ELLIS

Holding Power

Polymer Products

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 and innovation, and the creation of bespoke solutions for individual project specifications.
- Our manufacturing headquarters in North Yorkshire, England are ISO9001, 14001 and 45001 certified and all our cable cleats are manufactured to IEC 61914:2015 and short circuit tested as standard prior to being brought to 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 lessening our environmental impact and carbon footprint in every aspect of our business.

bsi

ISO 9001 Quality Management Systems CERTIFIED

ISO 14001 Environmental Management CERTIFIED

ISO 45001 Occupational Health and Safety Management CERTIFIED

Fixings are not supplied as standard but are available on request.

PP2023/03

QUICK SELECTION GUIDE

MATERIAL OPTIONS

Ellis offers products in a range of materials to suit the requirements of the specific application.

ELLIS CODE GFN: GLASS FILLED LSF NYLON

- High grade glass filled black nylon polymer. Heat stabilised – suitable for 120oC installations. Low smoke and fume (LSF), UL94 V-0 classified, zero halogen and phosphorus free. Very good mechanical and electrical properties. Excellent UV performance.

ELLIS CODE LSF: LSF NYLON

- High grade unreinforced nylon polymer. Low smoke and fume (LSF), UL94 V-0 classified, zero halogen and phosphorus free. Good mechanical and electrical properties. Very good UV performance.

ELLIS CODE LUL: LONDON UNDERGROUND APPROVED MATERIAL

- Specially formulated polymer to comply with the stringent material performance requirements of the London Underground 1-085 standard, in relation to limited oxygen index, smoke density and toxicity.

ELLIS CODE B: BLACK POLYPROPYLENE

- Standard black Polypropylene. The material is extremely tough and durable. It has excellent impact resistance, is resistant to water and chemicals and has good UV performance.

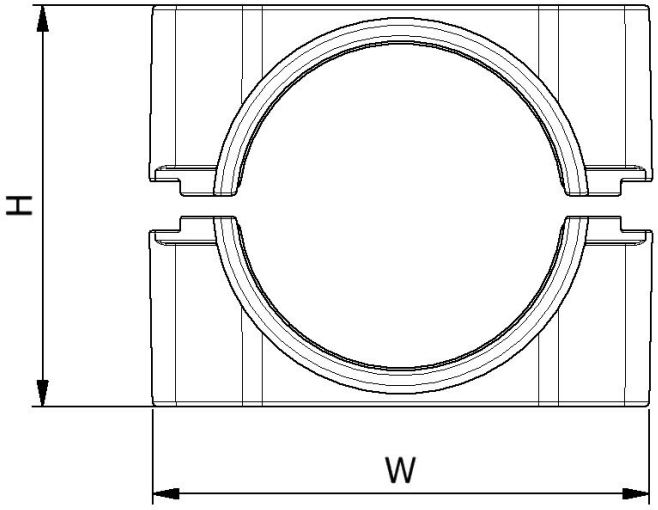
WORLDWIDE DISTRIBUTORS

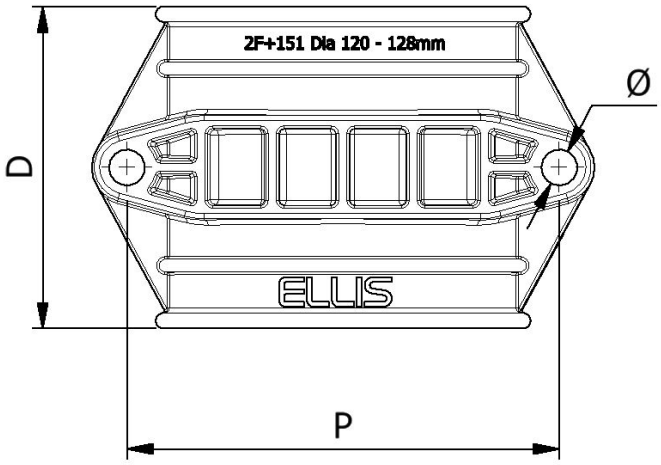
Ellis is represented by a network of International distributors, providing our customers with local and knowledgeable support.

