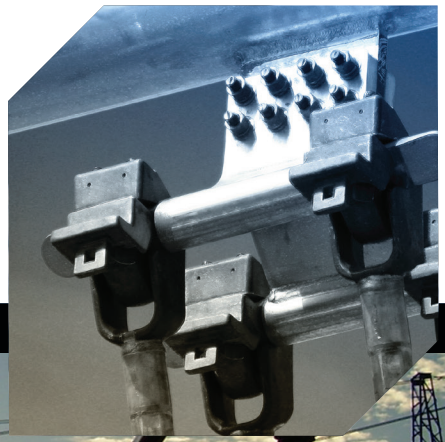
PREFORMED LINE PRODUCTS
The connection you can count on.
THAILAND

SUBSTATION
Product Catalog

COMMUNICATIONS ENERGY SPECIAL INDUSTRIES SOLAR



POWERFORMED™
Substation Systems

Distribution and transmission substation solutions for the Power Utility Industry

NEMA / ANSI Edition

Revision 1.1

Preformed Line Products

Preformed Line Products Thailand (PLP Thailand), designs and manufactures products and systems used in the construction and maintenance of overhead and underground networks for the energy, telecommunication, cable operators, and information industries worldwide. PLP Thailand is recognized as a leading designer and manufacturer of line hardware fittings and accessories with expertise in designing strings.

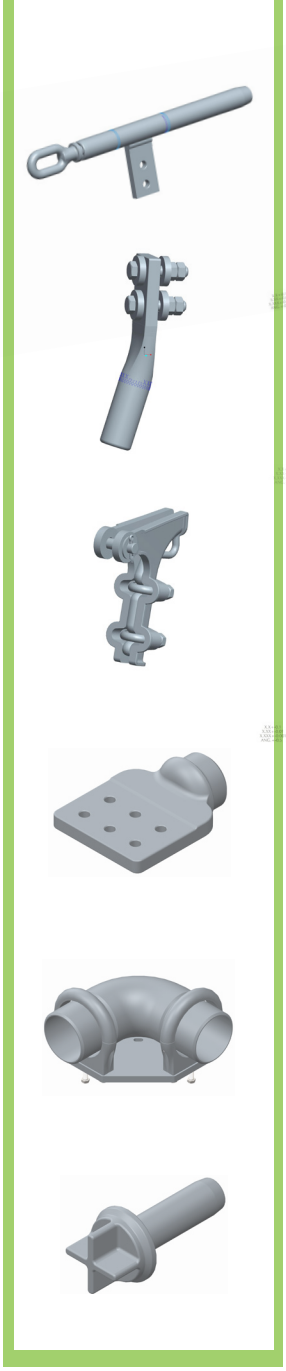
PLP Thailand is a wholly owned subsidiary of Preformed Line Products Co. which is headquartered in Cleveland, Ohio. PLP was founded in 1947 and now has 17 manufacturing facilities in fourteen different countries with over 2,900 employees.

PLP Thailand has designed and supplied complete insulator assemblies and accessories to Electricity Utilities in many countries throughout Asia, the Middle East, Europe and various contractors worldwide. In supplying these contracts, PLP Thailand has gained an enviable reputation for reliable high quality products and is approved by the Electricity Generating Authority of Thailand (EGAT) plus other Electricity Authorities globally for systems up to 500 kV.

PLP Thailand manufactures to many standards including, BS3288 Part 1, BS3288 Part 2 2002, BS IEC 61284, AS1154.1, AS1154.2, AS1154.3, ANSI C39.2 1983, NEMA CC 1 1984, IEC 61854 1998 and ASTM-A153-82 (revised 1984).

PLP's manufacture of its products is supported by a proven design engineering team as well as modern CNC technologies and a well-equipped Test Laboratory. It utilizes computer aided design and drafting systems, Pro Engineer software and a stringent product development program.

With lean and modern manufacturing technologies, PLP can react promptly to its customer's requirement keeping lead times to a minimum. An effective product supply chain makes sure that product moves from origin to installation without unnecessary delays. A Local customer service center offers a single point of contact and support. Combining local knowledge with world-class research, product development and manufacturing capabilities, PLP sets ever-higher standards of performance and user convenience. PLP also works very closely with its customers to pioneer the development for new products for their specific requirements.



CAPABILITIES INCLUDE:

- Wire Forming
- Forging
- Aluminum and Steel Welding (incl robot)
- Aluminum Casting: Gravity and Pressure Die Cast (PDC)
- Earth Rods and Accessories (Copper and Steel Rods)
- Assembly
- PVC Extrusion
- Plate Cutting
- Hardware machining
- Testing
- Tool Design and Manufacturing

ISO 14001:2004

ISO 9001:2008

Contents

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Introduction to POWERFORMED™

BUSLIGN™ for Busbars, SUBLIGN™ for Flexible Conductors

Preformed Line Products (PLP)
Preformed Line Products (PLP) is a worldwide designer, manufacturer and supplier of high quality products for the electric power Distribution and Transmission industries. With an equally strong presence in the Communications and Solar industry segments, PLP is a global power and fibre infrastructure specialist.

Located in 16 countries around the world, PLP's flexibility and global presence allows it to respond to customer's needs quickly and with precision. With ground breaking and innovative solutions like THERMOLIGN® products for high temperature transmission lines and COYOTE® Fibre Optic Products PLP have consistently pioneered advances in power utility communications and communications networks since 1947.

PLP was founded on technology for supporting, protecting, terminating and splicing transmission and distribution lines, OPGW (Optical Ground Wire) and ADSS (All Dielectric Self Supporting) fibre optic cables. The Company's reputation, product reliability and longevity speaks for itself. You can count on PLP's energy products and people day in and day out, year after year. That is because a steadfast commitment to quality is not just a goal at PLP, it's an obsession. In our engineering laboratories, on the manufacturing lines and all the way to field installation, it's the guiding principle of everything we do.

POWERFORMED™ Substation Systems
Preformed Line Products POWERFORMED™ Substation systems are a product of the company's global engineering design, testing and manufacturing strengths. Proven over many years of reliable in-service performance at voltages up to 500kV, the intellectual property and designs that underpin POWERFORMED™ fittings are drawn from as far afield as Australia, New Zealand, Poland, South Africa, and Thailand.

Within the POWERFORMED™ range are two distinct families of connectors, clamps and hardware for substation products. The families are called **BUSLIGN™** and **SUBLIGN™**. Within these families, the fittings have been divided into three distinct groups which are structured around application voltages within substations:

1. Fittings that are designed to be applied at voltages up to and including 230kV
2. Fittings that are designed to be applied at voltages between 245kV and 400kV
3. Fittings that are designed to be applied at voltages between 400kV and 500kV

BUSLIGN™: Substation Fittings for Tubular Aluminium Busbars
POWERFORMED™ BUSLIGN™ aluminium substation fittings includes both bolted, and welded solutions. Designed to be used to create high current tubular aluminium busbar systems in high voltage AC and DC substations, BUSLIGN™ fittings are available to suit both SPS (Standard Pipe Size) and Metric aluminium busbar tubes as large as 8 inch and 250mm OD (Outside Diameter). Conservatively designed for long and reliable in-service life, PLP's BUSLIGN™ range represents some of the latest thinking in power engineering product design, backed by mechanical, heat cycle, Corona and RIV short circuit testing at up to 63kA/1s.

SUBLIGN™: Substation Fittings for Flexible Aluminium Conductors
POWERFORMED™ SUBLIGN™ flexible conductor fittings encompasses bolted, welded and compression fitting solutions for AAC, AAAC, ACSR and ACAR flexible aluminium conductors. With some of the most unique and flexible designs available, installation is fast, easy and most importantly reliable for critical substation assets. Backed by extensive testing to NEMA, ANSI and IEC standards, SUBLIGN™ connectors are the low risk choice for substation assets.

Pictorial Index

BUSLIGN™ Bolted And Welded Family Up To 230kV

BOLTED FIXED SUPPORTS

BBAH - FSSST

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BOLTED FIXED OR SLIDING SUPPORTS

BBAH - FSST

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WELDED CORONA DOME CAPS

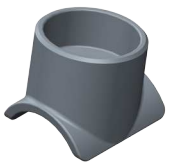
BWAH - CDND

Pg. 69

WELDED A FRAME CONNECTORS

BWAH - VC

Pg. 70



BWAH - TCWW

Pg. 71

WELDED MIDSPAN COUPLERS

BWAH - FMC

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BWAH - FMCD

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WELDED ELBOW CONNECTORS

BWAH - EBO

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WELDED TEE CONNECTORS

BWAH - TBPTZ2

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WELDED EARTH GROUND POINTS

BWAH - EGPMZ2

Section 3
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WELDED FIXED OR SLIDING SUPPORTS

BWAH - FSST

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WELDED EXPANSION SUPPORTS

BWAH - STXZ2

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WELDED PRIMARY EQUIPMENT CONNECTORS

BWAH - SPEXHZ2

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WELDED END TERMINALS

BWAH - ETTPZ2

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Pictorial Index

SUBLIGN™ Bolted And Welded Family Up To 230kV

BOLTED MIDSPAN SPACERS

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	SBAH - SCM4SZ2 Pg. 82
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WELDED TERMINAL PALMS

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BOLTED CONDUCTOR SUPPORTS

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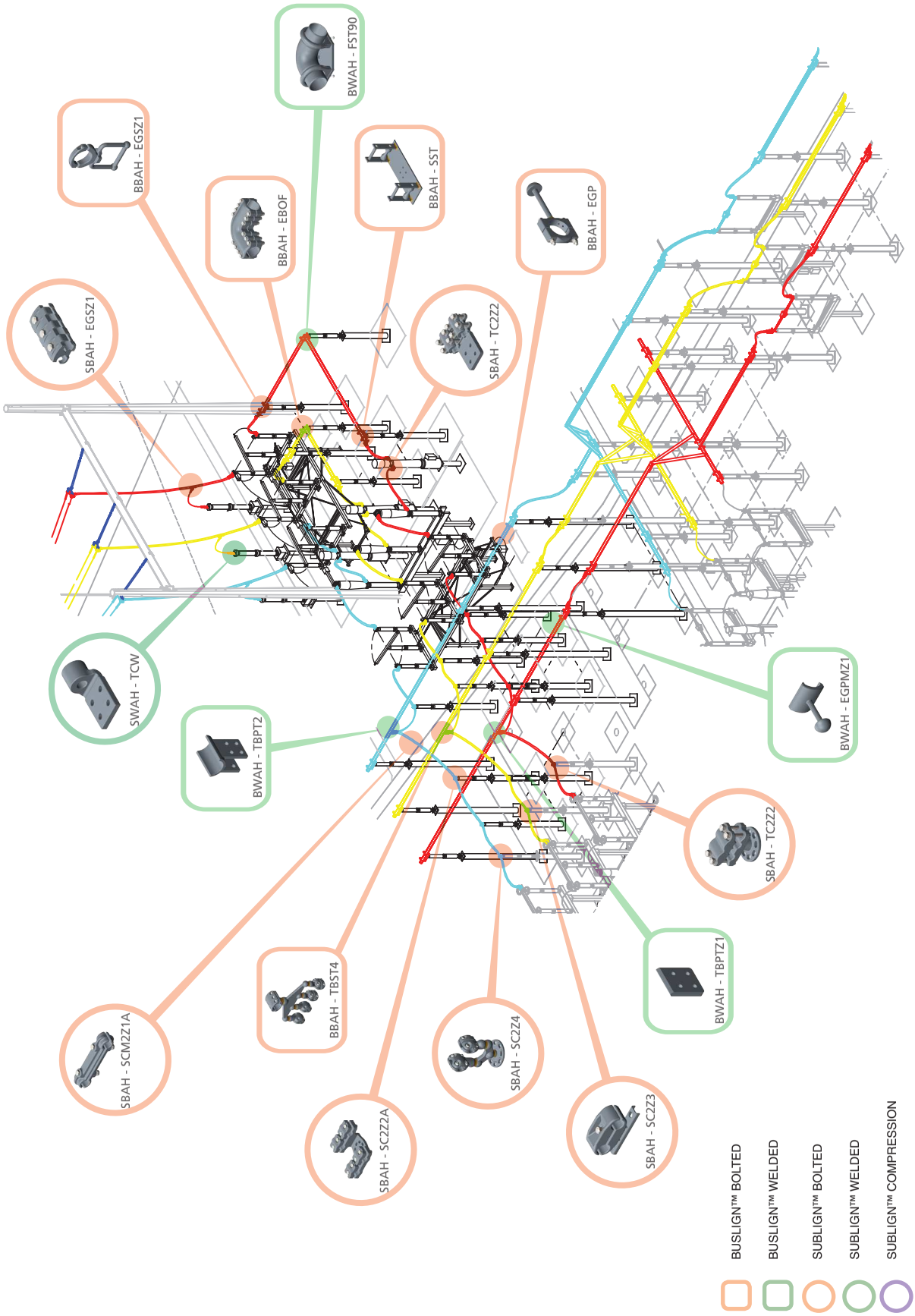
WELDED TERMINAL PALMS

	SWAH - TCW Pg. 87
	

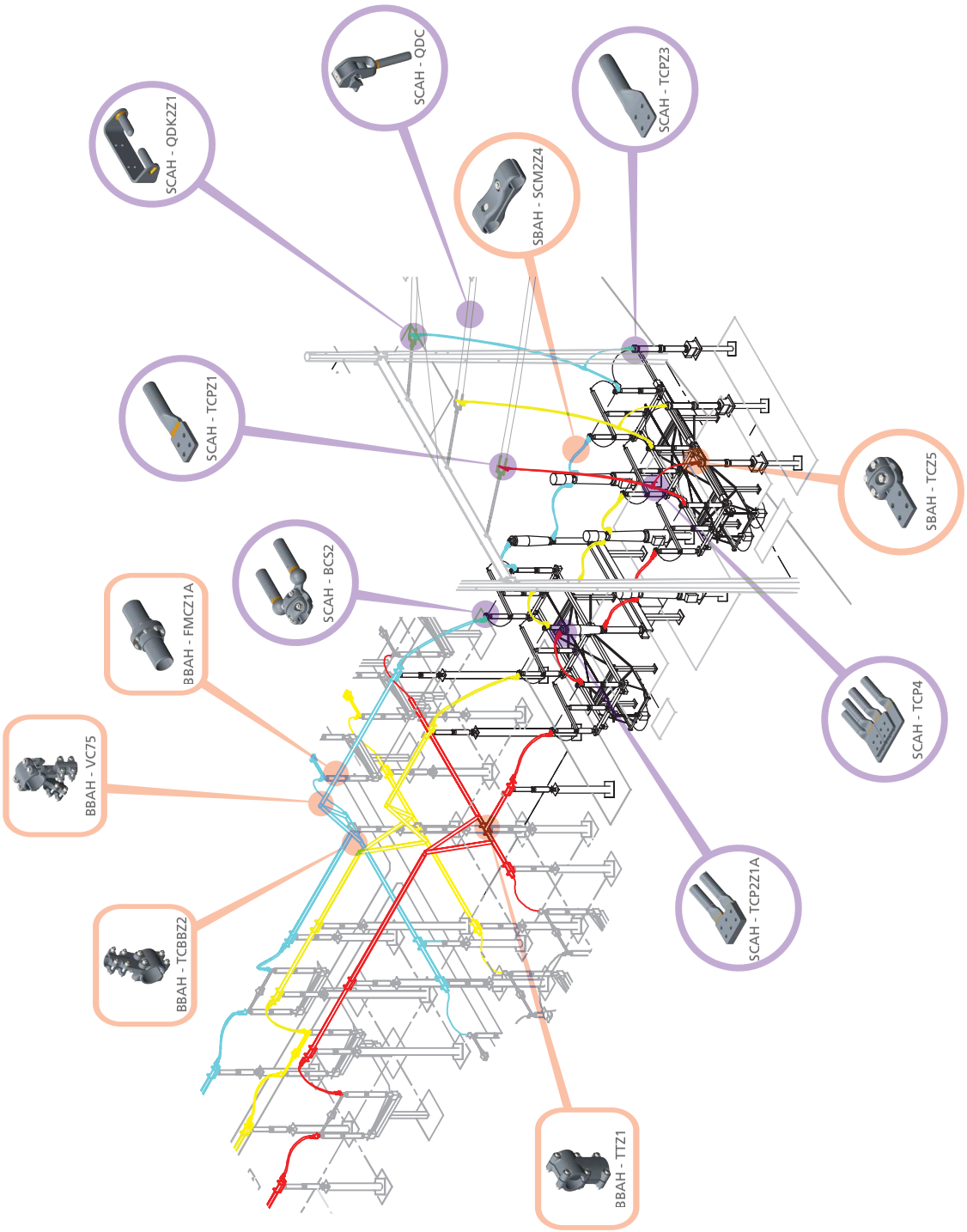
POWERFORMED™ Substation Isometric

BUSLIGN™ and SUBLIGN™ Product Deployment



POWERFORMED™ Substation Isometric

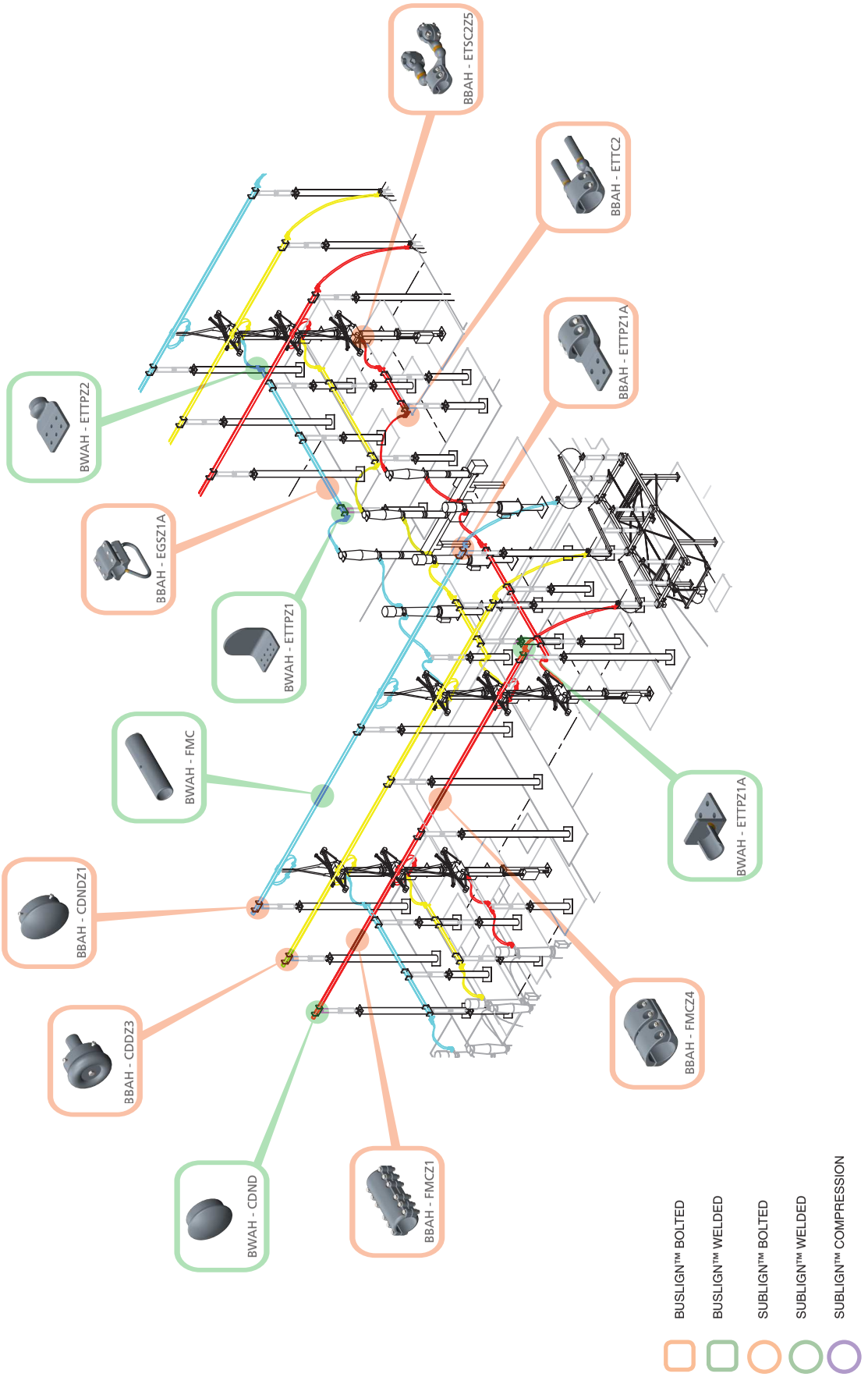
BUSLIGN™ and SUBLIGN™ Product Deployment



BUSLIGN™ BOLTED
BUSLIGN™ WELDED
SUBLIGN™ BOLTED
SUBLIGN™ WELDED
SUBLIGN™ COMPRESSION

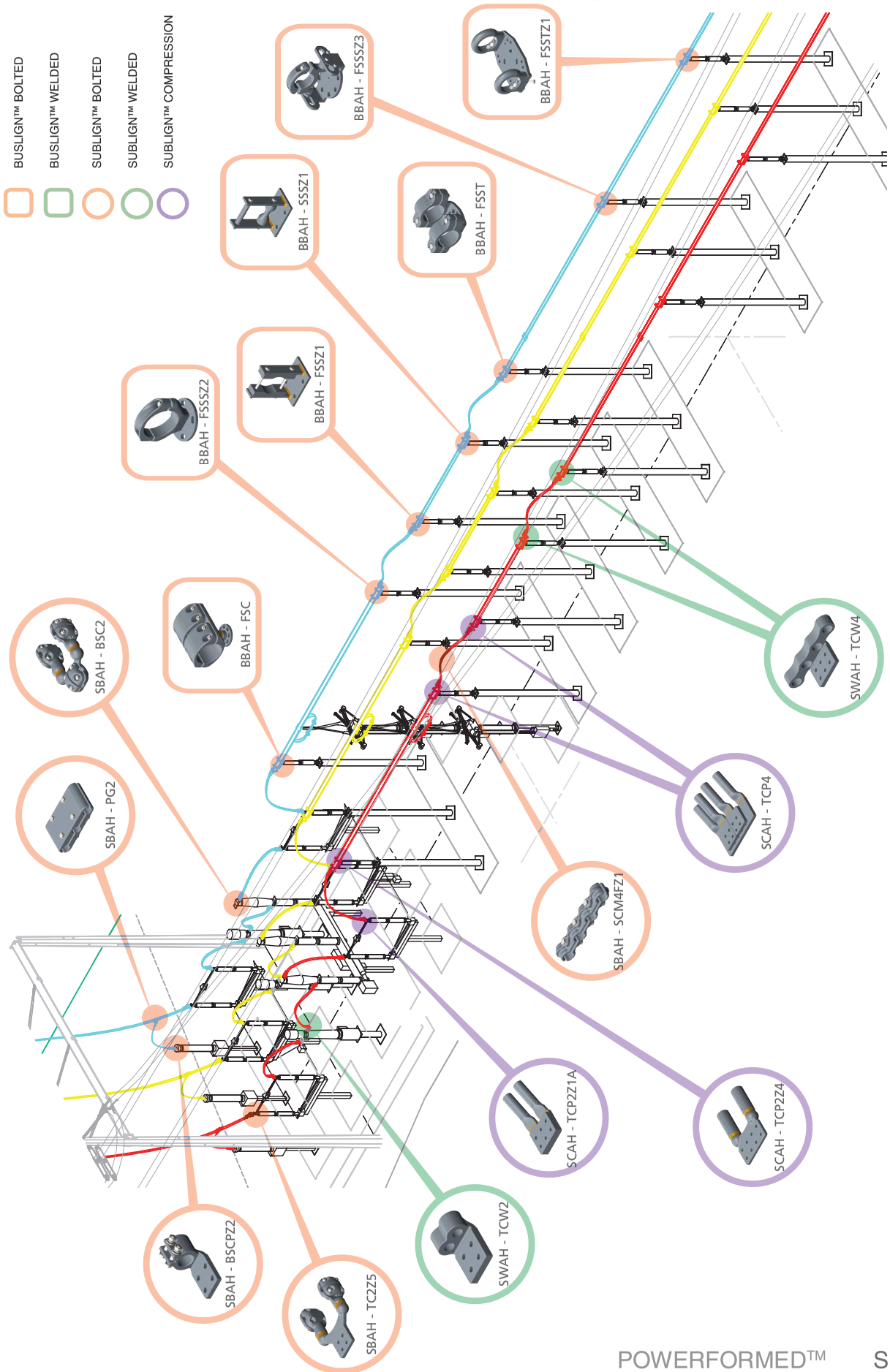
POWERFORMED™ Substation Isometric

BUSLIGN™ and SUBLIGN™ Product Deployment



POWERFORMED™ Substation Isometric

BUSLIGN™ and SUBLIGN™ Product Deployment



User Guide

POWERFORMED™ Catalog

The User Guide is designed to assist the understanding of PLP's approach to cataloging POWERFORMED™ products as well as provide specific details regarding ratings and dimensional information for BUSLIGN™ and SUBLIGN™ items.

