |
| 40 | Centaur® Intermediate Strap |
| 42 | Cable Guide Clamp |
| 44 | Atlas™ |
| 46 | Vari-Cleat™ |
| 48 | No Bolts Cleat™ |
| 50 | Solus Clamp |
| 52 | 1A |
| 54 | 2A |
| 56 | 1F |
| 58 | 2F+ |
| 60 | Phoenix® |
| 62 | Matrix™ |
| 63 | Ladder Adaptors |
| 66 | Bespoke Solutions |
| 67 | Convex Cable Hanger |
| 68 | Pegasus Hanger |
| 70 | Triplex Cable Surround |
| 72 | Single Bolt Fixing Clamp |
| 73 | Plastic Cable Clamps & Accessories |
| 79 | Jointers' Tools |

QUICK SELECTION GUIDE



Alpha™ page 12



Vulcan+™ page 14



Vulcan+™ Quad page 16



Vulcan+™ Twist Foot page 18



Emperor™ Trefoil page 20



Emperor™ Single page 22



Flexi-strap™ page 24



Protect™ page 26



Trident® page 28



Trident® with Spacer page 30



Colossus™ page 32



Centaur® page 34



Centaur® Strap page 36



Cable Guide Clamp™ page 38



Atlas™ page 40



Vari-cleat™ page 42



No Bolts Cleat™ page 44



Solus Clamp™ page 46



One & Two Hole Cableclamps - Metallic page 48



One & Two Hole Cableclamps - Non Metallic page 52



Phoenix® page 56



Matrix™ page 58



Convex Hanger page 63



Pegasus Hanger page 64



Triplex Cable Surround page 66



Single Bolt Fixing Clamp page 68

GRAPH BELOW IS FOR TREFOIL ONLY



TRIDENT™

Light duty Polymeric

ALPHA™

Light duty Compact

VULCAN+™

Standard duty Compact Stainless steel

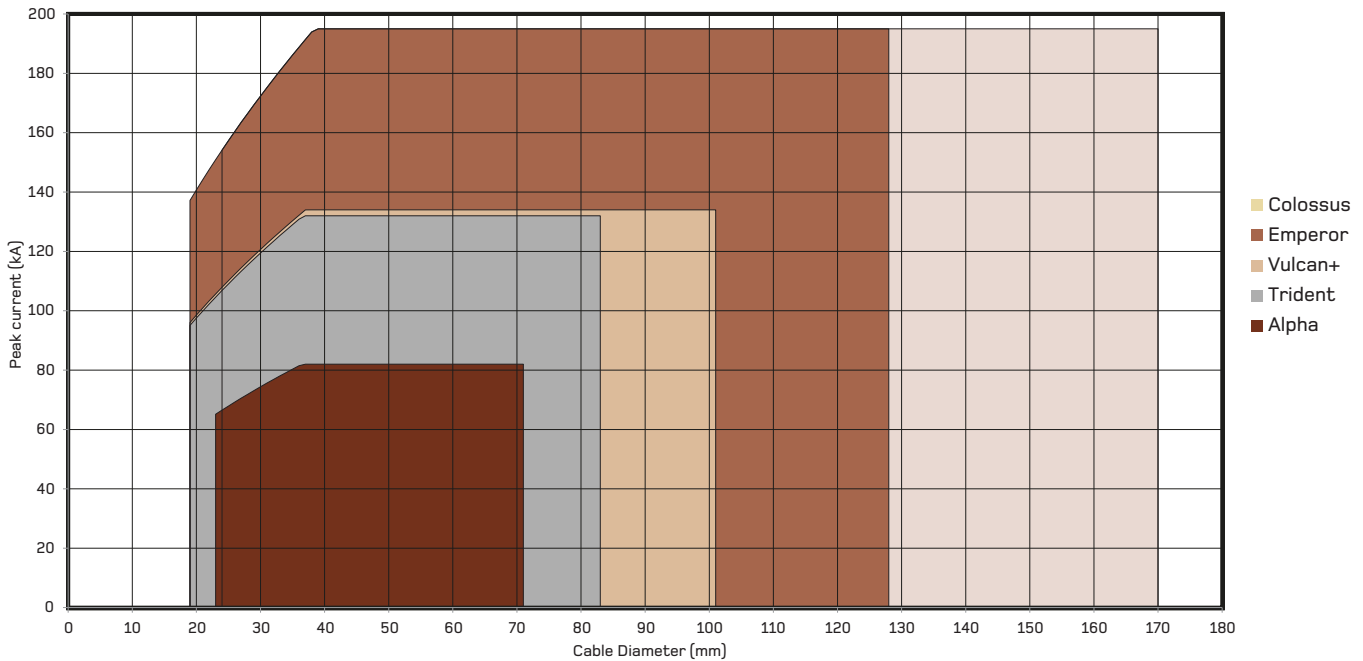
EMPEROR™

Heavy duty Compact Stainless steel

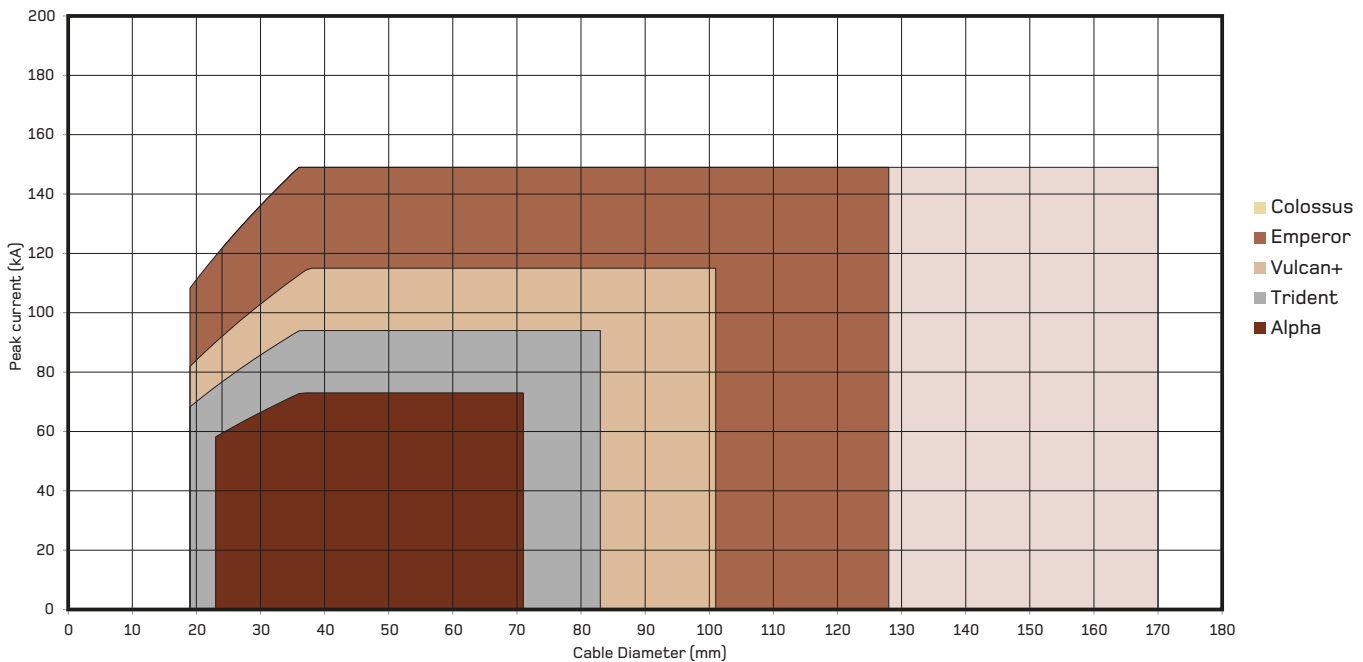
COLOSSUS™

Heavy duty Compact Polymeric and Stainless steel

ELLIS CLEAT RANGE. CLEATS SPACED AT 300MM



ELLIS CLEAT RANGE. CLEATS SPACED AT 600MM



The above graphs can be used to provide a general indication of relative cleat strengths, for accurate cleat specification refer to the Ellis online calculator or black book. Also check product datasheets for actual short circuit test results.

WORLDWIDE DISTRIBUTORS



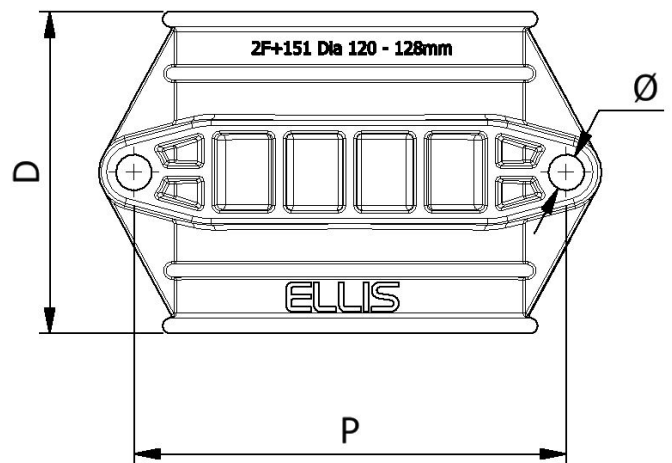
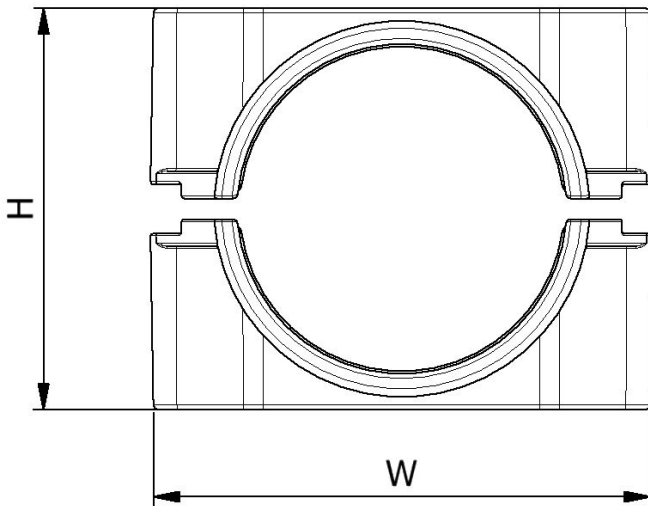
Ellis is represented by a network of International distributors, providing our customers with local and knowledgeable support.



TECHNICAL ADVANTAGES

REFINED DESIGN AND EASE OF USE

All our products are designed in house. Our Design team use the latest CAD and FEA software to develop and refine designs to meet and exceed industry requirements. Following manufacture of the products our design team build the short circuit testing rigs. This important step allows them to see first-hand how easy the products are to install and implement any design changes required to further improve the product.



CUSTOMER SPECIFIC DESIGNS

At Ellis Patents we understand that different markets and varying situations demand different product solutions. As problem solving engineers and a leading manufacturer of cable cleats we thrive on new challenges. When our standard product range isn't quite what you need, we can design, develop test and manufacture project specific, bespoke products to suit your specific requirements. We call this the Ellis Innovation Hub.



SAFETY IS OUR PRIORITY

All of our cleats are tested in line with the international standard IEC 61914. Each product goes through six individual tests including short circuit testing in order to meet the requirements of this standard.

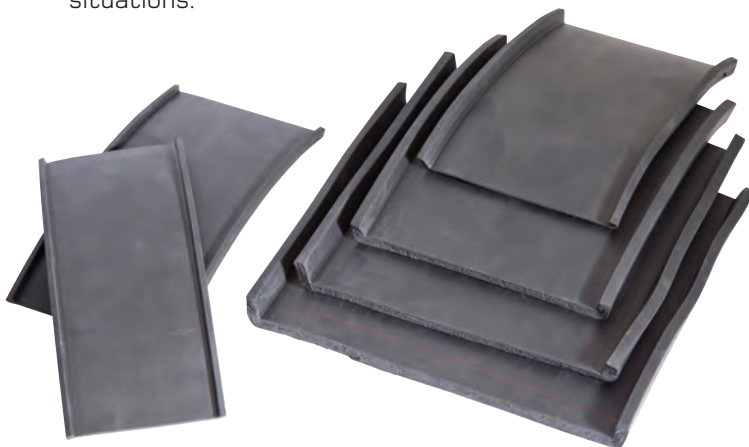
LONG TERM UV TESTING

In addition to the tests carried out to meet IEC 61914 we also carry out long term UV testing. This allows us to confidently recommend products that will be suitable for outdoor applications. Ellis products are designed with an allowance for this degradation over time to ensure they are still within acceptable safety limits even at the end of their design life.



USE OF LINERS

A number of Ellis products are available with the option of liners. Liners are project and product specific and can be useful in the following situations:



- ▶ VIBRATION DAMPING.
- ▶ PROVIDES A COMPLIANT SURFACE FOR CABLES THAT HAVE A SENSITIVE OUTER SHEATH.
- ▶ THE LINERS HELP ABSORB DIMENSIONAL CHANGES CAUSED BY CHANGES IN TEMPERATURE OR OPERATIONAL LOAD.



FIXING SOLUTIONS

Ellis supply a variety of fixings and our team are happy to help you select the correct type for your chosen product and installation.

MECHANICAL STRENGTH VS DYNAMIC STRENGTH

The international cable cleat standard IEC 61914 (Annex B) includes a formula to calculate the force between two conductors during a fault. If the strength of a particular cable cleat is known, the optimum spacing of the cable cleat along the cable can be calculated in order to restrain the force created by the fault.

The strength of a cable cleat is often determined using a mechanical tensile test (tensile to failure), the results may be misleading because the force is applied in a slow and controlled manner which does not replicate fault conditions. In a short circuit fault the forces are applied almost instantaneously and oscillate in every direction. Experience shows that a cable cleat that survives a mechanical tensile test at a given force will not necessarily survive a short circuit test, even if forces are the same.

Consider the properties of glass; immensely strong under tension but subject to brittle failure when impacted.

The preferred method of selection is based on a short circuit test.

CALCULATION OF CLEAT SPACING AND SELECTION OF CLEAT TYPE

Where the system peak fault current and the cable diameter are known the following formula, taken from the international standard (IEC 61914), can be used to calculate the forces between two conductors in the event of a three phase fault.

Where:

F_t = force in Newton/metre (N/m)

I_p = peak short-circuit current in kiloamp (kA)

S = distance between the centrelines of the conductors in metres (m)

$$F_t = \frac{0.17 \times I_p^2}{S}$$

Once F_t in N/m has been determined then the force for each potential cleat can be calculated.

Metric ladder typically has rungs at 300mm intervals, so cleat spacing is usually a multiple of this distance. So, $F_t \times 0.3$ gives the force a cleat will see if spaced at 300mm, $F_t \times 0.6$ for 600mm etc.

$F_t \times$ cleat spacing can then be compared to the cable cleat resistance to electromechanical force and then the cleat type and spacing can be selected.

Please refer to the Ellis Patents Black Book for more examples and information on the calculation of cable cleat spacing. Alternatively Ellis also provide an online cleat calculator to simplify selection:

www.ellispatents.co.uk/cleat-calculator/

CABLE CLEAT RESISTANCE TO ELECTROMECHANICAL FORCE

| CLEAT TYPE | CLEAT SPACING | | 600, 900, 1200mm | |
|--|---------------|---------------|------------------|---------------|
| | 300mm | | | |
| | Strength (N) | SC Level (kA) | Strength (N) | SC Level (kA) |
| Alpha | 9,500 | 82 | 15,000 | 73 |
| Vulcan+ Trefoil, Protect and SD Flexi-strap | 25,000 | 134 | 36,000 | 115 |
| Emperor Trefoil, Colossus and HD Flexi-strap | 51,000 | 195 | 63,000 | 149 |
| Trident | 24,500 | 132 | 25,000 | 94 |
| Trident with insert | 11,400 | 106 | - | - |
| Solus GFN | 11,000 | 164 | - | - |
| Solus LSF | 10,000 | 157 | - | - |

ALWAYS REMEMBER

Whole job cost should always be considered as costs can often be reduced by using a stronger, more expensive cable cleat at a wider spacing than a cheaper option at more regular intervals.

The values in the above table are based on short circuit tests carried out by Ellis, the numbers have been rounded and as such can be used as a guide to cleat selection, for detailed numbers please refer to the individual product datasheets. Test report results are detailed on individual product data sheets and are available on request. At 300mm spacing significantly more force is transmitted to the cleat by the cable compared to 600mm spacing and above.

CLEAT SELECTION QUESTIONS

CABLE DIAMETER

Cable diameter is critical to selecting the appropriate product. Cables have a tolerance that affects the diameter. This should be considered to ensure the cleat selected will still fit the cable even if the cable arrives on site at the limits of its size range.

MAX PEAK SHORT CIRCUIT CURRENT

Knowing the maximum peak short circuit current as specified by the system designer allows the appropriate cleat and spacing to be selected. The calculation formula uses peak current, however this is often unavailable with a Root Mean Square (RMS) value given instead. The ratio of peak to RMS short circuit fault current is dependent on the electrical characteristics of an installation and Ellis recommend the conversion factor used is 2.5, this is taken from IEC 62271 - High voltage switchgear. Dependant on the system a lower value can be used, IEC 61439-1 Low voltage switchgear and control gear assemblies is commonly referred to, which uses the multiples in the table.

| RMS value of SC current (kA) | Multiple |
|------------------------------|----------|
| $10 < I \leq 20$ | 2 |
| $20 < I \leq 50$ | 2.1 |
| $50 < I$ | 2.2 |

CABLE ARRANGEMENT

Cables are generally laid side by side or in trefoil formation. For accurate SC levels to be calculated the layout is required. Knowing the formation allows the correct style of cleat to be selected. Triplex is a variant of trefoil cable formation where the cables are twisted together. This can present a challenge for cleating. To remedy this Ellis offer a triplex cable surround.

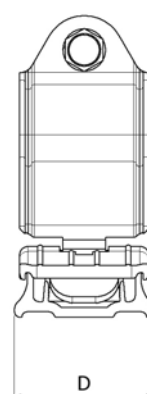
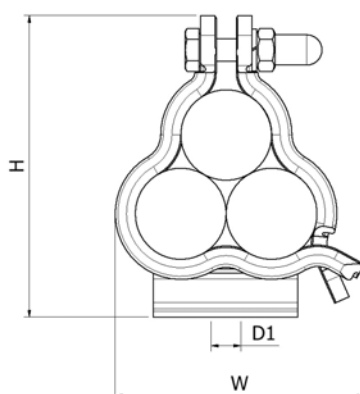
ALPHA™

Aluminium Trefoil Cleats
Patent No. UK Patent GB 240 5900

- ▶ 6000 SERIES ALUMINIUM FRAME
- ▶ ZINC PLATED STEEL M8 CLOSURE FIXINGS
- ▶ POLYESTER COATED FRAMES ARE AVAILABLE ON REQUEST
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ ABS APPROVED AND UL LISTED



| PART NO. ALUMINIUM BASE | PART NO. POLYMER BASE | CABLE RANGE TREFOIL | | DIMENSIONS (mm) | | | FIXING HOLES (D1) | WEIGHT (g) |
|----------------------------|--------------------------|------------------------|--------------------|-----------------|-----|------|----------------------|---------------|
| | | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | | |
| ALP01-AN0 | ALP01-AN1 | 23.2 | 25.1 | 76 | 93 | 48.5 | 1 x M10 | 168 |
| ALP02-AN0 | ALP02-AN1 | 25.1 | 27.1 | 79 | 96 | 48.5 | 1 x M10 | 178 |
| ALP03-AN0 | ALP03-AN1 | 27.1 | 29.3 | 82 | 101 | 48.5 | 1 x M10 | 185 |
| ALP04-AN0 | ALP04-AN1 | 29.3 | 31.7 | 86 | 105 | 48.5 | 1 x M10 | 195 |
| ALP05-AN0 | ALP05-AN1 | 31.7 | 34.2 | 91 | 110 | 48.5 | 1 x M10 | 205 |
| ALP06-AN0 | ALP06-AN1 | 34.2 | 37.0 | 96 | 116 | 48.5 | 1 x M10 | 217 |
| ALP07-AN0 | ALP07-AN1 | 37.0 | 40.0 | 101 | 121 | 48.5 | 1 x M10 | 229 |
| ALP08-AN0 | ALP08-AN1 | 40.0 | 43.2 | 106 | 127 | 48.5 | 1 x M10 | 241 |
| ALP09-AN0 | ALP09-AN1 | 43.2 | 46.7 | 113 | 134 | 48.5 | 1 x M10 | 255 |
| ALP10-AN0 | ALP10-AN1 | 46.7 | 50.5 | 119 | 141 | 48.5 | 1 x M10 | 272 |
| ALP11-AN0 | ALP11-AN1 | 50.5 | 54.6 | 127 | 148 | 48.5 | 1 x M10 | 288 |
| ALP12-AN0 | ALP12-AN1 | 54.6 | 59.0 | 135 | 156 | 48.5 | 1 x M10 | 307 |
| ALP13-AN0 | ALP13-AN1 | 59.0 | 63.8 | 144 | 165 | 48.5 | 1 x M10 | 327 |
| ALP14-AN0 | ALP14-AN1 | 63.8 | 69.0 | 153 | 175 | 48.5 | 1 x M10 | 348 |
| ALP15-AN0 | ALP15-AN1 | 69.0 | 74.6 | 163 | 186 | 48.5 | 1 x M10 | 372 |



ALUMINIUM BASE

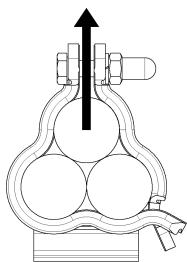


POLYMER BASE
(WITH POLYESTER COATED FRAME)

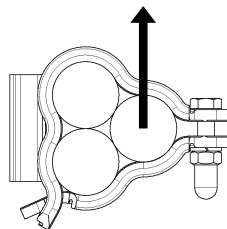
TESTING SUMMARY

Alpha Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|--|--|
| CLEAT TYPE | 6.1.1, 6.1.3 | METALLIC / COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1 | XENON ARC METHOD A | PASS APPLICABLE TO POWDER COATED AND POLYMER BASE OPTIONS |
| CORROSION RESISTANCE | 6.5.2 | REFER TO ELLIS | REFER TO ELLIS |
| IMPACT RATING | 6.3.5, | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | HORIZONTAL - 500N VERTICAL - 500N |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 82kA (REPORT No. PDL-18.184) CABLE OD = $\varnothing 35mm$ |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 600MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 73.4kA (REPORT No. PDL-18.122.2) CABLE OD = $\varnothing 36mm$ |



LATERAL LOAD
'VERTICAL' DIRECTION



LATERAL LOAD
'HORIZONTAL' DIRECTION



Conduit & cable hardware 4CG8 with AH-2 & wet locations. Listed sizes: ALP01-AN0 to ALP15-AN0.



LONDON UNDERGROUND
Alpha Cable Cleats are compliant with the requirements of LUL-1085. Product register number 360.

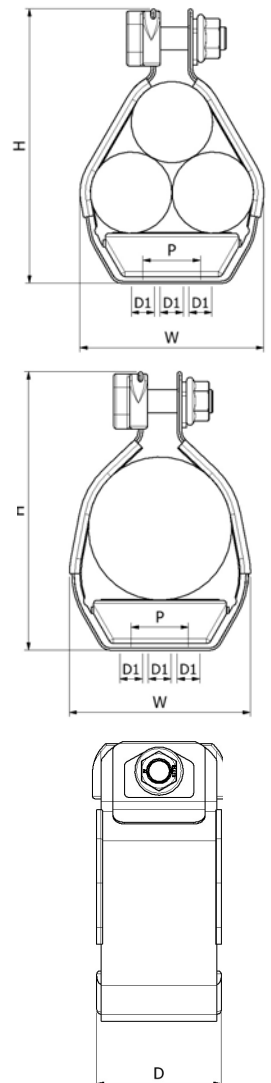
VULCAN+™

Standard Duty Stainless Steel Cable Cleat
For Cables In Single Or Trefoil Formation

- ▶ 316L STAINLESS STEEL FRAME AND FIXINGS
- ▶ SOFT LSF POLYMERIC LINER PROTECTS CABLE SHEATH
- ▶ CAPTIVE CLOSURE FIXINGS FOR FAST INSTALL
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ ABS AND DNV TYPE APPROVED AND ALSO UL LISTED



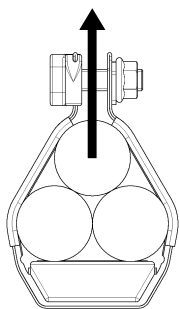
| PART NO. | CABLE RANGE TREFOIL | | CABLE RANGE SINGLE | | DIMENSIONS (mm) | | | | | WEIGHT (g) |
|----------|---------------------|-----------------|--------------------|-----------------|-----------------|-----|----|-----|-------------------|------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | P | FIXING HOLES (D1) | |
| VRT+00 | 19 | 24 | 30 | 42 | 60 | 93 | 54 | N/A | 1 x M10 | 251 |
| VRT+01 | 23 | 28 | 38 | 50 | 63 | 98 | 54 | N/A | 1 x M10 | 258 |
| VRT+02 | 27 | 32 | 43 | 58 | 72 | 106 | 54 | N/A | 1 x M10 | 269 |
| VRT+03 | 30 | 35 | 49 | 64 | 79 | 112 | 54 | N/A | 1 x M10 | 279 |
| VRT+04 | 33 | 38 | 55 | 70 | 85 | 118 | 54 | N/A | 1 x M10 | 284 |
| VRT+05 | 36 | 42 | 58 | 75 | 96 | 125 | 54 | N/A | 1 x M10 | 319 |
| VRT+06 | 40 | 46 | 63 | 84 | 105 | 133 | 54 | N/A | 1 x M10 | 331 |
| VRT+07 | 44 | 50 | 73 | 90 | 112 | 140 | 54 | N/A | 1 x M10 | 391 |
| VRT+08 | 48 | 55 | 83 | 100 | 121 | 149 | 54 | N/A | 1 x M10 | 405 |
| VRT+09 | 51 | 58 | 86 | 104 | 126 | 154 | 54 | N/A | 1 x M10 | 411 |
| VRT+10 | 55 | 62 | 88 | 110 | 134 | 162 | 54 | 50 | 3 x M10 | 442 |
| VRT+11 | 59 | 66 | 90 | 115 | 143 | 170 | 54 | 50 | 3 x M10 | 453 |
| VRT+12 | 63 | 70 | 100 | 125 | 152 | 177 | 54 | 50 | 3 x M10 | 460 |
| VRT+13 | 67 | 74 | 107 | 132 | 161 | 185 | 54 | 75 | 3 x M10 | 524 |
| VRT+14 | 71 | 78 | 120 | 145 | 169 | 192 | 54 | 75 | 3 x M10 | 536 |
| VRT+15 | 74 | 82 | 125 | 150 | 176 | 199 | 54 | 75 | 3 x M10 | 542 |
| VRT+16 | 77 | 85 | 132 | 153 | 183 | 205 | 54 | 75 | 3 x M10 | 544 |
| VRT+17 | 81 | 89 | 136 | 156 | 190 | 216 | 54 | 75 | 3 x M10 | 618 |
| VRT+18 | 85 | 93 | 139 | 159 | 200 | 225 | 54 | 75 | 3 x M10 | 628 |
| VRT+19 | 89 | 97 | 142 | 162 | 200 | 235 | 54 | 75 | 3 x M10 | 637 |
| VRT+20 | 93 | 101 | 160 | 170 | 215 | 240 | 54 | 75 | 3 x M10 | 646 |



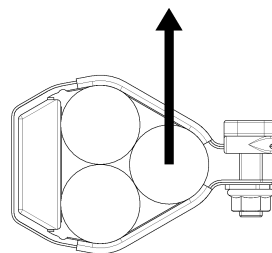
TESTING SUMMARY

Vulcan+ Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|---|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS≥16% CHROMIUM |
| IMPACT RATING | 6.3.4 | HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30s | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | 150N - TREFOIL 45N - SINGLE |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | HORIZONTAL - 200N VERTICAL -650N |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 134kA (REPORT No. PDL-18.122.1) CABLE OD= Ø36mm |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 600MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 115kA (REPORT No. PDL-16.164.3) CABLE OD= Ø36mm |



LATERAL LOAD
'VERTICAL' DIRECTION



LATERAL LOAD
'HORIZONTAL' DIRECTION



Conduit: 8 cable hardware 4CG8 with
AH-2 8 wet locations. Listed sizes:
VRT+00 to VRT+18.

LONDON UNDERGROUND
Vulcan+ Cable Cleats are compliant
with the requirements of LUL-1085.
Product register number 361.