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

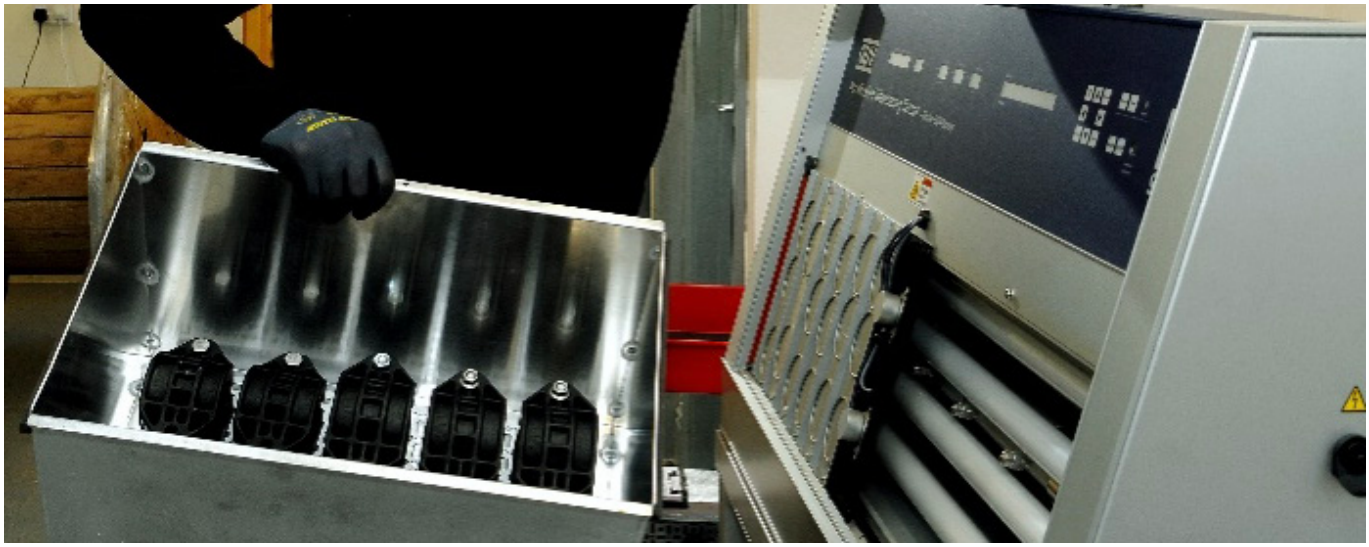
Here at Ellis Patents we understand that different markets and varying situations demand different product solutions. As problem solving engineers and a leading manufacturer of cable cleats we thrive on new challenges. When our standard product range isn't quite what you need, we can design, develop 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.

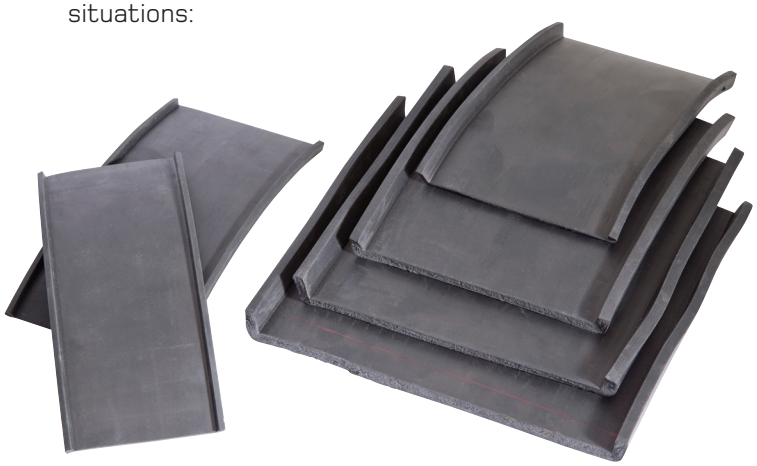
LONG TERM UV TESTING

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 ANY 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. We also have a fixing calculator tool on our website to assist with this.

MECHANICAL STRENGTH VS DYNAMIC STRENGTH

The international standard IEC 61914 includes a formula in Annex B that enables a designer 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.

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

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)

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 x 0.3 gives the force a cleat will see if spaced at 300mm, F_t x 0.6 for 600mm etc.

F_t x 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	300mm		600, 900, 1200mm	
	Strength (N)	SC Level (kA)	Strength (N)	SC Level (kA)
Alpha	9,500	82	15,000	73
Vulcan+, Protect and SD Flexi-strap	25,000	134	36,000	115
Emperor, 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	-	-

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 derived from actual short circuit tests carried out by Ellis. Test report numbers are detailed on individual product data sheets and are available upon 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. To calculate the peak current from the RMS, IEC 61439-1 Low voltage switchgear and control gear assemblies is commonly referred to, which uses the following multiples:

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

CABLE ARRANGEMENT

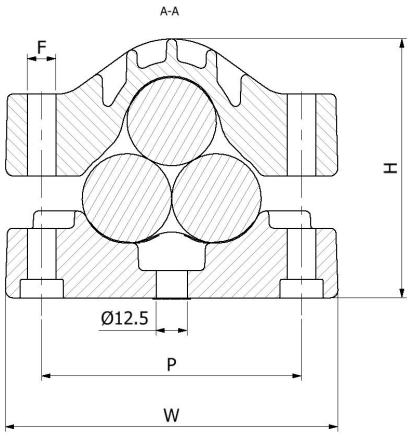
Cables are generally laid side by side or in trefoil formation. For accurate SC levels to be calculated the layout is required. Knowing the formation allows the correct style of cleat to be selected. Triplex is a variant of trefoil cable formation where the cables are twisted together. This can present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