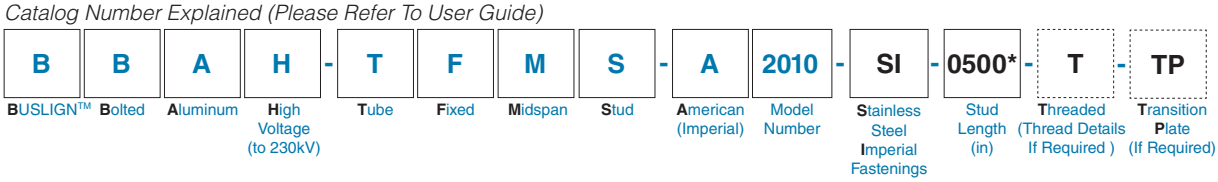
NEMA / ANSI Catalog and IEC Catalog
The POWERFORMED™ range consists of two separate and distinct catalogs that contain different information for the SUBLIGN™ and BUSLIGN™ product ranges.

	BUSLIGN™	SUBLIGN™
NEMA/ANSI Catalog	Fittings for Standard Pipe Size (SPS) Aluminium Busbar Tubes Defined by Nominal Size and Schedule 40 or 80 Specification for Tube Wall Thickness	Fittings for Imperial Conductors Conductor Size Defined by kcmil or Outside Diameter in inches (in)
IEC Catalog	Fittings for Metric Busbar Tubes Defined by Outside Diameter and Wall Thickness in millimeters (mm)	Fittings for Metric Conductors Conductor Size Defined by Outside Diameter in millimeters (mm)

Each catalog is clearly labelled "NEMA/ANSI EDITION" or "IEC EDITION". However, whether IEC or NEMA / ANSI, the fundamental product designs are identical. The individual products are simply manufactured to suit the specific imperial or metric tube or flexible conductor.

User Specified Catalog Fields
PLP has tried to be as prescriptive as possible with the catalog numbering to prevent errors occurring when specifying a product. On each SUBLIGN™ and BUSLIGN™ page there is a *Catalog Number Explained* section. An example is as follows:

Catalog Number Explained (Please Refer To User Guide)



Within the POWERFORMED™ catalog number:

Fields in Blue Text with Solid Line Box	Are defined by PLP within the tabulation of catalog numbers on each catalog page.

Fields in Black Text with Solid Line Box	Must be user defined to complete the BUSLIGN™ or SUBLIGN™ catalog number.

Fields in Black Text with Dotted Line Box	May be user defined in the catalog number if the BUSLIGN™ or SUBLIGN™ optional features are required.

User Guide

POWERFORMED™ Catalog

SUBLIGN™ and BUSLIGN™ Product Dimensions and References
Within both the IEC and NEMA / ANSI POWERFORMED™ catalogs, PLP has taken the approach of providing only the critical dimensions for each SUBLIGN™ and BUSLIGN™ product. Examples of critical dimensions include: conductor centers for multiple conductor bundles; pitch circle diameters for insulator mountings; and the busbar centerline heights over post insulators. Fully dimensioned Sales Drawings are available for each SUBLIGN™ and BUSLIGN™ item from PLP on request.

The dimensions in this catalog are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult PLP for the latest dimensions and design specifications.

The information of EGAT No.xx.xx in parentheses (EGAT No.xx.xx) that presents with some items is the EGAT reference legend number of EGAT Standard item.

SUBLIGN™ and BUSLIGN™ Continuous Current Ratings
Neither the SUBLIGN™ nor BUSLIGN™ catalog pages list continuous current ratings for each individual item within a product family.

The approach to engineering design for POWERFORMED™ products is conservative with continuous current rating limits being determined by factors including current density (cross sectional area and surface area contact), contact force, windspeed, and emissivity. POWERFORMED™ continuous current ratings are backed by test data to standards including NEMA CC1, ANSI C119.4, and IEC 61284. Not all POWERFORMED™ products have been tested because the diversity of SUBLIGN™ and BUSLIGN™ products is simply too great to achieve 100% type test status. Where products are not tested, the design is verified by tests on similar products where it is possible to extrapolate performance between assemblies. Continuous current ratings are available for all items and listed on the PLP Sales Drawing for each individual item.

SUBLIGN™ and BUSLIGN™ Short Circuit Ratings
In 2008 and 2009 Electropar PLP (New Zealand) embarked upon a programme to mathematically validate and then short circuit test a full size bay width of phase to phase insulated 220kV 200mm OD (4000amp) busbar and interplant connections at 25kA, 31.5kA, 40kA, 50kA and 63kA fault levels. The objectives of the testing were to prove the integrity of PLP's Powerformed fittings designs and to determine whether the existing method of calculation used to determine short circuit performance of substation components is valid (by comparing calculated load and displacement values to actual load and displacement values).

The testing took place at Powertech Lab's in Vancouver, Canada in June 2009 after a global search for laboratories with the capability to complete this scope. Under varying short circuits applied between 25kA/0.3s and 63kA/1sec (including long duration tests at 40kA/3s) measurement of the loads and displacements of the system under varying fault conditions took place. In all, 59 short circuit tests were completed over a 5 day test period with data collected by a combination of high speed cameras, still cameras, video and fibre optic sensors.

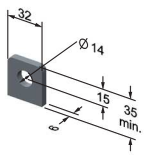
The data obtained from short circuit testing many SUBLIGN™ and BUSLIGN™ products in a real life environment underpins fundamental aspects of POWERFORMED™ product designs. Short circuit current ratings are available for all items and listed on the PLP Sales Drawing for each individual item.

FULL SCALE SHORT CIRCUIT TESTING TO 63 kA/1sec
POWERTECH LABORATORY, VANCOUVER, 2009.

Standard Terminal Palms

Dimensions and Types - Dimensions in Millimeters

AS1



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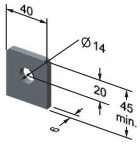

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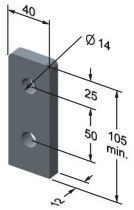

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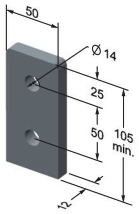

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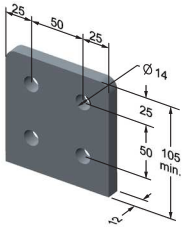

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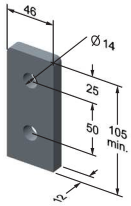

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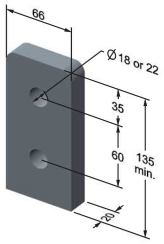

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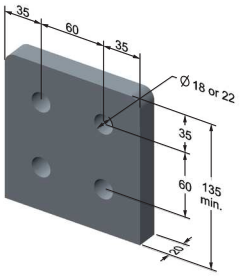

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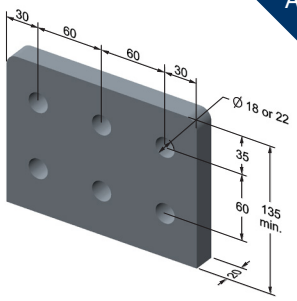

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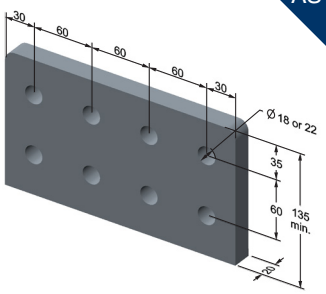

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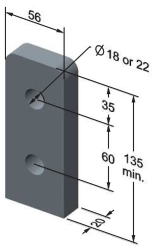

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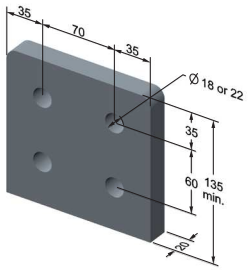

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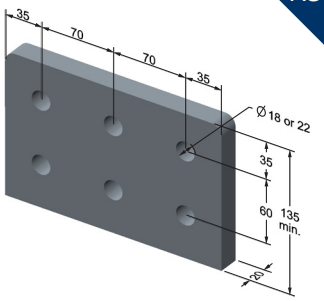

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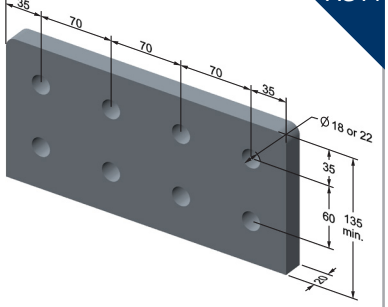
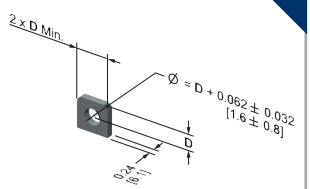


Standard Terminal Palms

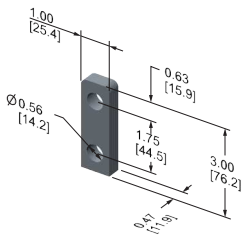
Dimensions and Types - Dimensions in Inches [Millimeters]

NC1



where D = stud diameter

NC2



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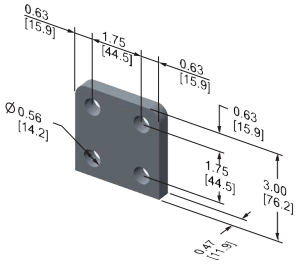

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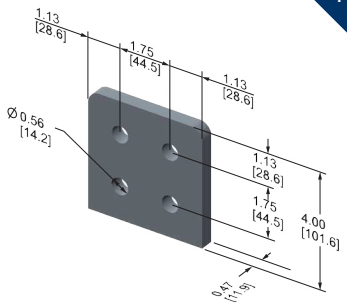

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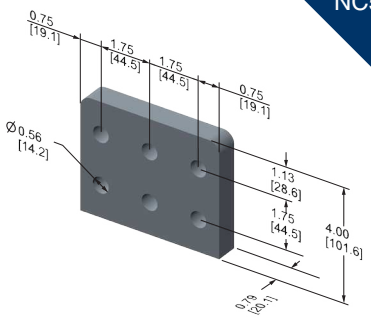

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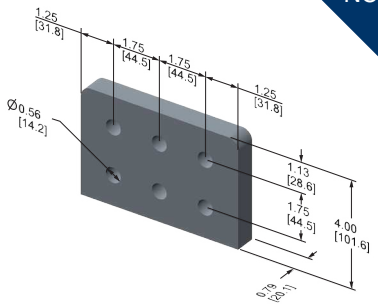

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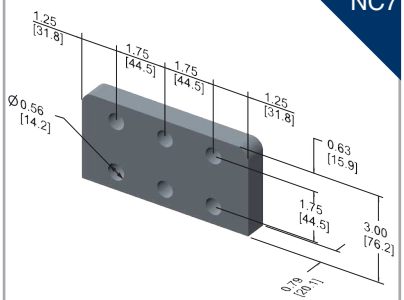

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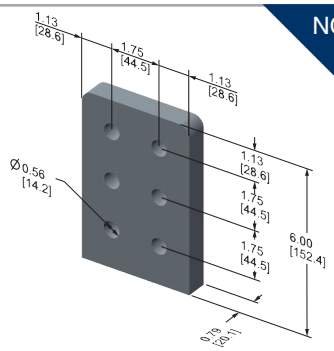
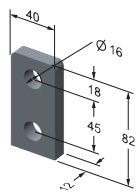


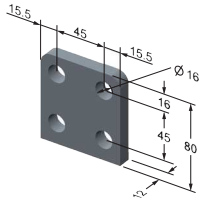
Standard Terminal Palms

Dimensions and Types - Dimensions in Millimeters

ND1



ND2-1



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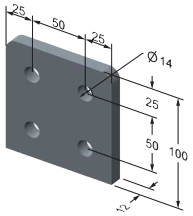

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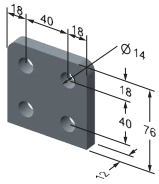
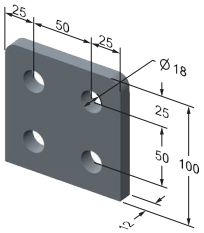
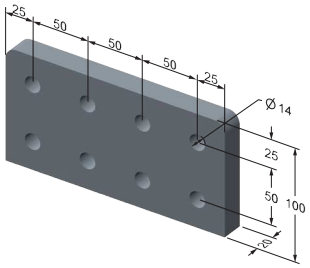


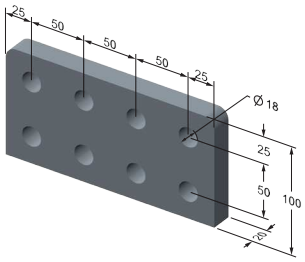
ND2-4



ND3-1



ND3-2



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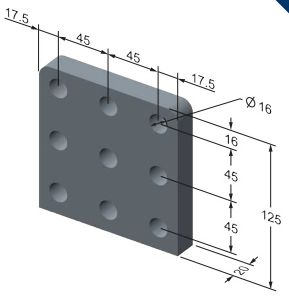
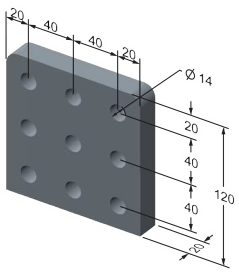


ND5



Standard Primary Equipment Stud Sizes

Dimensions, Types and Thread Details

BUSLIGN™ NEMA / ANSI
BUSLIGN™ NEMA / ANSI catalog pages relevant to primary equipment stud connections lists catalog numbers for connectors defined by the standard stud sizes in ANSI / NEMA CC1: 2009 Table C-3. However, these catalog pages do not list the standard threads for stud terminal connectors that are defined in ANSI / NEMA CC1: 2009

If the primary equipment stud terminal to which A NEMA / ANSI BUSLIGN™ connector must be connected is threaded, the standard thread details for POWERFORMED™ BUSLIGN™ connectors are listed in the following tabulation:

Stud Diameter		Number of Threads per Inch	Connector Thread Class
Inch (in)	Millimeters (mm)		
5/8	15.9	11	UNC-2B
3/4	19.0	16	UNF-2B
1	25.4	14	UNS-2B
1 1/8	28.6	12	UNF-2B
1 1/4	31.8	12	UNF-2B
1 1/2	38.1	12	UNF-2B
2	50.8	12	UN-2B
2 1/2	63.5	12	UN-2B
3	76.2	12	UN-2B

If the primary equipment stud size is not listed in the catalog page tabulation, contact PLP with the stud size (diameter and length) and the number of threads per inch / thread class if the stud is threaded. PLP will supply a special catalog number and sales drawing to define the BUSLIGN™ product requirements.

SUBLIGN™ NEMA / ANSI
Each SUBLIGN™ catalog page within the NEMA / ANSI catalog that is relevant to primary equipment stud connections lists the standard diameter of the stud terminal in inches and millimeters. It also lists the standard number of threads per inch and the thread class relevant to the stud size if the stud is threaded as defined in ANSI / NEMA CC1: 2009 Table C3.

If the primary equipment stud size is not listed in the catalog page tabulation, contact PLP with the stud size (diameter and length) and the number of threads per inch / thread class if the stud is threaded. PLP will supply a special catalog number and sales drawing to define the SUBLIGN™ product requirements.

SUBLIGN and BUSLIGN™ IEC
Each BUSLIGN™ and SUBLIGN™ catalog page within the IEC catalog that is relevant to primary equipment stud connections lists standard stud diameters in millimeters within the catalog number tabulation. If the primary equipment stud diameter is not listed in the catalog page tabulation, contact PLP with the stud size (diameter and length) and PLP will supply a special catalog number and sales drawing to define the BUSLIGN™ or SUBLIGN™ product requirements.

If the stud is threaded, details regarding the stud size (diameter and length), whether the thread is Coarse or fine and the thread pitch will be required. Standard coarse and fine I.S.O metric threads are tabulated below. PLP will supply a special catalog number and sales drawing to define the BUSLIGN™ and SUBLIGN™ product requirements.

Standard Primary Equipment Stud Sizes

Dimensions, Types and Thread Details

I.S.O Metric Coarse Threads	
Stud Outside Diameter (mm)	Pitch (mm)
10.0	1.50
12.0	1.75
14.0	2.00
16.0	2.00
18.0	2.50
20.0	2.50
22.0	2.50
24.0	3.00
27.0	3.00
30.0	3.50
33.0	3.50
36.0	4.00
39.0	4.00
42.0	4.50
45.0	4.50
48.0	5.00
52.0	5.00
56.0	5.50
60.0	5.50
64.0	6.00
68.0	6.00

Standard I.S.O Metric Fine Threads	
Stud Outside Diameter (mm)	Pitch (mm)
12.0	1.25
16.0	1.50
20.0	1.50
24.0	2.00
30.0	2.00
36.0	3.00
42.0	3.00
48.0	3.00
56.0	4.00
64.0	4.00

Nominal Dimensions and Weights

Schedule 40 Standard Pipe Size (SPS) Aluminum Tubes

SPS Schedule 40 Aluminum Tube

Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		Weight	
in	in	mm	in	mm	in^2	mm^2	lb/ft	kg/m
1	1.315	33.4	0.133	3.4	0.494	319	0.581	0.86
1 1/4	1.660	42.2	0.140	3.6	0.668	431	0.786	1.17
1 1/2	1.900	48.3	0.145	3.7	0.800	516	0.940	1.40
2	2.375	60.3	0.154	3.9	1.074	693	1.264	1.88
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	2.004	2.98
3	3.500	88.9	0.216	5.5	2.228	1437	2.621	3.90
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	3.151	4.69
4	4.500	114.3	0.237	6.0	3.174	2048	3.733	5.56
5	5.563	141.3	0.258	6.6	4.300	2774	5.057	7.53
6	6.625	168.3	0.280	7.1	5.581	3601	6.564	9.77
8	8.625	219.1	0.322	8.2	8.399	5419	9.878	14.70

SPS Schedule 80 Aluminum Tube

Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		Weight	
in	in	mm	in	mm	in^2	mm^2	lb/ft	kg/m
1	1.315	33.4	0.179	4.5	0.639	412	0.751	1.12
1 1/4	1.660	42.2	0.191	4.9	0.881	568	1.037	1.54
1 1/2	1.900	48.3	0.200	5.1	1.068	689	1.256	1.87
2	2.375	60.3	0.218	5.5	1.477	953	1.737	2.58
2 1/2	2.875	73.0	0.276	7.0	2.254	1454	2.650	3.94
3	3.500	88.9	0.300	7.6	3.016	1946	3.547	5.28
3 1/2	4.000	101.6	0.318	8.1	3.678	2373	4.326	6.44
4	4.500	114.3	0.337	8.6	4.407	2843	5.183	7.71
5	5.563	141.3	0.375	9.5	6.112	3943	7.188	10.70
6	6.625	168.3	0.432	11.0	8.405	5423	9.884	14.71
8	8.625	219.1	0.500	12.7	12.763	8234	15.008	22.33

Current Ratings by Temperature

Schedule 40 Standard Pipe Size (SPS) Aluminum Tubes

0-15°C Ambient, Operating Temperature 90°C maximum

SPS Schedule 40 Aluminum Tube							Current Rating			
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		0°C Ambient	5°C Ambient	10°C Ambient	15°C Ambient
in	in	mm	in	mm	in²	mm²	Amps	Amps	Amps	Amps
1	1.315	33.4	0.133	3.4	0.494	319	1049	1012	977	938
1 1/4	1.660	42.2	0.140	3.6	0.668	431	1312	1266	1227	1179
1 1/2	1.900	48.3	0.145	3.7	0.800	516	1498	1446	1396	1341
2	2.375	60.3	0.154	3.9	1.074	693	1867	1801	1731	1663
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	2503	2415	2334	2241
3	3.500	88.9	0.216	5.5	2.228	1437	3056	2949	2843	2730
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	3506	3383	3247	3118
4	4.500	114.3	0.237	6.0	3.174	2048	3969	3829	3681	3536
5	5.563	141.3	0.258	6.6	4.300	2774	4972	4797	4634	4451
6	6.625	168.3	0.280	7.1	5.581	3601	6018	5807	5587	5366
8	8.625	219.1	0.322	8.2	8.399	5419	8092	7808	7527	7230

20-35°C Ambient, Operating Temperature 90°C maximum

SPS Schedule 40 Aluminum Tube							Current Rating			
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		20°C Ambient	25°C Ambient	30°C Ambient	35°C Ambient
in	in	mm	in	mm	in²	mm²	Amps	Amps	Amps	Amps
1	1.315	33.4	0.133	3.4	0.494	319	896	858	814	771
1 1/4	1.660	42.2	0.140	3.6	0.668	431	1122	1078	1019	965
1 1/2	1.900	48.3	0.145	3.7	0.800	516	1280	1226	1163	1101
2	2.375	60.3	0.154	3.9	1.074	693	1595	1521	1449	1372
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	2139	2050	1943	1840
3	3.500	88.9	0.216	5.5	2.228	1437	2612	2497	2372	2247
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	2997	2851	2721	2577
4	4.500	114.3	0.237	6.0	3.174	2048	3392	3233	3080	2917
5	5.563	141.3	0.258	6.6	4.300	2774	4249	4070	3859	3654
6	6.625	168.3	0.280	7.1	5.581	3601	5143	4907	4671	4424
8	8.625	219.1	0.322	8.2	8.399	5419	6915	6611	6280	5948

Current Ratings by Temperature

Schedule 40 Standard Pipe Size (SPS) Aluminum Tubes

40-50°C Ambient, Operating Temperature 90°C maximum

SPS Schedule 40 Aluminum Tube							Current Rating		
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		40°C Ambient	45 °C Ambient	50 °C Ambient
in	in	mm	in	mm	in²	mm²	Amps	Amps	Amps
1	1.315	33.4	0.133	3.4	0.494	319	726	682	632
1 1/4	1.660	42.2	0.140	3.6	0.668	431	909	856	791
1 1/2	1.900	48.3	0.145	3.7	0.800	516	1038	974	903
2	2.375	60.3	0.154	3.9	1.074	693	1293	1208	1125
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	1733	1629	1508
3	3.500	88.9	0.216	5.5	2.228	1437	2117	1984	1841
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	2428	2266	2112
4	4.500	114.3	0.237	6.0	3.174	2048	2749	2569	2391
5	5.563	141.3	0.258	6.6	4.300	2774	3443	3235	2995
6	6.625	168.3	0.280	7.1	5.581	3601	4168	3899	3625
8	8.625	219.1	0.322	8.2	8.399	5419	5604	5254	4874

Basis of Ratings Calculations	
Material	6101 T6 Aluminum Alloy
Resistivity (at 20°C)	0.030μΩm
Wind Velocity	0.6 m/s
Conductor Emissivity	0.5

Current Ratings by Temperature

Schedule 80 Standard Pipe Size (SPS) Aluminum Tubes

0-15°C Ambient, Operating Temperature 90°C maximum

SPS Schedule 80 Aluminum Tube							Current Rating			
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		0°C Ambient	5°C Ambient	10°C Ambient	15°C Ambient
in	in	mm	in	mm	in²	mm²	Amps	Amps	Amps	Amps
1	1.315	33.4	0.133	3.4	0.494	319	1193	1151	1103	1059
1 1/4	1.660	42.2	0.140	3.6	0.668	431	1507	1454	1407	1352
1 1/2	1.900	48.3	0.145	3.7	0.800	516	1732	1671	1613	1549
2	2.375	60.3	0.154	3.9	1.074	693	2189	2112	2027	1946
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	2873	2772	2666	2561
3	3.500	88.9	0.216	5.5	2.228	1437	3548	3424	3293	3162
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	4087	3944	3802	3652
4	4.500	114.3	0.237	6.0	3.174	2048	4658	4495	4337	4165
5	5.563	141.3	0.258	6.6	4.300	2774	5874	5668	5450	5235
6	6.625	168.3	0.280	7.1	5.581	3601	7274	7019	6704	6439
8	8.625	219.1	0.322	8.2	8.399	5419	9664	9324	8979	8624

20-35°C Ambient, Operating Temperature 90°C maximum

SPS Schedule 80 Aluminum Tube							Current Rating			
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		20°C Ambient	25°C Ambient	30°C Ambient	35°C Ambient
in	in	mm	in	mm	in²	mm²	Amps	Amps	Amps	Amps
1	1.315	33.4	0.133	3.4	0.494	319	1019	969	926	877
1 1/4	1.660	42.2	0.140	3.6	0.668	431	1288	1236	1170	1108
1 1/2	1.900	48.3	0.145	3.7	0.800	516	1480	1417	1344	1273
2	2.375	60.3	0.154	3.9	1.074	693	1871	1780	1699	1609
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	2455	2342	2229	2111
3	3.500	88.9	0.216	5.5	2.228	1437	3033	2892	2754	2608
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	3493	3340	3172	3005
4	4.500	114.3	0.237	6.0	3.174	2048	3981	3809	3615	3424
5	5.563	141.3	0.258	6.6	4.300	2774	5020	4787	4559	4318
6	6.625	168.3	0.280	7.1	5.581	3601	6217	5888	5646	5347
8	8.625	219.1	0.322	8.2	8.399	5419	8259	7886	7500	7103

Current Ratings by Temperature

Schedule 80 Standard Pipe Size (SPS) Aluminum Tubes

40-50°C Ambient, Operating Temperature 90°C maximum

SPS Schedule 80 Aluminum Tube							Current Rating		
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		40°C Ambient	45°C Ambient	50°C Ambient
in	in	mm	in	mm	in²	mm²	Amps	Amps	Amps
1	1.315	33.4	0.133	3.4	0.494	319	826	770	718
1 1/4	1.660	42.2	0.140	3.6	0.668	431	1044	982	908
1 1/2	1.900	48.3	0.145	3.7	0.800	516	1199	1126	1043
2	2.375	60.3	0.154	3.9	1.074	693	1516	1414	1318
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	1989	1861	1730
3	3.500	88.9	0.216	5.5	2.228	1437	2457	2298	2138
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	2831	2654	2462
4	4.500	114.3	0.237	6.0	3.174	2048	3226	3027	2806
5	5.563	141.3	0.258	6.6	4.300	2774	4068	3804	3538
6	6.625	168.3	0.280	7.1	5.581	3601	5038	4679	4382
8	8.625	219.1	0.322	8.2	8.399	5419	6693	6267	5821