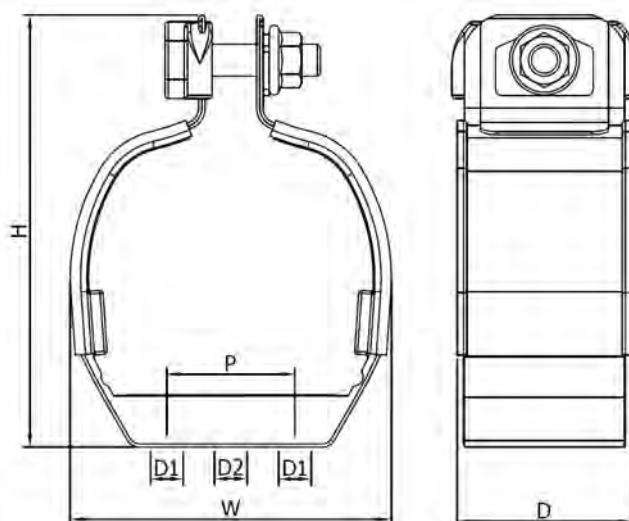
VULCAN+™ QUAD

Standard Duty Stainless Steel Cable Cleat For Cables In Quad Formation

- ▶ 316L STAINLESS STEEL FRAME AND FIXINGS
- ▶ SOFT LSF POLYMERIC LINER PROTECTS CABLE SHEATH
- ▶ CAPTIVE CLOSURE FIXINGS FOR FAST INSTALL
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ ABS APPROVED AND ALSO UL LISTED



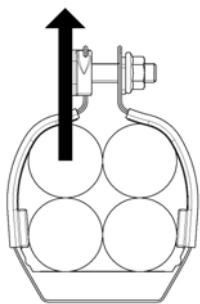
| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | | FIXING HOLES (D1) | WEIGHT (g) |
|----------|-------------|------------|-----------------|-----|----|-----|-------------------|------------|
| | MIN Ø (mm) | MAX Ø (mm) | W | H | D | P | | |
| VRQ+01 | 23 | 25 | 68 | 110 | 54 | N/A | 1 x M10 | 284 |
| VRQ+02 | 26 | 27 | 70 | 113 | 54 | N/A | 1 x M10 | 286 |
| VRQ+03 | 28 | 31 | 78 | 128 | 54 | N/A | 1 x M10 | 318 |
| VRQ+03A | 31 | 35 | 90 | 138 | 54 | N/A | 1 x M10 | 350 |
| VRQ+04 | 35 | 42 | 103 | 148 | 54 | N/A | 1 x M10 | 378 |
| VRQ+05 | 43 | 47 | 120 | 165 | 54 | N/A | 1 x M10 | 452 |
| VRQ+06 | 48 | 50 | 121 | 170 | 54 | N/A | 1 x M10 | 467 |
| VRQ+07 | 51 | 57 | 140 | 190 | 54 | 50 | 3 x M10 | 486 |
| VRQ+08 | 58 | 63 | 150 | 200 | 54 | 50 | 3 x M10 | 499 |
| VRQ+09 | 64 | 70 | 170 | 218 | 54 | 75 | 3 x M10 | 581 |



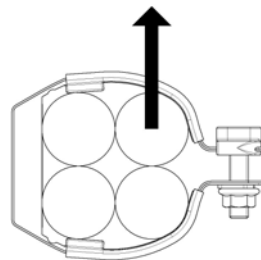
TESTING SUMMARY

Vulcan+ Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|--|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS ≥16% CHROMIUM |
| IMPACT RATING | 6.3.4 | HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30s | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | 100 |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | HORIZONTAL - 100N VERTICAL - 350N |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 134kA (REPORT No. PDL-22.079.03) CABLE OD= Ø36mm (VRQ+) |



LATERAL LOAD
'VERTICAL' DIRECTION



LATERAL LOAD
'HORIZONTAL' DIRECTION



Conduit & cable hardware 4CG8 with
AH-2 & wet locations. Listed sizes:
VRQ+01 to VRQ+09.

LONDON UNDERGROUND
Vulcan+ Cable Cleats are compliant
with the requirements of LUL-1085.
Product register number 361.

VULCAN+™ TWIST FOOT

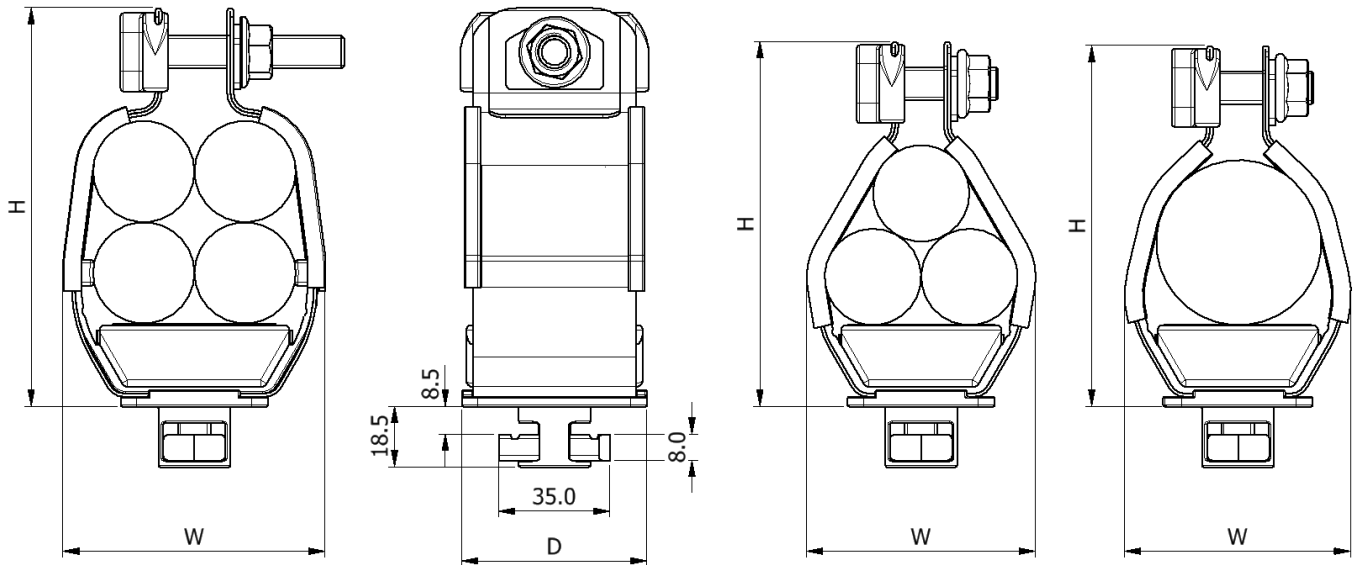
Standard Duty Stainless Steel Cable Cleat for Cables in Single, Trefoil or Quad Formation with the added benefit of a Twist Foot Base

- ▶ BASE FIXING KIT DESIGNED FOR FAST INSTALL ON 41X41 AND 41X21 UNISTRUT CHANNEL/LADDER
- ▶ CLEAT COMES WITH ALL FIXINGS IN PLACE READY FOR INSTALL, NO EXTRA FIXINGS ARE REQUIRED ON SITE
- ▶ FIXING KIT CAN BE SUPPLIED IN A4 STAINLESS STEEL, GALVANISED STEEL OR ZINC PLATED STEEL
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914 - REFER TO VRT+ DATA SHEETS



VRT+ TWIST FOOT FOR TREFOIL AND SINGLE

| PART NO. | CABLE RANGE TREFOIL | | CABLE RANGE SINGLE | | DIMENSIONS (mm) | | | WEIGHT (g) |
|----------------|---------------------|-----------------|--------------------|-----------------|-----------------|-----|----|------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | |
| VRT+00TFM10-X | 19 | 24 | 30 | 42 | 60 | 96 | 54 | 301 |
| VRT+01TFM10-X | 23 | 28 | 38 | 50 | 63 | 102 | 54 | 308 |
| VRT+02TFM10-X | 27 | 32 | 43 | 58 | 72 | 109 | 54 | 319 |
| VRT+03TFM10-X | 30 | 35 | 49 | 64 | 79 | 115 | 54 | 329 |
| VRT+04TFM10-X | 33 | 38 | 55 | 70 | 85 | 121 | 54 | 334 |
| VRT+05TFM10-X | 36 | 42 | 58 | 75 | 96 | 128 | 54 | 369 |
| VRT+06TFM10-X | 40 | 46 | 63 | 84 | 105 | 137 | 54 | 381 |
| VRT+07TFM10-X | 44 | 50 | 73 | 90 | 112 | 143 | 54 | 441 |
| VRT+08TFM10-X | 48 | 55 | 83 | 100 | 121 | 152 | 54 | 455 |
| VRT+09TFM10-X | 51 | 58 | 86 | 104 | 126 | 158 | 54 | 461 |
| VRT+10TFM10-X | 55 | 62 | 88 | 110 | 134 | 166 | 54 | 492 |
| VRT+11TFM10-X | 59 | 66 | 90 | 115 | 143 | 174 | 54 | 503 |
| VRT+12TFM10-X | 63 | 70 | 100 | 125 | 152 | 181 | 54 | 510 |
| VRT+13TTFM10-X | 67 | 74 | 107 | 132 | 161 | 188 | 70 | 525 |
| VRT+14TTFM10-X | 71 | 78 | 120 | 145 | 169 | 195 | 70 | 636 |
| VRT+15TTFM10-X | 74 | 82 | 125 | 150 | 176 | 199 | 70 | 642 |
| VRT+16TTFM10-X | 77 | 85 | 132 | 153 | 183 | 208 | 70 | 644 |
| VRT+17TTFM10-X | 81 | 89 | 136 | 156 | 190 | 219 | 70 | 718 |
| VRT+18TTFM10-X | 85 | 93 | 139 | 159 | 200 | 228 | 70 | 728 |
| VRT+19TTFM10-X | 89 | 97 | 142 | 162 | 200 | 238 | 70 | 737 |
| VRT+20TTFM10-X | 93 | 101 | 160 | 170 | 215 | 243 | 70 | 746 |



VRQ+ TWIST FOOT FOR QUAD

| PART NO. | CABLE RANGE QUAD | | DIMENSIONS (mm) | | | WEIGHT (g) |
|----------------|------------------|-----------------|-----------------|-----|----|------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | |
| VRQ+01TFM10-X | 23 | 25 | 68 | 113 | 54 | 334 |
| VRQ+02TFM10-X | 26 | 27 | 70 | 116 | 54 | 336 |
| VRQ+03TFM10-X | 28 | 31 | 78 | 131 | 54 | 368 |
| VRQ+03ATFM10-X | 31 | 35 | 90 | 141 | 54 | 400 |
| VRQ+04TFM10-X | 35 | 42 | 103 | 151 | 54 | 428 |
| VRQ+05TFM10-X | 43 | 47 | 120 | 166 | 54 | 502 |
| VRQ+06TFM10-X | 48 | 50 | 121 | 173 | 54 | 517 |
| VRQ+07TFM10-X | 51 | 57 | 140 | 193 | 70 | 536 |
| VRQ+08TFM10-X | 58 | 63 | 150 | 203 | 70 | 549 |
| VRQ+09TTFM10-X | 64 | 70 | 170 | 221 | 70 | 681 |

'X' DENOTES FIXING MATERIAL, OPTIONS ARE AS FOLLOWS:

4 = A4 STAINLESS STEEL
 G = GALVANISED STEEL
 Z = ZINC PLATED STEEL

E.G A VRT+04 WITH STAINLESS STEEL TWIST FOOT FIXINGS BECOMES: VRT+04TFM10-4



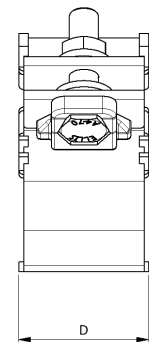
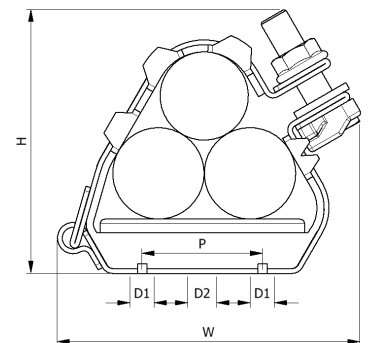
EMPEROR™ TREFOIL

Heavy Duty Stainless Steel Cable Cleat
For Cables In Trefoil Formation

- ▶ 316L STAINLESS STEEL FRAME AND FIXINGS
- ▶ SOFT LSF POLYMERIC LINER PROTECTS CABLE SHEATH
- ▶ CAPTIVE CLOSURE FIXINGS FOR FAST INSTALL
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ ABS AND DNV TYPE APPROVED AND ALSO UL LISTED



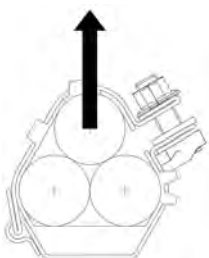
| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | | FIXING HOLES (D1 & D2) | WEIGHT (g) |
|-----------|-----------------|-----------------|-----------------|-----|----|----|------------------------|------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | P | | |
| ER19-23 | 19 | 23 | 96 | 83 | 54 | 25 | 2 x M10 + 1 x M12 | 425 |
| ER23-28 | 23 | 28 | 96 | 83 | 54 | 25 | 2 x M10 + 1 x M12 | 425 |
| ER27-32 | 27 | 32 | 97 | 88 | 54 | 25 | 2 x M10 + 1 x M12 | 440 |
| ER30-35 | 30 | 35 | 99 | 91 | 54 | 25 | 2 x M10 + 1 x M12 | 445 |
| ER33-38 | 33 | 38 | 103 | 95 | 54 | 25 | 2 x M10 + 1 x M12 | 460 |
| ER36-42 | 36 | 42 | 124 | 100 | 54 | 50 | 2 x M10 + 1 x M12 | 600 |
| ER40-46 | 40 | 46 | 125 | 106 | 54 | 50 | 2 x M10 + 1 x M12 | 605 |
| ER44-50 | 44 | 50 | 130 | 117 | 54 | 50 | 2 x M10 + 1 x M12 | 630 |
| ER48-55 | 48 | 55 | 132 | 121 | 54 | 50 | 2 x M10 + 1 x M12 | 640 |
| ER51-58 | 51 | 58 | 136 | 128 | 54 | 50 | 2 x M10 + 1 x M12 | 650 |
| ER55-62 | 55 | 62 | 160 | 135 | 54 | 75 | 2 x M10 + 1 x M12 | 810 |
| ER59-66 | 59 | 66 | 163 | 143 | 54 | 75 | 2 x M10 + 1 x M12 | 825 |
| ER63-70 | 63 | 70 | 166 | 151 | 54 | 75 | 2 x M10 + 1 x M12 | 850 |
| ER67-74 | 67 | 74 | 169 | 158 | 54 | 75 | 2 x M10 + 1 x M12 | 850 |
| ER71-78 | 71 | 78 | 172 | 165 | 54 | 75 | 2 x M10 + 1 x M12 | 890 |
| ER74-82 | 74 | 82 | 177 | 171 | 54 | 75 | 2 x M10 + 1 x M12 | 890 |
| ER77-85 | 77 | 85 | 183 | 177 | 54 | 75 | 2 x M10 + 1 x M12 | 905 |
| ER82-88 | 82 | 88 | 191 | 187 | 54 | 75 | 2 x M10 + 1 x M12 | 820 |
| ER88-96 | 88 | 96 | 207 | 203 | 54 | 75 | 2 x M10 + 1 x M12 | 890 |
| ER96-103 | 96 | 103 | 221 | 218 | 54 | 75 | 2 x M10 + 1 x M12 | 940 |
| ER103-111 | 103 | 111 | 237 | 235 | 54 | 75 | 2 x M10 + 1 x M12 | 950 |
| ER111-119 | 111 | 119 | 253 | 250 | 54 | 75 | 2 x M10 + 1 x M12 | 1010 |
| ER119-128 | 119 | 128 | 265 | 275 | 54 | 75 | 2 x M10 + 1 x M12 | 1220 |



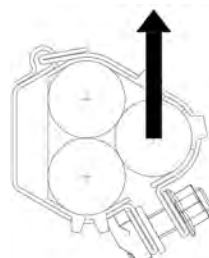
TESTING SUMMARY

Emperor Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|---|
| CLEAT TYPE | 6.1.3 | COMPOSITE | |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS≥16% CHROMIUM |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30s | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | 400 |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | HORIZONTAL - 650N VERTICAL -1000N |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 195kA (REPORT No. PDL-09.098.2) CABLE OD= Ø38mm (IEC 61914:2009) |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 600MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 149kA (REPORT No. PDL-17.137.4) CABLE OD= Ø36mm |



LATERAL LOAD
'VERTICAL' DIRECTION



LATERAL LOAD
'HORIZONTAL' DIRECTION



Conduit & cable hardware 4CG8 with
AH-2 & wet locations. Listed sizes:
ER19-23 to ER82-88.

LONDON UNDERGROUND
Emperor Cable Cleats are compliant
with the requirements of LUL-1085.
Product register number 362.

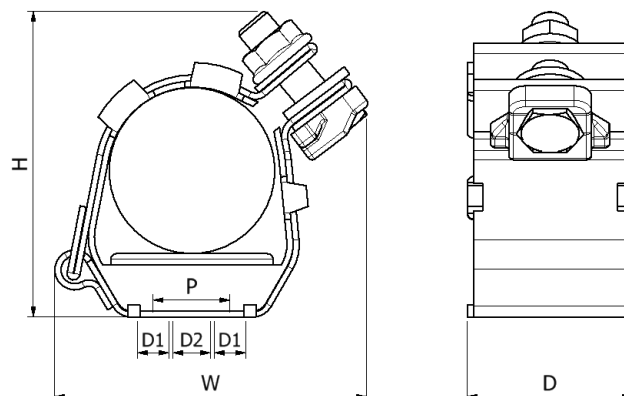
EMPEROR™ SINGLE

Heavy Duty Stainless Steel Cable Cleat For Single Cables

- ▶ 316L STAINLESS STEEL FRAME AND FIXINGS
- ▶ SOFT LSF POLYMERIC LINER PROTECTS CABLE SHEATH
- ▶ CAPTIVE CLOSURE FIXINGS FOR FAST INSTALL
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ ABS AND DNV TYPE APPROVED AND ALSO UL LISTED



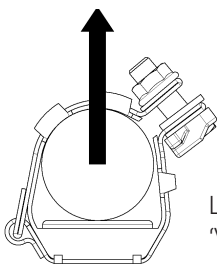
| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | | FIXING HOLES (D1 & D2) | WEIGHT (g) |
|-----------|-------------|------------|-----------------|-----|----|----|------------------------|------------|
| | MIN Ø (mm) | MAX Ø (mm) | W | H | D | P | | |
| ES32-39 | 32 | 39 | 91 | 89 | 54 | 25 | 2 x M10 + 1 x M12 | 450 |
| ES37-45 | 37 | 45 | 96 | 93 | 54 | 25 | 2 x M10 + 1 x M12 | 470 |
| ES44-52 | 44 | 52 | 99 | 98 | 54 | 25 | 2 x M10 + 1 x M12 | 480 |
| ES51-59 | 51 | 59 | 103 | 102 | 54 | 25 | 2 x M10 + 1 x M12 | 490 |
| ES58-66 | 58 | 66 | 109 | 101 | 54 | 25 | 2 x M10 + 1 x M12 | 500 |
| ES65-73 | 65 | 73 | 111 | 103 | 54 | 25 | 2 x M10 + 1 x M12 | 510 |
| ES73-85 | 73 | 85 | 135 | 112 | 54 | 50 | 2 x M10 + 1 x M12 | 640 |
| ES84-94 | 84 | 94 | 135 | 135 | 54 | 50 | 2 x M10 + 1 x M12 | 660 |
| ES94-118 | 94 | 118 | 160 | 150 | 54 | 50 | 2 x M10 + 1 x M12 | 710 |
| ES118-130 | 118 | 130 | 175 | 160 | 54 | 75 | 2 x M10 + 1 x M12 | 900 |
| ES127-150 | 127 | 150 | 180 | 180 | 54 | 75 | 2 x M10 + 1 x M12 | 940 |



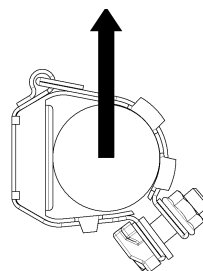
TESTING SUMMARY

Emperor Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|--|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS ≥16% CHROMIUM |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30s | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | 250 |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | HORIZONTAL - 650N VERTICAL -1000N |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) (EMPEROR TREFOIL) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 193KA (REPORT NO. PDL- 22.079.05) CABLE OD= Ø35MM PHASE SPACING = 125MM |



LATERAL LOAD
'VERTICAL' DIRECTION



LATERAL LOAD
'HORIZONTAL' DIRECTION



Conduit & cable hardware 4CG8
with AH-2 Ø wet locations. Listed sizes:
ES32-39 to ES94-118.

LONDON UNDERGROUND
Emperor Cable Cleats are compliant
with the requirements of LUL-1085.
Product register number 362.

EMPEROR™ TWIST FOOT

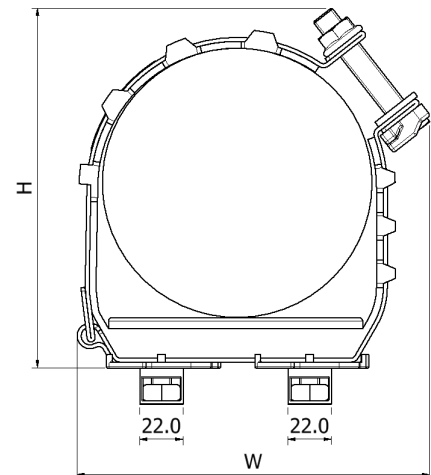
Heavy Duty Stainless Steel Cable Cleat For Single Cables

- ▶ BASE FIXING KIT DESIGNED FOR FAST INSTALL ON 41X41 AND 41X21 UNISTRUT CHANNEL/LADDER
- ▶ CLEAT COMES WITH ALL FIXINGS IN PLACE READY FOR INSTALL, NO EXTRA FIXINGS ARE REQUIRED ON SITE
- ▶ FIXING KIT CAN BE SUPPLIED IN A4 STAINLESS STEEL, GALVANISED STEEL OR ZINC PLATED STEEL
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914 - REFER TO EMPEROR SINGLE DATA SHEET



EMPEROR SINGLE TWIST FOOT OPTIONS

| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | WEIGHT (g) |
|-------------------|-------------|------------|-----------------|-----|----|------------|
| | MIN Ø (mm) | MAX Ø (mm) | W | H | D | |
| ES32-39TFM12-X | 32 | 39 | 91 | 92 | 54 | 500 |
| ES37-45TFM12-X | 37 | 45 | 96 | 96 | 54 | 520 |
| ES44-52TFM12-X | 44 | 52 | 99 | 101 | 54 | 530 |
| ES51-59TFM12-X | 51 | 59 | 103 | 105 | 54 | 540 |
| ES58-66TFM12-X | 58 | 66 | 109 | 104 | 54 | 550 |
| ES65-73TFM12-X | 65 | 73 | 111 | 106 | 54 | 560 |
| ES73-85TFM12-X | 73 | 85 | 135 | 115 | 54 | 690 |
| ES84-94TFM12-X | 84 | 94 | 135 | 138 | 54 | 710 |
| ES94-118TFM12-X | 94 | 118 | 160 | 153 | 54 | 760 |
| ES118-130TTFM10-X | 118 | 130 | 175 | 163 | 70 | 1000 |
| ES127-150TTFM10-X | 127 | 150 | 180 | 183 | 70 | 1040 |

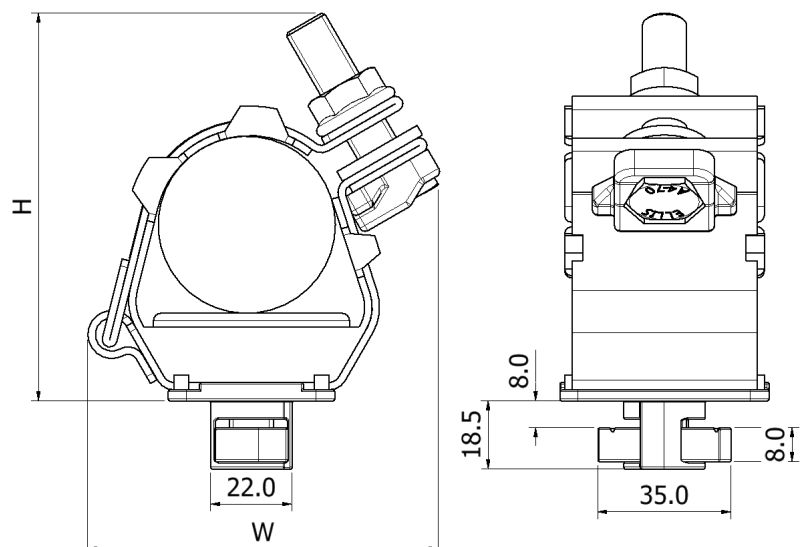


TWIN FIX TWIST FOOT:
ES118-130 TO ES127-150

X DENOTES FIXING MATERIAL, OPTIONS ARE AS FOLLOWS:

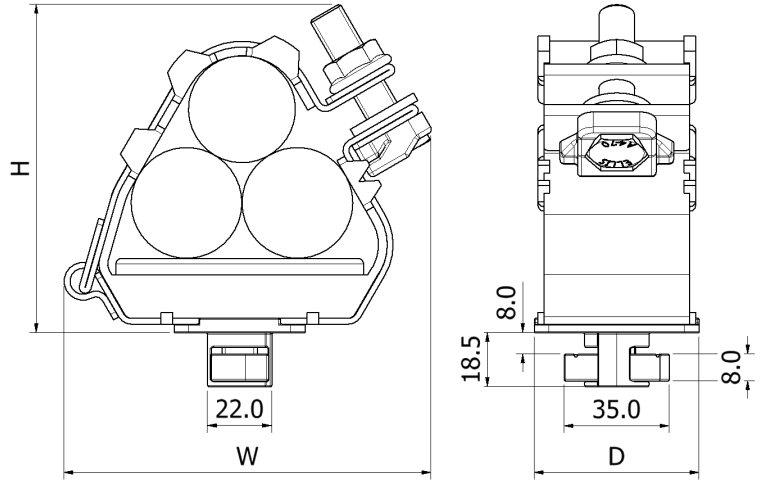
- 4 = A4 STAINLESS STEEL
- G = GALVANISED STEEL
- Z = ZINC PLATED STEEL

E.G A ES37-45 WITH STAINLESS STEEL TWIST FOOT FIXINGS BECOMES: ES37-45TFM10-4



SINGLE FIX TWIST FOOT: ES32-39 TO ES94-118

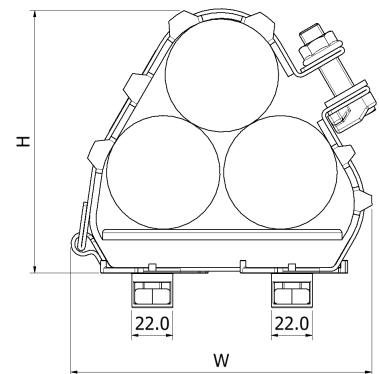
Heavy Duty Stainless Steel Cable
Cleat For Trefoil Cables



EMPEROR TREFOIL TWIST FOOT OPTIONS

SINGLE FIX TWIST FOOT: ER19-23 TO ER51-58

| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | WEIGHT (g) |
|-------------------|-----------------|-----------------|-----------------|-----|----|------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | |
| ER19-23TFM12-X | 19 | 23 | 96 | 86 | 54 | 475 |
| ER23-28TFM12-X | 23 | 28 | 96 | 86 | 54 | 475 |
| ER27-32TFM12-X | 27 | 32 | 97 | 91 | 54 | 490 |
| ER30-35TFM12-X | 30 | 35 | 99 | 94 | 54 | 495 |
| ER33-38TFM12-X | 33 | 38 | 103 | 98 | 54 | 510 |
| ER36-42TFM12-X | 36 | 42 | 124 | 103 | 54 | 660 |
| ER40-46TFM12-X | 40 | 46 | 125 | 109 | 54 | 655 |
| ER44-50TFM12-X | 44 | 50 | 130 | 120 | 54 | 680 |
| ER48-55TFM12-X | 48 | 55 | 132 | 124 | 54 | 690 |
| ER51-58TFM12-X | 51 | 58 | 136 | 131 | 54 | 700 |
| ER55-62TTFM10-X | 55 | 62 | 160 | 138 | 70 | 810 |
| ER59-66TTFM10-X | 59 | 66 | 163 | 146 | 70 | 825 |
| ER63-70TTFM10-X | 63 | 70 | 166 | 154 | 70 | 950 |
| ER67-74TTFM10-X | 67 | 74 | 169 | 161 | 70 | 950 |
| ER71-78TTFM10-X | 71 | 78 | 172 | 168 | 70 | 990 |
| ER74-82TTFM10-X | 74 | 82 | 177 | 174 | 70 | 990 |
| ER77-85TTFM10-X | 77 | 85 | 183 | 180 | 70 | 1005 |
| ER82-88TTFM10-X | 82 | 88 | 191 | 190 | 70 | 920 |
| ER88-96TTFM10-X | 88 | 96 | 207 | 206 | 70 | 990 |
| ER96-103TTFM10-X | 96 | 103 | 221 | 221 | 70 | 1040 |
| ER103-111TTFM10-X | 103 | 111 | 237 | 238 | 70 | 1050 |
| ER111-119TTFM10-X | 111 | 119 | 253 | 253 | 70 | 1110 |
| ER119-128TTFM10-X | 119 | 128 | 265 | 278 | 70 | 1320 |



TWIN FIX TWIST FOOT: ER55-62 TO ER119-128

X DENOTES FIXING MATERIAL,
OPTIONS ARE AS FOLLOWS:

- 4 = A4 STAINLESS STEEL
- G = GALVANISED STEEL
- Z = ZINC PLATED STEEL

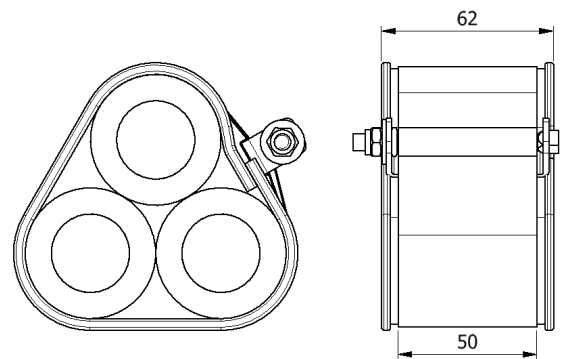
E.G A ER33-38 WITH STAINLESS STEEL TWIST
FOOT FIXINGS BECOMES: ER33-38TFM10-4

FLEXI-STRAP™

Intermediate Short-circuit Strap
Patent No. UK Patent GB 252 6331



- ▶ 316L STAINLESS STEEL FRAME AND FIXINGS
- ▶ SOFT LSF POLYMERIC LINER PROTECTS CABLE SHEATH
- ▶ HEAVY DUTY AND STANDARD DUTY OPTIONS AVAILABLE TO SUIT DIFFERENT SHORT CIRCUIT CONDITIONS
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ STRAPS CAN BE USED BETWEEN CLEATS TO REDUCE THE TOTAL AMOUNT OF FIXED CLEATS WHILST ENSURING ADEQUATE SHORT CIRCUIT PROTECTION



STANDARD DUTY SUITABLE FOR USE WITH VULCAN+ CLEATS

| PART NO. | CABLE RANGE | | WEIGHT (g) |
|--------------|-------------|------------|------------|
| | MIN Ø (mm) | MAX Ø (mm) | |
| FS24-34SDL | 24 | 34 | 131 |
| FS30-41SDL | 30 | 41 | 144 |
| FS37-47SDL | 37 | 47 | 155 |
| FS43-54SDL | 43 | 54 | 168 |
| FS50-60SDL | 50 | 60 | 180 |
| FS56-67SDL | 56 | 67 | 193 |
| FS63-73SDL | 63 | 73 | 204 |
| FS69-80SDL | 69 | 80 | 217 |
| FS72-85SDL | 72 | 85 | 226 |
| FS82-95SDL | 82 | 95 | 245 |
| FS92-105SDL | 92 | 105 | 264 |
| FS102-115SDL | 102 | 115 | 282 |
| FS112-125SDL | 112 | 125 | 301 |
| FS122-135SDL | 122 | 135 | 319 |
| FS132-145SDL | 132 | 145 | 338 |

HEAVY DUTY SUITABLE FOR USE WITH EMPEROR CLEATS

| PART NO. | CABLE RANGE | | WEIGHT (g) |
|--------------|-------------|------------|------------|
| | MIN Ø (mm) | MAX Ø (mm) | |
| FS24-34HDL | 24 | 34 | 165 |
| FS30-41HDL | 30 | 41 | 185 |
| FS37-47HDL | 37 | 47 | 202 |
| FS43-54HDL | 43 | 54 | 221 |
| FS50-60HDL | 50 | 60 | 238 |
| FS56-67HDL | 56 | 67 | 258 |
| FS63-73HDL | 63 | 73 | 275 |
| FS69-80HDL | 69 | 80 | 294 |
| FS72-85HDL | 72 | 85 | 308 |
| FS82-95HDL | 82 | 95 | 336 |
| FS92-105HDL | 92 | 105 | 364 |
| FS102-115HDL | 102 | 115 | 392 |
| FS112-125HDL | 112 | 125 | 420 |
| FS122-135HDL | 122 | 135 | 448 |
| FS132-145HDL | 132 | 145 | 476 |

TESTING SUMMARY

Flexi-Straps have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA (STANDARD DUTY) | TEST DATA (HEAVY DUTY) |
|--|---------------------------------------|---|--|--|
| CLEAT TYPE | 6.1.3 | COMPOSITE | N/A | N/A |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 | -40 to +60 |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS \geq 16% CHROMIUM | 316L STAINLESS STEEL HAS \geq 16% CHROMIUM |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME \geq 30s | PASS | PASS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 134kA (REPORT No. PDL-18.122.3) CABLE OD= \varnothing 36mm | - |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 600MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 114kA (REPORT No. PDL-18.122.4) CABLE OD= \varnothing 36mm | 156kA (REPORT No. ZKU-15-204) CABLE OD= \varnothing 38mm (IEC 61914:2009) |

INSTALLATION INFORMATION:

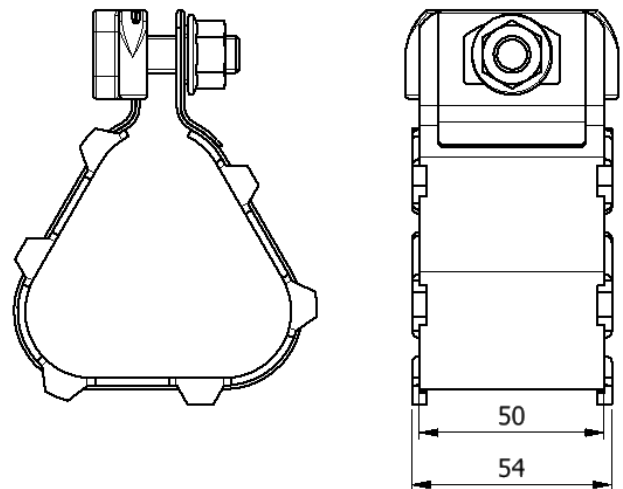
Flexi-Strap is installed by wrapping multiple layers of stainless steel strip around the cable. It is tightened and locked in place using a patented buckle and spindle design. Standard duty straps are wrapped twice around the cables and heavy duty straps are wrapped three times. For more information please refer to the product installation instructions or alternatively the videos section of our website.