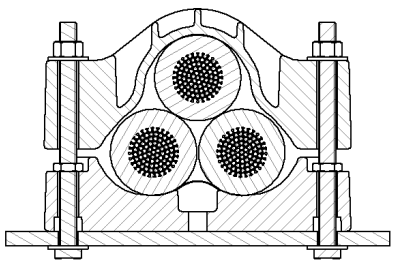
TRIDENT®

Polymeric Trefoil Cleat

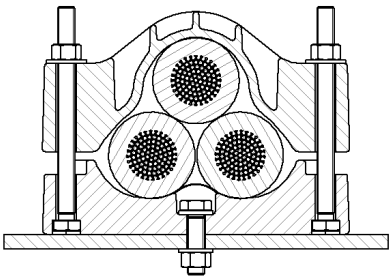
- MANUFACTURED AS STANDARD IN A HIGH STRENGTH LSF GLASS FILLED NYLON
- SINGLE OR TWO BOLT CLEAT FIXING OPTIONS
- SHAPING OF THE CLEAT ENSURES CABLES ARE HELD IN A TREFOIL FORMATION ACROSS THE RANGE
- SHORT CIRCUIT AND MECHANICALLY TESTED TO IEC 61914

PART NO.	CABLE RANGE		DIMENSIONS (mm)					WEIGHT (g)
	MIN ϕ (mm)	MAX ϕ (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

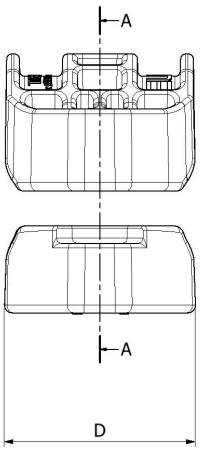


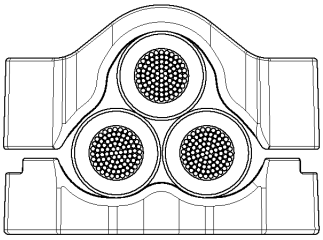


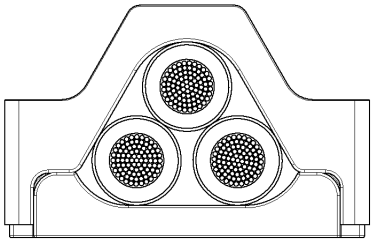
FIXING OPTION 1: 2 x M10/M12 FIXINGS



FIXING OPTION 2: 1 X M12 FIXING





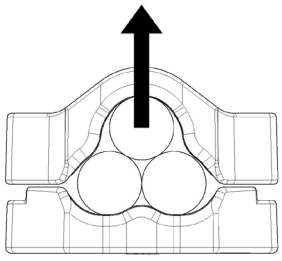


SHAPING OF THE TRIDENT CLAMPS ENSURES CABLES ARE MAINTAINED IN A TRUE TREFOIL FORMATION ACROSS ITS RANGE–TAKE, UNLIKE SIMILAR POLYMERIC CLAMPS ON THE MARKET.

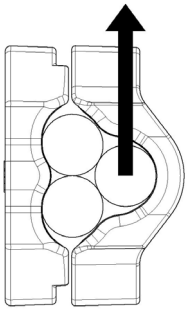
TESTING SUMMARY

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 +120
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 ≥30s	PASS
AXIAL LOAD RATING	6.4.3, 9.4	NEWTONS (N)	1100
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= ϕ36mm
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= ϕ36mm



LATERAL LOAD 'VERTICAL' DIRECTION

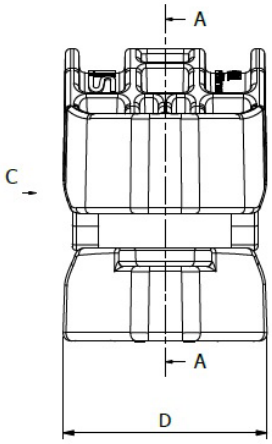


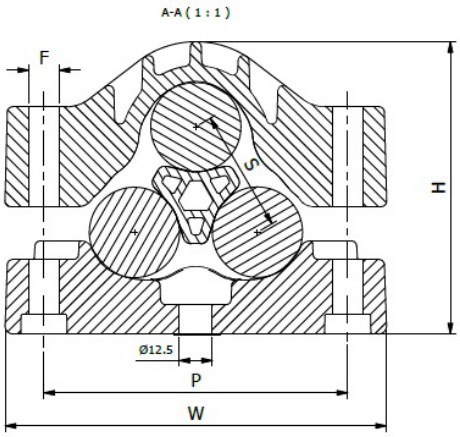
LATERAL LOAD 'HORIZONTAL' DIRECTION

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		DIMENSIONS (mm)					WEIGHT (g)	CORRESPONDING TRIDENT
	MIN ϕ (mm)	MAX ϕ (mm)	W	H	D	P	F		
TR29-41SP	29	34	144	115	77	114.5	M10	530	TR34-41
TR33-47SP	33	39	156	127	77	125	M12	618	TR39-47
TR41-54SP	41	45	172	141	77	145	M12	706	TR45-54