Basis of Ratings Calculations	
Material	6101 T6 Aluminum Alloy
Resistivity (at 20°C)	0.030μΩm
Wind Velocity	0.6 m/s
Conductor Emissivity	0.5

Short Circuit Ratings

Schedule 40 and 80 Standard Pipe Size (SPS) Aluminum Tubes

SPS Schedule 40 Aluminum Tube

							Current Rating	
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		3 Second Short Circuit Duration	1 Second Short Circuit Duration
in	in	mm	in	mm	in²	mm²	kA	kA
1	1.315	33.4	0.133	3.4	0.494	319	17.5	30.3
1 1/4	1.660	42.2	0.140	3.6	0.668	431	23.7	41.0
1 1/2	1.900	48.3	0.145	3.7	0.800	516	28.3	49.0
2	2.375	60.3	0.154	3.9	1.074	693	38.0	65.9
2 1/2	2.875	73.0	0.203	5.2	1.704	1099	60.3	104.4
3	3.500	88.9	0.216	5.5	2.228	1437	78.9	136.6
3 1/2	4.000	101.6	0.226	5.7	2.680	1729	94.8	164.2
4	4.500	114.3	0.237	6.0	3.174	2048	112.3	194.5
5	5.563	141.3	0.258	6.6	4.300	2774	152.2	263.5
6	6.625	168.3	0.280	7.1	5.581	3601	197.5	342.1
8	8.625	219.1	0.322	8.2	8.399	5419	297.2	514.8

SPS Schedule 80 Aluminum Tube

							Current Rating	
Nominal Size	Outside Diameter		Wall Thickness		Cross Sectional Area		3 Second Short Circuit Duration	1 Second Short Circuit Duration
in	in	mm	in	mm	in²	mm²	kA	kA
1	1.315	33.4	0.179	4.5	0.639	412	22.6	39.2
1 1/4	1.660	42.2	0.191	4.9	0.881	568	31.2	54.0
1 1/2	1.900	48.3	0.200	5.1	1.068	689	37.8	65.5
2	2.375	60.3	0.218	5.5	1.477	953	52.3	90.5
2 1/2	2.875	73.0	0.276	7.0	2.254	1454	79.7	138.1
3	3.500	88.9	0.300	7.6	3.016	1946	106.7	184.8
3 1/2	4.000	101.6	0.318	8.1	3.678	2373	130.2	225.5
4	4.500	114.3	0.337	8.6	4.407	2843	156.0	270.1
5	5.563	141.3	0.375	9.5	6.112	3943	216.3	374.6
6	6.625	168.3	0.432	11.0	8.405	5423	297.4	515.1
8	8.625	219.1	0.500	12.7	12.763	8234	451.6	782.2

Basis of Ratings Calculations	
Ambient Temperature	20°C
Conductor Temperature - Continuous	70°C
Conductor Temperature - Short Time	250°C

Thermal Expansion

Standard Pipe Size (SPS) Aluminum Busbar Tubes

10-50°C Temperature Change

Length		Change in Length									
		10°C temperature change		20°C temperature change		30°C temperature change		40°C temperature change		50°C temperature change	
ft	m	in	mm	in	mm	in	mm	in	mm	in	mm
10	3.05	0.028	0.7	0.055	1.4	0.083	2.1	0.11	2.8	0.138	3.5
20	6.1	0.055	1.4	0.110	2.8	0.166	4.2	0.221	5.6	0.276	7.0
30	9.14	0.083	2.1	0.166	4.2	0.284	6.3	0.331	8.4	0.414	10.5
40	12.19	0.110	2.8	0.221	5.6	0.331	8.4	0.442	11.2	0.552	14.0
50	15.24	0.138	3.5	0.276	7.0	0.414	10.5	0.552	14.0	0.690	17.5
60	18.29	0.166	4.2	0.331	8.4	0.497	12.6	0.662	16.8	0.828	21.0
70	21.34	0.192	4.9	0.386	9.8	0.580	14.7	0.773	19.6	0.966	24.5
80	24.38	0.221	5.6	0.442	11.2	0.662	16.8	0.883	22.4	1.104	28.0
90	27.43	0.248	6.3	0.497	12.6	0.745	18.9	0.994	25.2	1.242	31.5
100	30.48	0.276	7.0	0.522	14.0	0.828	21.0	1.104	28.0	1.380	35.0

60-100°C Temperature Change

Length		Change in Length									
		60°C temperature change		70°C temperature change		80°C temperature change		90°C temperature change		100°C temperature change	
ft	m	in	mm	in	mm	in	mm	in	mm	in	mm
10	3.05	0.166	4.2	0.193	4.9	0.221	5.6	0.248	6.3	0.276	7.0
20	6.10	0.331	8.4	0.386	9.8	0.442	11.2	0.497	12.6	0.552	14.0
30	9.14	0.497	12.6	0.580	14.7	0.662	16.8	0.745	18.9	0.828	21.0
40	12.19	0.662	16.8	0.773	19.6	0.883	22.4	0.994	25.2	1.104	28.0
50	15.24	0.828	21.0	0.966	24.5	1.104	28.0	1.242	31.5	1.38	35.1
60	18.29	0.994	25.2	1.159	29.4	1.325	33.7	1.49	37.8	1.656	42.1
70	21.34	1.159	29.4	1.352	34.3	1.546	39.3	1.739	44.2	1.932	49.1
80	24.38	1.325	33.7	1.546	39.3	1.766	44.9	1.987	50.5	2.208	56.1
90	27.43	1.49	37.8	1.739	44.2	1.987	50.5	2.236	56.8	2.484	63.1
100	30.48	1.656	42.1	1.932	49.1	2.208	56.1	2.484	63.1	2.76	70.1

Basis of Calculations	
Coefficient of Thermal Expansion	0.000023 in/in.°C

Deflection Values

SPS Schedule 40 Aluminum Busbar Tubes

16.4ft to 29.5ft Spans

SPS Schedule 40			Span Length (Feet (Meters))									
Nominal Size	OD	WT	16.4 (5.0)		19.7 (6.0)		23 (7.0)		26.2 (8.0)		29.5 (9.0)	
			Deflection									
in	in	in	in	mm	in	mm	in	mm	in	mm	in	mm
1	1.315	0.133	1.07	27.1								
1 1/4	1.660	0.140	0.65	16.5	1.34	34.2						
1 1/2	1.900	0.145	0.49	12.4	1.01	25.7	1.87	47.5				
2	2.375	0.154	0.30	7.7	0.63	16.1	1.17	29.7	2.00	50.7		
2 1/2	2.875	0.203	0.21	5.3	0.44	11.1	0.81	20.5	1.38	35.0	2.21	56.1
3	3.500	0.216	0.14	3.5	0.29	7.3	0.54	13.6	0.91	23.2	1.46	37.2
3 1/2	4.000	0.226	0.11	2.7	0.22	5.6	0.41	10.3	0.69	17.6	1.11	28.2
4	4.500	0.237	0.08	2.1	0.17	4.4	0.32	8.1	0.54	13.8	0.87	22.1
5	5.563	0.258	0.05	1.4	0.11	2.8	0.21	5.2	0.35	8.9	0.56	14.3
6	6.625	0.280	0.04	1.0	0.08	2.0	0.14	3.7	0.25	6.2	0.39	10.0
8	8.625	0.322	0.02	0.6	0.05	1.2	0.08	2.1	0.14	3.6	0.23	5.8

32.8ft to 45.9ft Spans

SPS Schedule 40			Span Length (Feet (Meters))									
Nominal Size	OD	WT	32.8 (10)		36.1 (11)		39.4 (12)		42.7 (13)		45.9 (14)	
			Deflection									
in	in	in	in	mm	in	mm	in	mm	in	mm	in	mm
3	3.500	0.216	2.23	56.7								
3 1/2	4.000	0.226	1.69	43.0	2.48	62.9						
4	4.500	0.237	1.33	33.7	1.94	49.3	2.75	69.9				
5	5.563	0.258	0.86	21.8	1.25	31.9	1.78	45.1	2.45	62.2	3.29	83.6
6	6.625	0.280	0.60	15.2	0.88	22.3	1.24	31.6	1.71	43.5	2.30	58.5
8	8.625	0.322	0.35	8.9	0.51	13.0	0.73	18.4	1.00	25.4	1.35	34.2

49.2ft to 62.3ft Spans

SPS Schedule 40			Span Length (Feet (Meters))									
Nominal Size	OD	WT	49.2 (15)		52.5 (16)		55.8 (17)		59.1 (18)		62.3 (19)	
			Deflection									
in	in	in	in	mm	in	mm	in	mm	in	mm	in	mm
6	6.625	0.280	3.03	77.1	3.93	99.8						
8	8.625	0.322	1.77	45.0	2.29	58.3	2.92	74.3	3.68	93.4	4.56	115.9

Basis of Calculations
Maximum deflections shown here are calculated assuming a simply supported beam
Maximum deflections of beams fixed at both ends is approxiametly 1/5 of the values shown here
See Deflection and Stress Formulae page for equations

Deflection Values

SPS Schedule 80 Aluminum Busbar Tubes

16.4ft to 29.5ft Spans

SPS Schedule 80			Span Length (Feet (Metres))									
Nominal Size	OD	WT	16.4 (5.0)		19.7 (6.0)		23 (7.0)		26.2 (8.0)		29.5 (9.0)	
			Deflection									
in	in	in	in	mm	in	mm	in	mm	in	mm	in	mm
1	1.315	0.133	1.14	29.0								
1 1/4	1.660	0.140	0.69	17.5	1.43	36.3						
1 1/2	1.900	0.145	0.52	13.1	1.07	27.2	1.98	50.3				
2	2.375	0.154	0.32	8.2	0.67	16.9	1.24	31.4	2.11	53.5		
2 1/2	2.875	0.203	0.22	5.6	0.46	11.7	0.85	21.6	1.45	36.8	2.32	59.0
3	3.500	0.216	0.15	3.7	0.30	7.7	0.56	14.3	0.96	24.4	1.54	39.0
3 1/2	4.000	0.226	0.11	2.8	0.23	5.8	0.43	10.8	0.73	18.4	1.16	29.5
4	4.500	0.237	0.09	2.2	0.18	4.6	0.33	8.5	0.57	14.4	0.91	23.1
5	5.563	0.258	0.06	1.4	0.12	2.9	0.21	5.4	0.37	9.3	0.59	14.9
6	6.625	0.280	0.04	1.0	0.08	2.1	0.15	3.8	0.26	6.5	0.41	10.5
8	8.625	0.322	0.02	0.6	0.05	1.2	0.09	2.2	0.15	3.8	0.24	6.1

32.8ft to 45.9ft Spans

SPS Schedule 80			Span Length (Feet (Metres))									
Nominal Size	OD	WT	32.8 (10)		36.1 (11)		39.4 (12)		42.7 (13)		45.9 (14)	
			Deflection									
in	in	in	in	mm	in	mm	in	mm	in	mm	in	mm
3	3.500	0.216	2.23	59.5								
3 1/2	4.000	0.226	1.69	45.0	2.48	65.8						
4	4.500	0.237	1.33	35.2	1.94	51.5	2.75	73.0				
5	5.563	0.258	0.86	22.7	1.25	33.2	1.78	47.1	2.55	64.8	3.43	87.2
6	6.625	0.280	0.60	15.9	0.88	23.3	1.24	33.0	1.79	45.5	2.41	61.2
8	8.625	0.322	0.35	9.3	0.51	13.6	0.73	19.2	1.04	26.5	1.40	35.6

49.2ft to 62.3ft Spans

SPS Schedule 80			Span Length (Feet (Metres))									
Nominal Size	OD	WT	49.2 (15)		52.5 (16)		55.8 (17)		59.1 (18)		62.3 (19)	
			Deflection									
in	in	in	in	mm	in	mm	in	mm	in	mm	in	mm
6	6.625	0.280	3.03	80.7	3.93	104.4						
8	8.625	0.322	1.77	46.9	2.29	60.7	2.92	77.4	3.68	97.3	4.56	120.8

Basis of Calculations
Maximum deflections shown here are calculated assuming a simply supported beam
Maximum deflections of beams fixed at both ends is approxiametly 1/5 of the values shown here
See Deflection and Stress Formulae page for equations

Nominal Dimensions and Weights

Metric Aluminum Busbar Tubes

Outside Diameter	Wall Thickness	Cross Sectional Area	Weight
mm	mm	mm^2	kg/m
50.0	4.0	578	1.57
50.0	6.0	829	2.24
63.0	4.0	741	2.01
63.0	6.0	1074	2.91
75.0	4.0	892	2.41
75.0	6.0	1301	3.52
80.0	4.0	955	2.58
80.0	6.0	1395	3.77
80.0	10.0	2199	5.94
100.0	4.0	1206	3.26
100.0	6.0	1772	4.79
100.0	8.0	2312	6.25
100.0	10.0	2827	7.64
120.0	4.0	1458	3.94
120.0	6.0	2149	5.81
120.0	8.0	2815	7.61
120.0	10.0	3456	9.34
125.0	6.0	2243	6.06
125.0	10.0	3613	9.76
140.0	6.0	2526	6.82
140.0	8.0	3318	8.96
140.0	10.0	4084	11.03
150.0	8.0	3569	9.64
150.0	10.0	4398	11.88
150.0	12.0	5202	14.05
160.0	6.0	2903	7.84
160.0	8.0	3820	10.32
160.0	10.0	4712	12.73
160.0	12.0	5579	15.07
200.0	6.0	3657	9.88
200.0	8.0	4825	13.03
200.0	10.0	5969	16.12
200.0	12.0	7087	19.14
250.0	6.0	4599	12.42
250.0	8.0	6082	16.43
250.0	10.0	7540	20.36
250.0	12.0	8972	24.23

Current Ratings by Temperature

Metric Aluminum Busbar Tubes

0-25°C Ambient, Operating Temperature 90°C maximum

Aluminum Tube			Current Rating					
Outside Diameter	Wall Thickness	Cross Sectional Area	0°C Ambient	5°C Ambient	10°C Ambient	15°C Ambient	20°C Ambient	25°C Ambient
mm	mm	mm²	Amps	Amps	Amps	Amps	Amps	Amps
50.0	4.0	578	1604	1548	1490	1431	1371	1309
50.0	6.0	829	1920	1852	1783	1713	1641	1566
63.0	4.0	741	1958	1889	1819	1747	1673	1598
63.0	6.0	1074	2355	2272	2188	2101	2012	1921
75.0	4.0	892	2275	2195	2113	2030	1944	1856
75.0	6.0	1301	2744	2647	2549	2448	2345	2239
80.0	4.0	955	2405	2320	2234	2146	2055	1962
80.0	6.0	1395	2903	2801	2697	2590	2481	2369
80.0	10.0	2199	3587	3461	3332	3200	3065	2927
100.0	4.0	1206	2913	2811	2706	2599	2490	2377
100.0	6.0	1772	3527	3403	3277	3147	3014	2878
100.0	8.0	2312	4013	3872	3728	3581	3430	3274
100.0	10.0	2827	4384	4230	4073	3912	3747	3577
120.0	4.0	1458	3408	3289	3167	3041	2913	2781
120.0	6.0	2149	4134	3989	3841	3689	3533	3373
120.0	8.0	2815	4713	4547	4378	4205	4028	3845
120.0	10.0	3456	5159	4978	4793	4603	4409	4209
125.0	6.0	2243	4284	4134	3980	3823	3661	3495
125.0	10.0	3613	5350	5162	4970	4774	4572	4365
140.0	6.0	2526	4729	4563	4393	4219	4041	3858
140.0	8.0	3318	5398	5208	5015	4816	4613	4404
140.0	10.0	4084	5917	5709	5497	5279	5057	4828
150.0	8.0	3569	5735	5534	5328	5118	4902	4680
150.0	10.0	4398	6290	6069	5844	5613	5376	5133
150.0	12.0	5202	6709	6474	6233	5986	5734	5474
160.0	6.0	2903	5313	5126	4936	4741	4541	4335
160.0	8.0	3820	6070	5857	5640	5417	5188	4953
160.0	10.0	4712	6661	6427	6188	5943	5693	5435
160.0	12.0	5579	7108	6858	6603	6342	6075	5800
200.0	6.0	3657	6457	6231	5999	5762	5519	5269
200.0	8.0	4825	7388	7129	6864	6592	6314	6028
200.0	10.0	5969	8118	7833	7542	7244	6938	6624
200.0	12.0	7087	8675	8370	8059	7741	7414	7078
250.0	6.0	4599	7854	7579	7297	7008	6713	6409
250.0	8.0	6082	8996	8680	8358	8027	7688	7340
250.0	10.0	7540	9895	9548	9193	8830	8457	8074
250.0	12.0	8972	10586	10214	9835	9446	9047	8638

Basis of Ratings Calculations	
Material	6101 T6 Aluminum Alloy
Resistivity (at 20°C)	0.030μΩm
Wind Velocity	0.6 m/s
Conductor Emissivity	0.5

Current Ratings by Temperature

Metric Aluminum Busbar Tubes

30-50°C Ambient, Operating Temperature 90°C maximum

Aluminum Tube			Current Rating				
Outside Diameter	Wall Thickness	Cross Sectional Area	30°C Ambient	35°C Ambient	40°C Ambient	45°C Ambient	50°C Ambient
mm	mm	mm²	Amps	Amps	Amps	Amps	Amps
50.0	4.0	578	1245	1179	1111	1040	966
50.0	6.0	829	1490	1411	1329	1245	1156
63.0	4.0	741	1520	1439	1356	1270	1179
63.0	6.0	1074	1828	1731	1631	1527	1418
75.0	4.0	892	1766	1672	1575	1475	1370
75.0	6.0	1301	2130	2017	1900	1779	1653
80.0	4.0	955	1866	1767	1665	1559	1448
80.0	6.0	1395	2253	2134	2011	1882	1749
80.0	10.0	2199	2784	2636	2484	2326	2161
100.0	4.0	1206	2261	2141	2018	1889	1755
100.0	6.0	1772	2737	2593	2443	2287	2125
100.0	8.0	2312	3115	2950	2779	2602	2417
100.0	10.0	2827	3403	3223	3036	2843	2641
120.0	4.0	1458	2645	2505	2361	2210	2053
120.0	6.0	2149	3209	3039	2863	2681	2490
120.0	8.0	2815	3658	3464	3264	3056	2839
120.0	10.0	3456	4004	3792	3573	3345	3108
125.0	6.0	2243	3325	3149	2967	2778	2581
125.0	10.0	3613	4152	3932	3705	3469	3223
140.0	6.0	2526	3670	3476	3275	3066	2849
140.0	8.0	3318	4189	3968	3738	3500	3252
140.0	10.0	4084	4592	4349	4098	3836	3564
150.0	8.0	3569	4451	4216	3972	3719	3455
150.0	10.0	4398	4882	4624	4356	4079	3789
150.0	12.0	5202	5207	4932	4646	4350	4041
160.0	6.0	2903	4124	3905	3679	3445	3200
160.0	8.0	3820	4712	4462	4204	3936	3657
160.0	10.0	4712	5170	4896	4613	4319	4012
160.0	12.0	5579	5517	5225	4922	4609	4282
200.0	6.0	3657	5012	4747	4472	4187	3890
200.0	8.0	4825	5734	5431	5117	4791	4451
200.0	10.0	5969	6301	5967	5622	5264	4890
200.0	12.0	7087	6733	6377	6008	5625	5226
250.0	6.0	4599	6096	5773	5440	5093	4731
250.0	8.0	6082	6982	6613	6230	5833	5419
250.0	10.0	7540	7680	7274	6853	6416	5961
250.0	12.0	8972	8216	7781	7331	6864	6377

Basis of Ratings Calculations	
Material	6101 T6 Aluminum Alloy
Resistivity (at 20°C)	0.030μΩm
Wind Velocity	0.6 m/s
Conductor Emissivity	0.5

Short Circuit Ratings

Metric Aluminum Busbar Tubes

Aluminum Tube			Current Rating	
Outside Diameter	Wall Thickness	Cross Sectional Area	3 Second Short Circuit Duration	1 Second Short Circuit Duration
mm	mm	mm²	kA	kA
50.0	4.0	578	31.7	54.9
50.0	6.0	829	45.5	78.8
63.0	4.0	741	40.7	70.4
63.0	6.0	1074	58.9	102.1
75.0	4.0	892	48.9	84.8
75.0	6.0	1301	71.3	123.6
80.0	4.0	955	52.4	90.7
80.0	6.0	1395	76.5	132.5
80.0	10.0	2199	120.6	208.9
100.0	4.0	1206	66.2	114.6
100.0	6.0	1772	97.2	168.3
100.0	8.0	2312	126.8	219.7
100.0	10.0	2827	155.1	268.6
120.0	4.0	1458	80.0	138.5
120.0	6.0	2149	117.9	204.1
120.0	8.0	2815	154.4	267.4
120.0	10.0	3456	189.5	328.3
125.0	6.0	2243	123.0	213.1
125.0	10.0	3613	198.2	343.2
140.0	6.0	2526	138.5	240.0
140.0	8.0	3318	182.0	315.2
140.0	10.0	4084	224.0	388.0
150.0	8.0	3569	195.7	339.0
150.0	10.0	4398	241.2	417.8
150.0	12.0	5202	285.3	494.2
160.0	6.0	2903	159.2	275.8
160.0	8.0	3820	209.5	362.9
160.0	10.0	4712	258.5	447.7
160.0	12.0	5579	306.0	530.0
200.0	6.0	3657	200.6	347.4
200.0	8.0	4825	264.7	458.4
200.0	10.0	5969	327.4	567.1
200.0	12.0	7087	388.7	673.3
250.0	6.0	4599	252.3	436.9
250.0	8.0	6082	333.6	577.8
250.0	10.0	7540	413.5	716.3
250.0	12.0	8972	492.1	852.4

Basis of Ratings Calculations	
Ambient Temperature	20°C
Conductor Temperature - Continuous	70°C
Conductor Temperature - Short Time	250°C

Thermal Expansion

Metric Aluminum Busbar Tubes

10-50°C Temperature Change

Length		Change in Length									
		10°C temperature change		20°C temperature change		30°C temperature change		40°C temperature change		50°C temperature change	
ft	m	in	mm	in	mm	in	mm	in	mm	in	mm
10	3.05	0.028	0.7	0.055	1.4	0.083	2.1	0.11	2.8	0.138	3.5
20	6.1	0.055	1.4	0.110	2.8	0.166	4.2	0.221	5.6	0.276	7.0
30	9.14	0.083	2.1	0.166	4.2	0.284	6.3	0.331	8.4	0.414	10.5
40	12.19	0.110	2.8	0.221	5.6	0.331	8.4	0.442	11.2	0.552	14.0
50	15.24	0.138	3.5	0.276	7.0	0.414	10.5	0.552	14.0	0.690	17.5
60	18.29	0.166	4.2	0.331	8.4	0.497	12.6	0.662	16.8	0.828	21.0
70	21.34	0.192	4.9	0.386	9.8	0.580	14.7	0.773	19.6	0.966	24.5
80	24.38	0.221	5.6	0.442	11.2	0.662	16.8	0.883	22.4	1.104	28.0
90	27.43	0.248	6.3	0.497	12.6	0.745	18.9	0.994	25.2	1.242	31.5
100	30.48	0.276	7.0	0.522	14.0	0.828	21.0	1.104	28.0	1.380	35.0

60-100°C Temperature Change

Length		Change in Length									
		60°C temperature change		70°C temperature change		80°C temperature change		90°C temperature change		100°C temperature change	
ft	m	in	mm	in	mm	in	mm	in	mm	in	mm
10	3.05	0.166	4.2	0.193	4.9	0.221	5.6	0.248	6.3	0.276	7.0
20	6.10	0.331	8.4	0.386	9.8	0.442	11.2	0.497	12.6	0.552	14.0
30	9.14	0.497	12.6	0.580	14.7	0.662	16.8	0.745	18.9	0.828	21.0
40	12.19	0.662	16.8	0.773	19.6	0.883	22.4	0.994	25.2	1.104	28.0
50	15.24	0.828	21.0	0.966	24.5	1.104	28.0	1.242	31.5	1.38	35.1
60	18.29	0.994	25.2	1.159	29.4	1.325	33.7	1.49	37.8	1.656	42.1
70	21.34	1.159	29.4	1.352	34.3	1.546	39.3	1.739	44.2	1.932	49.1
80	24.38	1.325	33.7	1.546	39.3	1.766	44.9	1.987	50.5	2.208	56.1
90	27.43	1.49	37.8	1.739	44.2	1.987	50.5	2.236	56.8	2.484	63.1
100	30.48	1.656	42.1	1.932	49.1	2.208	56.1	2.484	63.1	2.76	70.1