A special drive socket to turn the spindle is supplied with every 50 straps ordered, the socket can attach to a standard 1/4" or 6mm ratchet handle. Drive sockets can be ordered separately using the part number FS-T001-4; Although the FS-T001-4 can speed up installation, standard tools also can be used.

PROTECT™

Retention Strap
UK Design Reg No. 355854

- ▶ 316L STAINLESS STEEL FRAME AND FIXINGS
- ▶ SOFT LSF POLYMERIC LINER PROTECTS CABLE SHEATH
- ▶ SUITABLE FOR USE IN BETWEEN VULCAN+ CLEATS, REDUCING THE AMOUNT OF FIXED CLEATS WHILST ENSURING SHORT CIRCUIT PROTECTION
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ FOR STRAP SIZE DETAILS CONTACT ELLIS

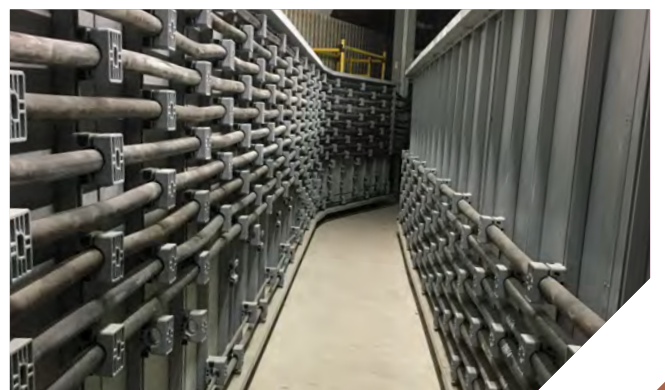
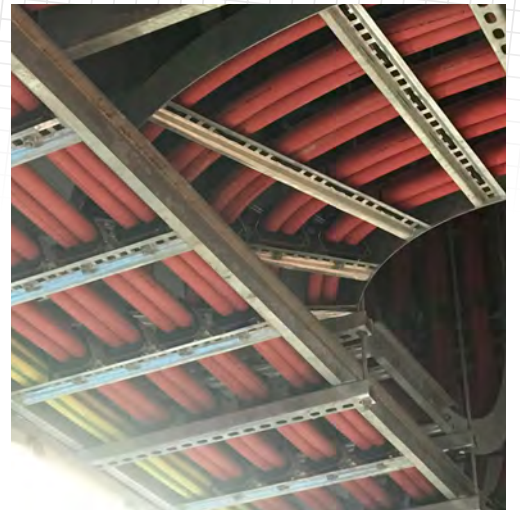


TESTING SUMMARY

Protect has been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|--|---|
| CLEAT TYPE | 6.1.3 | COMPOSITE | N/A |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS ≥16% CHROMIUM |
| IMPACT RATING | 6.3.5 | - | REFER TO ELLIS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30s | PASS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 133kA (REPORT No. PDL-18.071) CABLE OD= Ø36mm |

This information is subject to change without notice. The information provided has been generated in laboratory conditions and as such results in use may vary.



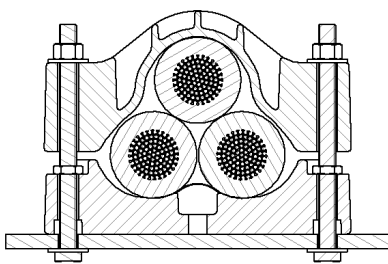
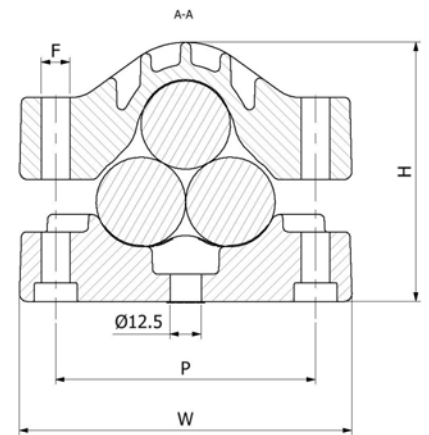
TRIDENT[®]

Polymeric Trefoil Cleat

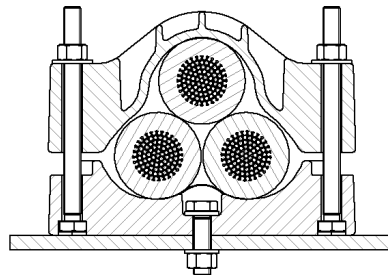


- ▶ MANUFACTURED AS STANDARD IN A HIGH STRENGTH LSF GLASS FILLED NYLON
- ▶ SINGLE OR TWO BOLT CLEAT FIXING OPTIONS
- ▶ SHAPING OF THE CLEAT ENSURES CABLES ARE HELD IN A TREFOIL FORMATION ACROSS THE RANGE
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ FIXINGS ARE NOT SUPPLIED AS STANDARD BUT CAN BE PROVIDED ON REQUEST

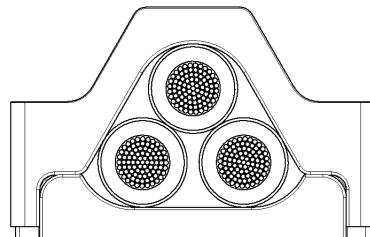
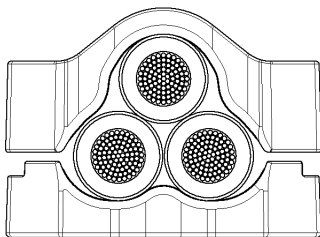
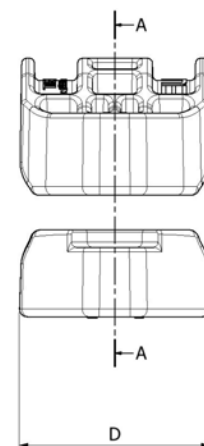
| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | | | WEIGHT (g) |
|----------|-------------|------------|-----------------|-----|----|-------|-----|------------|
| | MIN Ø (mm) | MAX Ø (mm) | W | H | D | P | F | |
| TR24-29 | 24 | 29 | 122 | 91 | 77 | 92.5 | M10 | 360 |
| TR27-32 | 27 | 32 | 126 | 95 | 77 | 98.5 | M10 | 370 |
| TR30-36 | 30 | 36 | 134 | 104 | 77 | 104.5 | M10 | 383 |
| TR34-41 | 34 | 41 | 144 | 112 | 77 | 114.5 | M10 | 485 |
| TR39-47 | 39 | 47 | 156 | 124 | 77 | 125 | M12 | 568 |
| TR45-54 | 45 | 54 | 172 | 138 | 77 | 145 | M12 | 666 |
| TR52-62 | 52 | 62 | 190 | 153 | 77 | 160 | M12 | 793 |
| TR60-72 | 60 | 72 | 215 | 177 | 98 | 182 | M12 | 1100 |
| TR69-83 | 69 | 83 | 238 | 198 | 98 | 205 | M12 | 1300 |



FIXING OPTION 1: 2 x M10/M12 FIXINGS



FIXING OPTION 2: 1 X M12 FIXING

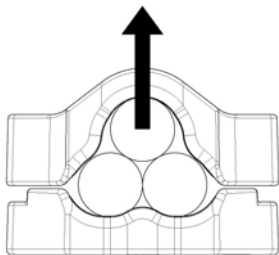


SHAPING OF THE TRIDENT CLAMPS ENSURES CABLES ARE MAINTAINED IN A TRUE TREFOIL FORMATION ACROSS ITS RANGE-TAKE, UNLIKE SIMILAR POLYMERIC CLAMPS ON THE MARKET.

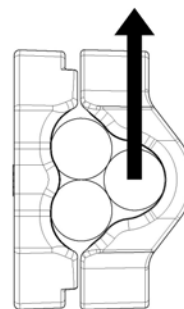
TESTING SUMMARY

Trident Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|--|
| CLEAT TYPE | 6.1.2 | NON-METALLIC | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS |
| CORROSION RESISTANCE | 6.5.2 | N/A | N/A |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | 1500 |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | HORIZONTAL - 2250N VERTICAL - 2250N |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 134kA (REPORT No. PDL-18.071.6) CABLE OD= $\varnothing 36mm$ |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 600MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 94kA (REPORT No. PDL-18.071.5) CABLE OD= $\varnothing 36mm$ |



LATERAL LOAD 'VERTICAL' DIRECTION

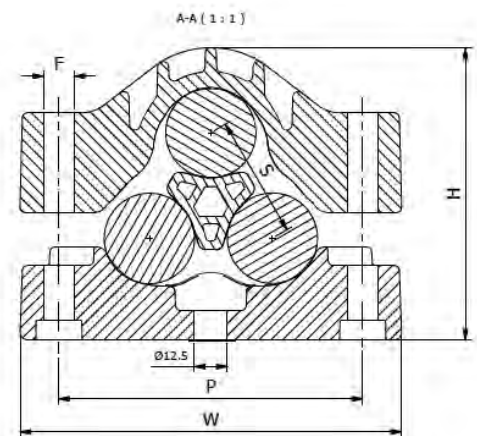
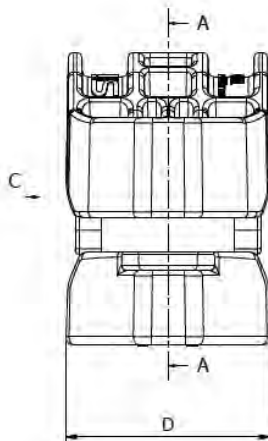


LATERAL LOAD 'HORIZONTAL' DIRECTION

TRIDENT WITH SPACER

Polymeric Trefoil Cleat

- ▶ MANUFACTURED AS STANDARD IN A HIGH STRENGTH LSF GLASS FILLED NYLON
- ▶ SINGLE OR TWO BOLT CLEAT FIXING OPTIONS
- ▶ SHAPING OF THE CLEAT ENSURES CABLES ARE HELD IN A TREFOIL FORMATION ACROSS THE RANGE
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ SPACER PIECE ENSURES EQUIDISTANT CABLE SPACING WHILST PROVIDING A LARGE CLAMP RANGE-TAKE WHEN USED WITH THE STANDARD TRIDENT CLAMP
- ▶ FIXINGS ARE NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST



| PART NO. | CABLE RANGE (WITH SPACER) | | CABLE RANGE (WITHOUT SPACER) | | DIMENSIONS (mm) | | | | | WEIGHT (g) | CORRESPONDING TRIDENT |
|-----------|---------------------------|-----------------|------------------------------|-----------------|-----------------|-----|----|-------|-----|------------|-----------------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | P | F | | |
| TR29-41SP | 29 | 34 | 34 | 41 | 144 | 115 | 77 | 114.5 | M10 | 530 | TR34-41 |
| TR33-47SP | 33 | 39 | 39 | 47 | 156 | 127 | 77 | 125 | M12 | 618 | TR39-47 |
| TR41-54SP | 41 | 45 | 45 | 54 | 172 | 141 | 77 | 145 | M12 | 706 | TR45-54 |

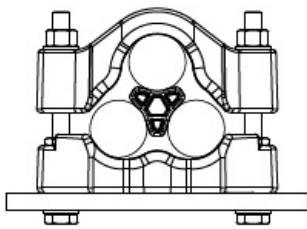
NOTE: REMOVAL OF THE SPACER PIECE CAN BE UTILISED TO PROVIDE A PRODUCT WITH A LARGE RANGE-TAKE. REFER TO THE STANDARD TRIDENT DATA SHEET.

TESTING SUMMARY

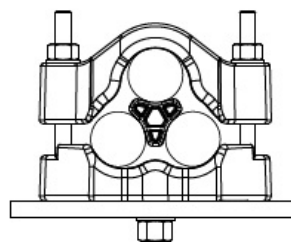
Trident Cleats have been tested in line with the international standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|--|--|
| CLEAT TYPE | 6.1.2 | NON-METALLIC | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -60 to + 60 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS |
| CORROSION RESISTANCE | 6.5.2 | N/A | N/A |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 106kA (REPORT No. PDL-21.085.03) CABLE OD= $\varnothing 36mm$ CABLE SPACING = 50mm |

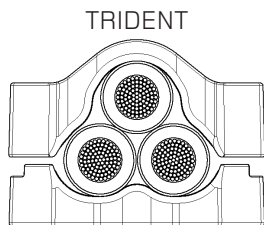
- 1) SP VARIANTS HAVE A DIFFERENT LOAD WITHSTAND TO STANDARD VARIANTS, PLEASE CONTACT ELLIS FOR FURTHER INFORMATION.
- 2) 'FIXING OPTION 1' S/C STRENGTH IS DERATED. REFER TO ELLIS FOR 'FIXING OPTION 1' SHORT CIRCUIT WITHSTANDS. PLEASE CONTACT ELLIS.
- 3) THE OPERATING TEMPERATURE IS BASED ON THE TEST REQUIREMENTS OF IEC 61914:2015 ONLY.



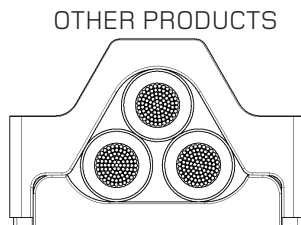
FIXING OPTION 1:
2 x M10/M12 FIXINGS



FIXING OPTION 2:
1 X M12 FIXING

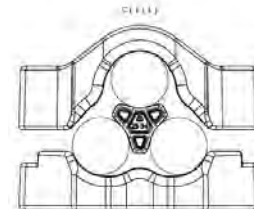


TRIDENT



OTHER PRODUCTS

SHAPING OF THE TRIDENT CLAMPS ENSURES CABLES ARE MAINTAINED IN A TRUE TREFOIL FORMATION ACROSS ITS RANGE-TAKE, UNLIKE SIMILAR POLYMERIC CLAMPS ON THE MARKET. UNEQUAL TREFOIL FORMATIONS CAN CAUSE ADDITIONAL VOLTAGE DROP.



'SP' VARIANTS UTILISE A DISTANCE WEDGE TO INCREASE RANGE-TAKE. EQUAL SPACING BETWEEN THE CABLES IS MAINTAINED.

COLOSSUS™

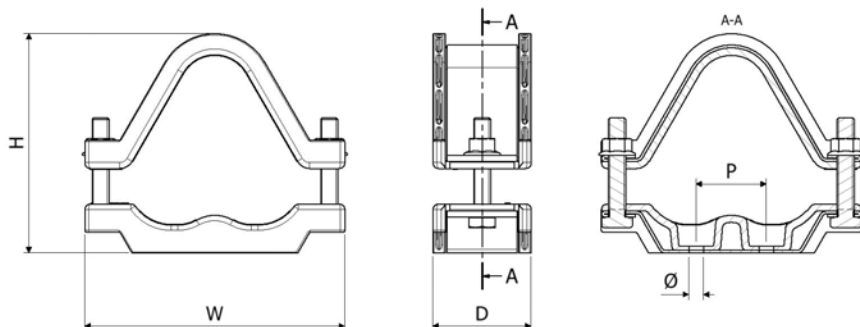
Community Design
Reg. No. 001927583

- ▶ 316L STAINLESS STEEL FRAME AND FIXINGS
- ▶ LSF POLYMERIC BASE AND TOP MOULDING PROTECTS THE CABLE SHEATH
- ▶ OPTIONAL SADDLED BASE AVAILABLE FOR LARGE CLEAT SPACING APPLICATIONS
- ▶ COLOSSUS RANGE CAN ACCOMMODATE TREFOIL CABLES FROM Ø24MM TO Ø170MM ACROSS 14 SIZES
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914



| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | | FIXING HOLES (D1 & D2) | WEIGHT (g) |
|------------|-------------|------------|-----------------|-----|-----|-----|------------------------|------------|
| | MIN Ø (mm) | MAX Ø (mm) | W | H | D | P | | |
| COL24-29 | 24 | 29 | 128 | 87 | 60 | 25 | 2 x M10 + M12 | 604 |
| COL27-32 | 27 | 32 | 133 | 92 | 60 | 25 | 2 x M10 + M12 | 623 |
| COL30-36 | 30 | 36 | 137 | 101 | 60 | 25 | 2 x M10 + M12 | 639 |
| COL34-41 | 34 | 41 | 146 | 110 | 60 | 25 | 2 x M10 + M12 | 690 |
| COL39-47 | 39 | 47 | 157 | 122 | 60 | 25 | 2 x M10 + M12 | 734 |
| COL45-54 | 45 | 54 | 171 | 141 | 70 | 50 | 2 x M10 | 913 |
| COL52-62 | 52 | 62 | 185 | 156 | 70 | 50 | 2 x M10 | 974 |
| COL60-72 | 60 | 72 | 204 | 176 | 70 | 50 | 2 x M10 | 1063 |
| COL69-83 | 69 | 83 | 225 | 202 | 100 | 75 | 2 x M12 | 1590 |
| COL79-95 | 79 | 95 | 247 | 225 | 100 | 75 | 2 x M12 | 1700 |
| COL91-109 | 91 | 109 | 273 | 253 | 100 | 120 | 2 x M12 | 1900 |
| COL105-126 | 105 | 126 | 306 | 286 | 150 | 120 | 2 x M12 | 3030 |
| COL122-146 | 122 | 146 | 345 | 324 | 150 | 150 | 2 x M12 | 3270 |
| COL142-170 | 142 | 170 | 390 | 371 | 150 | 150 | 2 x M12 | 3680 |

A SADDLED BASE IS AVAILABLE ON REQUEST.



TESTING SUMMARY

Colossus Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|--|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS \geq 16% CHROMIUM |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME \geq 30s | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 170kA (REPORT No. PDL-18.122) CABLE OD= \varnothing 36mm |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 600MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 150kA (REPORT No. PDL-16.164.2) CABLE OD= \varnothing 36mm |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 7.8M INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 104kA (REPORT No. ZKU-12-179) CABLE OD= \varnothing 70mm (WITH PROTECT STRAPS EVERY 1.3m - BASED ON IEC61914:2009) |

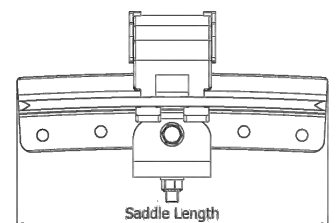
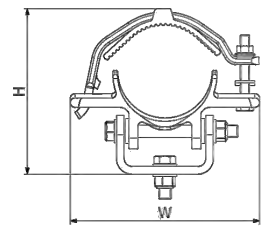
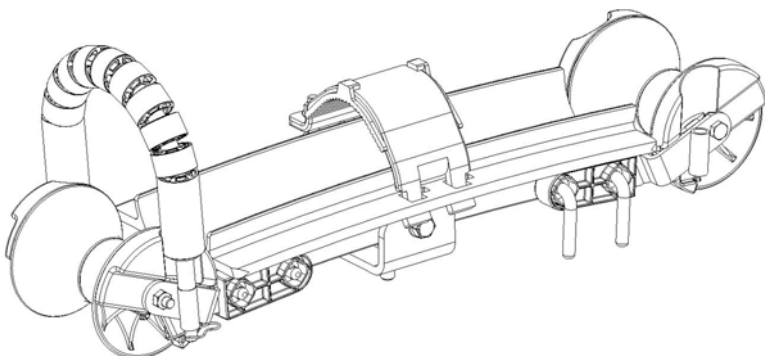
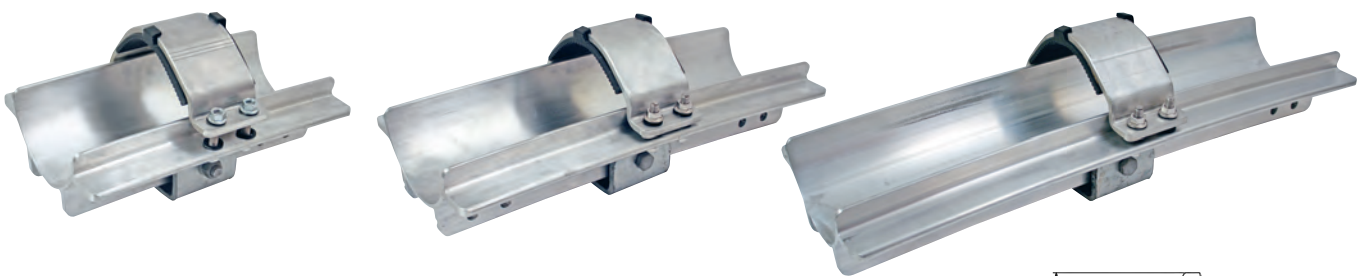
CENTAUR[®]

Cable Saddle, UK Patent App. No. 0805128.6
 European Patent No. 1973211, US Patent No. 8398033
 Community Design Registration No. 000749999

- ▶ CURVED SADDLE CLEAT TO SUIT SAGGED CABLE INSTALLATIONS
- ▶ PIVOT POINTS ALLOW THE SADDLE TO PARTIALLY ROTATE UP AND DOWN AND LEFT TO RIGHT ACROSS ITS LENGTH
- ▶ HINGED CABLE STRAP EASES INSTALLATION
- ▶ CABLE ROLLERS CAN BE POSITIONED AT THE ENDS OF THE SADDLE FOR CABLE PULLING AS AN OPTIONAL EXTRA
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED IN LINE WITH IEC 61914



| PART NO.. | CABLE RANGE | | DIMENSIONS (mm) | | | | BASE FIXING TYPE |
|-----------|-----------------|-----------------|-----------------|-----|-----------------|---------|------------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | W | H | SADDLE LENGTH | | |
| CS100-112 | 100 | 112 | 244 | 205 | 400, 600 or 800 | 1 x M16 | |
| CS108-122 | 108 | 122 | 244 | 212 | 400, 600 or 800 | 1 x M16 | |
| CS120-132 | 120 | 132 | 244 | 221 | 400, 600 or 800 | 1 x M16 | |
| CS128-142 | 128 | 142 | 244 | 233 | 400, 600 or 800 | 1 x M16 | |
| CS140-152 | 140 | 152 | 272 | 240 | 400, 600 or 800 | 1 x M16 | |
| CS150-162 | 150 | 162 | 272 | 253 | 400, 600 or 800 | 1 x M16 | |
| CS148-162 | 148 | 162 | 272 | 253 | 400, 600 or 800 | 1 x M16 | |



TESTING SUMMARY

Centaur cable saddles have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' As IEC 61914 is part of the low voltage directive it is not possible to follow the standard exactly and thus deviations have been made in areas. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|-----------------------------|--|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | UV RESISTANT | METALLIC FRAME SHIELDS ALL POLYMER COMPONENTS. |
| CORROSION RESISTANCE | 6.5.2.2 | REFER TO ELLIS | - |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | - | 163kA (REPORT No. KEMA-313-08) |

PROJECT SPECIFIC DESIGNS:

Centaur can be adapted to suit specific project requirements and as such Ellis can alter the design to suit certain load or functionality requirements. Please contact Ellis for further details.



This information is subject to change without notice. The information provided has been generated in laboratory conditions and as such results in use may vary.

CENTAUR[®] TREFOIL

UK Patent App. No. 0805128.6
European Patent No. 1973211, US Patent No. 8398033
Community Design Registration No. 000749999

- ▶ CURVED SADDLE CLEAT TO SUIT SAGGED CABLE INSTALLATIONS
- ▶ PIVOT POINTS ALLOW THE SADDLE TO PARTIALLY ROTATE UP AND DOWN AND LEFT TO RIGHT ACROSS ITS LENGTH
- ▶ HINGED CABLE STRAP EASES INSTALLATION
- ▶ SHORT CIRCUIT TESTED IN LINE WITH IEC 61914



Centaur Trefoil cable saddles are designed to support HV cables in trefoil formations alongside steelwork centres typically around 3 - 8m.

The assembly consists of an extruded and pressed aluminium saddle and a hinged aluminium overstrap. The curvature of the saddle accommodates the thermal expansion of the cable and the ends of the saddle are flared so that the cable never comes into contact with a sharp edge under any circumstances.

Centaur Trefoil is available in lengths of 400, 600 and 800mm to allow for different cable diameters and mounting centres.

Centaur Trefoil is project specific and as such range details cannot be provided. Please contact Ellis for further details.



A photo of the short circuit test rig for Centaur Trefoil including Flexi-Straps (see page 26). Testing was carried out at ZKU Laboratories in Prague, CZ.