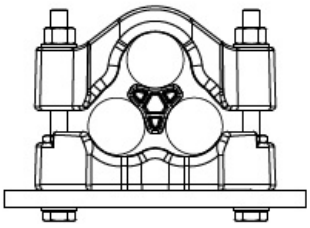
NOTE: REMOVAL OF THE SPACER PIECE CAN BE UTILISED TO PROVIDE A PRODUCT WITH A LARGE RANGE-TAKE. REFER TO THE STANDARD TRIDENT DATA SHEET.

TESTING SUMMARY

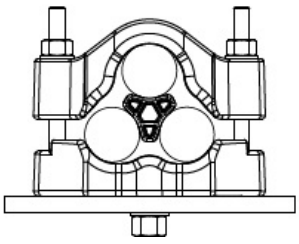
Trident cleats have been tested in line with the international standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

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 ≥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= ϕ36mm CABLE SPACING = 50mm

1) SP VARIANTS HAVE A DIFFERENT LOAD WITHSTAND TO STANDARD VARIANTS, PEASE 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.

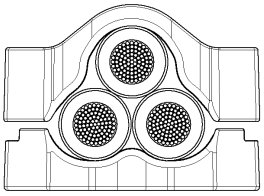


FIXING OPTION 1:
2 x M10/M12 FIXINGS

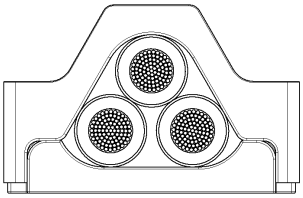


FIXING OPTION 2:
1 X M12 FIXING

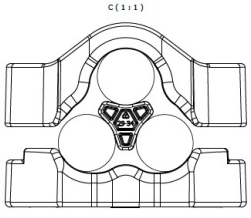
TRIDENT



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.

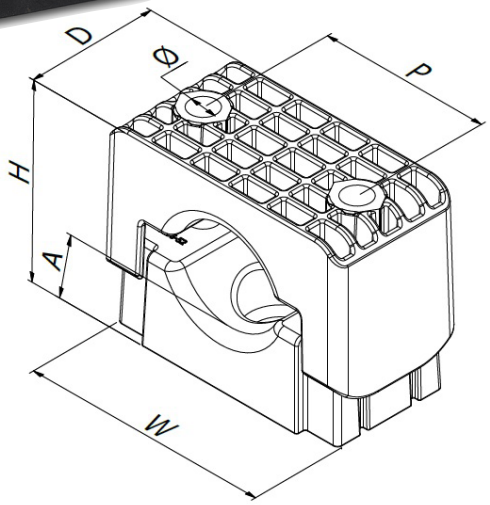


'SP' VARIANTS UTILISE A DISTANCE WEDGE TO INCREASE RANGE-TAKE. EQUAL SPACING BETWEEN THE CABLES IS MAINTAINED.

SOLUS CLAMP

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

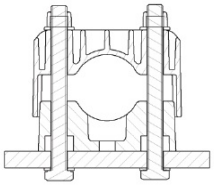
- RANGE ACOMODATES ϕ19 – ϕ75MM CABLES
- SUITABLE FOR INDOOR AND OUTDOOR USE
- SHORT CIRCUIT AND MECHANICALLY TESTED IN ACCORDANCE TO IEC 61914
- SINGLE OR TWIN BOLT FIXING OPTIONS
- MANUFACTURED IN A HIGH STRENGTH LSF GLASS FILLED NYLON OR NON GLASS REINFORCED POLYMER
- FIXINGS ARE NOT SUPPLIED AS STANDARD BUT ARE AVAILABLE ON REQUEST



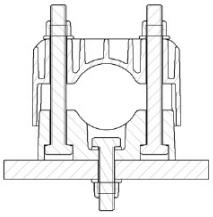
PART NO.	CABLE RANGE		LINER SIZE (mm)	CABLE RANGE WITH LINER		DIMENSIONS						AXIAL LOAD (KN)		LATERAL LOAD – HORIZONTAL (KN)		LATERAL LOAD – VERTICAL (kN)		WEIGHT (g)
	MIN ϕ (mm)	MAX ϕ (mm)		MIN ϕ (mm)	MAX ϕ (mm)	W	H	D	A	P	ϕ	SINGLE FIXING	TWIN FIXING	SINGLE FIXING	TWIN FIXING	SINGLE FIXING	TWIN FIXING	
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