Basis of Calculations	
Coefficient of Thermal Expansion	0.000023 in/in.°C

Deflection Values

Metric Aluminum Busbar Tubes

5.0-13.0m Spans

Tube Size		Span Length (m)								
OD (mm)	WT (mm)	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
50.0	4.0	11.6	24.1	44.6						
50.0	6.0	12.6	26.0	48.2						
63.0	4.0	7.1	14.7	27.2	46.4					
63.0	6.0	7.5	15.6	29.0	49.4					
75.0	4.0	4.9	10.2	18.8	32.1	51.4				
75.0	6.0	5.2	10.7	19.8	33.8	54.2				
80.0	4.0	4.3	8.9	16.4	28.0	44.9				
80.0	6.0	4.5	9.3	17.3	29.4	47.2				
80.0	10.0	5.0	10.3	19.0	32.5	52.0				
100.0	4.0	2.7	5.6	10.3	17.6	28.2	42.9	62.8		
100.0	6.0	2.8	5.8	10.7	18.3	29.3	44.7	65.4		
100.0	8.0	2.9	6.0	11.2	19.0	30.5	46.5	68.0		
100.0	10.0	3.0	6.3	11.6	19.8	31.7	48.3	70.7		
120.0	4.0	1.8	3.8	7.1	12.0	19.3	29.4	43.1	61.0	
120.0	6.0	1.9	3.9	7.3	12.5	19.9	30.4	44.5	63.0	
120.0	8.0	2.0	4.1	7.5	12.9	20.6	31.4	46.0	65.2	
120.0	10.0	2.0	4.2	7.8	13.3	21.3	32.5	47.5	67.3	
125.0	6.0	1.7	3.6	6.7	11.4	18.3	27.9	40.9	57.9	
125.0	10.0	1.9	3.9	7.1	12.2	19.5	29.7	43.5	61.7	
140.0	6.0	1.4	2.9	5.3	9.0	14.4	22.0	32.2	45.7	62.9
140.0	8.0	1.4	2.9	5.4	9.3	14.9	22.7	33.2	47.0	64.7
140.0	10.0	1.5	3.0	5.6	9.5	15.3	23.3	34.1	48.3	66.6
150.0	8.0	1.2	2.5	4.7	8.0	12.9	19.6	28.7	40.6	55.9
150.0	10.0	1.3	2.6	4.8	8.2	13.2	20.1	29.4	41.7	57.4
150.0	12.0	1.3	2.7	5.0	8.5	13.5	20.6	30.2	42.8	59.0
160.0	6.0	1.0	2.2	4.0	6.8	10.9	16.7	24.4	34.6	47.6
160.0	8.0	1.1	2.2	4.1	7.0	11.2	17.1	25.0	35.5	48.8
160.0	10.0	1.1	2.3	4.2	7.2	11.5	17.5	25.7	36.4	50.1
160.0	12.0	1.1	2.3	4.3	7.4	11.8	18.0	26.3	37.3	51.3
200.0	6.0	0.7	1.4	2.5	4.3	6.9	10.5	15.4	21.8	30.0
200.0	8.0	0.7	1.4	2.6	4.4	7.0	10.7	15.7	22.2	30.6
200.0	10.0	0.7	1.4	2.6	4.5	7.2	10.9	16.0	22.7	31.3
200.0	12.0	0.7	1.4	2.7	4.6	7.3	11.2	16.3	23.2	31.9
250.0	6.0	0.4	0.9	1.6	2.7	4.4	6.7	9.7	13.8	19.0
250.0	8.0	0.4	0.9	1.6	2.8	4.4	6.8	9.9	14.0	19.3
250.0	10.0	0.4	0.9	1.6	2.8	4.5	6.9	10.1	14.2	19.6
250.0	12.0	0.4	0.9	1.7	2.9	4.6	7.0	10.2	14.5	19.9

(Continued)

Deflection Values

Metric Aluminum Busbar Tubes

14.0-21.0m Spans

Tube Size		Span Length (m)							
OD (mm)	WT (mm)	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
140.0	6.0	84.6							
140.0	8.0	87.0							
140.0	10.0	89.5							
150.0	8.0	75.2							
150.0	10.0	77.3							
150.0	12.0	79.3							
160.0	6.0	64.1	84.4						
160.0	8.0	65.7	86.6						
160.0	10.0	67.3	88.8						
160.0	12.0	69.0	91.0						
200.0	6.0	40.4	53.2	68.9	87.8	110.4			
200.0	8.0	41.2	54.3	70.3	89.6	112.6			
200.0	10.0	42.0	55.4	71.7	91.4	114.9			
200.0	12.0	42.9	56.5	73.2	93.2	117.2			
250.0	6.0	25.6	33.7	43.6	55.5	69.8	86.7	106.4	129.3
250.0	8.0	26.0	34.2	44.3	56.4	70.9	88.1	108.1	131.4
250.0	10.0	26.4	34.8	45.0	57.4	72.1	89.5	109.9	133.5
250.0	12.0	26.8	35.3	45.7	58.3	73.2	90.9	111.6	135.7

Basis of Calculations
Maximum deflections shown here are calculated assuming a simply supported beam
Maximum deflections of beams fixed at both ends is approxiametly 1/5 of the values shown here
See Deflection and Stress Formulae page for equations

Standards

Busbar Tube and Flexible Conductor Fittings, Design, Testing and Manufacture

The following standards are used by PLP for the design and supply of POWERFORMED™ Products and Systems.

Design Standards		
AS 62271.301	High voltage switchgear 301: Dimensional standardization of terminals	2005
BS 159	Specification for high voltage busbars and busbar connections	1992
NEMA CC 1	Electrical Power Connections for Substations	2009
AS1154.1	Insulator and Conductor fittings for overhead power lines. Performance, material, general requirements and dimensions	2009
AS1154.3	Insulator and Conductor fittings for overhead power lines. Performance and General requirements for helical fittings	2009
IEC 60865	Short circuit currents - Calculation of effects Part 1 Definitions and calculation methods	2011
IEEE 605	IEEE Guide for bus design in air insulated substations	2008
Testing Standards		
IEC 61238-1 2nd Edition	Compression and mechanical connectors for power cables with copper or aluminum conductors - Part 1: Test methods and requirements	2nd Edition (2003)
IEC 61284	Overhead lines - Requirements and tests for fittings	1997
ANSI C119.4	Connectors for use between aluminum to aluminum and aluminum to cooper conductors designed for normal operation at or below 93 degree C and copper to copper conductors designed for normal operation at or below 100 degree C	2011
Material Standards		
AS/NZS 1531	Conductors - Bare overhead - Aluminum and Aluminum Alloy	1991
BS 2898	Specification for wrought aluminum and aluminum alloys for electrical purposes - bars, extruded round tubes and sections	1970
AS 1866	Aluminum and Aluminum alloys - Extruded rod, bar, solid and hollow shapes	1997
AS 2848.1	Aluminum and Aluminum alloys - Compositions and designations - Wrought products	1998
AS 3607	Conductors - Bare overhead, aluminum and aluminum alloy - Steel reinforced	1989
BS EN 755-2	Aluminum and aluminum alloys - extruded rod/bar, tube and profiles. Mechanical properties	2008
BS EN 1706	Aluminum and aluminum alloys - Castings. Chemical composition and mechanical properties	2010
ADC Handbook	Australian Aluminum Council Specifications	1994
Manufacturing Standards		
AS 1665	Welding of Aluminum structures	2004
Miscellaneous Standards		
AS/NZS 4680	Hot dip galvanized (zinc) coatings on fabricated ferrous articles	2006
IEC 17025	General requirements for the competence of testing and calibration laboratories	2005

Busbar Tube Aluminum Alloys

Mechanical and Electrical Properties

Bus Alloys: Comparison Of Properties

Alloy and Temper	Thermal Conductivity At 25°C (W/m.k)	Electrical Conductivity At 20°C % IACS Equal Volume	Electrical Resistivity at 20°C (μΩ.m)	Average Coefficient of Thermal Expansion Per °C	Melting Range Approx (°C)	Ultimate Tensile Strength (MPa) Min	Yeild Tensile Strength (MPa) Min
6060 T5	209	55	0.031	23.4	615-650	150	110
6060 T6	201	54	0.032	23.4	615-650	205	170
6061 T6	167	43	0.040	23.4	580-650	260	240
6063 T5	209	55	0.031	23.4	615-650	120	110
6063 T6	201	53	0.033	23.4	615-650	205	170
6101 T5	218	57	0.030	23.4	615-650	150	110
6101 T6	218	57	0.030	23.4	615-650	205	170

Alloys For Compression Fitting Barrels: Comparison Of Properties

Alloy and Temper	Thermal Conductivity At 25°C (W/m.k)	Electrical Conductivity At 20°C % IACS Equal Volume	Electrical Resistivity at 20°C (μΩ.m)	Average Coefficient of Thermal Expansion Per °C	Melting Range Approx (°C)	Ultimate Tensile Strength (MPa) Min	Yeild Tensile Strength (MPa) Min
1350 - F	234	61	0.028	23.8	645-655	60	30
1200 - F	222	60	0.029	24.0	645-655	90	35

Temper Designation Table			
U.K/EN	U.S.A. or CANADA	ISO Temper	Description of Designation
O	O	O	Annealed
F	F	F	As fabricated, as manufactured or as cast
T3	T3	TD	Solution heat treated, cold worked and naturally aged
T4	T4	TB	Solution heat treated, naturally aged and amenable to artificial ageing
T5	T5	TE	Artificially aged or precipitation heat treated
T6	T6	TF	Solution heat treated and precipitation heat treated

Sources:
Aluminum Development Council of Australia handbook
BSEN 755-2 : 1997 Aluminum and aluminum alloys – Extruded rod/bar, tube and profilesw

Busbar Tube Aluminum Alloys

Mechanical and Electrical Properties

Actual Temper Designations

Temper designations occur as a suffix at the end of the alloy's numeric designation, an example would be 6061-T6, the "T6" is the temper designation.

F	means the alloy is "as fabricated", no special control over strain hardening is noted
O	means that is has been annealed only, the alloy has been recrystallized, this is the softest temper
H1	means that it has strain hardened only
H2	means that it has been strain hardened and partially annealed
H3	means that it has been strain hardened and thermally stabilized
W	means that is has been solution heat treated
T1	means that it has been partially solution heat treated (cooled from an elevated-temperature shaping process such as extrusion), and naturally aged
T2	means that it has been cooled from an elevated-temperature shaping process, (casting), cold worked, and naturally aged
T3	means that it has been solution heat treated, then cold worked and naturally aged
T4	means that it has been solution heat treated, and naturally aged, it applies to alloys not cold worked after solution treatment, or where the effect of cold working may not be recognized in applicable specifications
T5	means that it has been partially solution heat treated and artificially aged, the temper is produced after an elevated temperature, rapid cool fabrication process, (like extrusion)
T6	means that it has been solution heat treated and then artificially aged, without cold working
T7	means that it has been solution heat treated and stabilized to control characteristics such as grain growth, distortion, or residual stresses
T8	means that it has been solution heat treated, then cold worked, and artificially aged
T9	means that it has been solution heat treated, artificially aged, and then cold worked
T10	means that it has been partially solution treated (cooled from an elevated shaping process, such as extrusion), cold worked, then artificially aged

Deflection and Stress Formulae

For Standard Pipe Size (SPS) and Metric Aluminum Busbar Tubes

			Continuous Beam	
	Simply Supported Beam	Beam Fixed At Both Ends	2 Spans	More Than 2 Spans
Maximum Deflection	$D = \frac{5wL^4}{384EI}$	$D = \frac{wL^4}{384EI}$	$D = \frac{wL^4}{185EI}$	①
Maximum Moment	$M = \frac{wL^2}{8}$ ②	$M = \frac{wL}{12}$ ③	$M = \frac{wL^2}{8}$ ④	$M = 0.107wL^2$ ④
Fiber Stress	$f^1 = \frac{wL^2}{8S}$ ②	$f^1 = \frac{wL^2}{12S}$ ③	$f^1 = \frac{wL^2}{8S}$ ④	$f^1 = \frac{0.107wL^2}{S}$ ④
Maximum Load	$W = \frac{8fS}{L}$	$W = \frac{12fS}{L}$	$W = \frac{8fS}{L}$	$W = \frac{fS}{0.1071}$
Maximum Span	$L = \sqrt{\frac{8fS}{w}}$	$L = \sqrt{\frac{12fS}{w}}$	$L = \sqrt{\frac{8fS}{w}}$	$L = \sqrt{\frac{fS}{0.107w}}$

Symbols:	**Units:**
D = deflection	in
w = load	lb/in
W = total uniform load	lb
L = span	in
E = modulus of elasticity	lb/in²
I = second moment of area ④	in
M = bending moment	lb.in
S = section modulus ②	in
f^1 = fiber stress	lb/in²
f = maximum allowable fiber stress	lb/in²

Notes:

① Maximum deflection occurs in the end spans and is only slightly more than that for a continuous beam of 2 spans.

② Maximum moment and fiber stress for simple beams occur at the center of the span.

③ Maximum moment and fiber stress for beams fixed at both ends occur at the points of support.

④ Maximum moment and fiber stress for continous beams occur at the second support from each end.

Aluminum Casting Alloys

Specification, Designations, Compositions and Properties

Specification Designations

Aluminum Association (AA)	Aluminium Development Council of Australia (ADC)	British Standard (BS)	France NF A57-702 NF A57-703	Germany DIN 1725	Italy U.N.I.
A413	CC401	LM6	A-S13	G-AlSi12	4514
A356	CC601	LM25	AS7G	-	3599

Aluminum Association (AA)	Japan JIS	Spain UNE	Sweden SIS	ISO
A413	AC3A	L-2520	144261	Al-Si 12
A356	AC4C	L-2651	144244	Al-Si7Mg

Chemical Composition Of Aluminium Castings (BS1490:1988)

Alloy	Silicon (Si)	Iron (Fe)	Copper (Cu)	Manganese (Mn)	Magnesium (Mg)	Nickel (Ni)
LM6	10.0 - 13.0	0.6*	0.1*	0.5*	0.1*	0.1*
LM25	6.5 - 7.5	0.5*	0.2*	0.3*	0.2 - 0.6	0.1*

Alloy	Zinc (Zn)	Tin (Sn)	Lead (Pb)	Titanium (Ti)	Other Elements	Aluminium (Al)
LM6	0.1*	0.05*	0.1*	0.2*	0.2*	Remainder
LM25	0.1*	0.05*	0.1*	0.2*	0.2*	Remainder

*Maximum Value

Typical Properties Of Aluminium Castings

Alloy and Temper	Casting Method	Thermal Conductivity At 25°C (W/m.K)	Electrical Conductivity At 20°C (%IACS Equal Volume)	Density (kg/m³)
CC401 F1	Sand	142	37	2650
	Permanent Mould	142	37	2650
CC601 T5	Sand	151	39	2680
	Permanent Mould	151	40	2680

Damping Conductors

Application in All Busbar Tubes

When the calculated resonant frequency of a length of busbar tube is less than 2.75 Hz in accordance with IEC 60865-1, damping is normally required to minimise aeolian vibration.

PLP recommend damping a busbar tube by installing a flexible conductor (AAC, ACSR or AAAC) inside the busbar tube fixed to the tube at one end. Damping conductors can be fixed into the tube by spot welding or by using a damping conductor type flat end cap or corona end cap.

Normally the flexible conductor mass per unit length should be between 10% and 15% of the mass per unit length of the busbar. In addition, the flexible conductor should be no less than two thirds the length of the busbar.

Examples (Standard Pipe Size Aluminum Tubes)

Nominal Tube Size	Tube Wall Thickness	Tube Mass / Unit Length lb/ft	Damping Conductor Type kcmil	Damping Conductor Mass / Unit Length lb/ft	Mass Per Unit Length Ratio
6" SPS	Schedule 40	6.564	795	0.745	11.4%
5" SPS	Schedule 80	7.188	1272	1.192	16.5%
3" SPS	Schedule 40	2.621	336.4	0.315	12.0%

Examples (Metric Aluminum Tubes)

Tube Outside Diameter (OD)	Tube Wall Thickness (WT)	Tube Mass / Unit Length kg/m	Damping Conductor Type	Damping Conductor Mass / Unit Length kg/m	Mass Per Unit Length Ratio
200.0 mm	6.0 mm	9.88	Cicada	1.73	17.5%
160.0 mm	10.0 mm	12.73	Venus	1.86	14.6%
120.0 mm	8.0 mm	7.61	Centipede	1.15	15.0%

Expansion Supports and Connectors

All Busbar Tubes

Within substations, thermal expansion and contraction of busbar tubes occurs as a result of variations in busbar temperature. Busbar temperatures increase when there is a higher electrical load or if, given a constant load, the ambient temperature increases (summer). This will cause the busbar to expand. Busbar temperatures decrease when there is a lighter electrical load or if, given a constant load, the ambient temperature decreases (winter). This will cause the busbar to contract.

Elsewhere in the General Information section of this catalogue, PLP lists values for the thermal expansion of Standard Pipe Size (SPS) and Metric aluminium busbar tubes. The thermal expansion tables list the change in length of Standard Pipe Size (SPS) and Metric aluminium busbar tubes based on changes in temperature over given busbar tube lengths.

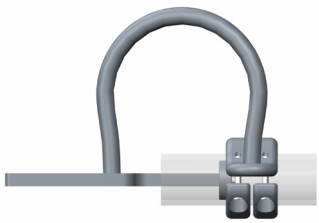
The values for expansion and contraction of busbar tubes are not dependent on the busbar tube outside diameter or wall thickness i.e. for the same span length, every size of busbar tube will expand and contract the same amount in the axial direction based on identical temperature changes. For example, a 50 foot span of a 5" SPS Schedule 40 busbar tube will expand 0.69 inches (17.5mm) based on a temperature change of 50°C. A 50 foot span of a 3" SPS Schedule 80 busbar tube will also expand 0.69 inches (17.5mm) based on the same temperature change of 50°C.

BUSLIGN™ expansion fittings for busbar tubes are applied when busbars are being connected to primary equipment (e.g. an HV disconnector) or located on top of post insulators. The expansion supports eliminate the possibility of the busbar tube applying a mechanical load to the substation primary equipment or post insulators. Mechanical load applied to substation primary equipment can potentially damage the equipment or pre-load the equipment connections so that in the event of a short circuit the mechanical forces applied to the equipment are intensified.

POWERFORMED™ expansion type BUSLIGN™ fittings are designed, when installed correctly, to account for a busbar tube operational temperature range of -20°C to 90°C continuous. For example, if a BUSLIGN™ expansion type primary equipment connector is installed on the end of a 50 foot busbar which is at 20°C (equal to ambient), the assembly can account for at least 0.966 inches (24.5mm) of expansion which will occur when the busbar reaches an operating temperature of 90°C. It can also account for a contraction of at least 0.552 inches (14.0mm) which will occur when the busbar reaches an operating temperature of -20°C.

Busbar temperature = -20°C

Busbar temperature = 20°C
(As Installed)



Busbar temperature = 90°C

Principles of Electrical Jointing

For Aluminum and Copper Conductors

CORROSION OF CONNECTORS

Two factors are associated with corrosion:
1. Atmospheric action
2. Galvanic action

For atmospheric action to result in corrosion, there must be moisture and oxygen. Galvanic action results in corrosion when two dissimilar metals in the electrolytic series, for example, aluminum and copper, are in physical contact. In this case, moisture acts as an electrolyte. In such an instance, the copper becomes a cathode and receives a positive charge; the aluminum becomes the anode and receives a negative charge.

The resultant current flow attacks the aluminum leaving the copper unharmed. Both factors described above are influenced by environmental conditions -the chemical attack of airborne pollutants. This occurs in rural areas to a lesser extent than in urban centers and more so in heavy industry locations such as steelworks, chemical plants, refineries, etc.

The problem of the mechanical jointing of two dissimilar metals in physical contact with each other, such as aluminum and copper, stems from their difference in electrical potential.

The column of metals listed here shows their relative positions in the Electrolytic Series, with the more anodic metals in the higher positions and the more cathodic in the lower.

The extent, or severity, of the corrosive action is proportional to the distance of separation of the metals in the list. i.e. the magnitude of the difference in electrolytic potential of the two metals, aluminum and copper, is quite considerable.

Aluminum to Aluminum Connections
No problem exists in the jointing of these conductors as electrolytic action is nonexistent. Nevertheless, care must be taken to prevent crevice corrosion and to select an aluminum alloy connector body not liable to stress corrosion cracking.

Aluminum to Copper Connections
The best choice is an aluminum bodied connector since it is not subject to the galvanic attack of the more vulnerable element - the aluminum conductor. It is essential to use a jointing compound on the aluminum connector body and brushed into the strands of the aluminum conductor. Wherever possible, install the aluminum conductor above the copper to prevent pitting from the galvanic action of copper salts washing over the aluminum connector and conductor when in a lower position.

Copper to Copper Connections
No problem exists in the jointing of these conductors as electrolytic action is non-existent.

THE ELECTROLYTIC SERIES

ANODIC
(Corroded End)

- **Magnesium**
- **Aluminum**
- **Duralumin**
- **Zinc**
- **Cadmium**
- **Iron**
- **Chromium Iron (active)**
- **Chromium-Nickel-Iron (active)**
- **Soft solder**
- **Tin**
- **Lead**
- **Nickel**
- **Brasses**
- **Bronze**
- **Monel**
- **Copper**
- **Chromium Iron (passive)**
- **Chromium-Nickel-Iron (passive)**
- **Silver solder**
- **Silver**
- **Gold**
- **Platinum**

CATHODIC
(Protected End)

Imperial Fastenings

Torque Settings

Recommended Tightening Torque For Galvanised Steel Bolts With Lubricant Coating

Bolt Diameter	Torque	
in	ft lbs	Nm
5/16	15	20
3/8	25	34
1/2	40	54
5/8	60	81
3/4	75	102

Recommended Tightening Torque For Galvanised Steel High Tensile Bolts With Lubricant Coating

Bolt Diameter	Torque	
in	ft lbs	Nm
5/16	15	20
3/8	25	34
1/2	40	54
5/8	60	81
3/4	75	102

Recommended Tightening Torque For Aluminum Bolts With Lubricant Coating

Bolt Diameter	Torque	
in	ft lbs	Nm
3/8	15	20
7/16	20	27
1/2	25	34
5/8	40	54
3/4	60	81

Recommended Tightening Torque For Stainless Steel Bolts with Lubricant Coating

Bolt Diameter	Torque	
in	ft lbs	Nm
5/16	11	14
3/8	20	27
1/2	43	58
5/8	92	124
3/4	128	172

Metric Fastenings

Torque Settings

Recommended Tightening Torque For Galvanised Steel Bolts With Lubricant Coating

Bolt Diameter	Torque	
	ft lbs	Nm
M12	33	45
M16	66	90

Recommended Tightening Torque For Galvanised Steel High Tensile Bolts With Lubricant Coating

Bolt Diameter	Torque	
	ft lbs	Nm
M12	33	45
M16	66	90

Recommended Tightening Torque For Aluminum Bolts With Lubricant Coating

Bolt Diameter	Torque	
	ft lbs	Nm
M12	25	34
M16	40	54

Recommended Tightening Torque For Stainless Steel

Bolt Diameter	Torque	
	ft lbs	Nm
M12	33	45
M16	66	90

Bolted Aluminum Joints

Installation Instructions

FASTENER SET ARRANGEMENTS

i. Typical fastener set arrangements are shown in Figures A, B, C and D below.

ii. Tools needed for installation (Fig 1) – Flat file, torque wrench, socket, spanner, stainless steel wire brush, Emery paper, Uni-Seal jointing compound.

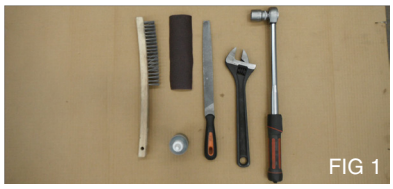


FIG 1

CONSTRUCTING THE JOINT

1. Remove the protective covering from the bolted joint palms. Inspect the contact surfaces and use a flat file to remove any raised imperfections (Fig 2).


FIG 2

2. Using a stainless steel wire brush, scouring pad or Emery paper, clean the contact surfaces of the palms (Fig 3). Apply Uni-Seal jointing compound to both contact surfaces immediately (Fig 4).

DO NOT USE THE SAME ABRASIVE TOOLS FOR COPPER AND ALUMINIUM AS THIS MAY CAUSE GALVANIC CORROSION.


FIG 3

3. Join the contact surfaces together and apply fasteners according to the correct arrangement illustrated in Figures A, B, C or D. Ensure the threads of the bolts are lubricated using a non-gritted compound or Uni-Seal jointing compound. Using a torque wrench, tighten the nut to the specified torque according to the bolt size (Fig 5).

For double nut arrangements (Fig B), apply the second nut and tighten against the first nut to the specified torque.


FIG 4

4. Wipe away any excess Uni-Seal jointing compound from the completed bolted aluminum electrical joint.


FIG 5

Fig A S/S OR HDG BOLTS AND NUTS WITH LARGE SERIES LOAD SPREADING WASHERS AND SPRING WASHERS

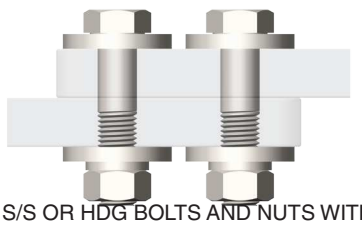


Fig B S/S OR HDG BOLTS AND NUTS WITH LARGE SERIES LOAD SPREADING WASHERS AND DOUBLE NUTS

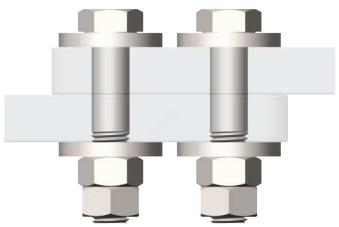


Fig C S/S OR HDG BOLTS AND NUTS WITH STANDARD SERIES WASHERS AND DOUBLE NUTS

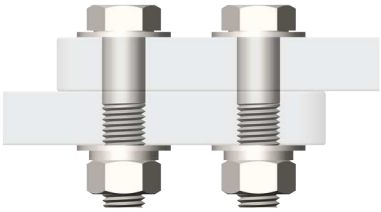
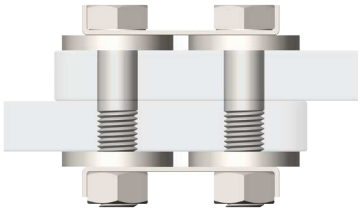


Fig D S/S BOLTS AND NUTS WITH LARGE SERIES WASHERS AND LOCKING PLATES



Non Tension Compression Fittings

Installation Instructions

I. Preparation

Make sure the conductor is in good condition along the full lenght of the joint. Cut away damaged or corroded sections before constructing the joint and ensure conductor ends are cut square and not deformed. To prevent interlayer slippage and birdcaging, the conductor should be secured at all times using a combination of electrical tape and hose clamps or twisted aluminium wire.

i. Determine the preparation method along the compression length (Fig i):
   a. For new, bright finish, fully greased conductors no unwinding of conductor layers is required. Cleaning and oxide removal is required on the outermost surface of the conductor only.
   b. For partially greased / ungreased conductors, all ungreased layers must be unwound and filled with POWERFORMED™ Uni-Seal jointing compound. Cleaning and oxide removal is required down to the layer in contact with the steel core or a maximum of two layers, whichever is less.
   c. For aged or dirty conductors – Ensure that all aluminium and steel strands are not corroded, and prepare as per Case (b) above.