TESTING SUMMARY

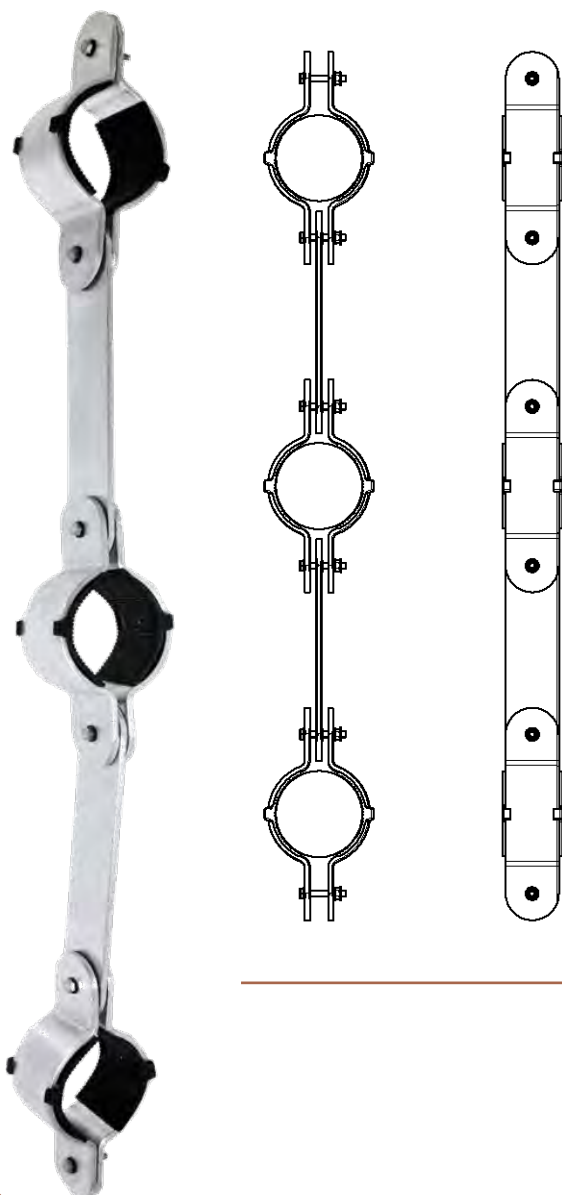
Centaur cable saddles have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' As IEC 61914 is part of the low voltage directive it is not possible to follow the standard exactly and thus deviations have been made in areas. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used:

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|-----------------------------|--|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | UV RESISTANT | METALLIC FRAME SHIELDS ALL POLYMER COMPONENTS. |
| CORROSION RESISTANCE | 6.5.2.2 | REFER TO ELLIS | - |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | - | 117kA (REPORT No.) ZKU 16-050 |

CENTAUR[®] INTERMEDIATE STRAP

Aluminium Cable Spacer

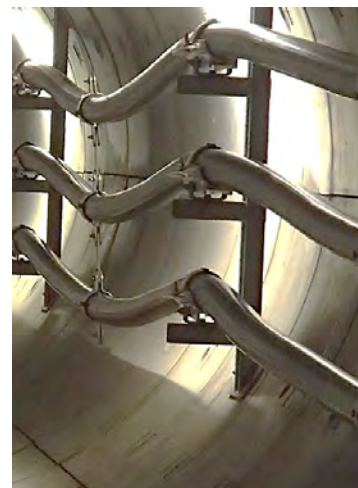
- ▶ DESIGNED TO RESTRAIN CABLES DURING A SHORT CIRCUIT FAULT AND MAINTAIN PHASE SPACING UNDER NORMAL OPERATING CONDITIONS
- ▶ MANUFACTURED IN 6000 SERIES ALUMINIUM
- ▶ TYPICAL SIZES RANGE FROM $\varnothing 100$ - $\varnothing 162$ MM HOWEVER SPECIALS CAN BE PROVIDED ON REQUEST
- ▶ EACH CLAMP CAN PIVOT ABOUT THE JOINING BAR TO ACCOMMODATE FOR DIFFERENTIAL CABLE MOVEMENT. FIXED VERSIONS CAN BE SUPPLIED ON REQUEST.
- ▶ SHORT CIRCUIT TESTED BASED ON IEC 61914



TYPICAL INSTALLATION, PHOTO TAKEN AT A SHORT CIRCUIT TESTING EVENT AT KEMA LAB, ARNHEM NL



BALFOUR BEATTY - POWER TRANSMISSION AND DISTRIBUTION ON THE LONDON POWER TUNNELS



SPECIAL VERSIONS CAN BE SUPPLIED ON REQUEST



TESTING SUMMARY

Centaur Intermediate Straps have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' As IEC 61914 is part of the low voltage directive it is not possible to follow the standard exactly and thus deviations have been made in areas. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|-----------------------------|--|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | UV RESISTANT | METALLIC FRAME SHIELDS ALL POLYMER COMPONENTS. |
| CORROSION RESISTANCE | 6.5.2.2 | REFER TO ELLIS | - |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | - | 163kA (REPORT No. KEMA-313-08) |

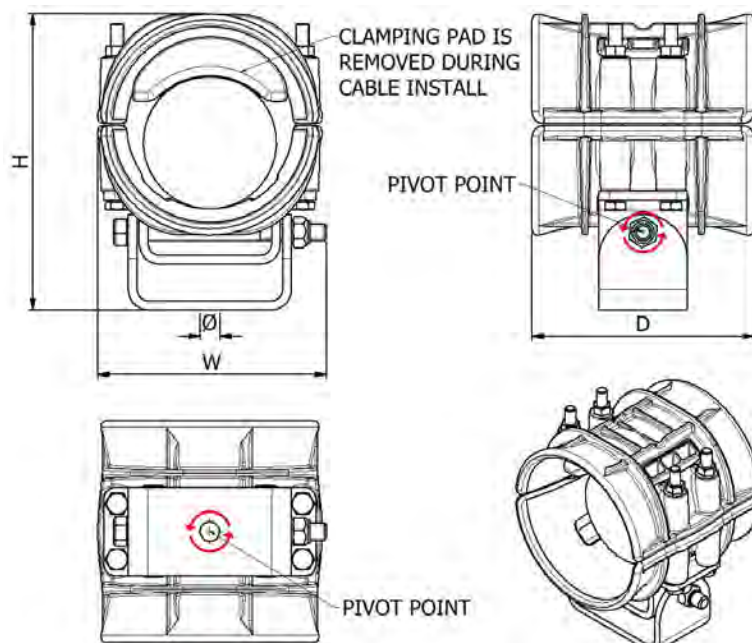
CABLE GUIDE CLAMP™

UK 2514384,
EUROPEAN 2806198
US 9,404,605 Patent

- ▶ FULLY GIMBALED CLAMP IS DESIGNED TO ROTATE UNDER CABLE PULLING FORCES
- ▶ CLAMPING PAD IS REMOVED FOR CABLE PULLING AND RE-INSTALLED TO CLAMP THE CABLE ONCE IT IS IN POSITION
- ▶ CONSTRUCTED FROM HIGH STRENGTH V0 GLASS FILLED NYLON AND GALVANISED STEEL COMPONENTS
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ INSTALLATION ANIMATION AVAILABLE IN THE VIDEOS SECTION OF OUR WEBSITE



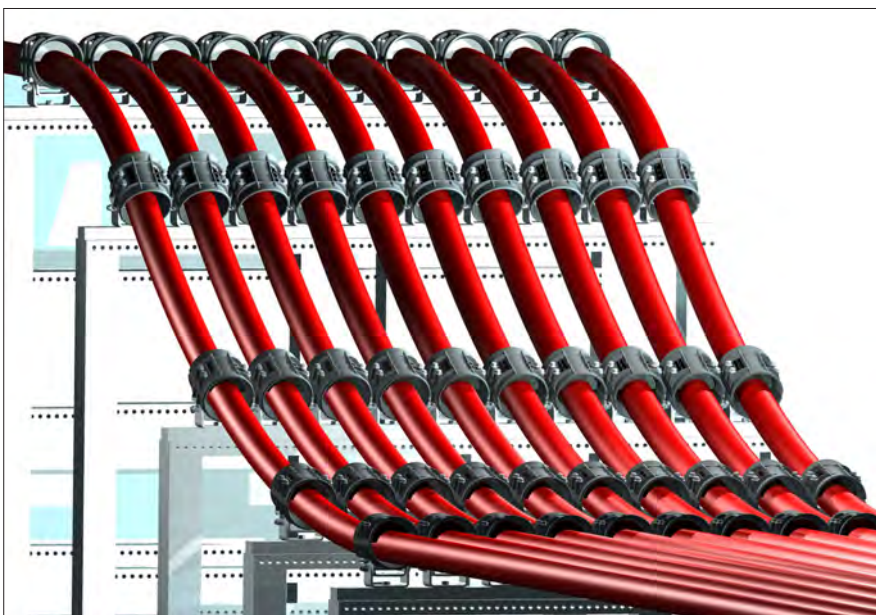
| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | | WEIGHT (kg) |
|--------------|-------------|------------|-----------------|-----|-----|---------------------|-------------|
| | MIN ϕ | MAX ϕ | W | H | D | ϕ FIXING HOLES | |
| CGC100-112-G | 100 | 112 | 185 | 260 | 200 | 1 x M16 | 5.2 |
| CGC110-122-G | 110 | 122 | 185 | 255 | 200 | 1 x M16 | 5.2 |
| CGC120-135-G | 120 | 135 | 203 | 281 | 200 | 1 x M16 | 5.5 |
| CGC130-145-G | 130 | 145 | 203 | 283 | 200 | 1 x M16 | 5.5 |
| CGC140-160-G | 140 | 160 | 262 | 324 | 250 | 1 x M16 | 6.25 |
| CGC150-170-G | 150 | 170 | 262 | 324 | 250 | 1 x M16 | 6.25 |



TESTING SUMMARY

Cable Guide Clamp has been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. As IEC 61914 is part of the low voltage directive it is not possible to follow the standard exactly and thus deviations have been made in areas. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|---|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 192H SALT SPRAY TEST - ISO 9227 |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 1M INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 114kA (REPORT No. PDL- 15.025.1) CABLE OD= $\varnothing 117mm$ PHASE SPACING = 200mm (BASED ON IEC61914:2009) |



A computer simulation of the Cable Guide Clamp installed on a wind farm substation in the North Sea. This was used to validate installation methodology.

ATLAS™

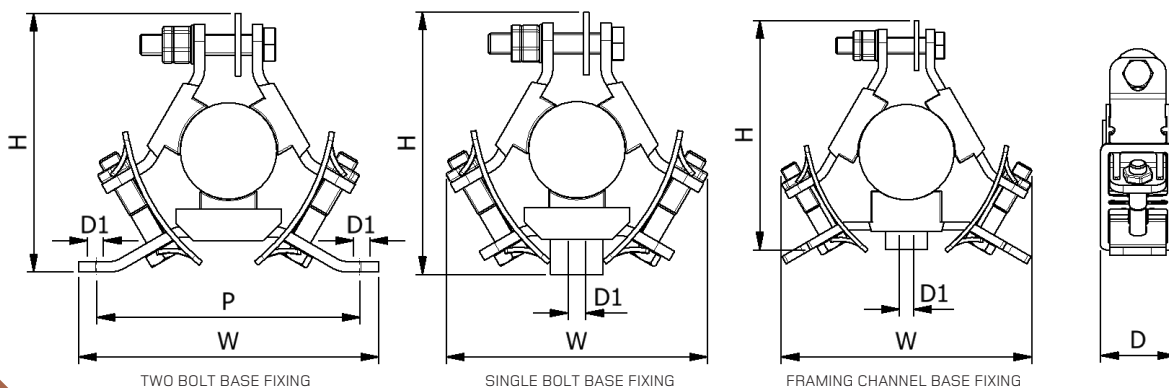
Galvanised Steel Cable Cleats
Patent No. UK Patent GB 228 4444

- ▶ GALVANISED STEEL FRAME WITH LSF POLYMERIC PADS TO PROTECT THE CABLE SHEATH
- ▶ CAN BE FIXED USING ONE BOLT, TWO BOLTS OR A FRAMING CHANNEL FIXING
- ▶ AVAILABLE FOR TREFOIL OR SINGLE CABLE APPLICATIONS
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914



SELECTION TABLE FOR TREFOIL FORMATIONS

| PART NO. | CABLE RANGE | DIMENSIONS (mm) | | | | | | | | | | | | | WEIGHT (g) |
|------------|-------------|----------------------|-----|----|-----|-------------------|-------------------------|-----|----|-------------------|-----------------------------|-----|----|-------------------|------------|
| | | TWO BOLT BASE FIXING | | | | | SINGLE BOLT BASE FIXING | | | | FRAMING CHANNEL BASE FIXING | | | | |
| | | W | H | D | P | FIXING HOLES (D1) | W | H | D | FIXING HOLES (D1) | W | H | D | FIXING HOLES (D1) | |
| AR2-A31-XX | 24-26 | 170 | 121 | 54 | 150 | 2 x M10 | 144 | 130 | 54 | 1 x M10 | 144 | 125 | 54 | 1 x M10 | 930 |
| AR2-A32-XX | 26-30 | 170 | 122 | 54 | 150 | 2 x M10 | 144 | 130 | 54 | 1 x M10 | 144 | 125 | 54 | 1 x M10 | 930 |
| AR2-A33-XX | 30-35 | 170 | 133 | 54 | 150 | 2 x M10 | 157 | 141 | 54 | 1 x M10 | 157 | 136 | 54 | 1 x M10 | 970 |
| AR2-A34-XX | 35-40 | 170 | 134 | 54 | 150 | 2 x M10 | 158 | 142 | 54 | 1 x M10 | 158 | 137 | 54 | 1 x M10 | 930 |
| AR3-A35-XX | 40-45 | 198 | 158 | 54 | 175 | 2 x M10 | 185 | 165 | 54 | 1 x M10 | 185 | 160 | 54 | 1 x M10 | 1200 |
| AR3-A36-XX | 45-50 | 198 | 160 | 54 | 175 | 2 x M10 | 187 | 167 | 54 | 1 x M10 | 187 | 162 | 54 | 1 x M10 | 1200 |
| AR4-A37-XX | 50-55 | 214 | 174 | 54 | 200 | 2 x M10 | 204 | 182 | 54 | 1 x M12 | 204 | 177 | 54 | 1 x M12 | 1300 |
| AR4-A38-XX | 55-60 | 214 | 179 | 54 | 200 | 2 x M10 | 210 | 187 | 54 | 1 x M12 | 210 | 182 | 54 | 1 x M12 | 1300 |
| AR4-A39-XX | 60-66 | 214 | 185 | 54 | 200 | 2 x M10 | 217 | 193 | 54 | 1 x M12 | 217 | 188 | 54 | 1 x M12 | 1300 |
| AR5-A61-XX | 66-71 | 250 | 225 | 54 | 225 | 2 x M10 | 254 | 225 | 54 | 1 x M12 | 254 | 220 | 54 | 1 x M12 | 1800 |
| AR5-A62-XX | 71-76 | 250 | 226 | 54 | 225 | 2 x M10 | 255 | 226 | 54 | 1 x M12 | 255 | 221 | 54 | 1 x M12 | 1800 |
| AR5-A63-XX | 76-82 | 250 | 230 | 54 | 225 | 2 x M10 | 260 | 230 | 54 | 1 x M12 | 260 | 225 | 54 | 1 x M12 | 1800 |
| AR8-A64-XX | 82-92 | 285 | 250 | 54 | 225 | 2 x M10 | N/A | | | | N/A | | | | 2100 |
| AR8-A65-XX | 92-102 | 285 | 250 | 54 | 225 | 2 x M10 | N/A | | | | N/A | | | | 1900 |



SELECTION TABLE FOR SINGLE FORMATIONS

| PART NO. | CABLE RANGE | DIMENSIONS (mm) | | | | | | | | | | | | | WEIGHT (g) |
|------------|-------------|----------------------|-----|----|-----|-------------------|-------------------------|-----|----|-------------------|-----------------------------|-----|----|-------------------|------------|
| | | TWO BOLT BASE FIXING | | | | | SINGLE BOLT BASE FIXING | | | | FRAMING CHANNEL BASE FIXING | | | | |
| | | W | H | D | P | FIXING HOLES (D1) | W | H | D | FIXING HOLES (D1) | W | H | D | FIXING HOLES (D1) | |
| AR2-A11-XX | 38-41 | 170 | 128 | 54 | 150 | 2 x M10 | 144 | 136 | 54 | 1 x M10 | 144 | 131 | 54 | 1 x M10 | 950 |
| AR2-A12-XX | 41-47 | 170 | 129 | 54 | 150 | 2 x M10 | 144 | 136 | 54 | 1 x M10 | 144 | 131 | 54 | 1 x M10 | 930 |
| AR2-A13-XX | 47-55 | 170 | 140 | 54 | 150 | 2 x M10 | 157 | 147 | 54 | 1 x M10 | 157 | 142 | 54 | 1 x M10 | 940 |
| AR2-A14-XX | 55-63 | 170 | 141 | 54 | 150 | 2 x M10 | 158 | 148 | 54 | 1 x M10 | 158 | 143 | 54 | 1 x M10 | 930 |
| AR3-A15-XX | 63-70 | 198 | 164 | 54 | 175 | 2 x M10 | 185 | 172 | 54 | 1 x M10 | 185 | 167 | 54 | 1 x M10 | 1200 |
| AR3-A16-XX | 70-79 | 198 | 166 | 54 | 175 | 2 x M10 | 187 | 173 | 54 | 1 x M10 | 187 | 168 | 54 | 1 x M10 | 1200 |
| AR4-A17-XX | 79-87 | 214 | 180 | 54 | 200 | 2 x M10 | 204 | 188 | 54 | 1 x M12 | 204 | 183 | 54 | 1 x M12 | 1300 |
| AR4-A18-XX | 87-95 | 214 | 186 | 54 | 200 | 2 x M10 | 210 | 193 | 54 | 1 x M12 | 210 | 188 | 54 | 1 x M12 | 1300 |
| AR4-A19-XX | 95-104 | 214 | 192 | 54 | 200 | 2 x M10 | 217 | 199 | 54 | 1 x M12 | 217 | 197 | 54 | 1 x M12 | 1300 |
| AR5-A51-XX | 104-112 | 250 | 231 | 54 | 225 | 2 x M10 | 254 | 231 | 54 | 1 x M12 | 254 | 226 | 54 | 1 x M12 | 1700 |
| AR5-A52-XX | 112-120 | 250 | 232 | 54 | 225 | 2 x M10 | 255 | 232 | 54 | 1 x M12 | 255 | 227 | 54 | 1 x M12 | 1700 |
| AR5-A53-XX | 120-130 | 250 | 237 | 54 | 225 | 2 x M10 | 260 | 237 | 54 | 1 x M12 | 260 | 232 | 54 | 1 x M12 | 1700 |

For full part number please replace 'XX' with the following:

TB = TWO BOLT BASE FIXING

SB = SINGLE BOLT BASE FIXING

FC = FRAMING CHANNEL BASE FIXING



TESTING SUMMARY

Atlas Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|--|---|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME \geq 30s | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 120kA (REPORT No. PDL-18.122.7) CABLE OD= \varnothing 36mm |

VARI-CLEAT™

Stainless Steel and Aluminium Cable Cleats
 Patent No. UK Patent GB 226 1014

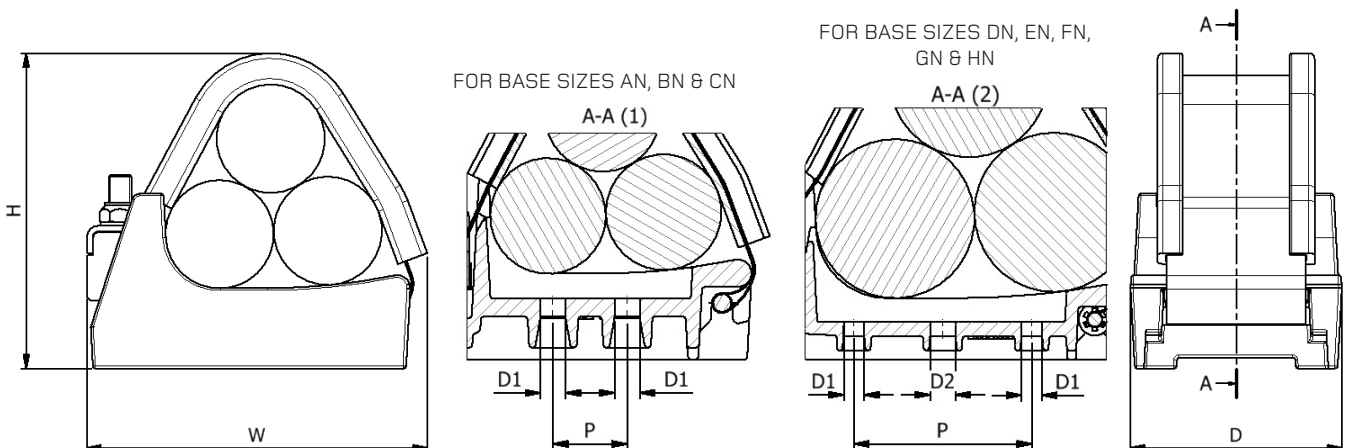
- ▶ 316L STAINLESS STEEL STRAP AND FIXINGS WITH A CAST ALUMINIUM BASE
- ▶ CAPTIVE CLOSURE FIXINGS FOR FAST INSTALL
- ▶ MULTI-CABLE BUNDLE OPTIONS AVAILABLE ON REQUEST
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914



TESTING SUMMARY

Vari-Cleat has been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA LINERED | TEST DATA NO LINER |
|---|------------------------------------|--|---|-----------------------|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 | -40 to +90 |
| IMPACT RATING | 6.3.4 | VERY HEAVY | PASS | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30s | PASS | N/A |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS | |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS | |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 110kA (REPORT No. PDL-18.071.3) (PART NO. - VC-BN4-BN0) CABLE OD= Ø36mm | |



| PART NO. | CABLE RANGE SINGLE WITH LINER | | DIMENSIONS (mm) | | | | FIXING HOLES (D1 & D2) | WEIGHT (g) |
|------------|-------------------------------|---------|-----------------|-----|----|-----|------------------------|------------|
| | TREFOIL | SINGLE | W | H | D | P | | |
| VC-AN1-XXX | 19-22 | 31-38 | 82 | 80 | 74 | 25 | 2 x M8 | 373 |
| VC-AN2-XXX | 21-24 | 36-43 | 82 | 84 | 74 | 25 | 2 x M8 | 373 |
| VC-AN3-XXX | 23-26 | 39-46 | 83 | 88 | 74 | 25 | 2 x M8 | 373 |
| VC-AN4-XXX | 25-29 | 44-51 | 86 | 92 | 74 | 25 | 2 x M8 | 373 |
| VC-BN1-XXX | 27-31 | 46-54 | 97 | 94 | 74 | 25 | 2 x M8 | 430 |
| VC-BN2-XXX | 29-33 | 50-58 | 97 | 97 | 74 | 25 | 2 x M8 | 430 |
| VC-BN3-XXX | 30-36 | 55-63 | 100 | 101 | 74 | 25 | 2 x M8 | 430 |
| VC-BN4-XXX | 33-38 | 59-68 | 104 | 105 | 74 | 25 | 2 x M8 | 430 |
| VC-CN1-XXX | 35-40 | 63-71 | 117 | 105 | 76 | 25 | 2 x M8 | 490 |
| VC-CN2-XXX | 37-42 | 67-76 | 117 | 109 | 76 | 25 | 2 x M8 | 490 |
| VC-CN3-XXX | 39-45 | 71-80 | 118 | 115 | 76 | 25 | 2 x M8 | 490 |
| VC-CN4-XXX | 42-47 | 76-86 | 124 | 121 | 76 | 50 | 2 x M8 | 490 |
| VC-DN1-XXX | 47-51 | 81-91 | 138 | 126 | 78 | 50 | 2 x M8 + 1 x M10 | 610 |
| VC-DN2-XXX | 49-54 | 86-95 | 141 | 132 | 78 | 50 | 2 x M8 + 1 x M10 | 610 |
| VC-DN3-XXX | 52-57 | 91-100 | 147 | 138 | 78 | 50 | 2 x M8 + 1 x M10 | 610 |
| VC-DN4-XXX | 55-60 | 96-106 | 153 | 144 | 78 | 75 | 2 x M8 + 1 x M10 | 610 |
| VC-EN1-XXX | 58-62 | 100-107 | 163 | 147 | 80 | 75 | 2 x M8 + 1 x M10 | 730 |
| VC-EN2-XXX | 61-66 | 106-113 | 167 | 154 | 80 | 75 | 2 x M8 + 1 x M10 | 730 |
| VC-EN3-XXX | 64-69 | 113-120 | 174 | 160 | 80 | 75 | 2 x M8 + 1 x M10 | 730 |
| VC-EN4-XXX | 67-73 | 120-127 | 181 | 167 | 80 | 75 | 2 x M8 + 1 x M10 | 730 |
| VC-FN1-XXX | 69-74 | 120-135 | 187 | 170 | 82 | 90 | 3 x M12 | 880 |
| VC-FN2-XXX | 72-78 | 128-140 | 194 | 177 | 82 | 90 | 3 x M12 | 880 |
| VC-FN3-XXX | 76-82 | 134-147 | 201 | 185 | 82 | 90 | 3 x M12 | 880 |
| VC-FN4-XXX | 80-86 | 143-155 | 210 | 193 | 82 | 90 | 3 x M12 | 880 |
| VC-GN1-XXX | 82-89 | 140-155 | 217 | 197 | 82 | 114 | 3 x M12 | 970 |
| VC-GN2-XXX | 86-93 | 150-165 | 225 | 205 | 82 | 114 | 3 x M12 | 970 |
| VC-GN3-XXX | 90-97 | 160-175 | 233 | 213 | 82 | 114 | 3 x M12 | 970 |
| VC-GN4-XXX | 94-101 | 170-185 | 240 | 221 | 82 | 114 | 3 x M12 | 970 |
| VC-HN1-XXX | 96-104 | 165-185 | 247 | 229 | 84 | 136 | 3 x M12 | 1170 |
| VC-HN2-XXX | 100-108 | 175-195 | 255 | 237 | 84 | 136 | 3 x M12 | 1170 |
| VC-HN3-XXX | 104-112 | 185-200 | 263 | 245 | 84 | 136 | 3 x M12 | 1170 |
| VC-HN4-XXX | 108-116 | 195-210 | 271 | 252 | 84 | 136 | 3 x M12 | 1170 |

SUFFIX 1

B - Lined

SUFFIX 2

(CAST BASE FINISH)

N - Natural

P - Polyester Black

K - Kevlar

SUFFIX 3

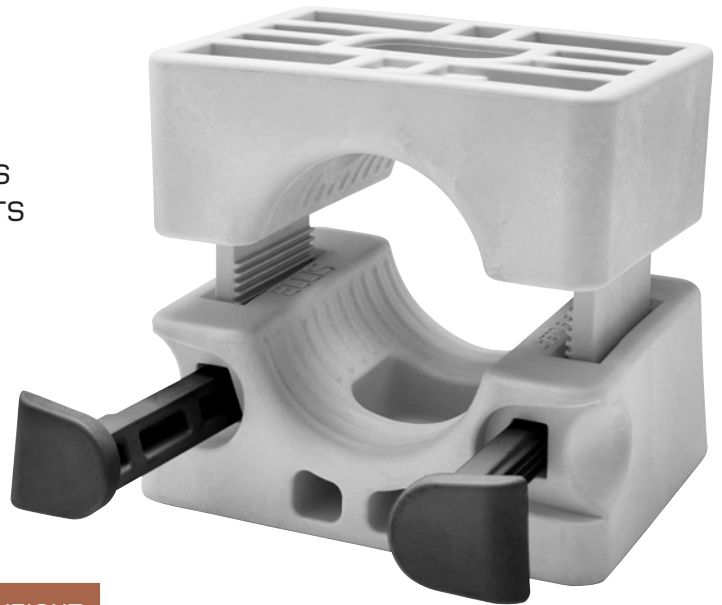
O - Standard Holes



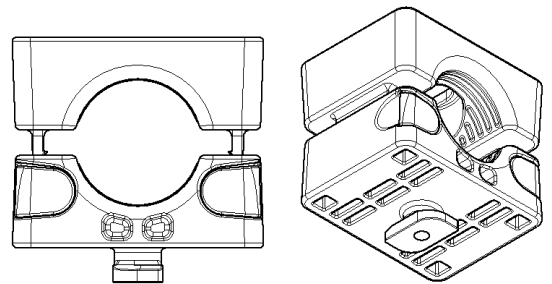
NO BOLTS CLEAT™

Patent Pending
(Application Number 1804174.9)

- ▶ FULLY POLYMERIC CONSTRUCTION ELIMINATES THE RISK OF SNAGGING CABLE ON FIXING BOLTS
- ▶ “NO TOOLS NEEDED” DESIGN ALLOWS FOR FAST INSTALLATION
- ▶ PRODUCT CAN BE STACKED THREE CLAMPS HIGH USING TWIST FOOT FEATURE
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914



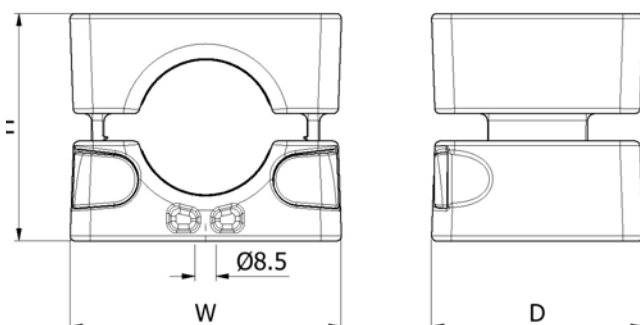
| PART NO. | CABLE RANGE | DIMENSIONS (mm) | | | FIXING HOLES | WEIGHT (g) |
|-----------|-------------|-----------------|----|----|--------------|------------|
| | | W | H | D | | |
| NBC18-22 | 18 - 22 | 109 | 91 | 90 | 1 x M8 | 830 |
| NBC20-26 | 20 - 26 | 109 | 91 | 90 | 1 x M8 | 815 |
| NBC24-30 | 24 - 30 | 109 | 91 | 90 | 1 x M8 | 808 |
| NBC28-34 | 28 - 34 | 109 | 91 | 90 | 1 x M8 | 801 |
| NBC32-39 | 32 - 39 | 109 | 91 | 90 | 1 x M8 | 792 |
| NBC37-47 | 37 - 47 | 109 | 91 | 90 | 1 x M8 | 758 |
| NBC45-55* | 45 - 55 | 109 | 91 | 85 | 1 x M8 | 675 |



NOTE: THE CLEAT RANGE IS COVERED BY A SET OF INSERTS THAT SIT INSIDE THE MAIN BODY, THEREFORE ALL OUTSIDE DIMENSIONS ARE THE SAME. *NBC45-55 DOES NOT USE INSERTS.

FOR THE TWIST FOOT VERSION ADD A 'TF' SUFFIX E.G. NBC18-22TF

| PADS NO. | ELLIS PART NO. |
|-------------|---------------------------------|
| 0111/120321 | NBC18-22TF (for 18-22mm cables) |
| 0111/120322 | NBC20-26TF (for 20-26mm cables) |
| 0111/120323 | NBC24-30TF (for 24-30mm cables) |
| 0111/120324 | NBC28-34TF (for 28-34mm cables) |
| 0111/120325 | NBC32-39TF (for 32-39mm cables) |
| 0111/120133 | NBC37-47TF (for 37-47mm cables) |
| 0111/120134 | NBC45-55TF (for 45-55mm cables) |



PRODUCT CAN BE STACKED A MAXIMUM OF THREE HIGH BY USING THE TWIST FOOT VARIANT. THIS VERSION LOCKS INTO THE RECESS PROVIDED IN THE TOP OF THE CLAMPS.

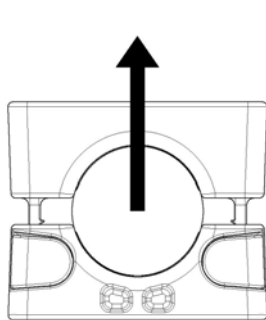
DUE TO THE TOLERANCES OF STANDARD UNISTRUT PROFILE, ELLIS RECOMMEND USING FIXINGS TO FASTEN THE CLAMP TO THE CHANNEL.