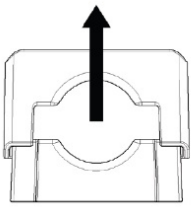
SINGLE FIXING STYLE

TESTING SUMMARY

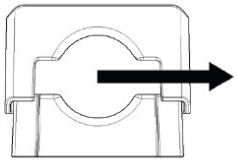
Solus clamps have been tested in line with the international standard 'Cable Cleats for Electrical Installations' IEC 61914:2021. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

PROPERTY	CLASSIFICATION CLAUSE IEC 61914	UNITS / CLASSIFICATION	TEST DATA	
			LSF	GFN
CLEAT TYPE	6.1.2	NON-METALLIC	-	
TEMP. FOR PERMAMENT 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 PAGE 16	SEE TABLE ON PAGE 16
LATERAL LOAD RATING	6.4.2, 9.3	NEWTONS (N)	SEE TABLE ON PAGE 16	SEE TABLE ON PAGE 16
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 = ϕ35mm PHASE SPACING = 125mm	164kA (REPORT No. PDL-22.079.01) CABLE OD = ϕ35mm 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

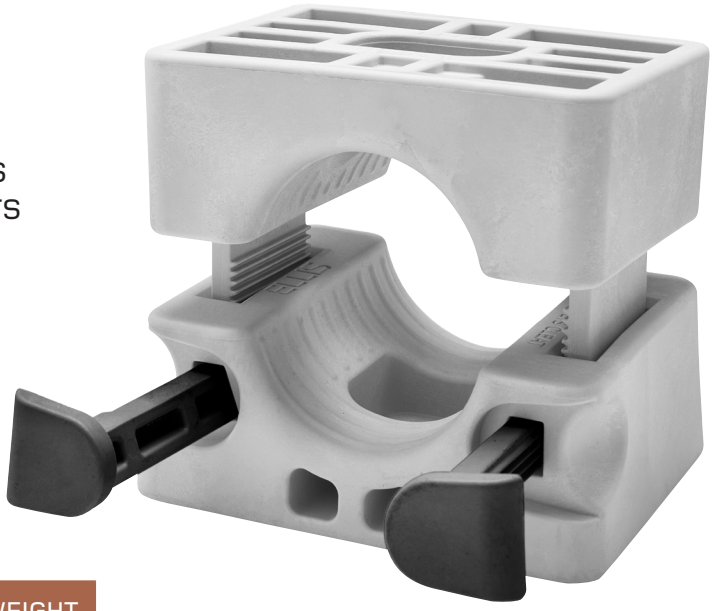


LATERAL LOAD 'HORIZONTAL' DIRECTION

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

NO BOLTS CLEAT™

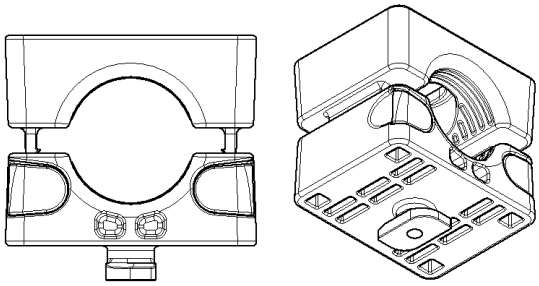
Patent Pending
(Application Number 1804174.9)



- 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

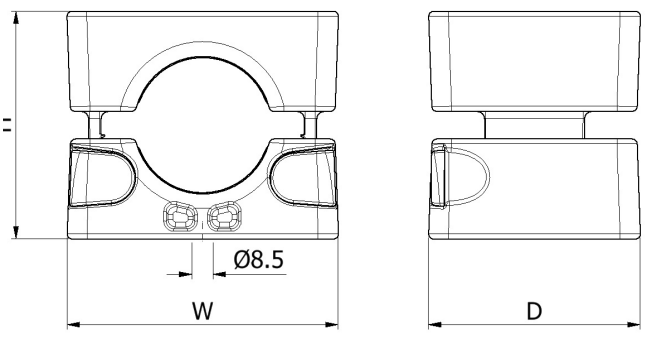
PART NO.	CABLE RANGE	DIMENSIONS (mm) W	H	D	FIXING HOLES	WEIGHT (g)
NBC18-22	18 - 22	109	91	90	1 x M8	830
NBC20-26	20 - 26	109	91	90	1 x M8	815
NBC24-30	24 - 30	109	91	90	1 x M8	808
NBC28-34	28 - 34	109	91	90	1 x M8	801
NBC32-39	32 - 39	109	91	90	1 x M8	792
NBC37-47	37 - 47	109	91	90	1 x M8	758
NBC45-55*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

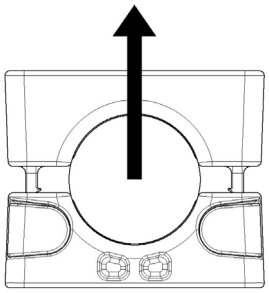
DUE TO THE TOLERANCES OF STANDARD UNISTRUT PROFILE, ELLIS RECOMMEND USING FIXINGS TO FASTEN THE CLAMP TO THE CHANNEL.