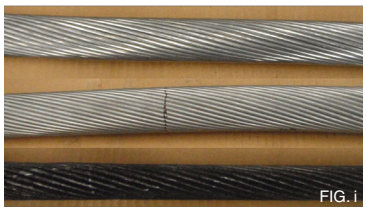


FIG. i

ii. Tools needed for installation (Fig ii) – Hacksaw, conductor trimming tool, tape measure, marker pen, zip ties, insulation tape, utility knife, stainless steel wire brush, Emery paper, Uni-Seal jointing compound, compression dies, compression tool, vernier callipers, file.

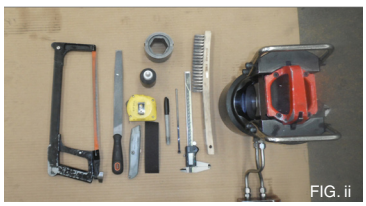


FIG. ii

II. Constructing the Joint

1. Ensure that the work area is clean, dry and protected from dust and water. Mark the conductor end at a distance to the knurl mark of the Joint (Fig 1). Straighten the conductor end to a distance of 2.5 times the marked length. Secure firmly at this point before preparing the conductor end (refer to Part I-i). For Case (a) proceed to Step 2, for Case (b) or (c) proceed to Step 3.

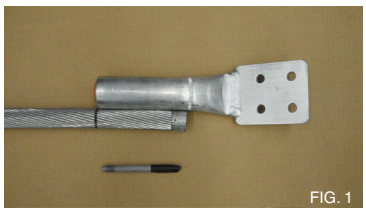


FIG. 1

2. Clean the outermost layer of the conductor end using a stainless steel wire brush, scouring pad or Emery paper, and apply POWERFORMED™ Uni-Seal jointing compound immediately (Fig 2). Proceed to Step 4.


FIG. 2

3. Secure the conductor end firmly at a distance 2.5 times the compression length. Unwind each layer in small groups, following the natural lay of the conductor, and allowing for access along the entire compression length (Fig 3a). Ensure that the strands are not deformed during this process. Starting at the innermost exposed layer, clean strands using a stainless steel wire brush, scouring pad or Emery paper, and apply POWERFORMED™ Uni-Seal jointing compound immediately. Wind the layers back (Fig 3b).

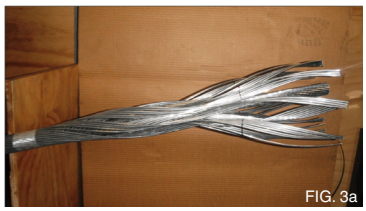


FIG. 3a


FIG. 3b

Non Tension Compression Fittings

Installation Instructions

4. Fully insert the conductor end into the compression barrel up to the mark. Using the correct aluminium die, compress the joint on to the conductor, starting at the knurl line and working out towards the conductor (Fig 4a). The die bites should be overlapped by a minimum of a half inch. Keep the joint as level as possible and rotate the fitting or die by one flat with each compression to avoid 'banana-ing' (Fig 4b).

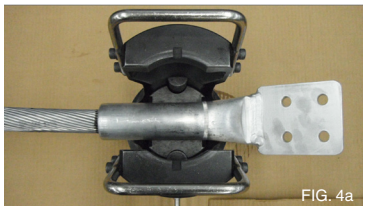


FIG. 4a

5. Remove any die flash or sharp edges with a file or Emery paper. Wipe away any excess jointing compound.

6. Measure the AF (across flat) dimensions across all faces of the joint in several locations to ensure that the correct compression has been achieved.


FIG. 4b

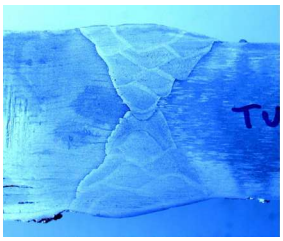
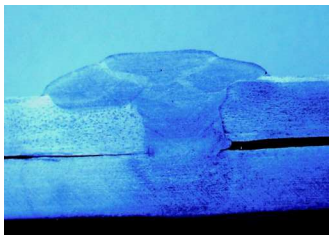
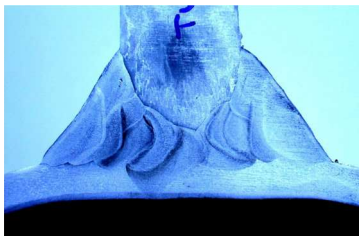
Welding

SUBLIGN™ and BUSLIGN™ Aluminum Fittings

Welding of high current aluminium substation busbar tubes, BUSLIGN™ busbar tube fittings and SUBLIGN™ flexible conductor fittings must be completed in accordance with a welding specification and welding procedure and must only be completed by properly trained and qualified personnel.

Welding Equipment	Both Metal Inert Gas (MIG) and Tungsten Inert Gas (TIG) welding are acceptable. The shielding gas must be pure argon or a helium argon mix and the filler wire must be type 4043.
Welding Environment	Welding must be carried out in a still, clean and dry environment. Welding POWERFORMED™ fittings, aluminium busbars or flexible conductors on a substation site will normally require an enclosure or tent to be erected around the welding area and the welder.
Welding Test Piece	Before site welding of POWERFORMED™ fittings, aluminium busbars or conductors, PLP recommends that a welding test piece is completed to demonstrate compliance with welding specifications and procedures. Contact PLP for welding test piece details.
Welding Procedure	The weld procedure must include (but not be limited to) specific instructions and details around weld preparation (chamfering), degreasing, tack welding, use of a stainless steel wire brush for cleaning, preheating, post weld cooling, location of the root run and the maximum temperature of the work for subsequent passes. Post weld processing and surface finish criteria should also be addressed.
Welding Destructive Testing	Macro examinations and fillet break-over tests are acceptable testing techniques for prequalifying weld test pieces.
Welding Non Destructive Testing	Both X-Ray and Ultrasound are acceptable non-destructive testing techniques for prequalifying weld test pieces and in-process testing of aluminium welds. Typical industrial x-ray images or busbar tube welds below.
Welding Acceptance Criteria	Loss of cross section of the weldment as a result of internal porosity shall not exceed 5% of the total cross sectional area of the weld. Good quality welding should not require grinding of the cap weld.

Typical X-Ray Non Destructive Weld Quality Analysis Images:

Jointing Compounds

Bolted and Compressed High Voltage High Current Connections

POWERFORMED™ Uniseal jointing compound manufactured by PLP is formulated to improve jointing conductivity and inhibit oxidation and corrosion between joint contact areas. Jointing compound should always be applied to the contact surfaces of all aluminium to aluminium connections prior to bolted or compressed installation.

POWERFORMED™ Uniseal jointing compound consists of lithium based grease, stable to 180°C, mixed with zinc particles. The base grease prevents water and contaminants interfering with the connection and prevents the formation of contact surface oxides. The zinc particles work to break down existing aluminium oxide on the conducting surfaces when those surfaces are brought together under pressure.

POWERFORMED™ Uniseal compound has been comparatively tested for resistance to water washout and the base grease selected for optimised anti-galling performance when used with stainless steel fastenings.

Flexible Conductors

Standard AAC Types and Specifications

Name	Size	OD		CSA		Stranding		Mass		Strength		Current Rating
	kcmil	mm	in	mm²	in²	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
Peachbell	6 AWG	4.67	0.184	13.3	0.021	7/1.55	7/0.061	37	25	2.5	563	74
Bug	28.8	4.89	0.193	14.6	0.023	7/1.63	7/0.064	40	27	2.3	515	79
Gemini	33.2	5.25	0.207	16.8	0.026	7/1.75	7/0.069	46	31	3.0	677	87
Thrip	38.3	5.64	0.222	19.4	0.030	7/1.88	7/0.074	53	36	3.0	685	96
Rose	4 AWG	5.88	0.231	21.1	0.033	7/1.96	7/0.077	58	39	3.7	825	102
Midget	46.0	6.18	0.243	23.3	0.036	7/2.06	7/0.081	64	43	3.7	822	109
Midge	45.9	6.20	0.244	23.3	0.036	7/2.06	7/0.081	64	43	4.0	899	109
Acacia	46.9	6.24	0.246	23.8	0.037	7/2.08	7/0.082	65	44	3.7	838	111
Namu	48.3	6.33	0.249	24.5	0.038	7/2.11	7/0.083	67	45	4.2	940	113
Lily	3 AWG	6.60	0.260	26.6	0.041	7/2.20	7/0.087	73	49	5.1	1147	120
Gnat	53.0	6.62	0.261	26.8	0.042	7/2.21	7/0.087	73	49	4.6	1032	120
Jupiter	54.9	6.75	0.266	27.8	0.043	7/2.25	7/0.089	77	51	4.8	1070	123
Poko	60.4	7.08	0.279	30.6	0.047	7/2.36	7/0.093	84	56	5.1	1151	132
Aphis	52.3	7.20	0.283	26.5	0.041	3/3.35	3/0.132	73	49	4.1	924	119
Iris	2 AWG	7.41	0.292	33.6	0.052	7/2.47	7/0.097	93	62	5.6	1266	141
Leo	67.8	7.50	0.295	34.4	0.053	7/2.50	7/0.098	94	63	5.7	1284	143
Mosquito	72.8	7.77	0.306	36.9	0.057	7/2.59	7/0.102	101	68	5.8	1300	150
Weevil	62.2	7.90	0.311	31.5	0.049	3/3.66	3/0.144	86	58	4.9	1093	135
Leonids	82.1	8.25	0.325	41.6	0.064	7/2.75	7/0.108	113	76	6.7	1511	163
Pansy	1 AWG	8.34	0.328	42.4	0.066	7/2.78	7/0.109	117	79	6.8	1535	165
Ladybird	84.7	8.37	0.330	42.9	0.067	7/2.79	7/0.110	117	79	6.9	1556	167
Kutu	97.7	9.00	0.354	49.5	0.077	7/3.00	7/0.118	135	91	7.9	1778	184
Libra	97.7	9.00	0.354	49.5	0.077	7/3.00	7/0.118	135	91	8.0	1794	184
Grub	97.7	9.00	0.354	49.5	0.077	7/3.00	7/0.118	136	91	7.8	1744	184
Ant	104.2	9.30	0.366	52.8	0.082	7/3.10	7/0.122	145	97	8.3	1866	193
Poppy	1/0 AWG	9.36	0.369	53.5	0.083	7/3.12	7/0.123	147	99	8.3	1864	194
Vitsippa	123.2	10.11	0.398	62.4	0.097	7/3.37	7/0.133	172	115	9.8	2200	216
Fly	125.7	10.20	0.402	63.7	0.099	7/3.40	7/0.134	174	117	10.0	2244	219
Aster	2/0 AWG	10.50	0.413	67.5	0.105	7/3.50	7/0.138	185	124	10.5	2349	228
Honi	131.1	10.50	0.413	66.4	0.103	19/2.11	19/0.083	182	122	11.4	2554	226
Rango	145.3	10.98	0.432	73.6	0.114	7/3.66	7/0.144	201	135	11.1	2504	243
Bluebottle	145.2	11.00	0.433	73.5	0.114	7/3.66	7/0.144	202	136	11.3	2549	243
Mars	152.6	11.30	0.445	77.3	0.120	7/3.75	7/0.148	211	142	11.8	2653	251
Earwig	155.0	11.35	0.447	78.6	0.122	7/3.78	7/0.149	216	145	12.3	2768	254
Grasshopper	166.0	11.70	0.461	84.1	0.130	7/3.91	7/0.154	230	155	12.8	2873	266
Phlox	3/0 AWG	11.79	0.464	85.0	0.132	7/3.93	7/0.155	234	157	12.7	2846	268
Moka	181.5	12.26	0.483	92.0	0.143	7/4.09	7/0.161	253	170	14.4	3241	283
Clegg	188.3	12.50	0.492	95.4	0.148	7/4.17	7/0.164	262	176	14.5	3266	291
Kattfot	196.0	12.75	0.502	99.3	0.154	7/4.25	7/0.167	273	184	15.6	3499	299
Wasp	209.1	13.18	0.519	106.0	0.164	7/4.39	7/0.173	290	195	16.0	3597	313
Oxlip	4/0 AWG	13.26	0.522	107.3	0.166	7/4.42	7/0.174	259	174	16.0	3588	315
Sunflower	211.5	13.40	0.528	107.2	0.166	19/2.68	19/0.106	295	198	16.8	3777	315
Beetle	209.9	13.40	0.528	106.4	0.165	19/2.67	19/0.105	292	196	17.2	3867	314
Mercury	219.7	13.50	0.531	111.3	0.173	7/4.50	7/0.177	304	204	16.9	3799	324
Weke	241.7	14.16	0.557	122.5	0.190	7/4.72	7/0.186	335	225	18.5	4159	346
Moon	244.8	14.30	0.563	124.0	0.192	7/4.75	7/0.187	339	228	18.9	4249	349
Sneezewort	250.0	14.40	0.567	126.7	0.196	7/4.80	7/0.189	349	235	18.9	4240	354
Valerian	250.0	14.55	0.573	126.7	0.196	19/2.91	19/0.115	349	235	22.1	4968	354
Bee	260.7	14.71	0.579	132.1	0.205	7/4.90	7/0.193	361	243	20.1	4519	364
Daisy	266.8	14.90	0.587	135.3	0.210	7/4.96	7/0.195	373	251	20.1	4525	371
Laurel	266.8	15.06	0.593	135.2	0.210	19/3.01	19/0.119	373	251	22.1	4970	370
Peony	300.0	15.95	0.628	152.1	0.236	19/3.19	19/0.126	419	282	25.8	5800	402
Cricket	311.6	16.08	0.633	157.9	0.245	7/5.36	7/0.211	432	290	23.9	5362	413
Hornet	311.1	16.26	0.640	157.6	0.244	19/3.25	19/0.128	433	291	24.7	5554	412
Gullviva	313.0	16.30	0.642	158.6	0.246	19/3.26	19/0.128	436	293	24.9	5588	414
Neptune	311.1	16.30	0.642	157.6	0.244	19/3.25	19/0.128	433	291	24.7	5553	412
Weta	330.5	16.75	0.659	167.5	0.260	19/3.35	19/0.132	461	310	26.2	5883	430
Tulip	336.4	16.92	0.666	170.6	0.264	19/3.38	19/0.133	470	316	27.4	6150	435
Hollyhock	335.9	16.94	0.667	170.2	0.264	37/2.42	37/0.095	468	314	26.7	5997	435
Gardenia	350.5	17.25	0.679	177.6	0.275	19/3.45	19/0.136	488	328	27.8	6259	448
Daffodil	350.0	17.25	0.679	177.3	0.275	19/3.45	19/0.136	488	328	30.2	6789	447
Orion	360.8	17.50	0.689	182.8	0.283	19/3.50	19/0.138	503	338	28.7	6452	457
Huhu	364.2	17.60	0.693	184.5	0.286	37/2.52	37/0.099	507	341	28.9	6503	460
Caterpillar	367.1	17.65	0.695	186.0	0.288	19/3.53	19/0.139	512	344	28.6	6436	462
Canna	397.5	18.40	0.724	201.6	0.312	19/3.68	19/0.145	556	374	30.6	6884	489
Pluto	414.1	18.80	0.740	209.8	0.325	19/3.75	19/0.148	576	387	31.9	7171	503
Chafer	420.8	18.92	0.745	213.2	0.330	19/3.78	19/0.149	586	394	33.4	7513	508
Mata	438.8	19.30	0.760	222.3	0.345	19/3.86	19/0.152	611	411	33.8	7587	523
Goldentuft	450.0	19.55	0.770	227.7	0.353	19/3.91	19/0.154	628	422	33.9	7621	532
Yarrow	449.6	19.60	0.772	227.8	0.353	37/2.80	37/0.110	627	421	35.7	8028	532
Spider	468.3	19.94	0.785	237.3	0.368	19/3.99	19/0.157	652	438	36.0	8095	548
Vallmo	475.9	20.10	0.791	241.2	0.374	19/4.02	19/0.158	663	446	37.8	8497	554

Flexible Conductors

Standard AAC Types and Specifications

Name	Size	OD		CSA		Stranding		Mass		Strength		Current Rating
	kcmil	mm	in	mm²	in²	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
Cosmos	477.0	20.14	0.793	241.6	0.374	19/4.02	19/0.158	666	448	37.2	8360	554
Syringa	477.0	20.19	0.795	241.5	0.374	37/2.88	37/0.114	666	448	38.7	8690	554
Zinnia	500.0	20.60	0.811	253.3	0.393	19/4.12	19/0.162	699	469	39.0	8760	573
Hyacinth	500.0	20.65	0.813	253.1	0.392	37/2.95	37/0.116	699	469	40.5	9110	573
Saturn	516.2	21.00	0.827	261.5	0.405	37/3.00	37/0.118	721	484	42.2	9487	586
Cockroach	523.6	21.10	0.831	265.3	0.411	19/4.22	19/0.166	731	491	40.4	9082	592
Dahlia	556.5	21.75	0.856	281.8	0.437	19/4.35	19/0.171	777	522	42.0	9438	617
Mistletoe	556.5	21.79	0.858	281.8	0.437	37/3.11	37/0.123	777	522	44.2	9940	617
Meadowsweet	600.0	22.61	0.890	303.8	0.471	37/3.23	37/0.127	839	564	51.5	11578	650
Lotus	600.4	22.67	0.893	304.2	0.472	61/2.52	61/0.099	837	562	47.7	10721	651
Sirius	605.8	22.80	0.898	306.9	0.476	37/3.25	37/0.128	845	568	48.2	10836	655
Butterfly	636.3	23.25	0.915	322.4	0.500	19/4.65	19/0.183	888	597	48.8	10959	678
Orchid	636.0	23.31	0.918	322.2	0.499	37/3.33	37/0.131	888	597	50.0	11236	677
Heuchera	651.3	23.59	0.929	330.0	0.512	37/3.37	37/0.133	909	611	56.1	12612	689
Taurus	664.5	23.80	0.937	336.7	0.522	19/4.75	19/0.187	924	621	51.3	11533	698
Verbena	700.0	24.43	0.962	354.5	0.549	37/3.49	37/0.138	979	658	60.2	13534	724
Verbenia	698.5	24.43	0.962	354.0	0.549	37/3.49	37/0.137	978	657	55.0	12367	723
Flag	700.0	24.49	0.964	354.5	0.550	61/2.72	61/0.107	978	657	57.4	12900	724
Violet	715.5	24.71	0.973	362.8	0.562	37/3.53	37/0.139	1001	673	61.6	13848	735
Nasturtium	715.5	24.77	0.975	362.5	0.562	61/2.75	61/0.108	999	672	58.3	13100	735
Moth	737.4	25.00	0.984	373.6	0.579	19/5.00	19/0.197	1027	690	56.3	12657	751
Drone	735.0	25.06	0.987	372.4	0.577	37/3.58	37/0.141	1024	688	58.4	13124	749
Petunia	750.0	25.30	0.996	380.2	0.589	37/3.62	37/0.142	1048	704	57.8	12983	760
Cattail	750.0	25.35	0.998	380.1	0.589	61/2.82	61/0.111	1048	704	60.1	13500	760
Arbitus	793.6	26.04	1.025	402.1	0.623	37/3.72	37/0.147	1112	747	68.4	15377	790
Lilac	795.2	26.10	1.028	402.9	0.625	61/2.90	61/0.114	111	75	63.7	14327	791
Heliotrope	800.7	26.18	1.031	405.7	0.629	61/2.91	61/0.115	1116	750	63.6	14296	795
Triton	806.5	26.30	1.035	408.7	0.633	37/3.75	37/0.148	1120	753	62.2	13983	799
Renfana	815.1	26.39	1.039	413.0	0.640	37/3.77	37/0.148	1136	763	64.7	14554	805
Centipede	819.4	26.46	1.042	415.2	0.644	37/3.78	37/0.149	1145	769	63.1	14186	808
Locust	845.9	26.80	1.055	428.6	0.664	19/5.36	19/0.211	1179	792	64.7	14552	826
Trojans	851.0	27.00	1.063	431.2	0.668	61/3.00	61/0.118	1189	799	69.6	15647	829
Anemone	874.5	27.36	1.077	443.5	0.687	37/3.91	37/0.154	1221	820	66.7	15000	846
Crocus	874.5	27.38	1.078	443.6	0.688	61/3.04	61/0.120	1221	821	70.3	15800	846
Akleja	896.9	27.71	1.091	454.5	0.704	61/3.08	61/0.121	1250	840	71.2	16015	860
Snapdragon	900.0	27.79	1.094	456.3	0.707	61/3.09	61/0.122	1257	845	70.7	15900	862
Cockscomb	899.3	27.81	1.095	455.7	0.706	37/3.96	37/0.156	1257	845	67.9	15265	862
Magnolia	954.0	28.55	1.124	483.6	0.750	37/4.08	37/0.161	1333	896	73.0	16400	898
Goldenrod	954.0	28.62	1.127	483.7	0.750	61/3.18	61/0.125	1333	896	75.0	16854	898
Maybug	959.1	28.63	1.127	486.0	0.753	37/4.09	37/0.161	1337	898	74.0	16627	901
Hawkweed	1000.0	29.21	1.150	506.7	0.785	37/4.18	37/0.164	1397	939	76.5	17200	928
Camelia	1000.0	29.26	1.152	506.4	0.785	61/3.25	61/0.128	1397	939	78.7	17700	927
Uranus	998.7	29.30	1.154	506.0	0.784	61/3.25	61/0.128	1400	941	75.2	16906	927
Bluebell	1033.5	29.72	1.170	523.5	0.811	37/4.24	37/0.167	1444	970	78.7	17700	949
Larkspur	1033.5	29.79	1.173	524.0	0.812	61/3.31	61/0.130	1444	970	81.2	18257	949
Scorpion	1044.3	29.90	1.177	529.1	0.820	37/4.27	37/0.168	1460	981	80.0	17980	956
Marigold	1113.0	30.87	1.215	564.2	0.874	61/3.43	61/0.135	1555	1045	87.5	19662	1000
Ursula	1158.2	31.50	1.240	586.9	0.910	61/3.50	61/0.138	1620	1089	87.3	19626	1027
Hampdan	1171.5	31.67	1.247	593.6	0.920	61/3.52	61/0.139	1632	1097	93.0	20917	1036
Hawthorn	1192.5	31.95	1.258	604.1	0.936	61/3.55	61/0.140	1665	1119	93.9	21100	1048
Cicada	1239.1	32.54	1.281	627.9	0.973	37/4.65	37/0.183	1730	1163	95.6	21492	1077
Narcissus	1272.0	33.03	1.300	644.5	0.999	61/3.67	61/0.144	1777	1194	98.0	22022	1096
Venus	1329.6	33.80	1.331	673.7	1.044	61/3.75	61/0.148	1860	1250	97.2	21852	1131
Columbine	1351.5	34.04	1.340	685.3	1.062	61/3.78	61/0.149	1888	1269	104.1	23400	1144
Carnation	1431.0	35.03	1.379	725.4	1.124	61/3.89	61/0.153	1999	1343	108.1	24300	1190
Gladiolus	1431.0	36.00	1.417	765.8	1.187	61/4.00	61/0.157	2110	1418	114.0	25617	1236
Stormhatt	1528.0	36.17	1.424	774.2	1.200	61/4.02	61/0.158	2129	1431	121.4	27281	1245
Tarantula	1570.1	36.60	1.441	795.6	1.233	37/5.23	37/0.206	2191	1472	120.1	27000	1269
Coreopsis	1590.0	36.90	1.453	805.2	1.248	61/4.10	61/0.161	2222	1493	120.0	26966	1280
Dogwood	1592.4	36.96	1.455	806.9	1.251	91/3.36	91/0.132	2219	1491	126.5	28432	1282
Bull	1723.9	38.42	1.513	873.5	1.354	61/4.27	61/0.168	2402	1614	136.9	30780	1354
Jessamine	1750.0	38.70	1.524	887.0	1.375	61/4.30	61/0.169	2445	1643	132.0	29679	1369
Solrus	1797.4	39.23	1.544	910.7	1.412	61/4.36	61/0.172	2505	1683	142.7	32091	1394
Jewelweed	2000.7	41.39	1.629	1013.8	1.571	61/4.60	61/0.181	2788	1873	158.9	35722	1502
Cowslip	2000.0	41.40	1.630	1012.7	1.570	91/3.76	91/0.148	2793	1877	154.0	34627	1501
Sagebrush	2250.0	43.92	1.729	1139.5	1.766	91/3.99	91/0.157	3171	2131	167.7	37700	1629
Toadflax	2498.0	46.25	1.821	1265.7	1.962	61/5.14	61/0.202	3481	2339	198.4	44601	1753
Lupine	2500.0	46.30	1.823	1266.0	1.962	91/4.21	91/0.166	3527	2370	186.4	41900	1753
Bitterroot	2750.0	48.59	1.913	1394.4	2.161	91/4.42	91/0.174	3880	2607	205.1	46100	1875
Virgo	2856.3	49.50	1.949	1447.3	2.243	91/4.50	91/0.177	4010	2695	207.0	46536	1924
Trillium	3000.0	50.70	1.996	1520.2	2.356	127/3.90	127/0.154	4232	2844	223.7	50300	1991
Pigweed	3428.2	54.22	2.135	1737.1	2.693	91/4.93	91/0.194	4777	3210	272.3	61210	2184
Bluebonnet	3500.0	54.81	2.158	1773.3	2.749	127/4.22	127/0.166	4985	3350	261.1	58700	2215
Nightshade	4329.9	60.99	2.401	2194.0	3.401	127/4.69	127/0.185	6034	4054	343.9	77310	2569