TESTING SUMMARY

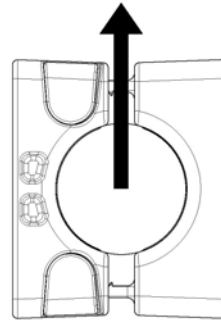
No Bolts Cleat has been tested in line with the International Standard of 'Cable Cleats for Electrical Installations' IEC 61914: 2015. Typical results below.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|---|
| CLEAT TYPE | 6.1.2 | POLYMERIC | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 101kA (REPORT No. PDL- 16.106) PHASE SPACING = 110mm CABLE OD= $\varnothing 36mm$ |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 71kA (REPORT No. PDL-16.106) TESTED IN STACKED FORMATION PHASE SPACING = 75mm CABLE OD= $\varnothing 36mm$ |

*TESTING CARRIED OUT ON NBC45-55 ONLY



LATERAL LOAD 'VERTICAL' DIRECTION



LATERAL LOAD 'HORIZONTAL' DIRECTION

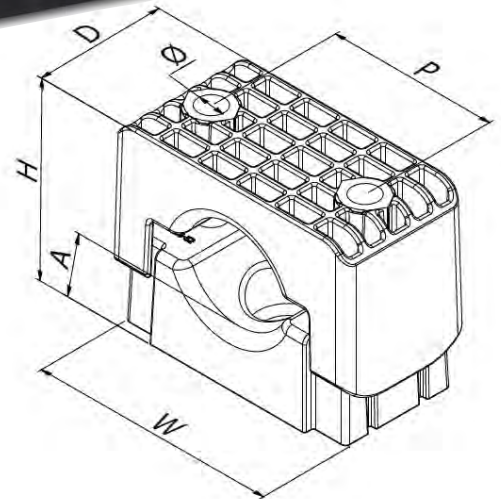
NO BOLTS CLEAT IS A NETWORK RAIL APPROVED PRODUCT. EXAMPLE PADS NUMBER (NBC45-55): 011/120134

This information is subject to change without notice. The information provided has been generated in laboratory conditions and as such results in use may vary.

SOLUS CLAMP

EU Design Reg No: 008307425
UK Design Reg No: 90083074250001

- ▶ RANGE ACOMODATES $\phi 19 - \phi 75$ MM CABLES
- ▶ SUITABLE FOR INDOOR AND OUTDOOR USE
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED IN ACCORDANCE TO IEC 61914
- ▶ SINGLE OR TWIN BOLT FIXING OPTIONS
- ▶ MANUFACTURED IN A HIGH STRENGTH LSF GLASS FILLED NYLON OR NON GLASS REINFORCED POLYMER
- ▶ FIXINGS ARE NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST

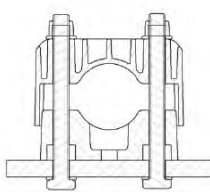


| PART NO. | CABLE RANGE | | LINER SIZE (mm) | CABLE RANGE WITH LINER | | DIMENSIONS | | | | | | AXIAL LOAD (kN) | | LATERAL LOAD - HORIZONTAL (kN) | | LATERAL LOAD - VERTICAL (kN) | | WEIGHT (g) |
|------------|-----------------|-----------------|-----------------|------------------------|-----------------|------------|-----|----|----|----|--------|-----------------|-------------|--------------------------------|-------------|------------------------------|-------------|------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | A | P | ϕ | SINGLE FIXING | TWIN FIXING | SINGLE FIXING | TWIN FIXING | SINGLE FIXING | TWIN FIXING | |
| SL25-38GFN | 25 | 38 | 3 | 19 | 32 | 100 | 80 | 60 | 24 | 60 | M12 | 0.9 | 1.2 | 4 | 5 | 6.5 | 10 | 285 |
| SL36-52GFN | 36 | 52 | 3 | 30 | 46 | 116 | 95 | 60 | 24 | 75 | M12 | 1.2 | 1.8 | 4 | 5.5 | 6 | 10 | 356 |
| SL49-75GFN | 49 | 75 | 3 | 43 | 69 | 138 | 124 | 60 | 26 | 95 | M12 | 1.6 | 1.6 | 4 | 10 | 6.5 | 9 | 485 |
| SL25-38LSF | 25 | 38 | 3 | 19 | 32 | 100 | 80 | 60 | 24 | 60 | M12 | 1.1 | 1.3 | 6.5 | 7 | 10 | 25 | 232 |
| SL36-52LSF | 36 | 52 | 3 | 30 | 46 | 116 | 95 | 60 | 24 | 75 | M12 | 1.1 | 1.8 | 6 | 8 | 9 | 25 | 287 |
| SL49-75LSF | 49 | 75 | 3 | 43 | 69 | 138 | 124 | 60 | 26 | 95 | M12 | 1.1 | 1.1 | 6 | 8 | 10.5 | 26 | 395 |

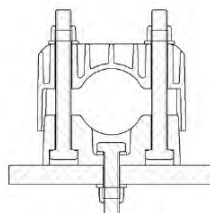
NOTE: FOR CLAMP WITH LINER ADD 'L' SUFFIX E.G. SL25-38GFNL.



POLYMERIC LINER CAN BE SUPPLIED



TWIN FIXING STYLE



SINGLE FIXING STYLE



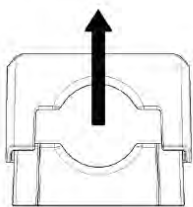
TESTING SUMMARY

Solus clamps have been tested in line with the international standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

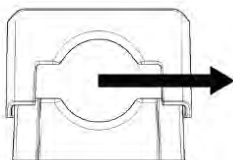
| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA | |
|---|------------------------------------|--|---|---|
| | | | LSF | GFN |
| CLEAT TYPE | 6.1.2 | NON-METALLIC | - | |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -60 to +60 | -60 to +120 |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS | |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30S | PASS | |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | SEE TABLE ON OPPOSITE PAGE | SEE TABLE ON OPPOSITE PAGE |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | SEE TABLE ON OPPOSITE PAGE | SEE TABLE ON OPPOSITE PAGE |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 157kA (REPORT No. PDL-22.079.02) CABLE OD = ϕ 35mm PHASE SPACING = 125mm | 164kA (REPORT No. PDL-22.079.01) CABLE OD = ϕ 35mm PHASE SPACING = 125mm |

NOTE: THE WITH LINER VERSION HAS A LOWER RATING TO THE STANDARD VERSION AS FOLLOWS:

- 1) TEMPERATURE RANGE OF -60 to +85°C.
- 2) AXIAL PERFORMANCE LOWER THAN STANDARD VERSION, CONTACT ELLIS FOR FURTHER INFORMATION..



LATERAL LOAD 'VERTICAL' DIRECTION



LATERAL LOAD 'HORIZONTAL' DIRECTION



PRODUCT CAN BE STACKED FLAT USING HEX RECESS ON BASE OF PRODUCT - REFER TO INSTALLATION INSTRUCTIONS

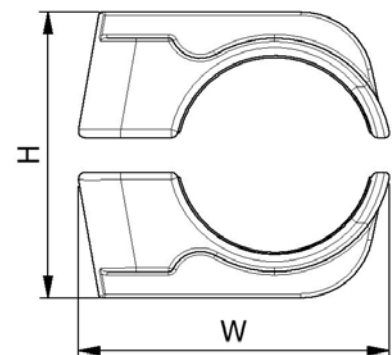
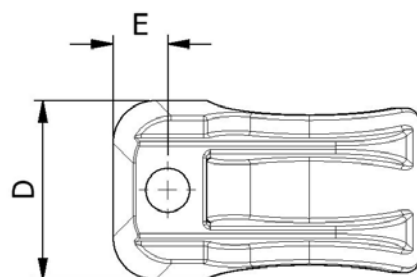
1A CABLE CLAMPS

Cast Aluminium Clamp

- ▶ 1 HOLE CLAMP CAST IN LM6 ALUMINIUM
- ▶ ACCOMMODATES $\varnothing 10\text{MM} - \varnothing 57\text{MM}$ CABLES ACROSS 10 SIZES
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ FIXINGS ARE NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST



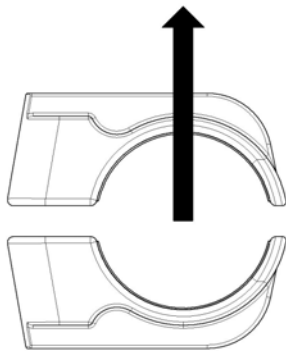
| PART NO. | CABLE RANGE (mm) | | DIMENSIONS (mm) | | | | FIXING HOLES | WEIGHT (g) |
|----------|------------------|-----|-----------------|-------|------|------|--------------|------------|
| | MIN | MAX | W | H | D | E | | |
| 1A-10N | 10 | 13 | 37.8 | 27-30 | 41.4 | 10.2 | 1 x M10 | 43 |
| 1A-11N | 13 | 16 | 41.2 | 30-33 | 41.4 | 10.4 | 1 x M10 | 52 |
| 1A-12N | 16 | 19 | 44.3 | 33-36 | 41.4 | 10.7 | 1 x M10 | 61 |
| 1A-13N | 19 | 23 | 48.2 | 36-40 | 41.4 | 10.9 | 1 x M10 | 68 |
| 1A-14N | 23 | 27 | 52.2 | 40-44 | 41.4 | 11.3 | 1 x M10 | 78 |
| 1A-15N | 27 | 32 | 57.1 | 44-49 | 41.4 | 11.6 | 1 x M10 | 85 |
| 1A-16N | 32 | 38 | 63.1 | 49-55 | 41.4 | 12.1 | 1 x M10 | 97 |
| 1A-17N | 38 | 46 | 71.3 | 58-66 | 41.4 | 12.9 | 1 x M10 | 121 |
| 1A-18N | 46 | 51 | 77.3 | 67-73 | 41.4 | 13.5 | 1 x M10 | 155 |
| 1A-19N | 51 | 57 | 83.2 | 72-78 | 41.4 | 13.9 | 1 x M10 | 171 |



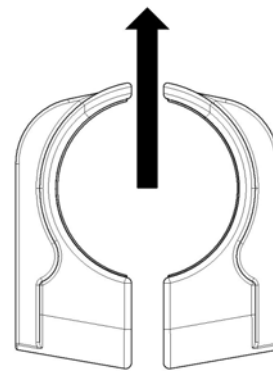
TESTING SUMMARY

1A Clamps have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|---|
| CLEAT TYPE | 6.1.2 | METALLIC | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +90 |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | N/A |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 600MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 70.8kA (REPORT No. PDL-15.025.2) (IEC 61914:2009) PHASE SPACING = 100mm CABLE OD= $\varnothing 39mm$ |



LATERAL LOAD 'VERTICAL' DIRECTION



LATERAL LOAD 'HORIZONTAL' DIRECTION

2A CABLE CLAMPS

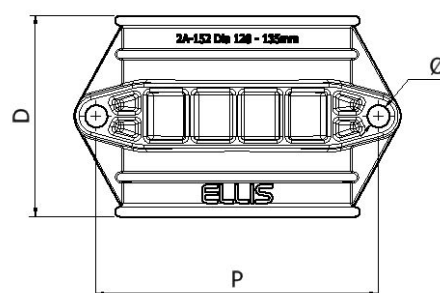
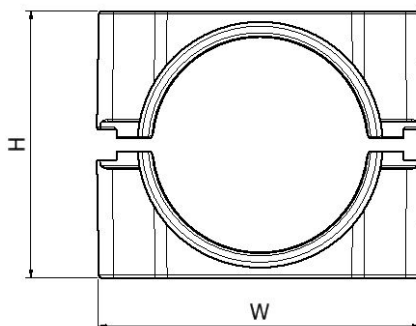
Cast Aluminium Clamp

- ▶ 2 HOLE CLAMPS CAST IN LM6 ALUMINIUM
- ▶ ROBUST DESIGN OFFERS GOOD RESISTANCE TO CABLE FORCES
- ▶ CLAMPING RANGE OF $\phi 32$ - $\phi 168$ MM ACHIEVED ACROSS 18 SIZES
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ FIXINGS ARE NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST



| PART NO. | CABLE RANGE | | LINER THICKNESS (mm) | CABLE RANGE WITH LINER | | DIMENSIONS (mm) | | | | | WEIGHT (g) | AXIAL LOAD | LATERAL LOAD - HORIZONTAL | LATERAL LOAD - VERTICAL |
|----------|-----------------|-----------------|----------------------|------------------------|-----------------|-----------------|---------|-----|-----|---------|------------|------------|---------------------------|-------------------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | | MIN ϕ (mm) | MIN ϕ (mm) | W | H | D | P | ϕ | | | | |
| 2A-07N | 38 | 46 | 3 | 32 | 40 | 94 | 48-57 | 49 | 68 | 2 x M10 | 174 | 800N | 12.5kN | 25kN |
| 2A-08N | 46 | 51 | 3 | 40 | 45 | 104 | 54-60 | 49 | 79 | 2 x M10 | 214 | 800N | 12.5kN | 25kN |
| 2A-09N | 51 | 57 | 3 | 45 | 51 | 105 | 61-68 | 49 | 79 | 2 x M10 | 224 | 800N | 12.5kN | 25kN |
| 2A-10N | 57 | 64 | 3 | 51 | 58 | 105 | 68-76 | 49 | 79 | 2 x M10 | 234 | 800N | 12.5kN | 25kN |
| 2A-11N | 64 | 70 | 3 | 58 | 64 | 133 | 74-80 | 64 | 106 | 2 x M10 | 360 | 1300N | 12.5kN | 25kN |
| 2A-1200N | 70 | 76 | 3 | 64 | 70 | 133 | 80-87 | 64 | 106 | 2 x M10 | 376 | 1300N | 12.5kN | 25kN |
| 2A-1201N | 76 | 83 | 3 | 70 | 77 | 133 | 97-95 | 64 | 106 | 2 x M10 | 388 | 1300N | 12.5kN | 25kN |
| 2A-1202N | 83 | 90 | 3 | 77 | 84 | 133 | 94-102 | 64 | 106 | 2 x M10 | 392 | 1300N | 12.5kN | 25kN |
| 2A-131N | 90 | 97 | 4 | 82 | 89 | 154 | 101-109 | 76 | 126 | 2 x M10 | 520 | 1500N | 12.5kN | 25kN |
| 2A-132N | 97 | 105 | 4 | 89 | 97 | 154 | 109-118 | 76 | 126 | 2 x M10 | 524 | 1500N | 12.5kN | 25kN |
| 2A-141N | 105 | 112 | 4 | 97 | 104 | 165 | 118-126 | 76 | 135 | 2 x M10 | 590 | 1500N | 12.5kN | 25kN |
| 2A-142N | 112 | 120 | 4 | 104 | 112 | 173 | 124-133 | 76 | 143 | 2 X M10 | 642 | 1500N | 12.5kN | 25kN |
| 2A-151N | 120 | 128 | 5 | 110 | 118 | 196 | 148-157 | 125 | 168 | 2 X M12 | 1700 | 5.5kN | 20kN | 50kN |
| 2A-152N | 128 | 135 | 5 | 118 | 125 | 203 | 158-166 | 125 | 176 | 2 X M12 | 1840 | 5.5kN | 20kN | 50kN |
| 2A-161N | 135 | 144 | 5 | 125 | 134 | 222 | 168-178 | 150 | 190 | 2 X M16 | 2633 | 6kN | 35kN | 60kN |
| 2A-162N | 144 | 152 | 5 | 134 | 142 | 232 | 179-188 | 150 | 200 | 2 X M16 | 2856 | 6kN | 35kN | 60kN |
| 2A-171N | 152 | 160 | 5 | 142 | 150 | 242 | 190-199 | 150 | 210 | 2 X M16 | 3089 | 6kN | 35kN | 60kN |
| 2A-172N | 160 | 168 | 5 | 150 | 158 | 252 | 201-210 | 150 | 220 | 2 X M16 | 3332 | 6kN | 35kN | 60kN |

FOR THE LINERED VERSION ADD 'L' AS A SUFFIX TO THE PART NO. E.G. '2A-07NL'.

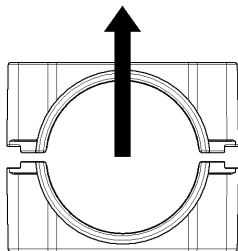


TESTING SUMMARY

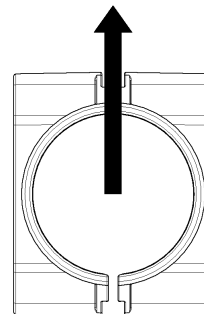
2A Clamps have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|--|
| CLEAT TYPE | 6.1, 6.1.3 | METALLIC | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +90 |
| UV RESISTANCE | 6.5.1.2 | N/A | - |
| IMPACT RATING | 6.35 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | N/A |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO THE DATA TABLE |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO THE DATA TABLE |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 183kA (REPORT No. PDL-18.071.1) CABLE OD= $\varnothing 36mm$ PHASE SPACING = 100MM |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 1M INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 113kA (REPORT No. PDL-15.025.1) CABLE OD= $\varnothing 117mm$ PHASE SPACING = 200MM |

The test data provided above is for the standard version only, for test data with the liner option please contact Ellis.



LATERAL LOAD 'VERTICAL' DIRECTION



LATERAL LOAD 'HORIZONTAL' DIRECTION

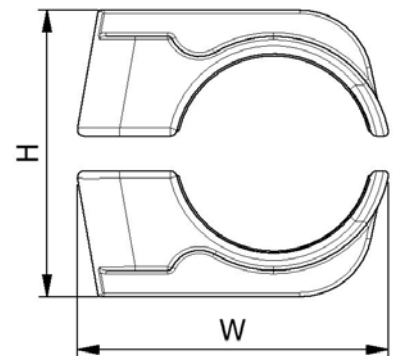
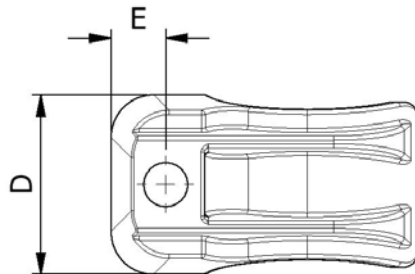
1F CABLE CLAMPS

UK Design Reg. No: 355854

- ▶ 1 HOLE CLAMPS MANUFACTURED IN LSF NYLON OR STANDARD POLYPROPYLENE
- ▶ ACCOMMODATES $\varnothing 10\text{MM} - \varnothing 57\text{MM}$ CABLES ACROSS 10 SIZES
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ FIXINGS ARE NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST
- ▶ OPTIONAL LSF POLYMERIC LINER AVAILABLE



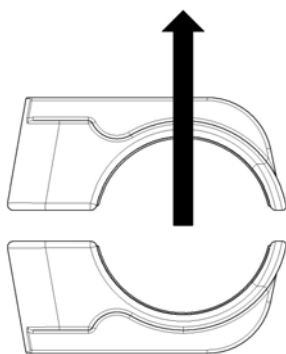
| PART NO. | MATERIAL SUFFIX | CABLE RANGE (mm) | | DIMENSIONS (mm) | | | | FIXING HOLES | PACK QTY | WEIGHT (g) | | |
|----------|-----------------|------------------|-----|-----------------|-------|------|------|--------------|----------|------------|------|------|
| | | MIN | MAX | W | H | D | E | | | B | LSF | LUL |
| 1F-10 | B/LSF/LUL | 10 | 13 | 37.8 | 27-30 | 41.4 | 10.2 | 1 x M10 | 100 | 14.6 | 19.6 | 23.8 |
| 1F-11 | B/LSF/LUL | 13 | 16 | 41.2 | 30-33 | 41.4 | 10.4 | 1 x M10 | 100 | 17.0 | 23.0 | 27.7 |
| 1F-12 | B/LSF/LUL | 16 | 19 | 44.3 | 33-36 | 41.4 | 10.7 | 1 x M10 | 100 | 19.6 | 26.4 | 32.0 |
| 1F-13 | B/LSF/LUL | 19 | 23 | 48.2 | 36-40 | 41.4 | 10.9 | 1 x M10 | 100 | 22.4 | 30.2 | 36.5 |
| 1F-14 | B/LSF/LUL | 23 | 27 | 52.2 | 40-44 | 41.4 | 11.3 | 1 x M10 | 100 | 25.8 | 34.6 | 42.0 |
| 1F-15 | B/LSF/LUL | 27 | 32 | 57.1 | 44-49 | 41.4 | 11.6 | 1 x M10 | 100 | 29.2 | 39.0 | 47.6 |
| 1F-16 | B/LSF/LUL | 32 | 38 | 63.1 | 49-55 | 41.4 | 12.1 | 1 x M10 | 100 | 34.2 | 46.2 | 55.7 |
| 1F-17 | B/LSF/LUL | 38 | 46 | 71.3 | 58-66 | 41.4 | 12.9 | 1 x M10 | 50 | 47.8 | 64.0 | 77.9 |
| 1F-18 | B/LSF/LUL | 46 | 51 | 77.3 | 67-73 | 41.4 | 13.5 | 1 x M10 | 50 | 54.0 | 73.2 | 88.0 |
| 1F-19 | B/LSF/LUL | 51 | 57 | 83.2 | 72-78 | 41.4 | 13.9 | 1 x M10 | 50 | 59.0 | 80.4 | 96.2 |



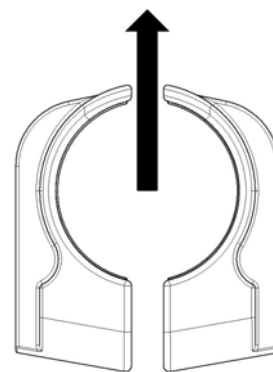
TESTING SUMMARY

1F Clamps have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA | |
|---|------------------------------------|--|--|--------------------------|
| | | | LSF | B |
| CLEAT TYPE | 6.1.2 | POLYMERIC | - | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 | -40 to +40 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS | PASS |
| IMPACT RATING | 6.3.5 | VERY HEAVY | REFER TO ELLIS | REFER TO ELLIS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | PASS | NOT COMPLIANT |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 10.4kA (REPORT No. PDL-17.137.2) (IEC 61914:2015) PHASE SPACING = 100mm CABLE OD= $\varnothing 36mm$ | NOT SHORT CIRCUIT TESTED |



LATERAL LOAD 'VERTICAL' DIRECTION



LATERAL LOAD 'HORIZONTAL' DIRECTION

APPROVALS:

THE LUL VERSION OF THE 1F ONE HOLE CABLE CLAMPS ARE COMPLIANT WITH THE REQUIREMENT OF LONDON UNDERGROUND STANDARD 1-085. PRODUCT REGISTER NO. 363.

2F+ CABLE CLAMPS

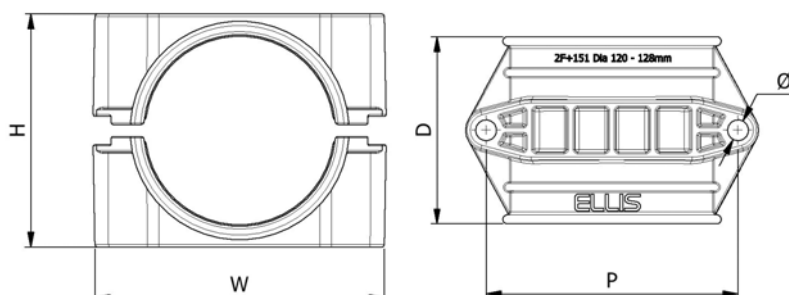
UK Design Reg. No: 355854

- ▶ 2 HOLE CLAMPS MANUFACTURED IN LSF NYLON OR STANDARD POLYPROPYLENE
- ▶ ROBUST DESIGN OFFERS GOOD RESISTANCE TO CABLE FORCES
- ▶ CLAMPING RANGE OF $\varnothing 32 - \varnothing 168\text{MM}$ ACHIEVED ACROSS 18 SIZES
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ FIXINGS ARE NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST



| PART NO. | CABLE RANGE | | LINER THICKNESS (mm) | CABLE RANGE WITH LINER | | DIMENSIONS (mm) | | | | | WEIGHT (g) | | PACK QTY | AXIAL LOAD | | LATERAL LOAD - HORIZONTAL | | LATERAL LOAD - VERTICAL | |
|----------|------------------------|------------------------|----------------------|------------------------|------------------------|-----------------|-----|-----|-----|---------------|------------|------|----------|------------|-------|---------------------------|-------|-------------------------|------|
| | MIN \varnothing (mm) | MAX \varnothing (mm) | | MIN \varnothing (mm) | MIN \varnothing (mm) | W | H | D | P | \varnothing | LSF | B | | LSF | B | LSF | B | LSF | B |
| 2F+07 | 38 | 46 | 3 | 32 | 40 | 92 | 68 | 54 | 68 | 2 x M10 | 91 | 73 | 25 | 200N | 150N | 1.75kN | 1.5kN | 15kN | 4kN |
| 2F+08 | 46 | 51 | 3 | 40 | 45 | 103 | 76 | 54 | 79 | 2 x M10 | 110 | 81 | 25 | 200N | 150N | 1.75kN | 1.5kN | 15kN | 4kN |
| 2F+09 | 51 | 57 | 3 | 45 | 51 | 103 | 82 | 54 | 79 | 2 x M10 | 119 | 95 | 25 | 200N | 150N | 1.75kN | 1.5kN | 15kN | 4kN |
| 2F+10 | 57 | 64 | 3 | 51 | 58 | 103 | 89 | 54 | 79 | 2 x M10 | 123 | 89 | 25 | 200N | 150N | 1.75kN | 1.5kN | 15kN | 4kN |
| 2F+11 | 64 | 70 | 3 | 58 | 64 | 130 | 95 | 54 | 106 | 2 x M10 | 157 | 116 | 10 | 200N | 150N | 1.75kN | 1.5kN | 15kN | 4kN |
| 2F+1200 | 70 | 76 | 4 | 62 | 68 | 128 | 101 | 75 | 104 | 2 x M10 | 190 | 160 | 10 | 500N | 500N | 5kN | 1.5kN | 15kN | 6kN |
| 2F+1201 | 76 | 83 | 4 | 68 | 75 | 135 | 107 | 75 | 111 | 2 x M10 | 207 | 174 | 10 | 500N | 500N | 5kN | 1.5kN | 15kN | 6kN |
| 2F+1202 | 83 | 90 | 4 | 75 | 82 | 143 | 115 | 75 | 119 | 2 x M10 | 229 | 188 | 10 | 500N | 500N | 5kN | 1.5kN | 15kN | 6kN |
| 2F+131 | 90 | 97 | 5 | 80 | 87 | 165 | 122 | 100 | 138 | 2 x M12 | 423 | 336 | 5 | 2kN | 700N | 5kN | 3kN | 18.5kN | 10kN |
| 2F+132 | 97 | 105 | 5 | 87 | 95 | 171 | 130 | 100 | 144 | 2 x M12 | 441 | 355 | 5 | 2kN | 700N | 5kN | 3kN | 18.5kN | 10kN |
| 2F+141 | 105 | 112 | 5 | 95 | 102 | 178 | 137 | 100 | 151 | 2 x M12 | 510 | 382 | 5 | 2kN | 700N | 5kN | 3kN | 18.5kN | 10kN |
| 2F+142 | 112 | 120 | 5 | 102 | 110 | 187 | 146 | 125 | 160 | 2 x M12 | 622 | 496 | 5 | 2kN | 1.3kN | 5kN | 4.5kN | 18.5kN | 8kN |
| 2F+151 | 120 | 128 | 5 | 110 | 118 | 196 | 156 | 125 | 168 | 2 x M12 | 716 | 537 | 5 | 2kN | 1.3kN | 5kN | 4.5kN | 18.5kN | 8kN |
| 2F+152 | 128 | 135 | 5 | 118 | 125 | 203 | 165 | 125 | 176 | 2 x M12 | 772 | 579 | 5 | 2kN | 1.3kN | 5kN | 4.5kN | 18.5kN | 8kN |
| 2F+161 | 135 | 144 | 5 | 125 | 134 | 222 | 177 | 150 | 190 | 2 x M16 | 1109 | 831 | 5 | 2.5kN | 2kN | 30kN | 8kN | 40kN | 15kN |
| 2F+162 | 144 | 152 | 5 | 134 | 142 | 232 | 187 | 150 | 200 | 2 x M16 | 1203 | 902 | 5 | 2.5kN | 2kN | 30kN | 8kN | 40kN | 15kN |
| 2F+171 | 152 | 160 | 5 | 142 | 150 | 242 | 198 | 150 | 210 | 2 x M16 | 1302 | 976 | 5 | 2.5kN | 2kN | 30kN | 8kN | 40kN | 15kN |
| 2F+172 | 160 | 168 | 5 | 150 | 158 | 252 | 209 | 150 | 220 | 2 x M16 | 1403 | 1052 | 5 | 2.5kN | 2kN | 30kN | 8kN | 40kN | 15kN |

TO SPECIFY MATERIAL ADD SUFFIX TO PART NO. E.G. 2F+07LSF



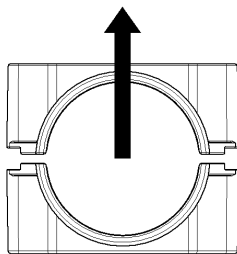
A CLAMP MANUFACTURED IN LONDON UNDERGROUND APPROVED MATERIAL CAN BE SUPPLIED ON REQUEST. CONTACT ELLIS FOR FURTHER DETAILS.

TESTING SUMMARY

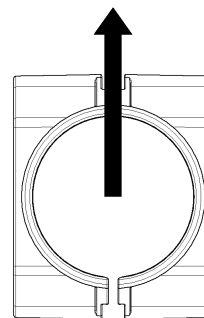
2F+ Clamps have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|--|--|
| CLEAT TYPE | 6.1, 6.1.3 | POLYMERIC | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | LSF: -40 to +60 B: -40 to +40 |
| UV RESISTANCE | 6.5.1.2 | XENON ARC METHOD A | PASS |
| IMPACT RATING | 6.35 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME $\geq 30s$ | LSF: PASS B: NOT COMPLIANT |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO THE DATA TABLE OPPOSITE |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO THE DATA TABLE OPPOSITE |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | 2F+07LSF CLEATS AT 600MM INTERVALS (WITHSTANDING ONE SHORT CIRCUIT) | 80.2kA (REPORT No. PDL-17.137.3) CABLE OD= $\varnothing 36mm$ PHASE SPACING = 100mm |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | 2F+142LSF CLEATS AT 1M INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 113kA (REPORT No. PDL-15.025.1) (BASED ON IEC 61914: 2009) CABLE OD= $\varnothing 117mm$ PHASE SPACING = 200mm |

The test data provided above is for the standard version only, for test data with the liner option please contact Ellis.