TESTING SUMMARY

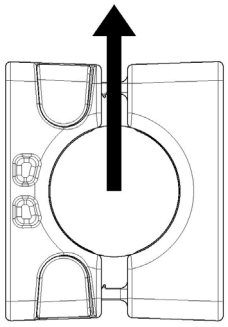
No Bolts Cleat has been tested in line with the International Standard of 'Cable Cleats for Electrical Installations' IEC 61914: 2015. Typical results below.

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 ≥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= Ø36mm
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= Ø36mm

*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

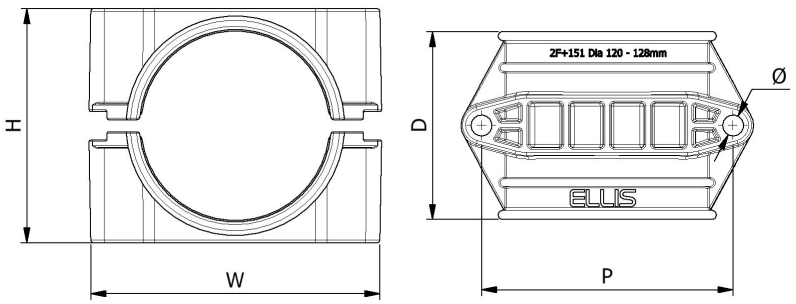
2F+ CABLE CLAMPS

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 ϕ32 – ϕ168MM 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 ϕ (mm)	MAX ϕ (mm)		MIN ϕ (mm)	MIN ϕ (mm)	W	H	D	P	ϕ	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



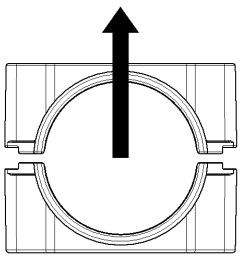
A CLAMP MANUFACTURED IN LONDON UNDERGROUND APPROVED MATERIAL CAN BE SUPPLIED ON REQUEST. CONTACT ELLIS FOR FURTHER DETAILS.

TESTING SUMMARY

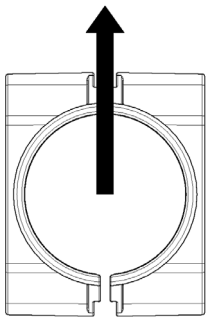
2F+ Clamps have been tested in line with the International Standard 'Cable Cleats for Electrical Installations' IEC 61914:2015. Typical results are detailed below, please note that these testing values are maximums and safety factors appropriate to your application should be used.

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 ≥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-18.071.1) CABLE OD= Ø36mm 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= Ø117mm 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

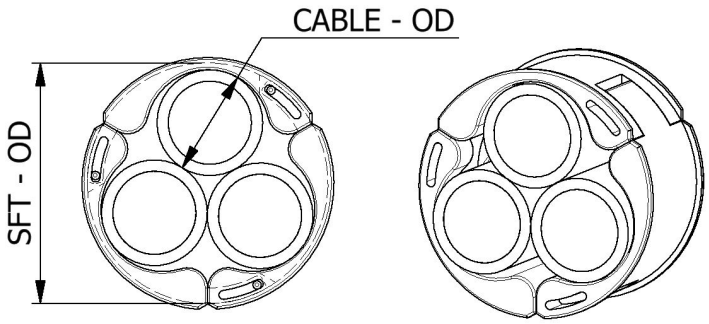
LONDON UNDERGROUND

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

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 MIN	CABLE RANGE MAX	DEPTH (mm)	WEIGHT (g)
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

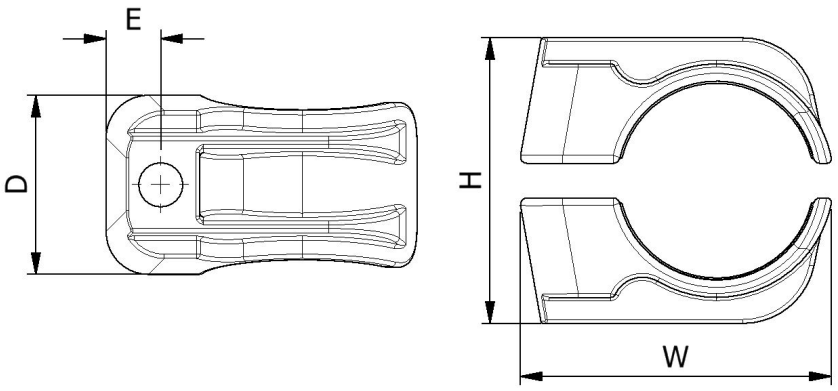
FOR PART NUMBERS IN RED THE WIDER SFT2F+ NEEDS TO BE USED TO SUIT THE INCREASED DEPTHS OF THE CLAMPS