Flexible Conductors

Standard ACSR Types and Specifications

Name	Size	OD		CSA		Aluminium Stranding		Steel Stranding		Mass		Strength		Current Rating
	kcmil	mm	in	mm²	in²	No./mm	No./in	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
Wren	8 AWG	3.99	0.157	8.3	0.013	6/1.33	6/0.052	1/1.33	1/0.052	34	23	3.3	740	53
Mole	24.4	4.50	0.177	10.6	0.016	6/1.50	6/0.059	1/1.50	1/0.059	43	29	4.1	922	63
Warbler	7 AWG	4.50	0.177	10.6	0.016	6/1.50	6/0.059	1/1.50	1/0.059	43	29	4.1	931	63
Bantam	13.1	5.04	0.198	6.7	0.010	3/1.68	3/0.066	4/1.68	4/0.066	88	59	11.7	2630	46
Turkey	6 AWG	5.04	0.198	13.3	0.021	6/1.68	6/0.066	1/1.68	1/0.066	54	36	5.3	1183	74
Wagtail	30.6	5.04	0.198	6.7	0.010	3/1.68	3/0.066	4/1.68	4/0.066	77	52	2.8	623	46
Quince	33.2	5.25	0.207	7.2	0.011	3/1.75	3/0.069	4/1.75	4/0.069	95	64	12.7	2855	48
Skating	33.2	5.30	0.209	7.2	0.011	3/1.75	3/0.069	4/1.75	4/0.069	83	56	12.3	2765	48
Budgerigar	38.3	5.64	0.222	11.1	0.017	4/1.88	4/0.074	3/1.88	3/0.074	86	58	4.6	1040	65
Thrush	5 AWG	5.67	0.223	16.8	0.026	6/1.89	6/0.074	1/1.89	1/0.074	68	46	6.6	1484	87
Magpie	48.3	6.33	0.249	10.5	0.016	3/2.11	3/0.083	4/2.11	4/0.083	122	82	17.8	4004	63
Squirrel	48.2	6.33	0.249	20.9	0.032	6/2.11	6/0.083	1/2.11	1/0.083	85	57	7.7	1742	101
Swan	4 AWG	6.36	0.250	21.1	0.033	6/2.12	6/0.083	1/2.12	1/0.083	85	57	8.3	1868	102
Swanate	4 AWG	6.53	0.257	21.1	0.033	7/1.96	7/0.077	1/2.61	1/0.103	100	67	10.5	2360	102
Gopher	60.5	7.09	0.279	26.3	0.041	6/2.36	6/0.093	1/2.36	1/0.093	106	71	9.6	2160	119
Swallow	3 AWG	7.14	0.281	26.7	0.041	6/2.38	6/0.094	1/2.38	1/0.094	108	73	10.2	2293	120
Almond	67.8	7.50	0.295	29.5	0.046	6/2.50	6/0.098	1/2.50	1/0.098	119	80	10.5	2361	128
Angling	67.8	7.50	0.295	29.5	0.046	6/2.50	6/0.098	1/2.50	1/0.098	113	76	10.6	2383	128
Barley	67.8	7.50	0.295	29.5	0.046	6/2.50	6/0.098	1/2.50	1/0.098	116	78	10.2	2293	128
Raisin	67.8	7.50	0.295	14.7	0.023	3/2.50	3/0.098	4/2.50	4/0.098	195	131	24.4	5485	79
Soccer	67.8	7.50	0.295	14.7	0.023	3/2.50	3/0.098	4/2.50	4/0.098	171	115	24.9	5598	79
Weasel	72.8	7.77	0.306	31.6	0.049	6/2.59	6/0.102	1/2.59	1/0.102	128	86	11.4	2563	135
Shrike	33.2	8.01	0.315	16.8	0.026	3/2.67	3/0.105	4/2.67	4/0.105	222	149	28.6	6430	87
Sparrow	2 AWG	8.01	0.315	33.6	0.052	6/2.67	6/0.105	1/2.67	1/0.105	136	91	12.7	2844	141
Sparate	2 AWG	8.26	0.325	33.6	0.052	7/2.47	7/0.097	1/3.30	1/0.130	16	11	16.2	3640	141
Apricot	82.1	8.30	0.327	35.6	0.055	6/2.75	6/0.108	1/2.75	1/0.108	144	97	12.6	2833	147
Aquatics	82.1	8.30	0.327	35.6	0.055	6/2.75	6/0.108	1/2.75	1/0.108	137	92	12.7	2855	147
Kookaburra	83.9	8.35	0.329	25.0	0.039	3/3.26	3/0.128	4/2.36	4/0.093	185	125	10.4	2346	115
Fox	84.7	8.37	0.330	36.8	0.057	6/2.79	6/0.110	1/2.79	1/0.110	149	100	13.2	2967	150
Ferret	97.5	8.99	0.354	42.3	0.066	6/3.00	6/0.118	1/3.00	1/0.118	172	116	15.2	3417	165
Apple	97.7	9.00	0.354	42.4	0.066	6/3.00	6/0.118	1/3.00	1/0.118	171	115	14.9	3350	165
Archery	97.7	9.00	0.354	42.4	0.066	6/3.00	6/0.118	1/3.00	1/0.118	163	110	15.1	3395	165
Bean	97.7	9.00	0.354	42.4	0.066	6/3.00	6/0.118	1/3.00	1/0.118	167	112	14.5	3260	165
Robin	1 AWG	9.00	0.354	42.4	0.066	6/3.00	6/0.118	1/3.00	1/0.118	172	116	15.9	3570	165
Sultana	97.7	9.00	0.354	28.3	0.044	4/3.00	4/0.118	3/3.00	3/0.118	243	163	28.3	6362	125
Swimming	97.7	9.00	0.354	28.3	0.044	4/3.00	4/0.118	3/3.00	3/0.118	218	146	28.9	6497	125
Galah	97.7	9.00	0.354	28.3	0.044	4/3.00	4/0.118	3/3.00	3/0.118	219	147	11.8	2648	125
Grouse	80.0	9.32	0.367	40.5	0.063	8/2.54	8/0.100	1/4.24	1/0.167	222	149	23.1	5200	160
Rabbit	122.0	10.05	0.396	53.0	0.082	6/3.35	6/0.132	1/3.35	1/0.132	214	144	18.4	4137	193
Raven	1/0 AWG	10.11	0.398	53.5	0.083	6/3.37	6/0.133	1/3.37	1/0.133	216	145	19.5	4380	195
Snipe	52.8	10.11	0.398	26.8	0.041	3/3.37	3/0.133	4/3.37	4/0.133	353	237	43.8	9847	120
Shoebill	134.4	10.56	0.416	29.2	0.045	3/3.52	3/0.139	4/3.52	4/0.139	340	228	12.2	2735	128
Mink	145.2	10.97	0.432	63.0	0.098	6/3.66	6/0.144	1/3.66	1/0.144	255	171	21.4	4811	218
Banana	152.6	11.30	0.445	66.3	0.103	6/3.75	6/0.148	1/3.75	1/0.148	268	180	22.7	5103	226
Baseball	152.6	11.30	0.445	66.3	0.103	6/3.75	6/0.148	1/3.75	1/0.148	254	171	22.3	5013	226
Cabbage	152.6	11.30	0.445	66.3	0.103	6/3.75	6/0.148	1/3.75	1/0.148	260	175	21.4	4811	226
Tennis	152.6	11.30	0.445	44.2	0.068	4/3.75	4/0.148	3/3.75	3/0.148	340	228	42.6	9577	170
Walnut	152.6	11.30	0.445	44.2	0.068	4/3.75	4/0.148	3/3.75	3/0.148	380	255	43.9	9869	170
Loon	66.5	11.34	0.446	33.7	0.052	3/3.78	3/0.149	4/3.78	4/0.149	444	298	54.9	12342	141
Quail	2/0 AWG	11.34	0.446	67.4	0.104	6/3.78	6/0.149	1/3.78	1/0.149	273	183	23.5	5290	228
Petrel	101.8	11.71	0.461	51.6	0.080	12/2.34	12/0.092	7/2.34	7/0.092	377	253	43.9	9869	190
Bobwhite	166.7	11.76	0.463	67.3	0.104	7/3.50	7/0.138	1/4.67	1/0.184	299	201	28.1	6309	228
Beaver	172.5	11.97	0.471	74.9	0.116	6/3.99	6/0.157	1/3.99	1/0.157	302	203	25.7	5778	246
Minorca	110.8	12.20	0.480	56.2	0.087	12/2.44	12/0.096	7/2.44	7/0.096	410	276	47.7	10723	201
Raccoon	181.4	12.27	0.483	78.8	0.122	6/4.09	6/0.161	1/4.09	1/0.161	320	215	27.2	6115	254
Otter	193.2	12.66	0.498	83.9	0.130	6/4.22	6/0.166	1/4.22	1/0.166	324	218	35.0	7861	266
Pigeon	3/0 AWG	12.75	0.502	85.0	0.132	6/4.25	6/0.167	1/4.25	1/0.167	344	231	29.5	6634	268
Skunk	197.7	12.95	0.510	63.3	0.098	12/2.59	12/0.102	7/2.59	7/0.102	465	312	53.1	11937	218
Volleyball	204.1	13.20	0.520	81.4	0.126	8/3.60	8/0.142	7/2.00	7/0.079	370	249	33.9	7628	260
Leghorn	134.6	13.45	0.530	68.2	0.106	12/2.69	12/0.106	7/2.69	7/0.106	499	335	57.6	12949	230
Cat	218.7	13.48	0.531	95.0	0.147	6/4.49	6/0.177	1/4.49	1/0.177	367	246	39.6	8899	290
Horse	229.9	13.95	0.549	73.6	0.114	12/2.79	12/0.110	7/2.79	7/0.110	538	362	61.2	13758	243
Stoat	230.9	14.00	0.551	110.8	0.172	18/2.80	18/0.110	1/2.80	1/0.110	346	232	46.2	10382	323
Dog	234.5	14.17	0.558	105.2	0.163	6/4.72	6/0.186	7/1.58	7/0.062	394	265	32.7	7351	311
Hare	241.7	14.17	0.558	105.0	0.163	6/4.72	6/0.186	1/4.72	1/0.186	405	272	43.7	9834	311
Bowls	237.6	14.30	0.563	106.3	0.165	6/4.75	6/0.187	7/1.60	7/0.063	385	259	32.7	7351	313
Carrot	237.6	14.30	0.563	106.3	0.165	6/4.75	6/0.187	7/1.60	7/0.063	391	263	32.0	7194	313
Cherry	237.6	14.30	0.563	106.3	0.165	6/4.75	6/0.187	7/1.60	7/0.063	402	270	33.4	7509	313
Penguin	4/0 AWG	14.31	0.563	107.2	0.166	6/4.77	6/0.188	1/4.77	1/0.188	433	291	37.2	8354	315
Guinea	159.0	14.60	0.575	80.6	0.125	12/2.92	12/0.115	7/2.92	7/0.115	588	395	67.5	15175	258
Hyena	249.5	14.60	0.575	106.0	0.164	7/4.39	7/0.173	7/1.93	7/0.076	428	287	44.1	9925	313
Auk	203.0	14.85	0.585	103.1	0.160	8/4.05	8/0.159	7/2.25	7/0.089	500	336	49.6	11151	307

Flexible Conductors

Standard ACSR Types and Specifications

Name	Size	OD		CSA		Aluminium Stranding		Steel Stranding		Mass		Strength		Current Rating
	kcmil	mm	in	mm²	in²	No./mm	No./in	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
Cougar	274.0	15.25	0.600	131.5	0.204	18/3.05	18/0.120	1/3.05	1/0.120	410	276	54.8	12319	363
Dotterel	176.9	15.40	0.606	89.6	0.139	12/3.08	12/0.121	7/3.08	7/0.121	654	439	72.6	16321	278
Waxwing	283.0	15.49	0.610	135.9	0.211	18/3.10	18/0.122	1/3.10	1/0.122	424	285	56.6	12726	372
Vulture	246.2	15.68	0.617	107.4	0.166	5/5.23	5/0.206	1/4.70	1/0.185	411	276	44.8	10062	316
Leopard	292.5	15.80	0.622	131.4	0.204	6/5.28	6/0.208	7/1.75	7/0.069	473	318	54.7	12306	363
Coyote	299.4	15.88	0.625	131.7	0.204	26/2.54	26/0.100	7/1.91	7/0.075	522	351	46.4	10431	364
Dorking	190.8	16.00	0.630	96.7	0.150	12/3.20	12/0.126	7/3.20	7/0.126	706	474	78.3	17603	293
Scaup	301.9	16.04	0.631	135.4	0.210	24/2.68	24/0.106	7/1.79	7/0.071	490	329	56.4	12682	371
Partridge	266.8	16.28	0.641	135.2	0.210	26/2.57	26/0.101	7/2.00	7/0.079	547	368	50.2	11283	370
Phoebe	300.0	16.40	0.646	152.1	0.236	18/3.28	18/0.129	1/3.28	1/0.129	485	326	35.2	7913	402
Tiger	320.0	16.54	0.651	131.5	0.204	30/2.36	30/0.093	7/2.36	7/0.093	602	405	58.0	13039	363
Owl	266.8	16.72	0.658	135.2	0.210	6/5.36	6/0.211	7/1.79	7/0.070	510	342	43.1	9680	370
Dingo	330.5	16.76	0.660	158.7	0.246	18/3.35	18/0.132	1/3.35	1/0.132	506	340	36.5	8208	414
Junco	330.3	16.80	0.662	135.7	0.210	30/2.40	30/0.095	7/2.40	7/0.095	584	393	56.5	12713	371
Cochin	211.3	16.87	0.664	107.1	0.166	12/3.37	12/0.133	7/3.37	7/0.133	784	527	92.1	20700	315
Gadwall	338.8	16.99	0.669	152.0	0.236	24/2.84	24/0.112	7/1.89	7/0.074	549	369	63.3	14241	402
Merlin	336.4	17.40	0.685	170.4	0.264	18/3.47	18/0.137	1/3.47	1/0.137	543	365	39.3	8826	435
Trogon	358.7	17.45	0.687	170.0	0.264	20/3.29	20/0.130	7/1.46	7/0.058	546	367	70.8	15926	434
Grape	358.4	17.50	0.689	147.3	0.228	30/2.50	30/0.098	7/2.50	7/0.098	677	455	63.5	14275	393
Corn	358.4	17.50	0.689	147.3	0.228	30/2.50	30/0.098	7/2.50	7/0.098	634	426	61.4	13794	393
Oden	364.9	17.60	0.693	116.8	0.181	12/3.52	12/0.139	7/3.52	7/0.139	775	521	48.7	10939	334
Woodcock	369.1	17.73	0.698	170.4	0.264	22/3.14	22/0.124	7/1.74	7/0.069	579	389	71.0	15958	435
Ostrich	300.0	17.78	0.700	152.0	0.236	26/2.73	26/0.107	7/2.12	7/0.084	614	413	56.5	12700	402
Piper	300.0	17.78	0.700	152.0	0.236	30/2.54	30/0.100	7/2.54	7/0.100	698	469	67.8	15242	402
Widgeon	380.4	18.00	0.709	170.8	0.265	24/3.01	24/0.119	7/2.00	7/0.079	616	414	71.2	15997	436
Caracal	383.8	18.05	0.711	184.2	0.286	18/3.61	18/0.142	1/3.61	1/0.142	587	394	41.1	9240	459
Brahma	203.2	18.12	0.713	103.0	0.160	16/3.12	16/0.123	19/2.48	19/0.098	1004	675	123.0	27652	306
Wolf	384.9	18.14	0.714	158.2	0.245	30/2.59	30/0.102	7/2.59	7/0.102	726	488	69.2	15557	413
Linnet	336.4	18.30	0.720	170.3	0.264	26/2.89	26/0.114	7/2.25	7/0.088	690	464	64.2	14428	435
Emu	405.4	18.55	0.730	129.7	0.201	12/3.71	12/0.146	7/3.71	7/0.146	861	578	54.1	12151	360
Oriole	336.4	18.83	0.741	170.5	0.264	30/2.69	30/0.106	7/2.69	7/0.106	784	527	77.2	17346	435
Chickadee	397.5	18.90	0.744	201.4	0.312	18/3.77	18/0.149	1/3.77	1/0.149	641	431	45.0	10116	489
Ptarmigan	424.7	18.99	0.748	201.3	0.312	20/3.58	20/0.141	7/1.59	7/0.063	646	434	83.9	18858	488
Stork	435.7	19.26	0.758	200.9	0.311	22/3.41	22/0.134	7/1.90	7/0.075	685	460	83.7	18820	488
Jaguar	438.8	19.30	0.760	210.6	0.326	18/3.86	18/0.152	1/3.86	1/0.152	671	451	46.6	10465	504
Lynx	447.7	19.53	0.769	183.9	0.285	30/2.79	30/0.110	7/2.79	7/0.110	842	566	79.8	17940	459
Brant	397.5	19.60	0.772	201.4	0.312	24/3.27	24/0.129	7/2.18	7/0.086	763	512	66.4	14927	489
Ibis	397.5	19.90	0.783	201.3	0.312	26/3.14	26/0.124	7/2.44	7/0.096	813	547	73.9	16609	488
Atle	475.9	20.10	0.791	152.3	0.236	12/4.02	12/0.158	7/4.02	7/0.158	1011	679	63.5	14267	402
Lark	397.5	20.44	0.805	201.4	0.312	30/2.92	30/0.115	7/2.92	7/0.115	927	623	90.4	20321	489
Pelican	477.0	20.70	0.815	241.7	0.375	18/4.14	18/0.163	1/4.14	1/0.163	773	519	78.1	17555	555
Tailorbird	509.2	20.79	0.818	241.4	0.374	20/3.92	20/0.154	7/1.74	7/0.069	775	521	100.6	22610	554
Panther	515.2	20.98	0.826	211.7	0.328	30/3.00	30/0.118	7/3.00	7/0.118	974	654	92.2	20727	506
Darts	516.2	21.00	0.827	212.1	0.329	30/3.00	30/0.118	7/3.00	7/0.118	913	614	91.6	20593	506
Lemon	516.2	21.00	0.827	212.1	0.329	30/3.00	30/0.118	7/3.00	7/0.118	973	654	90.4	20323	506
Garlic	516.2	21.00	0.827	212.1	0.329	30/3.00	30/0.118	7/3.00	7/0.118	913	613	88.4	19864	506
Pintail	516.2	21.00	0.827	212.1	0.329	30/3.00	30/0.118	7/3.00	7/0.118	913	613	88.4	19864	506
Toucan	477.0	21.20	0.835	241.7	0.375	22/3.74	22/0.147	7/2.08	7/0.082	854	574	68.9	15489	555
Flicker	477.0	21.50	0.846	241.8	0.375	24/3.58	24/0.141	7/2.39	7/0.094	915	615	88.6	19907	555
Abitibi	543.2	21.59	0.850	263.8	0.409	18/4.32	18/0.170	7/1.44	7/0.057	816	548	56.8	12769	589
Hawk	477.0	21.80	0.858	241.5	0.374	26/3.44	26/0.135	7/2.68	7/0.105	977	657	87.0	19549	554
Shelter Bay	504.3	21.82	0.859	256.1	0.397	22/3.85	22/0.152	7/2.14	7/0.084	903	607	71.7	16119	577
Lion	578.1	22.26	0.876	237.5	0.368	30/3.18	30/0.125	7/3.18	7/0.125	1095	736	100.6	22616	548
Osprey	556.5	22.33	0.879	281.9	0.437	18/4.47	18/0.176	1/4.47	1/0.176	899	604	60.9	13700	617
Hen	477.0	22.40	0.882	241.7	0.375	30/3.20	30/0.126	7/3.20	7/0.126	1110	746	107.7	24217	555
Tody	595.7	22.49	0.885	282.4	0.438	20/4.24	20/0.167	7/1.88	7/0.074	906	609	117.7	26452	618
Dice	605.8	22.80	0.898	248.9	0.386	30/3.25	30/0.128	7/3.25	7/0.128	1070	719	106.0	23830	566
Lychee	605.8	22.80	0.898	248.9	0.386	30/3.25	30/0.128	7/3.25	7/0.128	1140	766	105.0	23605	566
Sapsucker	556.5	22.88	0.901	282.0	0.437	22/4.04	22/0.159	7/2.24	7/0.088	995	669	78.8	17715	617
Heron	500.0	22.96	0.904	253.5	0.393	30/3.28	30/0.129	7/3.28	7/0.129	1163	782	108.0	24279	573
Ymer	629.7	23.20	0.913	251.0	0.389	32/3.16	32/0.124	7/3.52	7/0.139	1144	769	104.6	23508	569
Parakeet	556.5	23.20	0.913	282.1	0.437	24/3.87	24/0.152	7/2.58	7/0.102	1068	718	90.1	20244	617
Blue	644.7	23.45	0.923	264.9	0.411	30/3.35	30/0.132	7/3.35	7/0.132	1213	815	111.1	24976	591
Bear	644.7	23.47	0.924	264.9	0.411	30/3.35	30/0.132	7/3.35	7/0.132	1140	766	110.4	24810	591
Sandpiper	648.7	23.55	0.927	307.6	0.477	45/2.95	45/0.116	7/1.96	7/0.077	986	663	128.2	28811	656
Dove	556.5	23.55	0.927	282.0	0.437	26/3.72	26/0.146	7/2.89	7/0.114	1142	767	101.0	22701	617
Chignecto	588.8	23.57	0.928	299.0	0.463	22/4.16	22/0.164	7/2.31	7/0.091	1053	708	82.8	18614	643
Swift	636.0	23.62	0.930	322.2	0.499	36/3.38	36/0.133	1/3.38	1/0.133	958	644	61.4	13800	677
Kingbird	636.0	23.90	0.941	322.4	0.500	18/4.78	18/0.188	1/4.78	1/0.188	1031	693	71.1	15988	677
Turacos	680.0	24.02	0.946	322.3	0.500	20/4.53	20/0.178	7/2.01	7/0.079	1034	695	134.3	30194	677
Peace River	680.6	24.13	0.950	317.0	0.491	48/2.90	48/0.114	7/2.25	7/0.089	1092	734	88.0	19783	670
Batang	668.1	24.16	0.951	323.0	0.501	18/4.78	18/0.188	7/1.68	7/0.066	1010	679	69.7	15663	678