LATERAL LOAD 'VERTICAL' DIRECTION



LATERAL LOAD 'HORIZONTAL' DIRECTION

LONDON UNDERGROUND

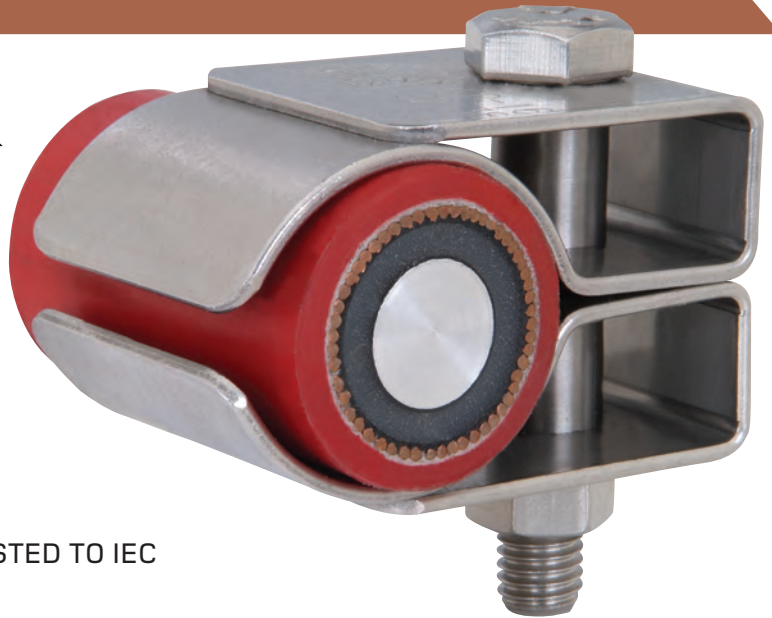
The LUL version of 2F+ Clamps are compliant with the requirements of LUL-1085. Product register number 364.

This information is subject to change without notice. The information provided has been generated in laboratory conditions and as such results in use may vary.

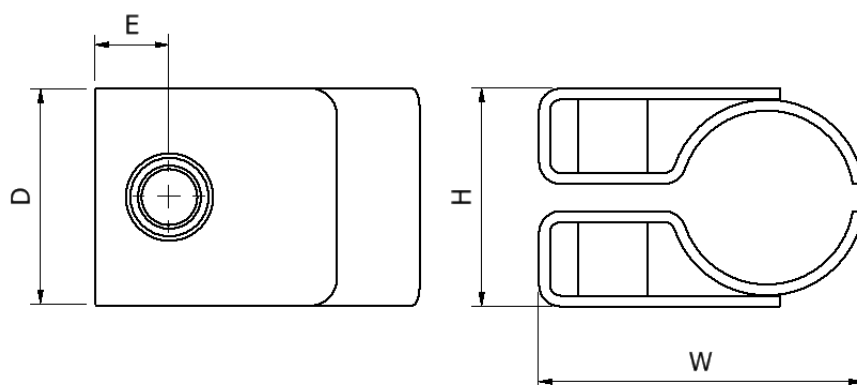
PHOENIX[®]

Fire Rated Cable Clamps
Community Design Reg No. 000355854-0002

- ▶ METALLIC FRAME IS DESIGNED FOR THE INSTALLATION OF FIRE PROTECTION RATED CABLES.
- ▶ TESTED FOR FIRE RESISTANCE IN ACCORDANCE WITH BS 5839-1.
- ▶ AVAILABLE IN 12 SIZES TO SUIT ϕ 10MM TO ϕ 74MM CABLE
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ MARINE GRADE STAINLESS STEEL FRAME ENSURES PERFORMANCE IN THE HARSHTEST OF ENVIRONMENTS
- ▶ FIXINGS NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST



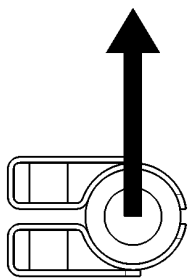
| PART NO. | CABLE RANGE | | DIMENSIONS (mm) | | | | | WEIGHT (g) |
|----------|-----------------|-----------------|-----------------|----|----|------|---------|------------|
| | MIN ϕ (mm) | MAX ϕ (mm) | W | H | D | P | F | |
| 1FP-10SS | 10 | 13 | 40 | 21 | 40 | 13.7 | 1 x M10 | 91 |
| 1FP-11SS | 13 | 16 | 44 | 24 | 40 | 13.7 | 1 x M10 | 106 |
| 1FP-12SS | 16 | 19 | 47 | 27 | 40 | 13.7 | 1 x M10 | 113 |
| 1FP-13SS | 19 | 23 | 51 | 31 | 40 | 13.7 | 1 x M10 | 125 |
| 1FP-14SS | 23 | 27 | 55 | 35 | 40 | 13.7 | 1 x M10 | 139 |
| 1FP-15SS | 27 | 32 | 60 | 40 | 40 | 13.7 | 1 x M10 | 153 |
| 1FP-16SS | 32 | 38 | 66 | 46 | 40 | 13.7 | 1 x M10 | 174 |
| 1FP-17SS | 38 | 46 | 74 | 54 | 40 | 13.7 | 1 x M10 | 201 |
| 1FP-18SS | 46 | 51 | 80 | 59 | 40 | 13.7 | 1 x M10 | 225 |
| 1FP-19SS | 51 | 57 | 85 | 64 | 40 | 13.7 | 1 x M10 | 242 |
| 1FP-20SS | 57 | 65 | 93 | 73 | 40 | 13.7 | 1 x M10 | 265 |
| 1FP-21SS | 65 | 74 | 98 | 82 | 40 | 13.7 | 1 x M10 | 293 |



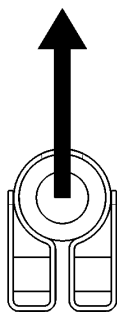
TESTING SUMMARY

Phoenix Cleats have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|--|------------------------------------|---|--|
| CLEAT TYPE | 6.1.1 | METALLIC | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +150 (FIRE RATED) |
| UV RESISTANCE | 6.5.1 | N/A | - |
| CORROSION RESISTANCE | 6.5.2.2 | OUTDOOR | 316L STAINLESS STEEL HAS 16% CHROMIUM |
| IMPACT RATING | 6.3.4 | HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | NO CONTRIBUTION TO FIRE | METALLIC |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | 45 |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | HORIZONTAL - 350N VERTICAL - 350N |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.5, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 31kA (REPORT No. PDL-17.137.1) CABLE OD= ϕ 36mm Phase Spacing = 100mm |



LATERAL LOAD
'VERTICAL'
DIRECTION



LATERAL LOAD
'HORIZONTAL'
DIRECTION



Phoenix clips have been fire tested in
accordance with BS 589-1:2017

APPROVALS:

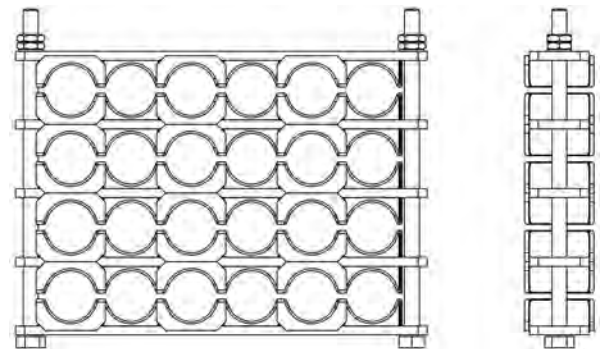
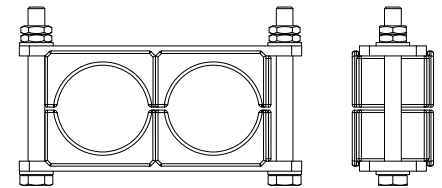
LONDON UNDERGROUND

Phoenix Cable Clamps are compliant with the requirements of LUL-1085. Product register number 1661.

MATRIX™

A Flexible Solution for Multiple Cables

- ▶ CLEAT DESIGN ALLOWS FOR MULTIPLE CABLES TO BE ASSEMBLED IN A MATRIX STYLE WITHIN ONE CLEAT
- ▶ GALVANISED STEEL FRAME AND FIXINGS
- ▶ SOFT LSF POLYMERIC PADS PROTECT CABLE SHEATH
- ▶ SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914
- ▶ FOR FRAME CONFIGURATION DETAILS CONTACT ELLIS



TESTING SUMMARY

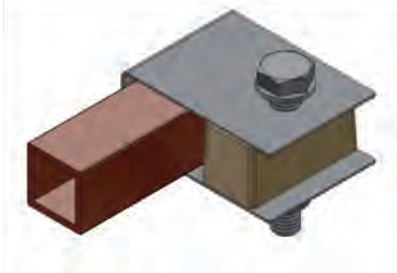
Matrix has been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

| PROPERTY | CLASSIFICATION CLAUSE IEC 61914 | UNITS / CLASSIFICATION | TEST DATA |
|---|------------------------------------|---|---|
| CLEAT TYPE | 6.1.3 | COMPOSITE | - |
| TEMP. FOR PERMANENT APPLICATION | 6.2 | °C | -40 to +60 |
| UV RESISTANCE | 6.5.1.2 | REFER TO ELLIS | - |
| IMPACT RATING | 6.3.5 | VERY HEAVY | PASS |
| FLAME PROPAGATION TEST | 10.0, 10.1 | APPLICATION TIME ≥30s | PASS |
| AXIAL LOAD RATING | 6.4.3, 9.4 | NEWTONS (N) | REFER TO ELLIS |
| LATERAL LOAD RATING | 6.4.2, 9.3 | NEWTONS (N) | REFER TO ELLIS |
| RESISTANCE TO ELECTROMECHANICAL FORCE (SHORT CIRCUIT TESTING) | 6.4, 6.4.4, 9.5 | CLEATS AT 300MM INTERVALS (WITHSTANDING MORE THAN ONE SHORT CIRCUIT) | 91.3kA (REPORT No. PDL-18.071.2) PHASE SPACING = Ø45mm (MC-4x1-037-G) |

This information is subject to change without notice. The information provided has been generated in laboratory conditions and as such results in use may vary.

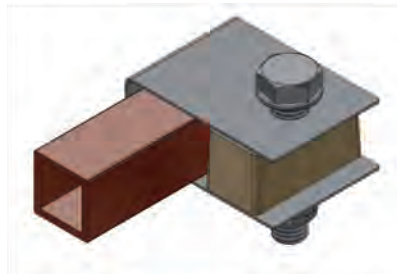
LADDER ADAPTORS

- ▶ ADAPTORS TO FIT ELLIS CLEATS TO WIDE RANGE OF LADDER
- ▶ STAINLESS STEEL CONSTRUCTION
- ▶ SUPPLIED WITH FIXINGS
- ▶ AVAILABLE WITH M10 OR M12 FIXINGS



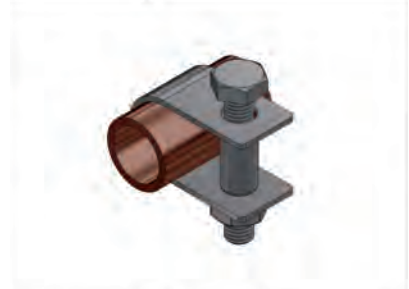
1.0" x 1.0" - M10 FIX

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0008-M10 | 1" Square |



1.0" x 1.0" - M12 FIX

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0008-M12 | 1" Square |



Ø23-27mm

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0012 | 23 - 27mm Round |



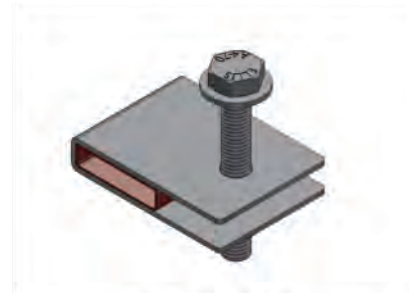
Oval 21 x 17mm

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0020 | Wibe - Round variant |



1.5" x 0.375" Flat Short Bolt

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0039 | Chatsworth Universal |



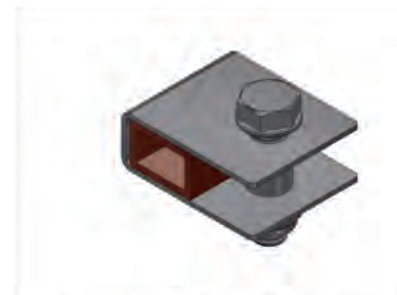
1.5" x 0.375" Flat Long Bolt

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0040 | Chatsworth Universal |



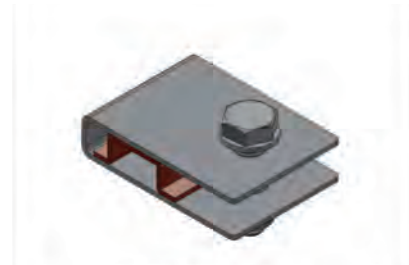
Rectangular 1.125" x 0.75"

| Kit Part No. | Compatible Ladder Type |
|--------------|---------------------------|
| KIT0041-M10 | Wibe - Perforated variant |
| KIT0041-M10 | Cooper Redirail |



Rectangular 1.125" x 0.75" - M12 Fix

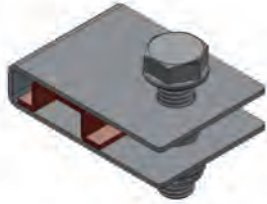
| Kit Part No. | Compatible Ladder Type |
|--------------|---------------------------|
| KIT0041-M12 | Wibe - Perforated variant |
| KIT0041-M12 | Cooper Redirail |



Top Hat 1.5" x 0.5"

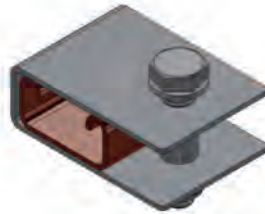
| Kit Part No. | Compatible Ladder Type |
|--------------|-------------------------|
| KIT0042-M10 | Cooper B-Line, Series 1 |

LADDER ADAPTORS



Top Hat 1.5" x 0.5" - M12 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|-------------------------|
| KIT0042-M12 | Cooper B-Line, Series 1 |



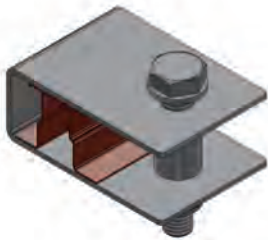
Unistrut - Channel 41 x 21mm

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0043-M10 | Unistrut |

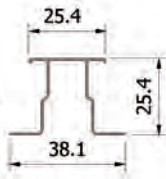


Wire Basket Tray - 5mm wote max.

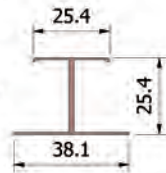
| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0044 | Cooper Flextray |



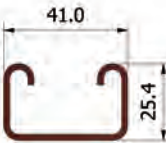
Cooper B-Line



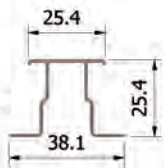
Cooper B-Line - Aluminium



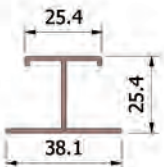
Cooper B-Line - Marine



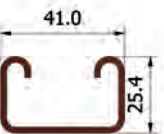
Cooper B-Line



Cooper B-Line - Aluminium



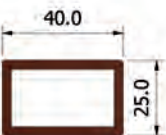
Cooper B-Line - Marine



1.5" x 1.0" - 40 x 25mm - M10 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|-------------------------------|
| KIT0046-M10 | Cooper B-Line, Series 2,3,4,5 |
| KIT0046-M10 | Cooper B-Line - Aluminium |
| KIT0046-M10 | Cooper B-Line - Marine |
| KIT0046-M10 | Rectangular 40 x 25mm |

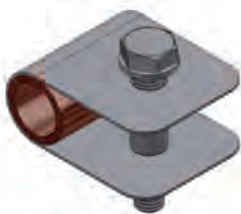
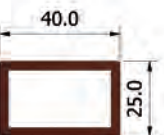
Rectangular 40 x 25mm



1.5" x 1.0" - 40 x 25mm - M12 Fix

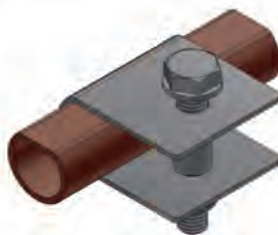
| Kit Part No. | Compatible Ladder Type |
|--------------|-------------------------------|
| KIT0046-M12 | Cooper B-Line, Series 2,3,4,5 |
| KIT0046-M12 | Cooper B-Line - Aluminium |
| KIT0046-M12 | Cooper B-Line - Marine |
| KIT0046-M12 | Rectangular 40 x 25mm |

Rectangular 40 x 25mm



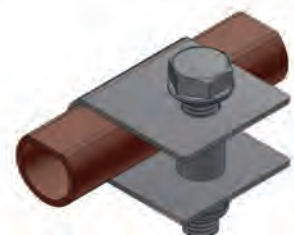
Round - Ø1.0"

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0045 | 1.0"oun Round |



D-rung - 27 x 23mm - M10 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0047-M10 | Cope - D-rung |



D-rung - 27 x 23mm - M12 Fix

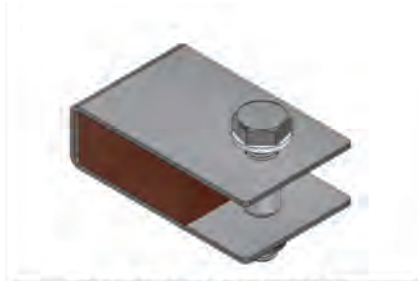
| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0047-M12 | Cope - D-rung |

LADDER ADAPTORS



Rectangular 30 x 20mm - M10 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0062-M10 | 30 x 20mm Rectangular |



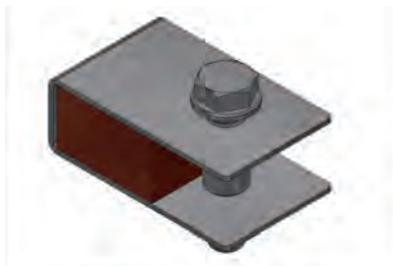
CODE ladder 50 x 21 - M10 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0064-M10 | CODE 50 x 21mm |



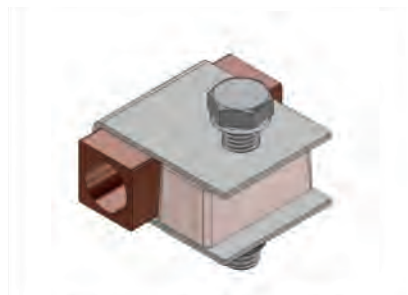
CODE ladder 50 x 21 - M10 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0065-M10 | CODE 25 x 21mm |



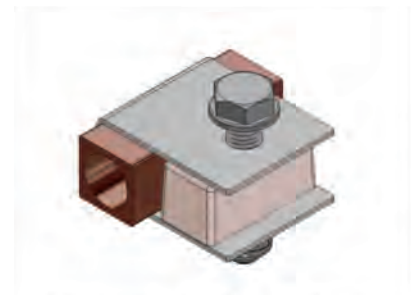
Rectangular 1-3/4" x 1" - M12 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|-------------------------|
| KIT0066-M12 | 1-3/4" x 1" Rectangular |



Rectangular 25 x 25mm - M10 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0086-M10 | 25 x 25mm Rectangular |



Rectangular 25 x 25mm - M12 Fix

| Kit Part No. | Compatible Ladder Type |
|--------------|------------------------|
| KIT0086-M12 | 25 x 25mm Rectangular |

ELLIS

Holding Power

BESPOKE SOLUTIONS AND PRODUCTS

We understand that different markets and varying situations demand different solutions; as problem solvers we thrive on new challenges. When our standard product range isn't quite what you need, we can still help. Visit our website for more information: www.ellispatents.co.uk.



Standard Emperor products modified to suit 2, 4 and 6 cable applications.



Standard Emperor product fitted with a universal base clamp designed to retrofit to three different undrilled ladder rung designs.



Side Fix Vulcan is available as a special with a side fixing for use when height is a limiting factor.

MOST REQUESTED

Our customers often require help with the following:

- Mounting products onto a non-standard structure.
- Manufacturing products in a non-standard format or size.
- Specialist surface treatments such as painting, plating or galvanizing.
- Developing a completely bespoke product.

We are well placed to meet these and many other requirements.

SPECIALIST APPLICATIONS

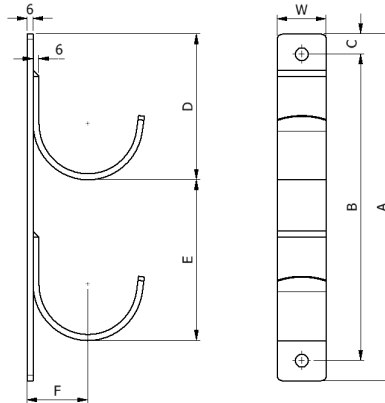
Just like our standard products, our bespoke solutions are designed to withstand the toughest conditions and can be made for specialist environments such as:

- High shock load
- High or low temperature
- A large temperature range
- Tunnel (including railway)
- Unusual or aggressive corrosion
- Fire

CONVEX CABLE HANGER

Registered design 6254645

- ▶ ROUNDED CORNERS REDUCE SNAGGING POINTS
- ▶ CONVEX CABLE HANGER PROFILE REDUCES THE RISK OF CABLE DAMAGE AND FACILITATES CABLE SAG
- ▶ SPIN GALVANISED (55MICRON THICKNESS) TO BS EN ISO 1461
- ▶ WIDE RANGE OF SIZES AVAILABLE
- ▶ CUSTOM DESIGNS AVAILABLE
- ▶ CURVED BACK PLATE TO SUIT TUNNEL WALLS AVAILABLE



| PART NO. | CABLE ϕ (mm) | NO. OF HOOKS | DIMENSIONS (mm) | | | | | | FIXING HOLES ϕ (mm) | WEIGHT (g) | SWL* (kg) | |
|----------|-------------------|--------------|-----------------|-----|----|-----|-----|----|--------------------------|------------|-----------|-----|
| | | | A | B | C | D | E | F | | | | |
| CH1W1 | Up to 50 | 1 | 145 | 105 | 20 | 105 | n/a | 37 | 40 | 11 | 490 | 200 |
| CH2W1 | Up to 50 | 2 | 235 | 195 | 20 | 105 | 90 | 37 | 40 | 11 | 890 | 200 |
| CH3W1 | Up to 50 | 3 | 325 | 285 | 20 | 105 | 90 | 37 | 40 | 11 | 1270 | 200 |
| CH4W1 | Up to 50 | 4 | 415 | 375 | 20 | 105 | 90 | 37 | 40 | 11 | 1670 | 200 |
| CH5W1 | Up to 50 | 5 | 505 | 465 | 20 | 105 | 90 | 37 | 40 | 11 | 2070 | 200 |
| CH6W1 | Up to 50 | 6 | 595 | 555 | 20 | 105 | 90 | 37 | 40 | 11 | 2460 | 200 |
| CH1W2 | 51-75 | 1 | 170 | 130 | 20 | 130 | n/a | 50 | 50 | 13 | 750 | 250 |
| CH2W2 | 51-75 | 2 | 295 | 255 | 20 | 130 | 125 | 50 | 50 | 13 | 1390 | 250 |
| CH3W2 | 51-75 | 3 | 420 | 380 | 20 | 130 | 125 | 50 | 50 | 13 | 2050 | 250 |
| CH4W2 | 51-75 | 4 | 545 | 505 | 20 | 130 | 125 | 50 | 50 | 13 | 2690 | 250 |
| CH5W2 | 51-75 | 5 | 670 | 630 | 20 | 130 | 125 | 50 | 50 | 13 | 3340 | 250 |
| CH6W2 | 51-75 | 6 | 795 | 755 | 20 | 130 | 125 | 50 | 50 | 13 | 3990 | 250 |
| CH1W3 | 76-100 | 1 | 185 | 145 | 20 | 145 | n/a | 62 | 50 | 13 | 870 | 250 |
| CH2W3 | 76-100 | 2 | 345 | 305 | 20 | 145 | 160 | 62 | 50 | 13 | 1670 | 250 |
| CH3W3 | 76-100 | 3 | 505 | 465 | 20 | 145 | 160 | 62 | 50 | 13 | 2490 | 250 |
| CH4W3 | 76-100 | 4 | 665 | 625 | 20 | 145 | 160 | 62 | 50 | 13 | 3290 | 250 |
| CH5W3 | 76-100 | 5 | 825 | 785 | 20 | 145 | 160 | 62 | 50 | 13 | 4100 | 250 |
| CH6W3 | 76-100 | 6 | 985 | 945 | 20 | 145 | 160 | 62 | 50 | 13 | 4900 | 250 |

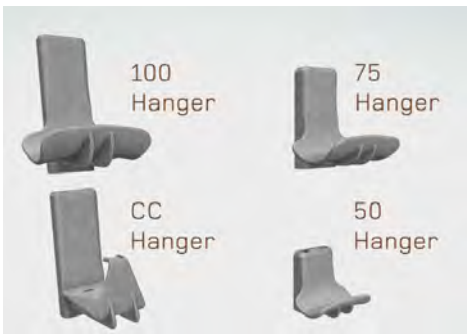
* Load Capacity: Brackets with multiple hook configurations are designed to operate with all hooks carrying their maximum load. As standard, parts are spin galvanised to BS EN 1461 (55 μ m), thicker galvanising options are available on request. Dimensions are provided with a tolerance, refer to detailed drawings for more details.

This information is subject to change without notice. The information provided has been generated in laboratory conditions and as such results in use may vary.

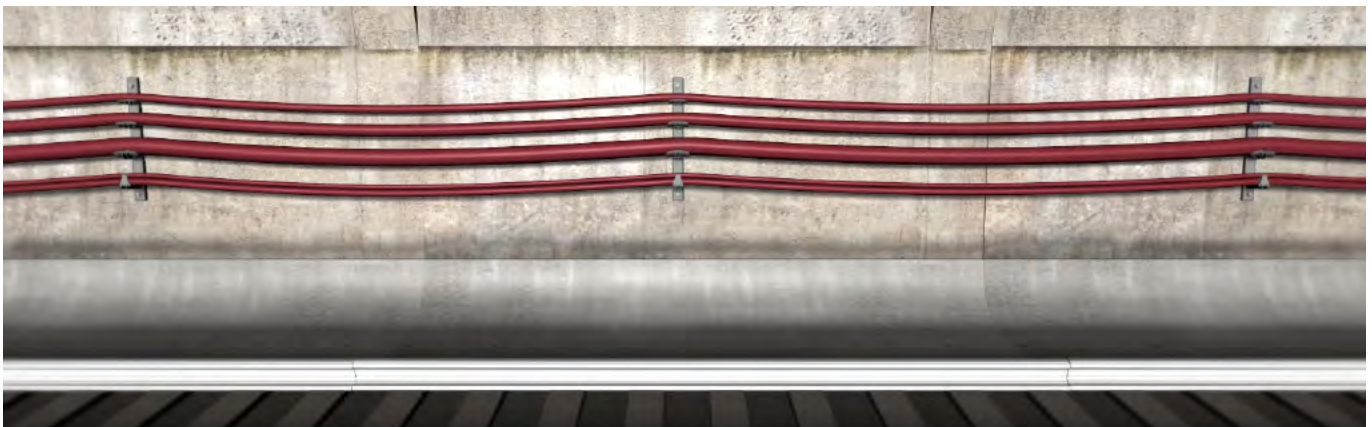
PEGASUS[®] HANGER

Modular Cable Hanger System
Patent No. 1507738.1

- ▶ COMPOSITE CABLE HANGER SYSTEM: POLYMER HANGER AND ENCLOSED CORROSION RESISTANT ALUMINIUM SPINE
- ▶ UPTO 50% LIGHTER THAN CONVENTIONAL STEEL SYSTEM, IMPROVES INSTALLATION TIME BY REDUCING INSTALLER FATIGUE
- ▶ WILL NOT RUST OR CORRODE
- ▶ INSULATING HANGER WITH EXCELLENT DIELECTRIC PROPERTIES, NO EARTH BONDING OR GROUNDING REQUIRED
- ▶ CURVED PROFILE HANGER DESIGN ALLOWS NATURAL SAG
- ▶ MULTIPLE COMBINATIONS OF HANGERS AVAILABLE, CURVED CONFIGURATION TO SUIT TUNNEL WALLS ALSO AVAILABLE
- ▶ AVAILABLE IN LUL 1-085 LSF MATERIAL FOR INDOOR APPLICATIONS OR UV STABILISED MATERIAL FOR EXTERNAL APPLICATIONS
- ▶ CURVED BACK PLATE TO SUIT TUNNEL WALLS AVAILABLE



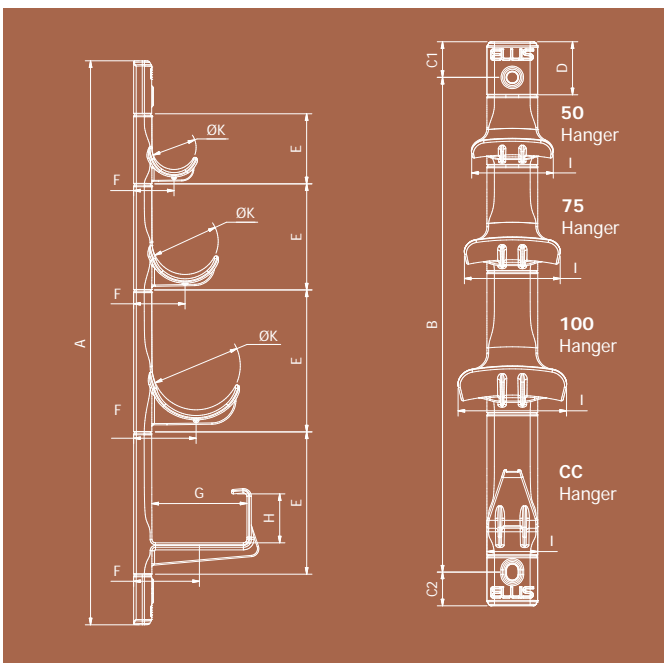
| Hanger | SWL kg |
|--------|--------|
| 100 | 60 |
| 75 | 45 |
| 50 | 45 |
| CC | 25 |



* Load Capacity: Brackets with multiple hook configurations are designed to operate with all hooks carrying their maximum load. Dimensions are provided with a tolerance, refer to detailed drawings for details.