1F CABLE CLAMPS

UK Design Reg. No: 355854

- 1 HOLE CLAMPS MANUFACTURED IN LSF NYLON OR STANDARD POLYPROPYLENE
- ACCOMMODATES ϕ10MM – ϕ57MM 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

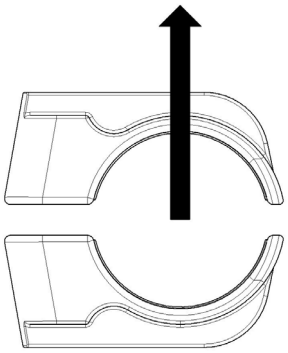
PART NO.	MATERIAL SUFFIX	CABLE RANGE (mm)		DIMENSIONS (mm)				FIXING HOLES	PACK QTY	WEIGHT (g)		
		MIN	MAX	W	H	D	E			B	LSF	LUL
1F-10	B/LSF/LUL	10	13	37.8	30.0	41.4	10.2	1 x M10	100	14.6	19.6	23.8
1F-11	B/LSF/LUL	13	16	41.2	33.0	41.4	10.4	1 x M10	100	17.0	23.0	27.7
1F-12	B/LSF/LUL	16	19	44.3	36.0	41.4	10.7	1 x M10	100	19.6	26.4	32.0
1F-13	B/LSF/LUL	19	23	48.2	40.0	41.4	10.9	1 x M10	100	22.4	30.2	36.5
1F-14	B/LSF/LUL	23	27	52.2	44.0	41.4	11.3	1 x M10	100	25.8	34.6	42.0
1F-15	B/LSF/LUL	27	32	57.1	49.0	41.4	11.6	1 x M10	100	29.2	39.0	47.6
1F-16	B/LSF/LUL	32	38	63.1	55.0	41.4	12.1	1 x M10	100	34.2	46.2	55.7
1F-17	B/LSF/LUL	38	46	71.3	66.0	41.4	12.9	1 x M10	50	47.8	64.0	77.9
1F-18	B/LSF/LUL	46	51	77.3	73.0	41.4	13.5	1 x M10	50	54.0	73.2	88.0
1F-19	B/LSF/LUL	51	57	83.2	78.0	41.4	13.9	1 x M10	50	59.0	80.4	96.2



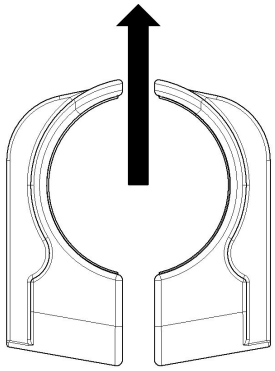
TESTING SUMMARY

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 ≥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= Ø36mm	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.

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 CLEAT

COMPOSITE CLEAT

NON METALLIC CLEAT

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

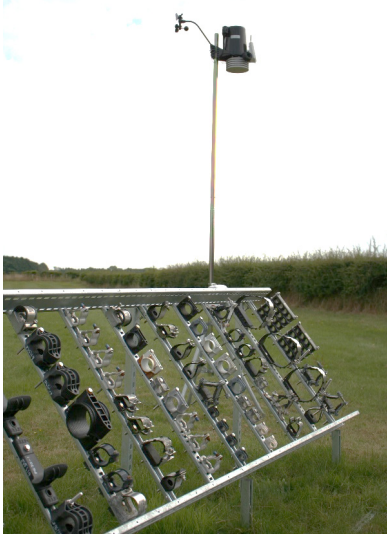
3. UV RESISTANCE

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.

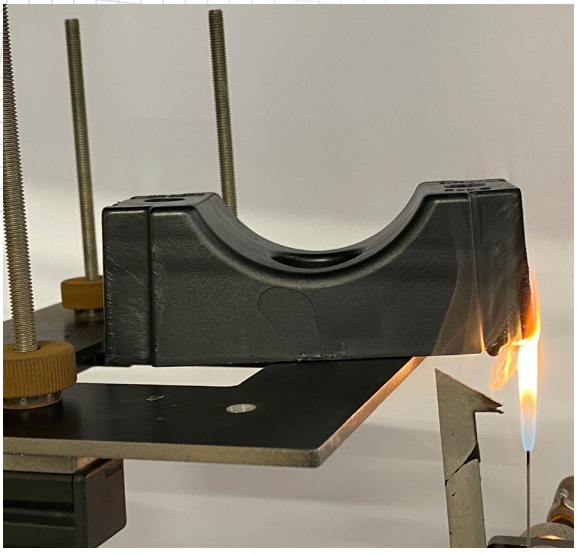
The impact test is reflective of the resistance to items dropping on it whilst on site, or it being dropped during install.