Flexible Conductors

Standard ACSR Types and Specifications

Name	Size	OD		CSA		Aluminium Stranding		Steel Stranding		Mass		Strength		Current Rating
	kcmil	mm	in	mm²	in²	No./mm	No./in	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
Eagle	556.5	24.20	0.953	282.0	0.437	30/3.46	30/0.136	7/3.46	7/0.136	1297	872	125.9	28313	617
Squab	605.0	24.20	0.953	306.4	0.475	26/3.87	26/0.153	7/3.01	7/0.119	1236	831	110.3	24797	654
Peacock	605.0	24.21	0.953	306.7	0.475	24/4.03	24/0.159	7/2.69	7/0.106	1160	780	96.1	21600	654
Duck	605.0	24.21	0.953	306.9	0.476	54/2.69	54/0.106	7/2.69	7/0.106	1160	779	101.0	22706	655
Goldfinch	636.0	24.48	0.964	322.5	0.500	22/4.32	22/0.170	7/2.40	7/0.095	1138	765	89.3	20076	678
Diving	702.5	24.50	0.965	288.6	0.447	30/3.50	30/0.138	7/3.50	7/0.138	1240	833	122.0	27427	627
Lime	702.5	24.50	0.965	288.6	0.447	30/3.50	30/0.138	7/3.50	7/0.138	1320	887	122.0	27427	627
Goose	636.0	24.84	0.978	323.1	0.501	54/2.76	54/0.109	7/2.76	7/0.109	1220	820	104.0	23380	678
Rook	636.0	24.84	0.978	322.3	0.500	24/4.14	24/0.163	7/2.76	7/0.109	1219	819	101.0	22701	677
Grosbeak	636.0	25.10	0.988	322.3	0.500	26/3.97	26/0.156	7/3.09	7/0.122	1299	873	110.8	24900	677
Teal	605.0	25.20	0.992	306.5	0.475	30/3.61	30/0.142	19/2.16	19/0.085	1398	939	135.7	30516	654
Woodduck	605.0	25.25	0.994	306.5	0.475	30/3.61	30/0.142	7/3.61	7/0.142	1410	948	128.6	28900	654
Gull	666.6	25.38	0.999	337.3	0.523	54/2.82	54/0.111	7/2.82	7/0.111	1278	859	109.0	24504	699
Mica	666.9	25.38	0.999	337.3	0.523	24/4.23	24/0.167	7/2.82	7/0.111	1275	857	105.0	23605	699
Flamingo	666.6	25.40	1.000	337.9	0.524	24/4.23	24/0.167	7/2.82	7/0.111	1278	859	105.4	23700	700
Grand Rapids	751.7	25.40	1.000	346.8	0.538	22/4.48	22/0.176	7/2.49	7/0.098	1225	823	96.2	21627	713
Grebe	763.9	25.55	1.006	361.9	0.561	45/3.20	45/0.126	7/2.14	7/0.084	1163	781	150.8	33901	734
Gannet	666.6	25.80	1.016	337.7	0.523	26/4.07	26/0.160	7/3.16	7/0.125	1366	918	119.6	26887	700
Scoter	636.0	25.88	1.019	322.3	0.499	30/3.70	30/0.146	7/3.70	7/0.146	1483	996	135.2	30400	677
Egret	636.0	25.90	1.020	322.3	0.499	30/3.70	30/0.146	19/2.22	19/0.087	1472	989	143.1	32170	677
Goat	788.7	25.96	1.022	324.0	0.502	30/3.71	30/0.146	7/3.71	7/0.146	1489	1001	135.8	30529	680
Crow	715.5	26.28	1.035	361.6	0.561	54/2.92	54/0.115	7/2.92	7/0.115	1371	921	117.0	26303	734
Stilt	715.5	26.31	1.036	362.7	0.562	24/4.39	24/0.173	7/2.92	7/0.115	1372	922	113.4	25500	735
Coot	795.0	26.42	1.040	402.8	0.624	36/3.77	36/0.149	1/3.77	1/0.149	1198	805	74.7	16800	791
Starling	715.5	26.68	1.050	362.6	0.562	26/4.21	26/0.166	7/3.28	7/0.129	1466	985	126.5	28432	735
Antelope	832.7	26.70	1.051	374.1	0.580	54/2.97	54/0.117	7/2.95	7/0.116	1347	905	155.9	35043	751
Macaw	795.0	26.76	1.054	401.8	0.623	42/3.49	42/0.137	7/1.94	7/0.076	1276	857	92.5	20795	789
Bison	849.4	26.97	1.062	381.0	0.591	54/3.00	54/0.118	7/3.00	7/0.118	1444	970	120.9	27180	761
Oats	851.0	26.99	1.063	381.7	0.592	54/3.00	54/0.118	7/3.00	7/0.118	1379	927	159.0	35754	762
Golf	851.0	27.00	1.063	381.7	0.592	54/3.00	54/0.118	7/3.00	7/0.118	1380	927	120.0	26977	762
Mango	851.0	27.00	1.063	381.7	0.592	54/3.00	54/0.118	7/3.00	7/0.118	1440	968	119.0	26752	762
Tern	795.0	27.00	1.063	402.7	0.624	45/3.38	45/0.133	7/2.25	7/0.089	1336	898	100.2	22517	791
Puffin	873.4	27.28	1.074	403.1	0.625	22/4.83	22/0.190	7/2.68	7/0.106	1371	922	168.0	37758	791
Buteo	881.3	27.44	1.081	362.1	0.561	30/3.92	30/0.154	7/3.92	7/0.154	1558	1047	150.9	33915	734
Redwing	715.5	27.50	1.083	362.4	0.562	30/3.92	30/0.154	19/2.35	19/0.093	1651	1109	156.7	35234	735
Cuckoo	795.0	27.70	1.091	402.8	0.624	24/4.62	24/0.182	7/3.08	7/0.121	1521	1022	126.3	28394	791
Baldpate	899.3	27.72	1.092	369.5	0.573	30/3.96	30/0.156	7/3.96	7/0.156	1590	1069	154.0	34610	745
Condor	795.0	27.80	1.094	402.6	0.624	54/3.08	54/0.121	7/3.08	7/0.121	1527	1026	127.6	28677	791
Sheep	913.0	27.90	1.098	375.1	0.581	30/3.99	30/0.157	7/3.99	7/0.157	1614	1085	156.3	35137	753
Chutes des Passes	850.0	27.93	1.100	430.5	0.667	45/3.49	45/0.137	7/2.33	7/0.092	1425	958	107.0	24055	828
Les Boules	911.6	27.94	1.100	439.5	0.681	42/3.65	42/0.144	7/2.02	7/0.080	1388	933	101.0	22706	840
Drake	795.0	28.11	1.107	403.0	0.625	26/4.44	26/0.175	7/3.45	7/0.136	1628	1094	140.2	31516	791
Willet	934.5	28.26	1.113	442.9	0.687	45/3.54	45/0.139	7/2.36	7/0.093	1422	955	184.5	41487	845
Zebra	953.1	28.62	1.127	427.5	0.663	54/3.18	54/0.125	7/3.18	7/0.125	1621	1089	131.9	29652	824
Ruddy	900.0	28.70	1.130	455.9	0.707	45/3.59	45/0.141	7/2.40	7/0.094	1509	1014	111.1	24985	862
Skimmer	978.2	28.92	1.138	401.9	0.623	30/4.13	30/0.163	7/4.13	7/0.163	1730	1162	167.5	37646	790
Mallard	795.0	28.96	1.140	402.9	0.624	30/4.14	30/0.163	19/2.48	19/0.098	1838	1235	170.8	38400	791
Crane	874.5	29.07	1.144	442.5	0.686	54/3.23	54/0.127	7/3.23	7/0.127	1676	1126	138.2	31078	844
Onion	998.7	29.24	1.151	448.0	0.694	54/3.25	54/0.128	7/3.25	7/0.128	1619	1088	186.7	41962	852
Gymnastics	998.7	29.30	1.154	448.0	0.694	54/3.25	54/0.128	7/3.25	7/0.128	1620	1089	139.0	31249	852
Orange	998.7	29.30	1.154	448.0	0.694	54/3.25	54/0.128	7/3.25	7/0.128	1690	1136	137.0	30799	852
Rail	954.0	29.50	1.161	483.4	0.749	45/3.70	45/0.146	7/2.47	7/0.097	1602	1076	117.9	26514	898
Brolga	1015.1	29.51	1.162	455.3	0.706	54/3.28	54/0.129	7/3.28	7/0.129	1645	1106	189.7	42652	861
Canary	900.0	29.52	1.162	456.0	0.707	54/3.28	54/0.129	7/3.28	7/0.129	1724	1158	142.2	31959	862
Corncrake	1020.0	29.59	1.165	483.4	0.749	20/5.55	20/0.218	7/2.47	7/0.097	1598	1074	113.9	25600	898
Towhee	1038.5	29.85	1.175	483.5	0.749	48/3.58	48/0.141	7/2.79	7/0.110	1671	1123	126.8	28500	898
Deer	1045.7	29.90	1.177	429.6	0.666	30/4.27	30/0.168	7/4.27	7/0.168	1849	1242	179.0	40241	827
Tanager	1060.4	30.11	1.185	522.8	0.810	36/4.30	36/0.169	1/4.30	1/0.169	1534	1031	217.8	48970	948
Camel	1062.9	30.15	1.187	476.8	0.739	54/3.35	54/0.132	7/3.35	7/0.132	1797	1208	145.7	32755	889
Redbird	1076.4	30.28	1.192	482.6	0.748	24/5.06	24/0.199	7/3.38	7/0.133	1746	1173	201.1	45207	897
Cardinal	954.0	30.40	1.197	483.3	0.749	54/3.38	54/0.133	7/3.38	7/0.133	1839	1236	153.6	34535	898
Carillion	1084.2	30.48	1.200	522.5	0.810	42/3.98	42/0.157	7/2.21	7/0.087	1653	1111	117.0	26303	948
Snowbird	1089.4	30.51	1.201	525.2	0.814	42/3.99	42/0.157	7/2.21	7/0.087	1623	1091	218.8	49191	951
Ortolan	1033.5	30.80	1.213	523.4	0.811	45/3.85	45/0.152	7/2.57	7/0.101	1735	1166	125.8	28270	949
Whooper	1126.4	31.03	1.222	524.5	0.813	48/3.73	48/0.147	7/2.90	7/0.114	1750	1176	218.5	49131	950
Avocet	1113.0	31.14	1.226	565.4	0.876	42/4.14	42/0.163	7/2.30	7/0.091	1786	1200	122.3	27500	1001
Parsnip	1158.2	31.49	1.240	519.5	0.805	54/3.50	54/0.138	7/3.50	7/0.138	1877	1261	216.5	48666	944
Elk	1161.3	31.50	1.240	477.1	0.740	30/4.50	30/0.177	7/4.50	7/0.177	2054	1380	198.8	44693	890
Hurdles	1158.2	31.50	1.240	519.5	0.805	54/3.50	54/0.138	7/3.50	7/0.138	1880	1263	159.0	35745	944
Olive	1158.2	31.50	1.240	519.5	0.805	54/3.50	54/0.138	7/3.50	7/0.138	1960	1317	159.0	35745	944
Morkulla	1167.8	31.59	1.244	562.7	0.872	42/4.13	42/0.163	7/2.30	7/0.091	1741	1170	234.4	52704	998
Beaumont	1113.0	31.65	1.246	562.7	0.872	42/4.13	42/0.163	7/2.29	7/0.090	1785	1199	126.0	28326	998

Flexible Conductors

Standard ACSR Types and Specifications

Name	Size	OD		CSA		Aluminium Stranding		Steel Stranding		Mass		Strength		Current Rating
	kcmil	mm	in	mm²	in²	No./mm	No./in	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
Canvasback	1172.1	31.65	1.246	483.5	0.749	30/4.53	30/0.178	19/2.72	19/0.107	2065	1388	201.5	45291	898
Curlew	1033.5	31.68	1.247	523.4	0.811	54/3.51	54/0.138	7/3.51	7/0.138	1981	1331	162.7	36586	949
Merganser	1176.9	31.72	1.249	483.5	0.749	30/4.53	30/0.178	7/4.53	7/0.178	2081	1398	201.5	45291	898
Moose	1178.6	31.78	1.251	528.7	0.819	54/3.53	54/0.139	7/3.53	7/0.139	1999	1343	161.1	36217	955
Bluejay	1113.0	32.00	1.260	564.2	0.874	45/4.00	45/0.157	7/2.66	7/0.105	1871	1257	135.4	30430	1000
Bullfinch	1212.6	32.19	1.267	564.6	0.875	48/3.87	48/0.152	7/3.01	7/0.119	1884	1266	235.3	52888	1000
Oxbird	1254.0	32.74	1.289	604.3	0.937	42/4.28	42/0.169	7/2.38	7/0.094	1869	1256	251.8	56602	1048
Finch	1244.8	32.84	1.293	559.5	0.867	54/3.63	54/0.143	19/2.18	19/0.086	2013	1353	233.1	52412	994
Gatineau	1269.6	33.02	1.300	591.2	0.916	48/3.96	48/0.156	7/3.08	7/0.121	2048	1376	155.0	34846	1033
Bunting	1192.5	33.10	1.303	604.3	0.937	45/4.14	45/0.163	7/2.76	7/0.109	2005	1347	145.3	32658	1048
Cormorant	1295.3	33.27	1.310	603.2	0.935	48/4.00	48/0.158	7/3.11	7/0.122	2013	1353	251.3	56501	1047
Chuka NZ	1497.9	33.30	1.311	759.0	1.176	84/3.70	84/0.146	7/3.70	7/0.146	2710	1821	203.0	45636	1228
Skylark	1310.4	33.47	1.318	646.0	1.001	36/4.78	36/0.188	1/4.78	1/0.188	1896	1274	269.2	60514	1098
Potato	1326.1	33.70	1.327	596.4	0.924	54/3.75	54/0.148	19/2.25	19/0.089	2143	1440	248.5	55866	1039
Lacrosse	1326.1	33.80	1.331	596.4	0.924	54/3.75	54/0.148	19/2.25	19/0.089	2150	1445	180.0	40466	1039
Pawpaw	1326.1	33.80	1.331	596.4	0.924	54/3.75	54/0.148	19/2.25	19/0.089	2240	1505	178.0	40016	1039
Scissortail	1272.0	33.90	1.335	644.4	0.999	42/4.42	42/0.174	7/2.46	7/0.097	2043	1373	144.0	32373	1096
Seaway	1277.5	33.96	1.337	647.4	1.003	42/4.43	42/0.174	7/2.46	7/0.097	2050	1378	145.0	32597	1100
Grackle	1192.5	33.97	1.337	604.2	0.937	54/3.77	54/0.149	19/2.27	19/0.089	2282	1533	186.3	41875	1048
Bittern	1272.0	34.16	1.345	644.3	0.999	45/4.27	45/0.168	7/2.85	7/0.112	2133	1433	151.7	34100	1096
Ringdove	1423.1	34.88	1.373	685.9	1.063	42/4.56	42/0.180	7/2.53	7/0.100	2121	1425	285.8	64250	1145
Bersimis	1361.0	35.04	1.380	688.9	1.068	42/4.57	42/0.180	7/2.54	7/0.100	2184	1468	154.0	34621	1148
Pheasant	1272.0	35.10	1.382	644.7	0.999	54/3.90	54/0.154	19/2.34	19/0.092	2437	1638	198.0	44515	1097
Dipper	1351.5	35.20	1.386	684.8	1.061	45/4.40	45/0.173	7/2.93	7/0.116	2265	1522	164.0	36858	1144
Dinosaur	1471.3	35.49	1.397	661.7	1.026	54/3.95	54/0.156	19/2.37	19/0.093	2378	1598	275.7	61984	1117
Bersfort	1476.1	35.56	1.400	687.4	1.065	48/4.27	48/0.168	7/3.32	7/0.131	2375	1596	180.0	40466	1147
Poinjay	1505.9	35.88	1.412	725.6	1.125	42/4.69	42/0.185	7/2.61	7/0.103	2245	1508	302.3	67966	1191
Ripa	1524.8	36.10	1.421	734.9	1.139	42/4.72	42/0.186	7/2.62	7/0.103	2272	1527	306.2	68838	1201
Skata	1528.0	36.17	1.424	685.4	1.062	54/4.02	54/0.158	7/4.02	7/0.158	2477	1664	285.6	64201	1144
Martin	1351.5	36.17	1.424	684.8	1.061	54/4.02	54/0.158	19/2.30	19/0.091	2585	1737	205.9	46284	1144
Boblink	1431.0	36.25	1.427	724.9	1.124	45/4.53	45/0.178	7/3.02	7/0.119	2400	1613	170.4	38300	1190
Nuthatch	1510.5	37.21	1.465	765.3	1.186	45/4.65	45/0.183	7/3.10	7/0.122	2533	1702	178.4	40100	1235
Plover	1431.0	37.24	1.466	725.2	1.124	54/4.14	54/0.163	19/2.48	19/0.098	2738	1840	217.6	48928	1190
Ratite	1670.7	37.79	1.488	805.0	1.248	42/4.94	42/0.195	7/2.75	7/0.108	2491	1674	335.4	75405	1280
Lapwing	1590.0	38.20	1.504	805.9	1.249	45/4.78	45/0.188	7/3.18	7/0.125	2672	1796	191.2	42979	1281
Parrot	1510.5	38.30	1.508	764.9	1.186	54/4.25	54/0.167	19/2.55	19/0.100	2893	1944	235.1	52862	1235
Moa	1720.8	38.40	1.512	826.0	1.280	76/3.72	76/0.147	7/2.89	7/0.114	2577	1732	344.2	77374	1303
Hornbill	1728.6	38.44	1.513	804.7	1.247	48/4.62	48/0.182	7/3.60	7/0.142	2687	1806	335.3	75374	1279
Orre	1794.1	39.16	1.542	864.7	1.340	42/5.12	42/0.202	7/2.84	7/0.112	2673	1796	360.3	81000	1345
Falcon	1590.0	39.26	1.546	805.7	1.249	54/4.36	54/0.172	19/2.62	19/0.103	3042	2044	243.1	54660	1280
Seahawk	1927.5	40.62	1.599	946.6	1.467	68/4.21	68/0.166	7/2.34	7/0.092	2804	1884	394.4	88668	1432
Nelson	1919.3	40.64	1.600	932.1	1.445	72/4.06	72/0.160	7/2.71	7/0.107	2902	1950	200.0	44962	1417
Chukar	1780.0	40.70	1.602	902.3	1.399	84/3.70	84/0.146	19/2.22	19/0.087	3087	2074	228.4	51353	1385
Mockingbird	2122.9	42.63	1.678	1031.0	1.598	72/4.27	72/0.168	7/2.85	7/0.112	3133	2105	429.6	96579	1520
Rice	2127.7	42.68	1.680	956.9	1.483	54/4.75	54/0.187	19/2.85	19/0.112	3439	2311	398.7	89635	1443
Peach	2127.7	42.75	1.683	956.9	1.483	54/4.75	54/0.187	19/2.85	19/0.112	3439	2311	284.0	63846	1443
Rugby	2127.7	42.80	1.685	956.9	1.483	54/4.75	54/0.187	19/2.85	19/0.112	3450	2318	287.0	64520	1443
Nynah	2163.3	43.08	1.696	1013.8	1.571	84/3.92	84/0.154	19/2.35	19/0.093	3337	2242	422.4	94961	1502
Roadrunner	2170.2	43.14	1.699	1042.9	1.617	76/4.18	76/0.165	19/1.95	19/0.077	3246	2181	434.6	97692	1532
Kiwi	2167.0	44.07	1.735	1098.2	1.702	72/4.41	72/0.174	7/2.94	7/0.116	3427	2303	221.5	49800	1588
Dodo	2297.5	44.39	1.748	1076.8	1.669	84/4.04	84/0.159	19/2.42	19/0.095	3543	2381	448.7	100864	1566
Bluebird	2156.0	44.75	1.762	1092.3	1.693	84/4.07	84/0.160	19/2.44	19/0.096	3737	2511	268.2	60300	1582
Thrasher	2132.0	45.77	1.802	1171.3	1.815	76/4.43	76/0.174	19/2.07	19/0.081	3761	2527	252.2	56700	1661
Joree	2515.0	47.75	1.880	1274.2	1.975	76/4.62	76/0.182	19/2.16	19/0.085	4091	2749	274.5	61700	1761

Flexible Conductors

Standard AAAC Types and Specifications

Name	Size	OD		CSA		Stranding		Mass		Strength		Current Rating
	kcmil	mm	in	mm²	in²	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
Abilene	18.9	3.96	0.156	9.6	0.015	7/1.32	7/0.052	26	18	2.6	587	59
Akron	6 AWG	5.03	0.198	15.5	0.024	7/1.68	7/0.066	43	29	4.9	1110	82
Agate	33.2	5.25	0.207	16.8	0.026	7/1.75	7/0.069	46	31	4.7	1059	87
Argon	33.2	5.25	0.207	16.8	0.026	7/1.75	7/0.069	46	31	4.0	899	87
Box	37.3	5.55	0.219	18.9	0.029	7/1.85	7/0.073	51	34	5.3	1183	94
Arcacia	47.1	6.24	0.246	23.8	0.037	7/2.08	7/0.082	66	44	6.7	1508	111
Alton	4 AWG	6.35	0.250	24.7	0.038	7/2.12	7/0.083	68	46	7.8	1760	114
Amethyst	54.9	6.75	0.266	27.8	0.043	7/2.25	7/0.089	77	51	7.8	1749	123
Boron	54.9	6.75	0.266	27.8	0.043	7/2.25	7/0.089	77	51	6.6	1486	123
Austin	60.4	7.08	0.279	30.6	0.047	7/2.36	7/0.093	84	57	8.3	1876	132
Chlorine	67.8	7.50	0.295	34.4	0.053	7/2.50	7/0.098	94	63	8.2	1839	143
Diamond	67.8	7.50	0.295	34.4	0.053	7/2.50	7/0.098	94	63	9.6	2167	143
Cedar	70.0	7.62	0.300	35.5	0.055	7/2.54	7/0.100	97	65	10.0	2237	146
Ames	2 AWG	8.03	0.316	39.3	0.061	7/2.67	7/0.105	108	73	12.5	2800	157
Chronium	82.1	8.25	0.325	41.6	0.064	7/2.75	7/0.108	113	76	9.9	2228	163
Dolomite	82.1	8.25	0.325	41.6	0.064	7/2.75	7/0.108	114	77	11.6	2608	163
Fir	94.2	8.85	0.348	47.7	0.074	7/2.95	7/0.116	131	88	13.4	3012	180
Astoria	96.4	8.94	0.352	48.8	0.076	7/2.98	7/0.117	134	90	13.3	2991	182
Emerald	97.7	9.00	0.354	49.5	0.077	7/3.00	7/0.118	136	91	13.9	3125	184
Fluorine	97.7	9.00	0.354	49.5	0.077	7/3.00	7/0.118	135	91	11.8	2653	184
Hazel	118.3	9.90	0.390	59.9	0.093	7/3.30	7/0.130	164	110	16.8	3777	210
Azusa	1/0 AWG	10.11	0.398	62.5	0.097	7/3.37	7/0.133	172	116	19.8	4460	217
Pine	141.1	10.83	0.426	71.5	0.111	7/3.61	7/0.142	196	132	20.1	4519	238
Garnet	152.6	11.30	0.445	77.3	0.120	7/3.75	7/0.148	213	143	21.7	4878	251
Helium	152.6	11.30	0.445	77.3	0.120	7/3.75	7/0.148	211	142	17.6	3957	251
Anaheim	2/0 AWG	11.35	0.447	78.7	0.122	7/3.79	7/0.149	217	146	24.0	5390	254
Willow	177.0	12.12	0.477	89.7	0.139	7/4.04	7/0.159	246	165	25.2	5661	278
Amherst	3/0 AWG	12.75	0.502	99.2	0.154	7/4.25	7/0.167	273	184	30.2	6790	299
Hydrogen	219.7	13.50	0.531	111.3	0.173	7/4.50	7/0.177	305	205	24.3	5463	324
Jade	219.7	13.50	0.531	111.3	0.173	7/4.50	7/0.177	306	206	31.2	7014	324
Oak	234.4	13.95	0.549	118.8	0.184	7/4.65	7/0.183	325	218	33.3	7486	338
Iodine	244.8	14.30	0.563	124.0	0.192	7/4.75	7/0.187	340	228	27.1	6092	349
Jasper	244.8	14.30	0.563	124.0	0.192	7/4.75	7/0.187	341	229	34.8	7823	349
Alliance	4/0 AWG	14.30	0.563	125.1	0.194	7/4.77	7/0.188	345	232	38.1	8560	351
Mulberry	296.9	15.50	0.610	150.4	0.233	19/3.18	19/0.125	415	279	42.4	9523	399
Krypton	311.1	16.30	0.642	157.6	0.244	19/3.25	19/0.128	433	291	37.4	8408	412
Opal	311.1	16.30	0.642	157.6	0.244	19/3.25	19/0.128	433	291	44.2	9937	412
Butte	266.8	16.31	0.642	158.5	0.246	19/3.26	19/0.128	437	294	48.9	11000	414
Ash	356.6	17.40	0.685	180.7	0.280	19/3.48	19/0.137	497	334	50.6	11375	453
Lutelium	360.8	17.50	0.689	182.8	0.283	19/3.50	19/0.138	502	337	41.7	9375	457
Patronite	360.8	17.50	0.689	182.8	0.283	19/3.50	19/0.138	503	338	51.3	11533	457
Canton	336.4	18.31	0.721	199.9	0.310	19/3.66	19/0.144	551	370	59.2	13300	486
Elm	416.2	18.80	0.740	210.9	0.327	19/3.76	19/0.148	580	390	59.1	13286	504
Neon	414.1	18.80	0.740	209.8	0.325	19/3.75	19/0.148	578	388	47.8	10746	503
Pearl	414.1	18.80	0.740	209.8	0.325	19/3.75	19/0.148	577	388	58.8	13219	503
Cairo	397.5	19.89	0.783	235.8	0.365	19/3.98	19/0.157	650	437	69.4	15600	545
Poplar	472.5	20.09	0.791	239.4	0.371	37/2.87	37/0.113	658	442	67.0	15062	551
Nitrogen	516.2	21.00	0.827	261.5	0.405	37/3.00	37/0.118	721	484	62.2	13983	586
Ruby	516.2	21.00	0.827	261.5	0.405	37/3.00	37/0.118	719	483	73.5	16524	586
Darien	397.5	21.79	0.858	283.5	0.439	19/4.36	19/0.172	782	525	83.6	18800	620
Sycamore	596.8	22.61	0.890	302.4	0.469	37/3.23	37/0.127	835	561	85.0	19109	648
Nobelium	605.8	22.80	0.898	306.9	0.476	37/3.25	37/0.128	845	568	72.9	16389	655
Ruthenium	605.8	22.80	0.898	306.9	0.476	37/3.25	37/0.128	844	567	86.1	19356	655
Elgin	477.0	23.55	0.927	330.6	0.512	19/4.71	19/0.185	911	612	97.4	21900	689
Oxygen	664.5	23.80	0.937	336.7	0.522	19/4.75	19/0.187	926	622	73.6	16546	698
Rutile	664.5	23.80	0.937	336.7	0.522	19/4.75	19/0.187	926	622	94.4	21222	698
Palladium	702.5	24.50	0.965	356.0	0.552	37/3.50	37/0.138	979	658	97.0	21806	726
Upas	714.9	24.71	0.973	362.2	0.561	37/3.53	37/0.139	997	670	101.5	22818	735
Flint	636.0	25.17	0.991	375.4	0.582	37/3.59	37/0.142	1035	696	108.5	24400	753
Phosphorus	806.5	26.30	1.035	408.7	0.633	37/3.75	37/0.148	1120	753	93.1	20930	799
Sapphire	806.5	26.30	1.035	408.7	0.633	37/3.75	37/0.148	1124	755	115.0	25853	799
Serpentine	851.0	26.99	1.063	431.2	0.668	61/3.00	61/0.118	1186	797	117.5	26413	829
Rhodium	851.0	27.00	1.063	431.2	0.668	61/3.00	61/0.118	1189	799	97.0	21807	829
Greely	795.0	28.14	1.108	469.8	0.728	37/4.02	37/0.158	1295	870	135.7	30500	880
Yew	947.2	28.42	1.119	480.0	0.744	37/4.06	37/0.160	1322	888	134.5	30237	893
Totara	983.0	28.99	1.141	498.1	0.772	37/4.14	37/0.163	1370	920	135.7	30510	917
Selenium	998.7	29.30	1.154	506.0	0.784	61/3.25	61/0.128	1400	941	114.0	25628	927
Spinel	998.7	29.30	1.154	506.0	0.784	61/3.25	61/0.128	1392	935	135.0	30349	927
Rubus	1158.2	31.49	1.240	586.9	0.910	61/3.50	61/0.138	1614	1085	159.9	35951	1027
Silicon	1158.2	31.50	1.240	586.9	0.910	61/3.50	61/0.138	1620	1089	127.0	28551	1027
Tantalum	1158.2	31.50	1.240	586.9	0.910	61/3.50	61/0.138	1614	1085	156.0	35070	1027
Sorbus	1301.4	33.38	1.314	659.4	1.022	61/3.71	61/0.146	1813	1219	179.7	40394	1114
Sulphur	1329.6	33.80	1.331	673.7	1.044	61/3.75	61/0.148	1860	1250	145.0	32597	1131
Topaz	1329.6	33.80	1.331	673.7	1.044	61/3.75	61/0.148	1853	1245	179.0	40241	1131
Araucaria	1620.5	37.25	1.467	821.1	1.273	61/4.14	61/0.163	2258	1517	223.7	50300	1297
Karri	1941.4	40.81	1.607	983.7	1.525	91/3.71	91/0.146	2705	1818	268.0	60260	1471
Redwood	1966.0	41.03	1.615	996.2	1.544	61/4.56	61/0.180	2740	1841	271.4	61024	1484
Jarrah	2359.5	44.99	1.771	1195.6	1.853	91/4.09	91/0.161	3288	2209	325.8	73236	1685
Xenon	2856.3	49.50	1.949	1447.3	2.243	91/4.50	91/0.177	4010	2695	300.0	67443	1924
Zircon	2856.3	49.50	1.949	1447.3	2.243	91/4.50	91/0.177	3980	2674	384.0	86327	1924