| PART NO. | WAYS | DIMENSIONS (MM) | | | | | | | | | | | FIXING HOLES DIAMETER | PACK QTY. | MODULAR WEIGHT L | WEIGHT KG | SWL KG |
|----------|------|-----------------|------|----|----|----|-----|----|-----|----|-----|------|-----------------------|-----------|------------------|-----------|--------|
| | | A | B | C1 | C2 | D | E | F | G | H | I | K | | | | | |
| PG050-1 | 1 | 197 | 121 | 40 | 38 | 60 | - | 46 | - | - | 92 | Ø50 | M12 | 1 | 0.16 | 0.3 | 45 |
| PG050-2 | 2 | 276 | 200 | 40 | 38 | 60 | 79 | 46 | - | - | 92 | Ø50 | M12 | 1 | 0.16 | 0.46 | 90 |
| PG050-3 | 3 | 355 | 279 | 40 | 38 | 60 | 79 | 46 | - | - | 92 | Ø50 | M12 | 1 | 0.16 | 0.62 | 135 |
| PG050-4 | 4 | 434 | 358 | 40 | 38 | 60 | 79 | 46 | - | - | 92 | Ø50 | M12 | 1 | 0.16 | 0.78 | 180 |
| PG050-5 | 5 | 513 | 437 | 40 | 38 | 60 | 79 | 46 | - | - | 92 | Ø50 | M12 | 1 | 0.16 | 0.94 | 225 |
| PG050-6 | 6 | 592 | 516 | 40 | 38 | 60 | 79 | 46 | - | - | 92 | Ø50 | M12 | 1 | 0.16 | 1.1 | 270 |
| PG075-1 | 1 | 237 | 161 | 40 | 38 | 60 | - | 58 | - | - | 108 | Ø75 | M12 | 1 | 0.25 | 0.39 | 45 |
| PG075-2 | 2 | 357 | 281 | 40 | 38 | 60 | 120 | 58 | - | - | 108 | Ø75 | M12 | 1 | 0.25 | 0.64 | 90 |
| PG075-3 | 3 | 476 | 400 | 40 | 38 | 60 | 120 | 58 | - | - | 108 | Ø75 | M12 | 1 | 0.25 | 0.89 | 135 |
| PG075-4 | 4 | 595 | 519 | 40 | 38 | 60 | 120 | 58 | - | - | 108 | Ø75 | M12 | 1 | 0.25 | 1.14 | 180 |
| PG075-5 | 5 | 714 | 638 | 40 | 38 | 60 | 120 | 58 | - | - | 108 | Ø75 | M12 | 1 | 0.25 | 1.39 | 225 |
| PG075-6 | 6 | 834 | 758 | 40 | 38 | 60 | 120 | 58 | - | - | 108 | Ø75 | M12 | 1 | 0.25 | 1.64 | 270 |
| PG100-1 | 1 | 279 | 203 | 40 | 38 | 60 | - | 71 | - | - | 122 | Ø100 | M12 | 1 | 0.41 | 0.55 | 60 |
| PG100-2 | 2 | 440 | 364 | 40 | 38 | 60 | 161 | 71 | - | - | 122 | Ø100 | M12 | 1 | 0.41 | 0.96 | 120 |
| PG100-3 | 3 | 600 | 524 | 40 | 38 | 60 | 161 | 71 | - | - | 122 | Ø100 | M12 | 1 | 0.41 | 1.37 | 180 |
| PG100-4 | 4 | 760 | 684 | 40 | 38 | 60 | 161 | 71 | - | - | 122 | Ø100 | M12 | 1 | 0.41 | 1.78 | 240 |
| PG100-5 | 5 | 921 | 845 | 40 | 38 | 60 | 161 | 71 | - | - | 122 | Ø100 | M12 | 1 | 0.41 | 2.19 | 300 |
| PG100-6 | 6 | 1085 | 1009 | 40 | 38 | 60 | 161 | 71 | - | - | 122 | Ø100 | M12 | 1 | 0.41 | 2.6 | 360 |
| PGCC-1 | 1 | 279 | 203 | 40 | 38 | 60 | - | 74 | 107 | 55 | 57 | - | M12 | 1 | 0.31 | 0.45 | 25 |
| PGCC-2 | 2 | 440 | 364 | 40 | 38 | 60 | 161 | 74 | 107 | 55 | 57 | - | M12 | 1 | 0.31 | 0.76 | 50 |
| PGCC-3 | 3 | 600 | 524 | 40 | 38 | 60 | 161 | 74 | 107 | 55 | 57 | - | M12 | 1 | 0.31 | 1.07 | 75 |
| PGCC-4 | 4 | 760 | 684 | 40 | 38 | 60 | 161 | 74 | 107 | 55 | 57 | - | M12 | 1 | 0.31 | 1.38 | 100 |
| PGCC-5 | 5 | 921 | 845 | 40 | 38 | 60 | 161 | 74 | 107 | 55 | 57 | - | M12 | 1 | 0.31 | 1.69 | 125 |
| PGCC-6 | 6 | 1085 | 1009 | 40 | 38 | 60 | 161 | 74 | 107 | 55 | 57 | - | M12 | 1 | 0.31 | 2 | 150 |



**PEGASUS IS A MODULAR SYSTEM
AND CAN BE SUPPLIED IN ANY CONFIGURATION**

PART NUMBERS FOR SPECIAL CONFIGURATIONS CAN BE WORKED OUT AS FOLLOWS:

Example: Part Number for product shown would be:
PG 50-1/75-1/100-1/CC-1

PG defines the product as Pegasus

The size and number of hangers is then listed as shown, starting from the top

Any number of hangers can be specified in any order

Standard material is suitable for tunnel applications, for UV stabilised material add -UV to end of part number

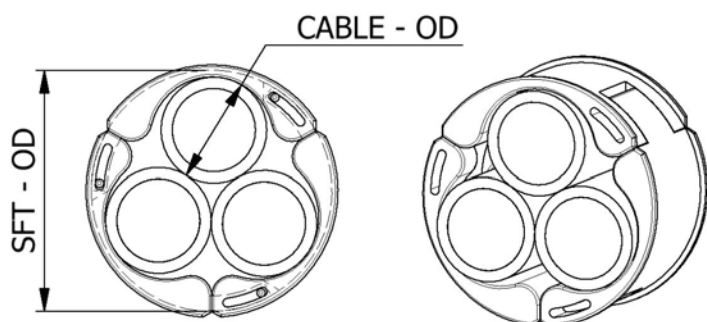
Standard product is straight but can be supplied curved, for curved option add -C to end of part number

This information is subject to change without notice. The information provided has been generated in laboratory conditions and as such results in use may vary.

TRIPLEX CABLE SURROUND

UK (2514384), EUROPEAN (2806198)
and US (9,404,605) Patent

- ▶ TRIPLEX CABLE SURROUND OVERCOMES THE TWIST IN TRIPLEX CABLE TO ALLOW THE CABLE TO BE CLEATED AT ANY POINT ALONG ITS LENGTH
- ▶ ADAPTOR MANUFACTURED IN A LSF V0 POLYMER
- ▶ CAN BE USED WITH EMPEROR SINGLE, VULCAN+, 2F+ AND 2A CLEATS
- ▶ REFER TO INDIVIDUAL PRODUCT DATA SHEETS FOR PERFORMANCE TO IEC 61914
- ▶ SOLD SEPARATELY TO THE CLEATS AS STANDARD BUT CAN BE PROVIDED ASSEMBLED INSIDE THE CLEAT ON REQUEST



| PART NO. | CABLE RANGE | | DEPTH (mm) | WEIGHT (g) |
|------------------|-------------|-----|------------|------------|
| | MIN | MAX | | |
| SFT26 | 24 | 28 | 62 | 67.3 |
| SFT31 / SFT2F+31 | 28 | 34 | 62 / 84 | 87 / 125 |
| SFT36 / SFT2F+36 | 33 | 39 | 62 / 84 | 113 / 160 |
| SFT43 / SFT2F+43 | 39 | 47 | 62 / 109 | 140 / 272 |
| SFT51 / SFT2F+51 | 47 | 55 | 62 / 134 | 212 / 447 |

NOTE:

SFT2F+XX part numbers refer to a deeper SFT+ moulding to be used with 2F+ and 2A clamps, see table for more detail.

NOTE: 'CABLE RANGE' REFERS TO THE OUTSIDE DIAMETER OF THE INDIVIDUAL CABLES INSIDE THE TRIPLEX BRAID

THIS PRODUCT HAS BEEN SHORT CIRCUIT TESTED IN LINE WITH EN 50368:

CONFIGURATION: 2F+LSF CLEAT WITH SFT

PEAK CURRENT: 76kA

CLEAT SPACING: 600mm

CABLE CLEAT SELECTION DETAIL FOR CLEATS TO BE USED WITH THE TRIPLEX CABLE SURROUND

| CABLE OD (mm) | SFT OD (mm) | ADAPTOR TYPE | VULCAN+ | EMPEROR | 2F + CLAMP | 2A CLAMP |
|---------------|-------------|--------------|---------|-----------|------------|----------|
| 24 | 56 | SFT26 | VRT+03 | ES51-59 | 2F+09 | 2A-09 |
| 25 | 58 | SFT26 | VRT+03 | ES51-59 | 2F+10 | 2A-10 |
| 26 | 59 | SFT26 | VRT+03 | ES51-59 | 2F+10 | 2A-10 |
| 27 | 61 | SFT26 | VRT+04 | ES58-66 | 2F+10 | 2A-10 |
| 28 | 63 | SFT26 | VRT+04 | ES58-66 | 2F+10 | 2A-10 |
| 28 | 64 | SFT31 | VRT+05 | ES58-66 | 2F+11 | 2A-11 |
| 29 | 66 | SFT31 | VRT+05 | ES65-73 | 2F+11 | 2A-11 |
| 30 | 68 | SFT31 | VRT+05 | ES65-73 | 2F+11 | 2A-11 |
| 31 | 70 | SFT31 | VRT+06 | ES65-73 | 2F+1200 | 2A-1200 |
| 32 | 71 | SFT31 | VRT+06 | ES65-73 | 2F+1200 | 2A-1200 |
| 33 | 73 | SFT31 | VRT+06 | ES65-73 | 2F+1200 | 2A-1200 |
| 34 | 75 | SFT31 | VRT+06 | ES73-85 | 2F+1200 | 2A-1200 |
| 33 | 76 | SFT36 | VRT+06 | ES73-85 | 2F+1201 | 2A-1201 |
| 34 | 78 | SFT36 | VRT+06 | ES73-85 | 2F+1201 | 2A-1201 |
| 35 | 80 | SFT36 | VRT+07 | ES73-85 | 2F+1201 | 2A-1201 |
| 36 | 82 | SFT36 | VRT+07 | ES73-85 | 2F+1201 | 2A-1201 |
| 37 | 83 | SFT36 | VRT+07 | ES73-85 | 2F+1202 | 2A-1202 |
| 38 | 84 | SFT36 | VRT+07 | ES73-85 | 2F+1202 | 2A-1202 |
| 39 | 86 | SFT36 | VRT+08 | ES84-94 | 2F+1202 | 2A-1202 |
| 39 | 88 | SFT43 | VRT+08 | ES84-94 | 2F+1202 | 2A-1202 |
| 40 | 89.5 | SFT43 | VRT+08 | ES84-94 | 2F+1202 | 2A-1202 |
| 41 | 93 | SFT43 | VRT+08 | ES84-94 | 2F+131 | 2A-131 |
| 42 | 94 | SFT43 | VRT+09 | ES84-94 | 2F+131 | 2A-131 |
| 43 | 95 | SFT43 | VRT+09 | ES94-118 | 2F+131 | 2A-131 |
| 44 | 97 | SFT43 | VRT+09 | ES94-118 | 2F+131 | 2A-131 |
| 45 | 99 | SFT43 | VRT+10 | ES94-118 | 2F+132 | 2A-132 |
| 46 | 102 | SFT43 | VRT+10 | ES94-118 | 2F+132 | 2A-132 |
| 47 | 104.5 | SFT43 | VRT+11 | ES94-118 | 2F+132 | 2A-132 |
| 47 | 105 | SFT51 | VRT+11 | ES94-118 | 2F+132 | 2A-132 |
| 48 | 107 | SFT51 | VRT+11 | ES94-118 | 2F+141 | 2A-141 |
| 49 | 110 | SFT51 | VRT+12 | ES94-118 | 2F+141 | 2A-141 |
| 50 | 112 | SFT51 | VRT+12 | ES94-118 | 2F+141 | 2A-141 |
| 51 | 114 | SFT51 | VRT+12 | ES94-118 | 2F+142 | 2A-142 |
| 52 | 117 | SFT51 | VRT+12 | ES94-118 | 2F+142 | 2A-142 |
| 53 | 119.5 | SFT51 | VRT+13 | ES118-130 | 2F+142 | 2A-142 |
| 54 | 121 | SFT51 | VRT+13 | ES118-130 | 2F+151 | 2A-151 |
| 55 | 123.5 | SFT51 | VRT+13 | ES118-130 | 2F+151 | 2A-151 |

FOR PART NUMBERS IN RED THE WIDER SFT2F+ NEEDS TO BE USED TO SUIT THE INCREASED DEPTHS OF THE CLAMPS

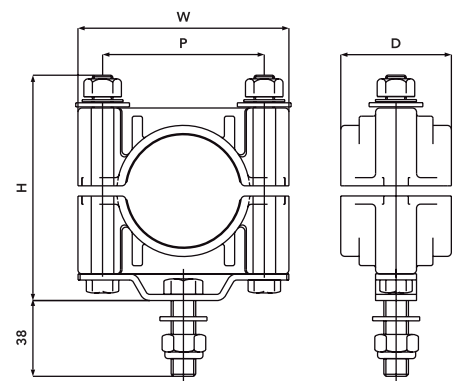
SINGLE BOLT FIXING CLAMP

Polymer Clamp On Steel Bracket

- ▶ HEAVY DUTY FIXING BRACKET ALLOWS POLYMERIC 2 HOLE CLAMPS TO BE FIXED ON A SINGLE BOLT
- ▶ CLAMP CAN BE SUPPLIED IN LSF NYLON OR STANDARD POLYPROPYLENE
- ▶ ADAPTOR BRACKET IS MANUFACTURED IN ZINC PLATED MILD STEEL
- ▶ HEADS OF FIXING BOLTS ARE WELDED CAPTIVE FOR EASY INSTALLATION
- ▶ FOR CLAMP PERFORMANCE TO IEC 61914 REFER TO 2 HOLE CLAMP DATA SHEET



| PART NO. | CLAMP MATERIAL SUFFIX | CABLE RANGE (mm) | DIMENSIONS (mm) | | | WEIGHT (g) | |
|------------|-----------------------|------------------|-----------------|-----|----|------------|-------|
| | | | W | H | D | B | LSF |
| 2F+AS-08 | B or LSF | 46-51 | 103 | 110 | 54 | 353.9 | 382.9 |
| 2F+AS-09 | B or LSF | 51-57 | 103 | 110 | 54 | 368 | 392 |
| 2F+AS-10 | B or LSF | 57-64 | 103 | 110 | 54 | 362.1 | 395.5 |
| 2F+AS-11 | B or LSF | 64-70 | 130 | 143 | 54 | 433 | 474.3 |
| 2F+AS-1200 | B or LSF | 70-76 | 128 | 143 | 75 | 477.1 | 507 |
| 2F+AS-1201 | B or LSF | 76-83 | 135 | 148 | 75 | 491 | 523.5 |
| 2F+AS-1202 | B or LSF | 83-90 | 143 | 156 | 75 | 505.3 | 545.6 |

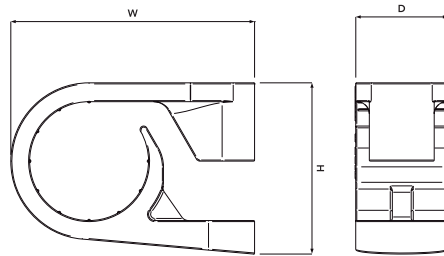


PART NO. EXAMPLE:

For a single bolt fixing 2F+11 clamp in LSF nylon use the part number:2F+AS-11-LSF.

INDUSTRIAL CABLE CLAMP

Manufactured as standard in Black LLDPE (B) or in a London Underground Approved Material (LUL).
Used to fix power cables in indoor and outdoor applications.

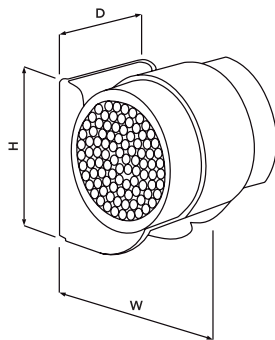
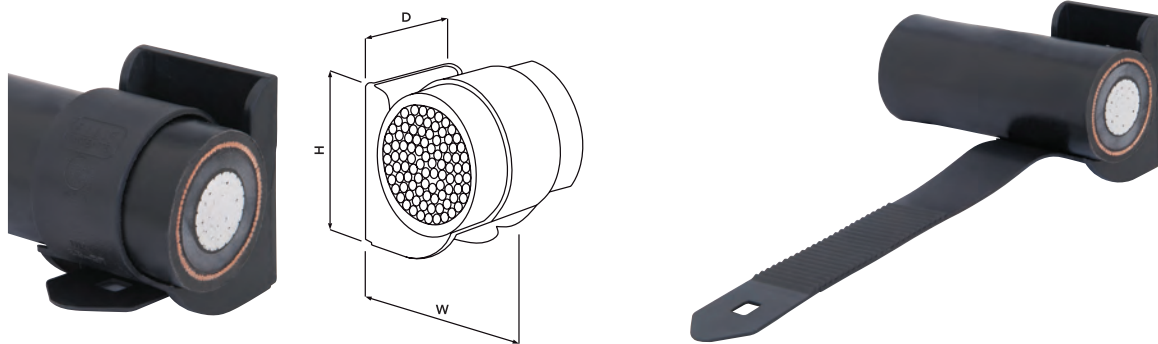


| Part No. | Cable Range | | Dimensions mm | | | Fixing Holes | Pack Qty | SWL kgf | Weight g | | |
|----------|-------------|-----|---------------|-------------|------|--------------|----------|---------|----------|------|-------|
| | LLDPE | LUL | Min Dia. mm | Max Dia. mm | W | | | | H | D | LLDPE |
| 17-01B | 17-01LUL | 10 | 15 | 27.8 | 17.6 | 12 | 1 x M4 | 100 | 18 | 2.0 | 3.5 |
| 17-02B | 17-02LUL | 12 | 17 | 32.0 | 20.8 | 14 | 1 x M4 | 100 | 24 | 3.3 | 5.4 |
| 17-03B | 17-03LUL | 15 | 20 | 37.1 | 25.3 | 16 | 1 x M4 | 100 | 32 | 5.2 | 8.6 |
| 17-04B | 17-04LUL | 18 | 24 | 41.0 | 29.6 | 18 | 1 x M4 | 100 | 39 | 7.3 | 12.2 |
| 17-05B | 17-05LUL | 22 | 29 | 52.1 | 35.4 | 20 | 1 x M6 | 50 | 52 | 11.2 | 18.6 |
| 17-06B | 17-06LUL | 26 | 34 | 58.2 | 40.9 | 22 | 1 x M6 | 50 | 66 | 16.5 | 27.9 |
| 17-07B | 17-07LUL | 32 | 42 | 69.3 | 49.2 | 25 | 1 x M6 | 25 | 79 | 25.6 | 42.9 |
| 17-08B | 17-08LUL | 39 | 51 | 81.7 | 58.5 | 26 | 1 x M6 | 25 | 93 | 36.2 | 60.1 |

The LUL version of this clamp is compliant with the requirement of London Underground Standard 1-085. Product Register No. 365.

ELITE RANGE-TAKER CABLE CLAMP

Manufactured as standard in Black Polypropylene (B), White Polypropylene (W) or Black Flame Retardant VO Zero Halogen Phosphorus-Free Nylon (LSF). The clamp incorporates a fully releasable strap allowing ease of re-installation. Used to fix power cables in indoor and outdoor applications.



| Part No. | Material Suffix | Cable Range | | Dimensions mm | | | Fixing Holes | Pack Qty | Weight g | |
|----------|-----------------|-------------|-------------|---------------|------|------|--------------|----------|----------|------|
| | | Min Dia. mm | Max Dia. mm | W | H | D | | | B/W | LSF |
| 15-1 | B,W or LSF | 9.5 | 16.0 | 27.0 | 37.0 | 25.0 | 1 x M6 | 100 | 6.0 | 8.0 |
| 15-2 | B,W or LSF | 15.0 | 25.0 | 36.0 | 37.0 | 32.0 | 1 x M6 | 50 | 8.0 | 10.9 |
| 15-3 | B,W or LSF | 23.0 | 37.0 | 48.0 | 48.0 | 36.0 | 1 x M6 | 50 | 15.0 | 18.1 |
| 15-4 | B,W or LSF | 34.0 | 52.0 | 63.0 | 65.0 | 40.0 | 1 x M6 | 25 | 20.0 | 25.5 |

EARTHING STRIP CLIP

Manufactured as standard in Black Polypropylene (B) or Grey Flame Retardant Polypropylene (FR). Used to fix PVC coated, bare copper or aluminium strip.

IMPERIAL SIZES

| Part No. | Material Suffix | Strip Size inches | Hold Off inches | Length inches | Fixing Holes (slotted) inches | Pack Qty | Weight g |
|----------|-----------------|-------------------|-----------------|---------------|-------------------------------|----------|----------|
| 60-04 | B or FR | 1 x 1/8 | 5/16 | 2 | 7/16 x 5/16 | 100 | 12 |
| 60-05 | B or FR | 1 1/4 x 1/8 | 3/8 | 2 5/8 | 7/16 x 5/16 | 100 | 21 |
| 60-06 | B or FR | 1 1/4 x 3/16 | 5/16 | 2 5/8 | 7/16 x 5/16 | 100 | 20 |
| 60-08 | B or FR | 1 1/2 x 3/16 | 5/16 | 2 5/8 | 7/16 x 5/16 | 100 | 20 |
| 60-10 | B or FR | 1 1/2 x 1/8 | 3/8 | 2 5/8 | 7/16 x 5/16 | 100 | 20 |
| 60-15 | B or FR | 2 x 1/8 | 1/4 | 3 1/8 | 7/16 x 5/16 | 100 | 24 |
| 60-26 | B or FR | 1 x 1/8 | 3/4 | 2 1/8 | 7/16 x 5/16 | 100 | 16 |
| 60-27 | B or FR | 1 x 3/16 | 5/8 | 2 1/8 | 7/16 x 5/16 | 100 | 16 |
| 60-28 | B or FR | 1 1/2 x 3/16 | 5/8 | 2 7/8 | 7/16 x 5/16 | 100 | 25 |
| 60-32 | B or FR | 1 1/4 x 1/4 | 5/8 | 3 | 7/16 x 5/16 | 100 | 25 |
| 60-34 | B or FR | 1 1/2 x 1/8 | 3/4 | 3 | 7/16 x 5/16 | 100 | 25 |
| 60-36 | B or FR | 1 1/2 x 1/4 | 5/8 | 3 | 7/16 x 5/16 | 100 | 24 |
| 60-37 | B or FR | 1 1/2 x 3/8 | 3/8 | 2 7/8 | 7/16 x 5/16 | 100 | 23 |
| 60-38 | B or FR | 1 3/4 x 1/8 | 3/4 | 3 3/8 | 7/16 x 5/16 | 100 | 27 |
| 60-39 | B or FR | 1 3/4 x 1/4 | 5/8 | 3 3/8 | 7/16 x 5/16 | 100 | 27 |
| 60-40 | B or FR | 2 x 1/8 | 3/4 | 3 3/8 | 7/16 x 5/16 | 100 | 30 |
| 60-42 | B or FR | 2 x 1/4 | 5/8 | 3 3/8 | 7/16 x 5/16 | 100 | 25 |
| 60-44 | B or FR | 2 x 3/8 | 3/8 | 3 3/8 | 7/16 x 5/16 | 100 | 24 |

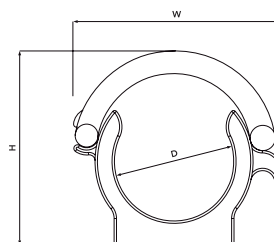


METRIC SIZES

| Part No. | Material Suffix | Strip Size mm | Hold Off mm | Length mm | Fixing Holes (slotted) mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-------------|-----------|---------------------------|----------|----------|
| 70-04 | B or FR | 20 x 4 | 17 | 55 | 11 x 8 | 100 | 15 |
| 70-06 | B or FR | 20 x 6 | 16 | 55 | 11 x 8 | 100 | 16 |
| 70-07 | B or FR | 25 x 6 | 16 | 55 | 11 x 8 | 100 | 14 |
| 70-08 | B or FR | 50 x 4 | 18 | 87 | 11 x 8 | 100 | 28 |
| 70-09 | B or FR | 40 x 6 | 16 | 87 | 11 x 8 | 100 | 28 |
| 70-10 | B or FR | 50 x 6 | 15 | 87 | 11 x 8 | 100 | 26 |
| 70-11 | B or FR | 40 x 4 | 18 | 87 | 11 x 8 | 100 | 28 |
| 70-12 | B or FR | 50 x 10 | 11 | 87 | 11 x 8 | 100 | 24 |
| 70-14 | B or FR | 60 x 6 | 18 | 97 | 11 x 8 | 100 | 31 |
| 70-16 | B or FR | 80 x 6 | 19 | 118 | 11 x 8 | 50 | 41 |

CABLE CONDUIT CLIP

Manufactured as standard in Black Nylon this surface mounted Conduit Clip comes complete with a captive hinged over-strap. Used to fix conduit in indoor and outdoor applications.



| Part No. | Material Suffix | D mm | H mm | W mm | Fixing Holes mm | Stand off | Pack Qty | Weight g |
|----------|-----------------|------|------|------|-----------------|-----------|----------|----------|
| CC20B | B or W | 20 | 35 | 35 | 4 | 5 | 100 | 8.8 |
| CC25B | B or W | 25 | 40 | 40 | 4 | 5 | 100 | 10.6 |

FRAMING CHANNEL ACCESSORIES

FRAMING CHANNEL END CAPS

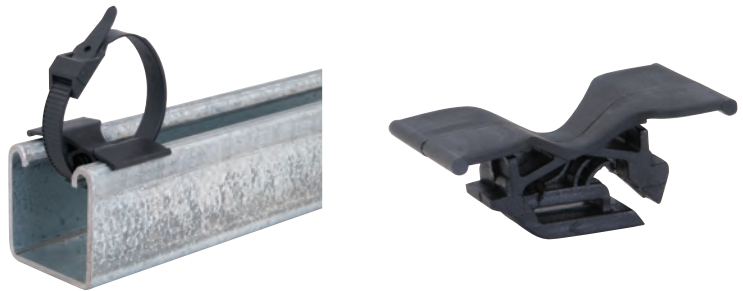
Manufactured as standard in Black or White Polypropylene (PP), Black or White LDPE (PE) or Nylon (LSF). The EC version is a spring fit whilst the 'Gripper' version has fins which bend and deform into the channel. There is provision to incorporate the customers logo. Also available to order in other colours.

| Part No. | Description | Size mm | Material Suffix | Colour | Pack Qty | Weight g |
|-----------|--------------------------------|---------|-----------------|--------|----------|----------|
| 91-ECLB | 'EC' type channel end cap | 41 x 41 | PP | Black | 100 | 7.3 |
| 91-ECLW | 'EC' type channel end cap | 41 x 41 | PP | White | 100 | 7.3 |
| 91-ECSB | 'EC' type channel end cap | 41 x 21 | Black | 100 | 3.2 | |
| 91-ECSW | 'EC' type channel end cap | 41 x 21 | PP | White | 100 | 3.2 |
| 91-JGLB | 'Gripper' type channel end cap | 41 x 41 | PE | Black | 100 | 9.4 |
| 91-JGLW | 'Gripper' type channel end cap | 41 x 41 | PE | White | 100 | 9.4 |
| 91-JGSB | 'Gripper' type channel end cap | 41 x 21 | PE | Black | 100 | 4.4 |
| 91-JGSW | 'Gripper' type channel end cap | 41 x 21 | PE | White | 100 | 4.4 |
| 91-JGLLSF | 'Gripper' type channel end cap | 41 x 41 | LSF | Black | 100 | 9.4 |
| 91-JGSLSF | 'Gripper' type channel end cap | 41 x 21 | LSF | Black | 100 | 4.4 |



BUTTERFLY CLIP

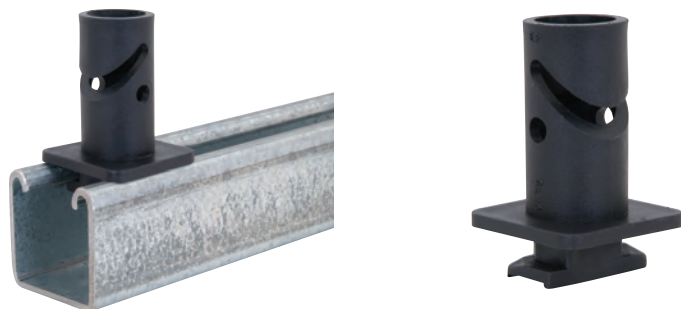
Manufactured as standard in Black Nylon, the butterfly clip snaps into 41mm wide framing channel. It will accommodate a cable tie of up to 100mm in width (not included). Used to allow cables to be strapped at right angles to the channel.



| Part No. | Material Suffix | Pack Qty | Weight g |
|----------|-----------------|----------|----------|
| 91-BC | NY | 100 | 3.8 |

THERMAL SPACER

Manufactured as standard in Black Polypropylene. A slotted hole is also provided for running heat detection cable. Used to ensure separation of the cable on cable ladder, framing channel and ladder rungs with reduced return flanges.



| Part No. | Height Above Ladder Rung | Material Suffix | Pack Qty | Weight g |
|----------|--------------------------|-----------------|----------|----------|
| 91-TSL1 | 75mm | PP | 100 | 19.5 |
| 91-TS7.5 | 50mm | PP | 100 | 14.7 |

FRAMING CHANNEL ACCESSORIES

FRAMING CHANNEL WASHER

Manufactured as standard in the materials shown this washer is recommended for use when our range of 2F+ clamps are fitted to framing channel.



| Part No. | Size | Material Suffix | Hole Size mm | Pack Qty | Weight g |
|----------|---------|------------------------|--------------|----------|----------|
| 91-WZ | 40 x 40 | Mild Steel Zinc Plated | 10 | 100 | 33 |
| 91-WZ-X | 40 x 40 | Mild Steel Zinc Plated | 12 | 100 | 33 |
| 91-W-2 | 40 x 40 | A2 Stainless Steel | 10 | 100 | 34 |
| 91-W-4 | 40 x 40 | A4 Stainless Steel | 12 | 100 | 34 |
| 91-WG | 40 x 40 | Mild Steel Galvanised | 10 | 100 | 37 |

CHANNEL NUTS

Manufactured as standard in Bright Zinc Plated Mild Steel.



| Part No. | Material Suffix | Pack Qty | Weight g |
|---------------|--------------------------------|----------|----------|
| 0F-M10-CN00-Z | M10 Channel Nut (long spring) | 100 | 38 |
| 0F-M10-CN01-Z | M10 Channel Nut (short spring) | 100 | 37 |
| 0F-M10-CN02-Z | M10 Channel Nut (no spring) | 100 | 36 |

INSULATION PLATE

Manufactured as standard in Black Polypropylene or Black Flame Retardant VO Zero Halogen Phosphorus-Free UV Stabilised Nylon (LSF), this insulation plate can be used to provide a barrier where galvanic reaction may occur between dissimilar metals, e.g. when installing stainless steel cleats onto galvanised steel channel.



| Part No. | Material Suffix | Pack Qty | Weight g |
|----------|-----------------|----------|----------|
| 91-IP | B | 100 | 5 |
| 91-IP 12 | B/LSF | 100 | 5 |
| 91-IP-1 | B/LSF | 100 | 5 |
| 91-IP-2 | B/LSF | 100 | 5 |
| 91-IP-3 | B/LSF | 100 | 5 |

TRUNKING ADAPTOR

Manufactured as standard in Black Polypropylene (B) or Nylon (LSF), this adaptor can be used to fit one hole and two hole cable clamps when cables are being installed parallel to the trunking.



| Part No. | Material Suffix | Pack Qty | Weight g |
|----------|-----------------|----------|----------|
| 91-TA | B | 100 | 5.3 |
| 91-TA | LSF | 100 | 7.1 |

SPECIALIST CABLE FIXINGS FOR UTILITIES



SINGLE WAY FIXING CABLE CLEAT

Manufactured as standard in Black Polypropylene (B) and Grey Flame Retardant Polypropylene (FR) or Black Acetal (A). A robust cleat used for securing armoured power cables.