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 cleats 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 cleats 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

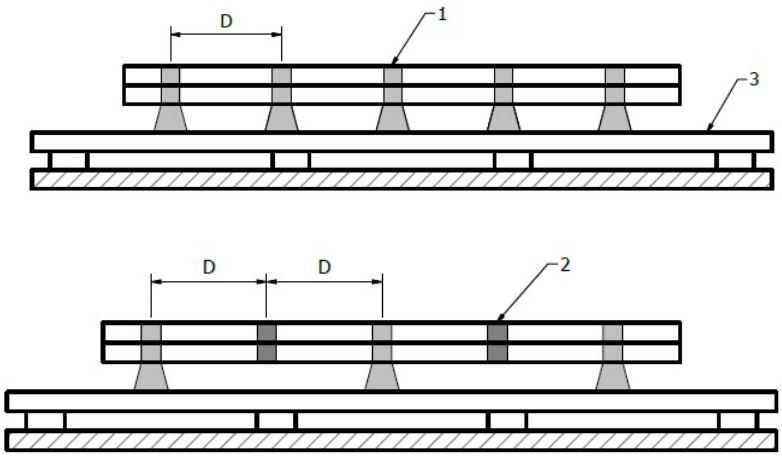
The lateral load test measures the cleat's capability to withstand continuous loading over long periods of time. A self-declared load is applied and held for an hour and a cleat is deemed to have passed if the deformation of the product is less than 50% of the minimum mandrel diameter the cleat can accept. 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 LATERAL LOAD RATING OF A CLEAT CAN BE USED TO SPECIFY CLEATS BASED ON CONTINUOUS LOADING, SUCH AS MOUNTING CLEATS ON A SIDE.

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 cleats short circuit performance.

9. RESISTANCE TO ELECTROMECHANICAL FORCE

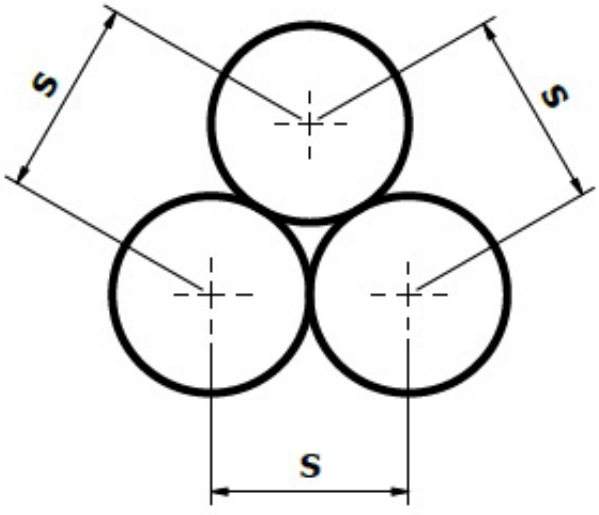
Perhaps the most important function of a cable cleat is to withstand the electromechanical forces generated during a short circuit. IEC 61914 short circuit testing specifies a three phase fault with one cable per phase. One end of the cables is connected to a three phase supply and the other end to a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

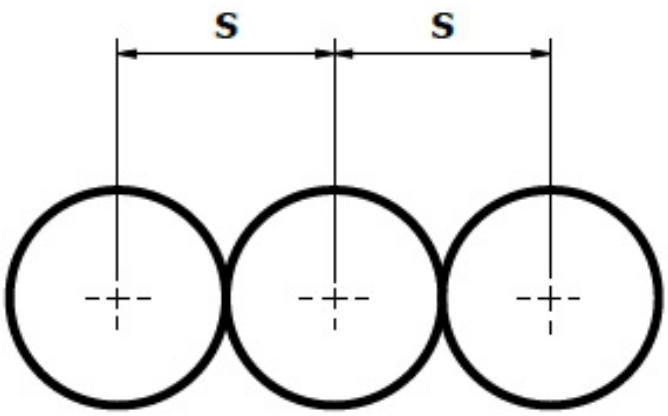


Key	Description
1	Cable Cleats
2	Intermediate Restraints
3	Mounting Surface
D	Lineal Spacing

EXTRACT FROM IEC INTERMEDIATE RESTRAINT TEST LAYOUT.

- 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:





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.

NOTES

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