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-----------------|----------|----------|
| 10-034 | B or FR | 9.0 | 3 | 200 | 0.8 |
| 10-042 | B or FR | 10.6 | 4 | 200 | 1.9 |
| 10-046 | B or FR | 11.7 | 4 | 200 | 2.8 |
| 10-053 | B or FR | 13.5 | 4 | 200 | 2.8 |
| 10-056 | B or FR | 14.2 | 4 | 200 | 3.1 |
| 10-061 | B or FR | 15.5 | 4 | 200 | 3.1 |
| 10-065 | B or FR | 16.5 | 4 | 200 | 4.8 |
| 10-072 | B or FR | 18.2 | 4 | 200 | 4.2 |
| 10-083 | B or FR | 21.1 | 6 | 100 | 7.7 |
| 10-098 | B or FR | 24.8 | 6 | 100 | 6.4 |
| 10-106 | B or FR | 27.0 | 6 | 100 | 7.5 |
| 10-120 | A | 31.0 | 6 | 50 | 15.8 |
| 10-138 | A | 35.0 | 6 | 50 | 23.0 |



SINGLE WAY HEAVY DUTY RADIUSED POLE CLEAT

Manufactured as standard in Black Polypropylene (B) or Black Flame Retardant VO Zero Halogen Phosphorus-Free UV Stabilised Nylon (LSF). A curved robust cleat used for securing power cables on 200mm diameter wooden electricity supply poles.

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-----------------|----------|----------|
| 35-04 | B | 27.6 | 8 | 100 | 13.0 |
| 35-06 | B | 31.2 | 8 | 100 | 12.0 |
| 35-065 | B | 33.5 | 8 | 100 | 18.5 |
| 35-07 | B | 36.0 | 8 | 100 | 14.0 |
| 35-08 | B | 37.8 | 8 | 100 | 16.0 |
| 35-10 | B | 41.5 | 8 | 100 | 26.0 |
| 35-12 | B | 44.6 | 8 | 100 | 25.0 |
| 35-22 | B | 49.2 | 8 | 100 | 23.0 |
| 35-26 | B | 53.5 | 8 | 50 | 25.0 |
| 35-30 | B | 56.6 | 8 | 50 | 27.0 |
| 35-34 | B | 61.6 | 11 | 50 | 53.0 |
| 35-42 | B | 72.5 | 11 | 25 | 84.0 |



TWO WAY SINGLE FIXING CABLE CLEAT

Manufactured as standard in Black Polypropylene (B) and Grey Flame Retardant Polypropylene (FR). A robust cleat used for securing two armoured power cables on flat surfaces.

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-----------------|----------|----------|
| 2W37 | B | 9.4 | 4 | 100 | 2.2 |
| 2W42 | B or FR | 10.6 | 4 | 100 | 3.3 |
| 2W46 | B or FR | 11.7 | 4 | 100 | 3.6 |
| 2W53 | B or FR | 13.5 | 4 | 100 | 4.0 |
| 2W56 | B or FR | 14.2 | 4 | 100 | 5.0 |



THREE & FOUR WAY DOUBLE FIXING CABLE CLEAT

Manufactured as standard in Black Polypropylene (B) and Grey Flame Retardant Polypropylene (FR). A robust cleat used for securing three or four armoured power cables on flat surfaces.

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-----------------|----------|----------|
| 3W46 | B or FR | 11.7 | 4 | 200 | 8.7 |
| 3W56 | B or FR | 14.2 | 4 | 200 | 9.3 |
| 4W10 | B | 4 x 15 | 4 | 100 | 9.5 |



TWO WAY HEAVY DUTY RADIUSED POLE CLEAT

Manufactured as standard in Black Polypropylene (B) or Black Flame Retardant VO Zero Halogen Phosphorus-Free UV Stabilised Nylon (LSF). A curved robust cleat used for securing two power cables on 200mm diameter wooden electricity poles.

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-----------------|----------|----------|
| 2WP04 | B | 11.7 | 4 | 100 | 6.1 |
| 2WP06 | B | 13.2 | 4 | 100 | 5.4 |
| 2WP10 | B | 16.5 | 4 | 100 | 6.5 |
| 2WP15 | B | 19.1 | 8 | 100 | 7.3 |

SPECIALIST CABLE FIXINGS FOR UTILITIES



THREE WAY HEAVY DUTY RADIUSED POLE CLEAT

Manufactured as standard in Black Polypropylene (B) or Black Flame Retardant VO Zero Halogen Phosphorus-Free UV Stabilised Nylon (LSF). A curved robust cleat used for securing three power cables on 200mm diameter wooden electricity supply poles.

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-----------------|----------|----------|
| 3WP04 | B | 11.7 | 6.35 | 200 | 8.0 |
| 3WP06 | B | 13.2 | 6.35 | 200 | 8.2 |
| 3WP10 | B | 16.5 | 6.35 | 200 | 9.8 |
| 3WP15 | B | 19.2 | 6.35 | 200 | 12.5 |
| 3WP20 | B | 21.7 | 6.35 | 200 | 13.7 |
| 3WP2 | B | 15.0 | 6.35 | 200 | 10.7 |
| 3WN05 | B | 24.0 | 6.35 | 200 | 11.9 |



TWO WAY CLEAT AND SPACER

Manufactured as standard in Black Polypropylene (B) and Grey Flame Retardant Polypropylene (FR). Used for mounting power cables to poles and flat surfaces. A spacer is available to facilitate the stacking of the cleat

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------|-----------------|----------|----------|
| E272 | B or FR | 11.1-19.1 | 10.0 | 50 pairs | 22.7 |
| E272S | B or FR | 11.1-19.1 | 10.0 | 50 | 15.1 |
| E273 | B or FR | 6.35-12.0 | 6.63 | 50 pairs | 11.4 |
| E273S | B or FR | 6.35-12.0 | 6.63 | 50 | 7.2 |

S = Spacer



CABLE TIE BASE

Manufactured in Nylon (NY). Used to accommodate a cable tie of up to 10mm in width (not included)

| Part No. | Material Suffix | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|-----------------|----------|----------|
| 115-001 | NY | 6 | 100 | 2.5 |



UNIVERSAL CLEAT

Manufactured as standard in Black Polypropylene (B). Used for stacking cables vertically or horizontally using a framework system. More detail can be supplied on request

| Part No. | Material Suffix | Cable Dia. mm | Pack Qty | Weight g |
|----------|-----------------|---------------|----------|----------|
| 30U-1 | B | 23.8-38.1 | 50 pairs | 89 |



SINGLE WAY SNAP ON SADDLE CLIP

Manufactured as standard in Black Polypropylene (B) and Grey Flame Retardant Polypropylene (FR). Used for mounting cables and pipes on flat surfaces also providing clearance between the cable or pipe and the mounting surface.

| Part No. | Material Suffix | Cable Dia. mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|---------------------|-----------------|----------|----------|
| 90-M095 | B or FR | 9.5 | 3.75 | 500 | 1.8 |
| 90-M120 | B or FR | 12.0 | 3.75 | 500 | 2.4 |
| 90-01 | B or FR | 12.7 | 3.75 | 500 | 2.2 |
| 90-02 | B or FR | 15.0 | 3.75 | 500 | 2.4 |
| 90-03 | B or FR | 17.5 | 4.0 | 500 | 3.3 |
| 90-075 | B or FR | 19.0 | 4.0 | 500 | 3.6 |
| 90-04 | B or FR | 23.0 | 4.0 | 500 | 3.2 |
| 90-04.1 | B or FR | 24.2 | 4.0 | 500 | 3.1 |
| 90-05 | B or FR | 25.4 | 4.0 | 500 | 4.3 |
| 90-06 | B or FR | 27.5 | 5.0 | 500 | 5.3 |
| 90-07 | B or FR | 31.7 | 5.0 | 200 | 6.8 |
| 90-08 | B or FR | 34.0 | 5.0 | 200 | 6.7 |
| 90-09 | B or FR | 38.1 | 5.0 | 100 | 6.8 |
| 90-10 | B or FR | 42.0 | 5.0 | 200 | 8.7 |
| 90-11 | B or FR | 42.6 | 5.0 | 200 | 9.5 |
| 90-12 | B or FR | 44.4 | 5.0 | 100 | 7.4 |
| 90-13 | B or FR | 48.7 | 5.0 | 200 | 10.4 |
| 90-14 | B or FR | 53.9 | 5.0 | 100 | 14.4 |
| 90-143 | B or FR | 55.0 | 6.0 | 100 | 26.3 |
| 90-15 | B or FR | 60.5 | 6.0 | 100 | 25.8 |
| 90-19 | B or FR | 75.0 | 7.5 | 50 | 40.8 |
| 90-24++ | B | 88.9 | 10.0 | 25 | 70.7 |
| 90-S | B | Saddle Clip Spacer* | | | 1.2 |

++ This item is supplied with a base plate.

* Spacer suitable for use with all saddle clips (except part no 90-24).

Provides additional separation of the cable or pipe from the mounting surface of approximately 12.5mm.



ABC WALL CLEAT

Manufactured as standard in Black Polypropylene (B). Used as a simple solution to the fixing of vertical and horizontal serial bundled cable to walls and other surfaces. (Tested to ESI Standards 43-14.)

| Part No. | Material Suffix | A mm | H mm | D mm | Fixing Holes mm | Pack Qty | Weight g |
|----------|-----------------|------|------|------|-----------------|----------|----------|
| 115-010 | B | 10 | 47 | 31 | 6 | 100 | 12 |
| 115-050 | B | 50 | 59 | 37 | 6 | 100 | 27 |
| 115-100 | B | 100 | 72 | 43 | 6 | 25 | 54 |
| 115-125 | B | 125 | 80 | 48 | 6 | 25 | 74 |

Please note: These clamps are available in 4 stand off variants denoted by 'A'.

JOINTERS' TOOLS

CABLE CORE TWISTERS

Manufactured in Acetal (International Orange). Used to manipulate bare or insulated cable cores and to align the cores prior to jointing.



3 CORE

| Part No. | Cores | Core Range Size mm ² | Pack Qty | Weight g |
|-----------|-------|---------------------------------|----------|----------|
| 110-95C | 3 | 70 Bare x 95 Bare | 10 | 54 |
| 110-X01C | 3 | 95 Bare x 95 Ins | 10 | 51 |
| 110-120C | 3 | 70 Bare x 120 Bare | 10 | 51 |
| 110-120IC | 3 | 70 Ins x 120 Ins | 10 | 49 |
| 110-X06C | 3 | 120 Bare x 120 Ins | 10 | 48 |
| 110-X07C | 3 | 185 Bare x 185 Ins | 10 | 148 |
| 110-240C | 3 | 185 Bare x 240 Bare | 10 | 146 |
| 110-300C | 3 | 185 Bare x 300 Bare | 10 | 147 |
| 110-300IC | 3 | 185 Ins x 300 Ins | 10 | 139 |
| 110-X08C | 3 | 300 Bare x 300 Ins | 10 | 138 |
| 110-X09C | 3 | 70 Bare x 70 Ins | 10 | 53 |
| 110-X10C | 3 | 95 Bare x 185 Bare | 10 | 154 |
| 110-X11C | 3 | 95 Ins x 185 Ins | 10 | 149 |

Supplied in accordance with IEC 60900

3 & 4 CORE

| Part No. | Cores | Core Range Size mm ² | Pack Qty | Weight g |
|----------|-------|---------------------------------|----------|----------|
| 110-X03C | 3 & 4 | 3C 95 Ins x 4C 95 Ins | 10 | 50 |
| 110-X04C | 3 & 4 | 3C 185 Ins x 4C 185 Ins | 10 | 145 |
| 110-X05C | 3 & 4 | 3C 300 Ins x 4C 240 Ins | 10 | 135 |
| 110-X12C | 3 & 4 | 3C 300 Bare x 4C 300 Bare | 10 | 141 |
| 110-X13C | 3 & 4 | 3C 300 Ins x 4C 300 Ins | 10 | 134 |

4 CORE

| Part No. | Cores | Core Range Size mm ² | Pack Qty | Weight g |
|----------|-------|----------------------------------|----------|----------|
| 110-41C | 4 | 95 Bare x 95 Ins | 10 | 51 |
| 110-42C | 4 | 185 Ins x 240 Ins | 10 | 142 |
| 110-43C | 4 | 185 Bare x 240 Bare | 10 | 150 |
| 110-44C | 4 | 185 Ins x 300 Ins | 10 | 141 |
| 110-45C | 4 | 185 Ins x 185 Bare | 10 | 170 |
| 110-46C | 4 | 300 Ins x 300 Bare | 10 | 160 |
| 110-48C | 4 | 120 Ins x 185 Ins | 10 | 150 |
| 110-X02C | 4 | 185 Bare x 300 Bare | 10 | 146 |
| 110-X14C | 4 | 95 Bare x 185 Bare | 10 | 155 |
| 110-X15C | 4 | 95 Ins x 185 Ins | 10 | 149 |
| 110-X16C | 4 | 95 Ins stranded x 95 Ins solid | 10 | 51 |
| 110-X17C | 4 | 300 Ins stranded x 300 Ins solid | 10 | 140 |



CABLE CORE FORMER

Manufactured in Nylon. Used to hold the cores of a three core cable apart whilst a joint is being made. The central hole provides a facility for positioning a mastic bung.

| Part No. | Core Separation Distance mm | Pack Qty | Weight g |
|----------|-----------------------------|----------|----------|
| 120-F | 32 - 58 | 10 | 44.1 |

JOINTERS' TOOLS

CABLE CORE GUARD

Manufactured in Nylon (International Orange). Used to provide separation between a cable core which is being cut and neighbouring cores.

| Part No. | Nominal Lift mm | Pack Qty | Weight g |
|----------|-----------------|----------|----------|
| 120-CG1C | 23 | 10 | 57 |

Supplied in accordance with IEC 60900



CABLE CORE STRIPPER

Manufactured in a Polymeric material. Used to remove insulation and sheathing from armoured power cables. The tool has an exceptionally strong, tough blade and a unique handle moulded in a softer plastic which provides a cushion effect when a hammer is used to initiate a cut in the cable sheath.

| Part No. | Nominal Lift mm | Pack Qty | Weight g |
|----------|-----------------|----------|----------|
| 120-CS | 90 | 10 | 183 |

Supplied in accordance with IEC 60900



CABLE CORE WEDGE

Manufactured in Nylon (International Orange). Used to prise apart and to separate the cores of cables.

| Part No. | Length mm | Width mm | Nominal Lift mm | Pack Qty | Weight g |
|----------|-----------|----------|-----------------|----------|----------|
| 110-1NYC | 150 | 25 | 15 | 10 | 41 |
| 110-2NYC | 225 | 25 | 25 | 10 | 65 |
| 110-3NYC | 225 | 25 | 38 | 10 | 89 |
| 110-4NYC | 150 | 13 | 25 | 10 | 32 |

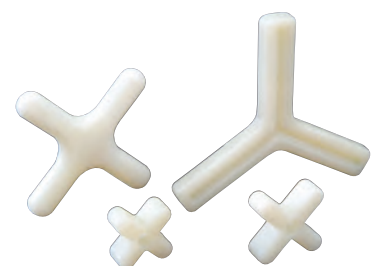
Supplied in accordance with IEC 60900



CABLE CORE SPREADER

Manufactured in Nylon. Used to hold apart the cores of a cable when jointing cables.

| Part No. | Core | Core Range Size mm ² | Pack Qty | Weight g |
|----------|------|---------------------------------|----------|----------|
| 120-VNY | 3 | 240 - 300 | 100 | 45 |
| 120-WNY | 3 | 185 | 100 | 38 |
| 120-YNY | 3 | 95 - 150 | 100 | 30 |
| 120-ZNY | 3 | 95 | 100 | 24 |
| 120-UNY | 4 | Universal | 100 | 37 |
| 120-15 | 4 | Universal | 100 | 10 |
| 120-20 | 4 | Universal | 100 | 12 |



IEC 61914 – CABLE CLEATS FOR ELECTRICAL INSTALLATIONS

IEC 61914 specifies requirements and tests for cable cleats and intermediate restraints used for securing cable in electrical installations. Cable cleats provide resistance to electromechanical forces. Products achieve conformance to the standard after being subjected to a range of tests.

The tests are designed to simulate real world installation conditions and provide designers with data that can be used to aid with system design. Relevant sections of the standard and Ellis' testing regime are detailed below.

- ▶ 1. CLEAT TYPE
- ▶ 2. TEMPERATURE FOR PERMANENT APPLICATION
- ▶ 3. UV RESISTANCE
- ▶ 4. CORROSION RESISTANCE
- ▶ 5. IMPACT RATING
- ▶ 6. FLAME PROPAGATION TEST
- ▶ 7. AXIAL LOAD RATING
- ▶ 8. LATERAL LOAD RATING TEST
- ▶ 9. RESISTANCE TO ELECTROMECHANICAL FORCE

1. CLEAT TYPE

The three cleat classifications are:

- ▶ METALLIC
- ▶ COMPOSITE
- ▶ NON-METALLIC



Metallic cleats are all metal, composite cleats contain a combination of metallic and polymeric parts and non-metallic cleats contain no metallic parts and are fully polymeric.

2. TEMPERATURE FOR PERMANENT APPLICATION

DEFINITION:

The ambient temperature range that a cleat is capable of operating within.

IEC 61914 provides set temperatures to specify against. These values are ambient and are not representative of the expected maximum cable conductor temperature.

| MINIMUM TEMPERATURE °C |
|------------------------|
| +5 |
| -5 |
| -15 |
| -25 |
| -40 |
| -60 |

| MAXIMUM TEMPERATURE °C |
|------------------------|
| +40 |
| +60 |
| +85 |
| +105 |
| +120 |

3. UV RESISTANCE

Composite and non-metallic type cleats are subject to UV resistance testing. Samples are exposed to a minimum of 700 hours of 'Xenon-arc' UV light in accordance with ISO 48922:2006. Products are deemed to have passed if they show no signs of cracking or degradation to normal vision and pass the requirements of the impact test.

Cleats deemed as being UV resistant are certified only to the requirements of IEC 61914 and as such their classification may not extend to harsher criteria (e.g. desert installation). Ellis have UV testing capabilities in house and can test conditions which are more onerous than detailed in IEC 61914.



ELLIS' IN HOUSE UV WEATHERING TEST STATION

4. CORROSION RESISTANCE:

Metallic or composite type cleats are subject to corrosion resistance testing. Any metal components that are non-ferrous (e.g. aluminium) or are ferrous but contain more than 16% chromium (e.g. 316L stainless steel) need not be tested and are assumed to meet the classification for high resistance to corrosion. Any metallic components that do not meet this criteria are subject to a minimum of 192 hours of salt spray according to ISO9227 (for 'high corrosion classification'). After the exposure the cleats are visually checked and deemed to have passed if 'no red rust visible to normal or corrected vision.'

Similar to the UV test data the classification of 'high corrosion resistance' is limited to the criteria of the standard and therefore for applications in harsh environments contact Ellis for guidance.

IN ADDITION TO THE CORROSION TESTING TO IEC 61914 ELLIS CARRIES OUT EXTENDED TESTING ON ITS OUTDOOR WEATHERING STATION.



5. IMPACT RATING

A cleat's impact rating is established by dropping a set weight onto a product from a set height. The rating relevant to the weight and height characteristics are detailed below. For composite and non-metallic cleats this is conducted at the minimum declared temperature for the cleats. For metallic cleats the testing is done at room temperature. A cleat is deemed to have passed providing there is no damage that would affect the cleats load holding capability.

The impact test is reflective of the resistance to items dropping on it whilst on site, or it being dropped during install.



| CLASSIFICATION | NOMINAL IMPACT ENERGY (J) | EQUIVALENT MASS (KG) | HEIGHT (MM) |
|----------------|---------------------------|----------------------|-------------|
| Very light | 0.5 | 0.25 | 200 |
| Light | 1.0 | 0.25 | 400 |
| Medium | 2.0 | 0.5 | 400 |
| Heavy | 5.0 | 1.7 | 300 |
| Very Heavy | 20.0 | 20.0 | 400 |

6. FLAME PROPAGATION

This test applies to composite and non-metallic type cleats. A needle flame is applied to a product to establish its potential contribution to fire. A cleat is deemed to have passed if any drips of material that fall from the product do not ignite tissue paper placed below and if after 30 seconds of the flame being removed there is no flaming of the cleat. The testing follows the general principles of IEC 60695-11-5.

This test determines whether a cleat will propagate fire in the presence of a small external flame, a pass to the criteria of IEC 61914 does not make a cleat 'fire rated'. Ellis offers predominantly flame-retardant polymers, for lower cost non critical applications non FR rated materials are available.



FLAME PROPAGATION TEST ON SOLUS NON-METALLIC CLEAT.



THE AXIAL LOAD RATING OF A CLEAT IS USED TO SPECIFY THE SPACING OF CLEATS TO HOLD THE WEIGHT OF THE CABLE IN VERTICAL INSTALLS

7. AXIAL LOAD RATING TEST

A cleat's axial load rating is a measure of its grip on a cable. A manufacturer-declared load is applied to a mandrel, this load is held for 5 minutes and the cleat is deemed to have passed if the deformation of the mandrel relative to the cleat is less than 5mm. For composite and non-metallic cleats, the test is carried out at the maximum declared temperature. For metallic cleats the test is carried out at room temperature.

A cleat's axial rating is provided to specify cleats for vertical installations where the cleat is required to hold the weight of the cable within its grip. It may also be applicable to installations where resistance to thermomechanical axial thrust is required.

8. LATERAL LOAD RATING TEST

The lateral load test measures the cleat's capability to withstand continuous loading over long periods of time. A self-declared load is applied and held for an hour and a cleat is deemed to have passed if the deformation of the product is less than 50% of the minimum mandrel diameter the cleat can accept. The test is undertaken in two different cleat mounting scenarios, detailed as horizontal and vertical in Ellis' literature. For composite and non-metallic cleats, the test is carried out at the cleat's maximum declared temperature, for metallic type cleats, testing is at room temperature.

The test can be considered representative of the cleat's ability to hold cable weight, for example if it is installed upside down or on its side. It can also provide detail of the cleat's resistance to any lateral thermomechanical loads. The lateral load test data is not an indication of a cleat's short circuit performance.

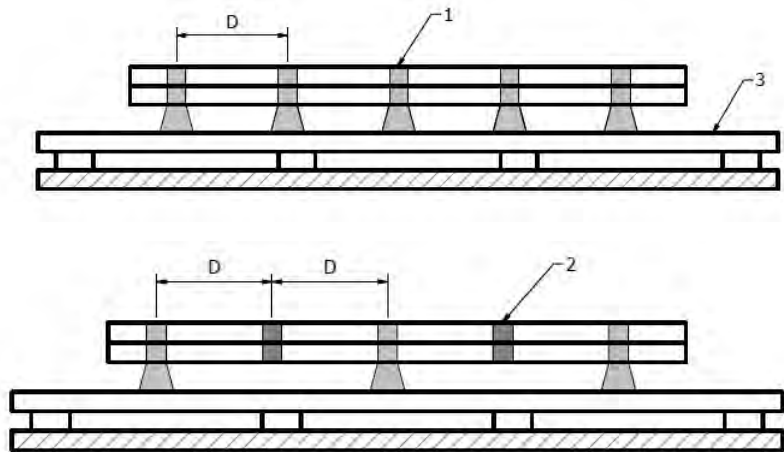


THE LATERAL LOAD RATING OF A CLEAT CAN BE USED TO SPECIFY CLEATS BASED ON CONTINUOUS LOADING, SUCH AS MOUNTING CLEATS ON A SIDE.

9. RESISTANCE TO ELECTROMECHANICAL FORCE

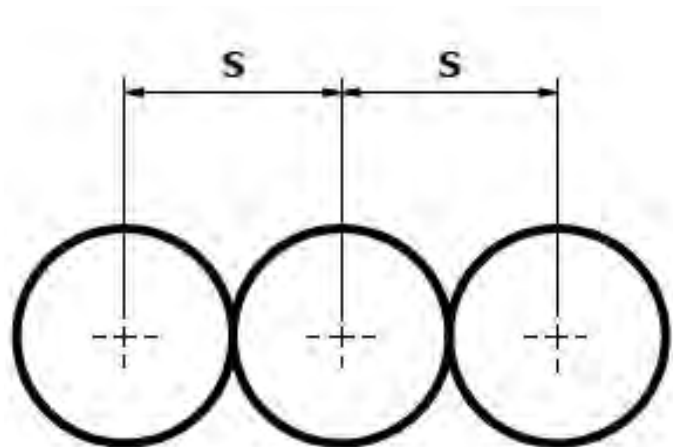
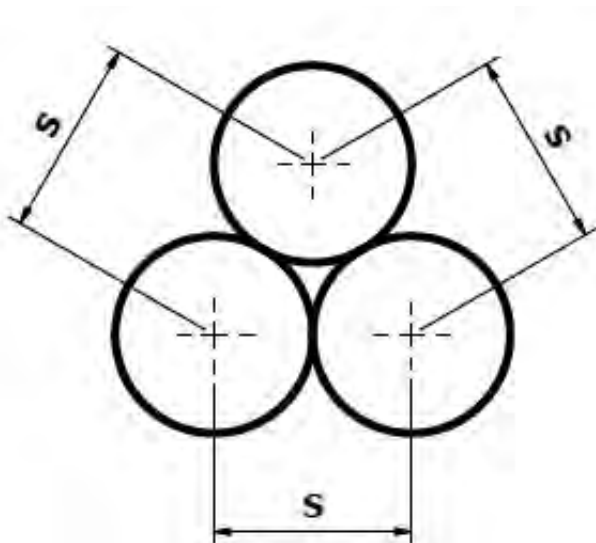
Perhaps the most important function of a cable cleat is to withstand the electromechanical forces generated during a short circuit. IEC 61914 short circuit testing specifies a three phase fault with one cable per phase. One end of the cables is connected to a three phase supply and the other end to a short-circuit busbar connecting all three phases. Some key requirements of the testing are as follows:

- ▶ The short circuit peak current is carried out to a manufacturer declared peak current and lasts no less than 0.1s.
- ▶ The test cable must be unarmoured single core 600 V /100 V stranded copper conductor cable with a 35(±5 mm or 50 (±5)mm outside diameter.
- ▶ Testing is carried out at the prevailing ambient temperature of the laboratory.
- ▶ A minimum of 5 test cleats are to be used for fully cleated tests and at least 4 cleats and 3 intermediate straps must be used for cleat-strap installs, as displayed above.
- ▶ The cable formation tested must either be trefoil or flat formation, see below:



| Key | Description |
|-----|-------------------------|
| 1 | Cable Cleats |
| 2 | Intermediate Restraints |
| 3 | Mounting Surface |
| D | Lineal Spacing |

**EXTRACT FROM IEC
INTERMEDIATE
RESTRAINT TEST
LAYOUT.**



After one short circuit a cleat is deemed to have passed if:

- ▶ There is no failure that will affect the cleat or intermediate straps from holding the cables in place.
- ▶ The cleats and intermediate straps shall be intact with no missing parts including all devices used to secure cleats to the mounting surface.
- ▶ There shall be no cuts or damage visible to normal or corrected vision to the outer sheath of each cable caused by the cleats or intermediate straps.

A manufacturer can decide to test a second short circuit. The pass criteria for a cleat withstanding two short circuits is as follows:

- ▶ The pass criteria for one short circuit applies.
- ▶ The test rig must pass a 2.8kV d.c or 1.0kV a.c 60 second voltage withstand test administered between the cable cores and the mounting frame. With the cable jackets and mounting frame being pre-wetted to facilitate a current leakage path.

Ellis has over 20 years' experience of short circuit testing. Our experience in the field precedes the inception of National and International Cable Cleat standards. The company has carried out over 1,000 short circuit tests in numerous test labs around the world to the requirements of IEC 61914 as well as specialised testing to customer requirements.



TYPICAL TESTING TO IEC 61914 AND BESPOKE TESTING OF A HV TEST RIG TO A CUSTOMER'S SPECIFICATION.

ELLIS

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