Flexible Conductors

Standard ACAR Types and Specifications

Size	OD		CSA		Aluminium Stranding		Alloy Stranding		Mass		Strength		Current Rating
kcmil	mm	in	mm²	in²	No./mm	No./in	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
4 AWG	5.89	0.232	21.1	0.033	4/1.96	4/0.077	3/1.96	3/0.077	59	39.6	5.0	1120	102
2 AWG	7.42	0.292	33.6	0.052	4/2.47	4/0.097	3/2.47	3/0.097	93	62.5	7.8	1747	141
1/0 AWG	9.35	0.368	53.5	0.083	4/3.12	4/0.123	3/3.12	3/0.123	148	99.5	12.0	2686	194
2/0 AWG	10.52	0.414	67.5	0.105	4/3.50	4/0.138	3/3.50	3/0.138	187	125.7	14.7	3305	228
3/0 AWG	11.80	0.465	85.0	0.132	4/3.93	4/0.155	3/3.93	3/0.155	235	157.9	18.2	4092	268
4/0 AWG	13.25	0.522	107.3	0.166	4/4.42	4/0.174	3/4.42	3/0.174	297	199.6	23.0	5171	315
30.6	5.03	0.198	15.5	0.024	4/1.68	4/0.066	3/1.68	3/0.066	43	28.9	3.7	825	82
48.7	6.35	0.250	24.7	0.038	4/2.12	4/0.083	3/2.12	3/0.083	68	45.7	5.7	1288	114
77.5	8.03	0.316	39.3	0.061	4/2.67	4/0.105	3/2.67	3/0.105	109	73.2	8.9	2008	157
123.3	10.11	0.398	62.5	0.097	4/3.37	4/0.133	3/3.37	3/0.133	173	116.3	14.0	3136	217
155.4	11.35	0.447	78.7	0.122	4/3.79	4/0.149	3/3.79	3/0.149	218	146.5	17.0	3822	254
195.7	12.74	0.502	99.2	0.154	4/4.25	4/0.167	3/4.25	3/0.167	274	184.1	21.3	4788	299
246.9	14.31	0.563	125.1	0.194	4/4.77	4/0.188	3/4.77	3/0.188	346	232.5	26.8	6029	351
250	14.56	0.573	126.7	0.196	15/2.91	15/0.115	4/2.91	4/0.115	350	235.2	24.3	5463	354
250	14.56	0.573	126.7	0.196	12/2.91	12/0.115	7/2.91	7/0.115	350	235.2	27.5	6182	354
300	15.96	0.628	152.1	0.236	15/3.19	15/0.126	4/3.19	4/0.126	420	282.2	28.9	6486	402
300	15.96	0.628	152.1	0.236	12/3.19	12/0.126	7/3.19	7/0.126	420	282.2	32.8	7363	402
350	17.24	0.679	177.3	0.275	15/3.45	15/0.136	4/3.45	4/0.136	490	329.3	33.2	7452	447
350	17.24	0.679	177.3	0.275	12/3.45	12/0.136	7/3.45	7/0.136	490	329.3	37.4	8397	447
400	18.44	0.726	202.7	0.314	15/3.69	15/0.145	4/3.69	4/0.145	560	376.3	37.5	8419	491
400	18.44	0.726	202.7	0.314	12/3.69	12/0.145	7/3.69	7/0.145	560	376.3	42.3	9509	491
450	19.55	0.770	228.0	0.353	15/3.91	15/0.154	4/3.91	4/0.154	630	423.3	41.5	9330	533
450	19.55	0.770	228.0	0.353	12/3.91	12/0.154	7/3.91	7/0.154	630	423.3	47.1	10589	533
500	20.60	0.811	253.3	0.393	15/4.12	15/0.162	4/4.12	4/0.162	700	470.4	46.2	10386	573
500	20.60	0.811	253.3	0.393	12/4.12	12/0.162	7/4.12	7/0.162	700	470.4	52.4	11780	573
500	20.65	0.813	253.1	0.392	33/2.95	33/0.116	4/2.95	4/0.116	700	470.4	44.4	9982	573
500	20.65	0.813	253.1	0.392	30/2.95	30/0.116	7/2.95	7/0.116	700	470.4	48.0	10780	573
500	20.65	0.813	253.1	0.392	24/2.95	24/0.116	13/2.95	13/0.116	700	470.4	52.9	11881	573
500	20.65	0.813	253.1	0.392	18/2.95	18/0.116	19/2.95	19/0.116	700	470.4	58.6	13174	573
550	21.66	0.853	278.6	0.432	15/4.32	15/0.170	4/4.32	4/0.170	770	517.4	50.6	11375	612
550	21.66	0.853	278.6	0.432	12/4.32	12/0.170	7/4.32	7/0.170	770	517.4	57.7	12972	612
550	21.66	0.853	278.6	0.432	33/3.10	33/0.122	4/3.10	4/0.122	770	517.4	48.0	10791	612
550	21.66	0.853	278.6	0.432	30/3.10	30/0.122	7/3.10	7/0.122	770	517.4	52.0	11679	612
550	21.66	0.853	278.6	0.432	24/3.10	24/0.122	13/3.10	13/0.122	770	517.4	57.3	12882	612
550	21.66	0.853	278.6	0.432	18/3.10	18/0.122	19/3.10	19/0.122	770	517.4	64.0	14377	612
600	22.58	0.889	304.0	0.471	15/4.51	15/0.178	4/4.51	4/0.178	840	564.5	55.5	12477	650
600	22.58	0.889	304.0	0.471	12/4.51	12/0.178	7/4.51	7/0.178	840	564.5	62.6	14073	650
600	22.63	0.891	303.8	0.471	33/3.23	33/0.127	4/3.23	4/0.127	840	564.5	52.4	11780	650
600	22.63	0.891	303.8	0.471	30/3.23	30/0.127	7/3.23	7/0.127	840	564.5	56.8	12769	650
600	22.63	0.891	303.8	0.471	24/3.23	24/0.127	13/3.23	13/0.127	840	564.5	62.6	14073	650
600	22.63	0.891	303.8	0.471	18/3.23	18/0.127	19/3.23	19/0.127	840	564.5	70.2	15782	650
650	23.57	0.928	329.1	0.510	33/3.37	33/0.133	4/3.37	4/0.133	910	611.5	56.8	12769	687
650	23.57	0.928	329.1	0.510	30/3.37	30/0.133	7/3.37	7/0.133	910	611.5	61.3	13781	687
650	23.57	0.928	329.1	0.510	24/3.37	24/0.133	13/3.37	13/0.133	910	611.5	68.0	15287	687
653	23.57	0.928	329.1	0.510	18/3.37	18/0.133	19/3.37	19/0.133	910	611.5	76.0	17086	687
700	24.46	0.963	354.5	0.549	33/3.49	33/0.138	4/3.49	4/0.138	980	658.5	60.4	13579	724
700	24.46	0.963	354.5	0.549	30/3.49	30/0.138	7/3.49	7/0.138	980	658.5	65.3	14680	724
700	24.46	0.963	354.5	0.549	24/3.49	24/0.138	13/3.49	13/0.138	980	658.5	71.5	16074	724
700	24.46	0.963	354.5	0.549	18/3.49	18/0.138	19/3.49	19/0.138	980	658.5	79.5	17872	724
750	25.32	0.997	380.2	0.589	33/3.62	33/0.142	4/3.62	4/0.142	1050	705.6	64.0	14388	760
750	25.32	0.997	380.2	0.589	30/3.62	30/0.142	7/3.62	7/0.142	1050	705.6	69.3	15579	760
750	25.32	0.997	380.2	0.589	24/3.62	24/0.142	13/3.62	13/0.142	1050	705.6	76.0	17086	760
750	25.32	0.997	380.2	0.589	18/3.62	18/0.142	19/3.62	19/0.142	1050	705.6	84.4	18974	760
800	26.15	1.030	405.1	0.628	33/3.73	33/0.147	4/3.73	4/0.147	1120	752.6	68.0	15287	794
800	26.15	1.030	405.1	0.628	30/3.73	30/0.147	7/3.73	7/0.147	1120	752.6	73.7	16568	794
800	26.15	1.030	405.1	0.628	24/3.73	24/0.147	13/3.73	13/0.147	1120	752.6	80.8	18165	794
800	26.15	1.030	405.1	0.628	18/3.73	18/0.147	19/3.73	19/0.147	1120	752.6	90.1	20255	794
850	26.95	1.061	430.9	0.668	33/3.85	33/0.152	4/3.85	4/0.152	1190	799.6	71.0	15962	829
850	26.95	1.061	430.9	0.668	30/3.85	30/0.152	7/3.85	7/0.152	1190	799.6	77.2	17355	829
850	26.95	1.061	430.9	0.668	24/3.85	24/0.152	13/3.85	13/0.152	1190	799.6	85.3	19176	829
850	26.95	1.061	430.9	0.668	18/3.85	18/0.152	19/3.85	19/0.152	1190	799.6	95.0	21357	829
900	27.75	1.093	456.3	0.707	33/3.96	33/0.156	4/3.96	4/0.156	1260	846.7	75.5	16973	862
900	27.75	1.093	456.3	0.707	30/3.96	30/0.156	7/3.96	7/0.156	1260	846.7	81.7	18367	862
900	27.75	1.093	456.3	0.707	24/3.96	24/0.156	13/3.96	13/0.156	1260	846.7	90.2	20267	862
900	27.75	1.093	456.3	0.707	18/3.96	18/0.156	19/3.96	19/0.156	1260	846.7	99.5	22369	862
950	28.50	1.122	481.2	0.746	33/4.07	33/0.160	4/4.07	4/0.160	1330	893.7	79.5	17872	895
950	28.50	1.122	481.2	0.746	30/4.07	30/0.160	7/4.07	7/0.160	1330	893.7	86.1	19356	895
950	28.50	1.122	481.2	0.746	24/4.07	24/0.160	13/4.07	13/0.160	1330	893.7	95.0	21357	895
950	28.50	1.122	481.2	0.746	18/4.07	18/0.160	19/4.07	19/0.160	1330	893.7	106.1	23852	895
1000	29.30	1.154	506.7	0.785	33/4.18	33/0.164	4/4.18	4/0.164	1400	940.8	83.9	18862	928
1000	29.30	1.154	506.7	0.785	30/4.18	30/0.164	7/4.18	7/0.164	1400	940.8	90.6	20368	928
1000	29.30	1.154	506.7	0.785	24/4.18	24/0.164	13/4.18	13/0.164	1400	940.8	100.3	22548	928

Flexible Conductors

Standard ACAR Types and Specifications

Size	OD		CSA		Aluminium Stranding		Alloy Stranding		Mass		Strength		Current Rating
kcmil	mm	in	mm²	in²	No./mm	No./in	No./mm	No./in	kg/km	lbs/1000ft	kN	lbs	amps
1000	29.30	1.154	506.7	0.785	18/4.18	18/0.164	19/4.18	19/0.164	1400	940.8	111.9	25156	928
1000	29.32	1.154	506.4	0.785	54/3.25	54/0.128	7/3.25	7/0.128	1397	938.7	87.5	19671	927
1000	29.32	1.154	506.4	0.785	48/3.25	48/0.128	13/3.25	13/0.128	1397	938.7	93.7	21065	927
1000	29.32	1.154	506.4	0.785	42/3.25	42/0.128	19/3.25	19/0.128	1397	938.7	101.7	22863	927
1000	29.32	1.154	506.4	0.785	33/3.25	33/0.128	28/3.25	28/0.128	1397	938.7	122.1	27449	927
1100	30.65	1.207	567.6	0.880	33/4.42	33/0.174	4/4.42	4/0.174	1540	1034.8	91.9	20660	1004
1100	30.65	1.207	567.6	0.880	30/4.42	30/0.174	7/4.42	7/0.174	1540	1034.8	99.9	22459	1004
1100	30.65	1.207	567.6	0.880	24/4.42	24/0.174	13/4.42	13/0.174	1540	1034.8	110.1	24752	1004
1100	30.65	1.207	567.6	0.880	18/4.42	18/0.174	19/4.42	19/0.174	1540	1034.8	123.0	27652	1004
1100	30.70	1.209	557.5	0.864	54/3.41	54/0.134	7/3.41	7/0.134	1540	1034.8	95.9	21559	991
1100	30.70	1.209	557.5	0.864	48/3.41	48/0.134	13/3.41	13/0.134	1540	1034.8	101.7	22863	991
1100	30.70	1.209	557.5	0.864	42/3.41	42/0.134	19/3.41	19/0.134	1540	1034.8	110.1	24752	991
1100	30.70	1.209	557.5	0.864	33/3.41	33/0.134	28/3.41	28/0.134	1540	1034.8	118.1	26550	991
1200	32.00	1.260	608.1	0.943	33/4.58	33/0.180	4/4.58	4/0.180	1680	1128.9	100.3	22548	1053
1200	32.00	1.260	608.1	0.943	30/4.58	30/0.180	7/4.58	7/0.180	1680	1128.9	108.8	24459	1053
1200	32.00	1.260	608.1	0.943	24/4.58	24/0.180	13/4.58	13/0.180	1680	1128.9	120.4	27056	1053
1200	32.00	1.260	608.1	0.943	18/4.58	18/0.180	19/4.58	19/0.180	1680	1128.9	134.0	30125	1053
1200	32.10	1.264	608.4	0.943	54/3.56	54/0.140	7/3.56	7/0.140	1680	1128.9	102.6	23066	1053
1200	32.10	1.264	608.4	0.943	48/3.56	48/0.140	13/3.56	13/0.140	1680	1128.9	109.7	24662	1053
1200	32.10	1.264	608.4	0.943	42/3.56	42/0.140	19/3.56	19/0.140	1680	1128.9	118.6	26662	1053
1200	32.10	1.264	608.4	0.943	33/3.56	33/0.140	28/3.56	28/0.140	1680	1128.9	127.9	28753	1053
1250	32.70	1.287	633.4	0.982	33/4.67	33/0.184	4/4.67	4/0.184	1750	1175.9	104.8	23560	1083
1250	32.70	1.287	633.4	0.982	30/4.67	30/0.184	7/4.67	7/0.184	1750	1175.9	113.7	25561	1083
1250	32.70	1.287	633.4	0.982	24/4.67	24/0.184	13/4.67	13/0.184	1750	1175.9	125.2	28146	1083
1250	32.70	1.287	633.4	0.982	18/4.67	18/0.184	19/4.67	19/0.184	1750	1175.9	139.0	31249	1083
1250	32.72	1.288	632.9	0.981	54/3.64	54/0.143	7/3.64	7/0.143	1750	1175.9	107.0	24055	1083
1250	32.72	1.288	632.9	0.981	48/3.64	48/0.143	13/3.64	13/0.143	1750	1175.9	114.0	25628	1083
1250	32.72	1.288	632.9	0.981	42/3.64	42/0.143	19/3.64	19/0.143	1750	1175.9	123.4	27742	1083
1250	32.72	1.288	632.9	0.981	33/3.64	33/0.143	28/3.64	28/0.143	1750	1175.9	133.2	29945	1083
1300	33.33	1.312	658.4	1.021	33/4.76	33/0.187	4/4.76	4/0.187	1820	1223.0	108.8	24459	1113
1300	33.33	1.312	658.4	1.021	30/4.76	30/0.187	7/4.76	7/0.187	1820	1223.0	118.1	26550	1113
1300	33.33	1.312	658.4	1.021	24/4.76	24/0.187	13/4.76	13/0.187	1820	1223.0	130.0	29225	1113
1300	33.33	1.312	658.4	1.021	18/4.76	18/0.187	19/4.76	19/0.187	1820	1223.0	145.2	32642	1113

Flexible Conductors

AWG and MCM Sizes Listed by Outside Diameter

Conductor Diameter (Inches)	ACSR	All-Aluminum	Alum. Alloy (5005-6201)	Compacted		AWAC®	Copper	Copperweld®
				ACSR	All-Alum.			
0.162		#6, Solid					#6, Solid	
0.169					#6, 7W			
0.174								9 1/2 D
0.179								8C
0.182		#5, Solid		#6, 6/1			#5, Solid	
0.184		#6, 7W					#6, 7W	
0.198	#6, 6/1		#6, 7W					
0.199								8A
0.201			#6, 3W					
0.202							#6, 3W	
0.204		#4, Solid					#4, Solid	
0.206							#5, 7W	
0.213					#4, 7W			
0.219								8D
0.223	#5, 6/1							7A
0.225								6C
0.226							#5, 3W	
0.229		#3, Solid		#4, 6/1			#3, Solid	
0.230								6A
0.232		#4, 7W					#4, 7W	
0.236				#4, 7/1				
0.245						#4, 6/1		
0.246								7D
0.250	#4, 6/1		#4,7W					
0.257	#4, 7/1							
0.258		#2, Solid		#3, 6/1			#2, Solid	5A
0.260		#3, 7W					#3, 7W	
0.261						#4, 5/2		
0.268					#2, 7W			
0.276								6D
0.279			#3, 7W					
0.281	#3, 6/1					#4, 4/3		
0.286							#3, 3W	
0.289		#1, Solid					#1, Solid	
0.290				#2, 6/1				4A
0.292		#2, 7W					#2, 7W	
0.298				#2, 7/1				
0.301					#1, 7W			
0.307						#4, 3/4		
0.308								2F
0.309						#2, 6/1		
0.310								5D
0.316	#2, 6/1		#2, 7W					
0.320							#2, 3W	
0.325	#2, 7/1						1/0, Solid	
0.326				#1, 6/1				5P
0.327								2G
0.328		#1, 7W					#1, 7W	4N
0.330						#2, 5/2		
0.332		#1, 19W					#1, 19W	
0.338					1/0, 7W			
0.340					1/0, 19W	#4, 2/5		
0.346								1F
0.348								4D

(Continued)

Flexible Conductors

AWG and MCM Sizes Listed by Outside Diameter

Conductor Diameter (Inches)	ACSR	All-Aluminum	Alum. Alloy (5005-6201)	Compacted		AWAC®	Copper	Copperweld®
				ACSR	All-Alum.			
0.349								2J
0.352			#1, 7W					
0.355	#1,6/1					#2, 4/3		
0.360							#1, 3W	
0.365				1/0, 6/1			2/0, Solid	
0.366								2A, 4P
0.367	80, 8/1							1G
0.368		1/0, 7W					1/0, 7W	3N
0.372							1/0, 19W	
0.373		1/0, 19W						
0.377								2K
0.381					2/0, 7W			
0.382					2/0, 19W			
0.386						#2, 3/4		
0.388								1/0 F
0.390						1/0, 6/1	1/0, 12W	
0.392								1J
0.393	1/0, 5/1							
0.398	1/0, 6/1		1/0, 7W					
0.410				2/0, 6/1				
0.411								3P
0.412								1/0 G
0.413								2N
0.414		2/0, 7W					2/0, 7W	
0.416						1/0, 5/2		
0.419		2/0, 19W					2/0, 19W	
0.423								1K
0.426					3/0, 7W			
0.428					3/0, 19W			
0.429						#2, 2/5		
0.434						#1, 3/4		
0.436								2/0 F
0.438						2/0, 6/1	2/0, 12W	
0.440								1/0 J
0.447	2/0, 6/1		2/0, 7W			1/0, 4/3		
0.460	2/0, 7/1							
0.461	101.8, 12/7			3/0, 6/1				
0.462								2P
0.463								2/0 G
0.464		3/0, 7W					3/0, 7W	1N
0.467						2/0, 5/2		
0.470		3/0, 19W					3/0, 19W	
0.475								1/0 K
0.480					4/0, 7W			
0.481	110.8, 12/7				4/0, 19W			
0.487						1/0, 3/4		
0.492		3/0,12W					3/0, 12W	
0.494								2/0 J
0.502	3/0, 6/1		3/0, 7W			2/0, 4/3		
0.517				4/0, 6/1				
0.522		4/0, 7W					4/0, 7W	
0.523					250, 19W			
0.528		4/0, 19W					4/0, 19W	
0.530	134.6, 12/7							
0.534								2/0 K

(Continued)

Flexible Conductors

AWG and MCM Sizes Listed by Outside Diameter

Conductor Diameter (Inches)	ACSR	All-Aluminum	Alum. Alloy (5005-6201)	Compacted		AWAC®	Copper	Copperweld®
				ACSR	All-Alum.			
0.537					266.8, 7W			
0.540					266.8, 19W			
0.541						1/0, 2/5		
0.542	4/0, 18/1							
0.550								4/0 F
0.552		4/0, 12W				4/0, 6/1	4/0, 12W	
0.556	4/0, 5/1							
0.559				266.8, 18/1				
0.563	4/0, 6/1		4/0, 7W					
0.565								
0.571								4/0 EK
0.573					300, 19W			
0.574		250, 19W					250, 19W	
0.575		250, 37W				4/0, 15/4	250, 37W	
0.576	159, 12/7							
0.583								4/0 G
0.584	203, 8/7							
0.586		266.8, 7W						
0.593		266.8, 19W		300, 18/1				
0.594		266.8, 37W						
0.600							250, 12W	
0.603					336.4, 7W			
0.607	176.9, 12/7				336.4, 19W			
0.607	219.9, 8/7							
0.609	266.8, 18/1							
0.613								4/0 E
0.618					350, 19W			
0.621								250 EK
0.628		300, 19W		336.4, 18/1			300, 19W	
0.630		300, 37W					300, 37W	
0.631	190.8, 12/7							
0.633	266.8, 6/7							
0.642	266.8, 26/7		266.8, 19W					
0.646	300, 18/1							
0.657							300, 12W	
0.660					397.5, 19W			
0.664	211.3, 12/7							
0.666		336.4, 19W						250 E
0.668		336.4, 37W						
0.677	336.4, 36/1							
0.678							350, 19W	
0.679		350, 19W				336.4, 18/1		
0.680	300, 26/7							300 EK
0.681		350, 37W					350, 37W	
0.682				397.5, 18/1				
0.684	336.4, 18/1							
0.700	300, 30/7							
0.709						336.4, 16/3		
0.710							350, 12W	
0.714	203.2, 16/19							
0.721	336.4, 26/7							
0.722					477, 19W			
0.724		397.5, 19W						
0.725						336.4, 15/4		

(Continued)

Flexible Conductors

AWG and MCM Sizes Listed by Outside Diameter

Conductor Diameter (Inches)	ACSR	All-Aluminum	Alum. Alloy (5005-6201)	Compacted		AWAC®	Copper	Copper-weld®
				ACSR	All-Alum.			
0.726		400, 19W					400, 19W	
0.728		400, 37W					400, 37W	
0.729								300 E
0.735								350 EK
0.736	397.5, 36/1							
0.739					500, 19W			
0.741	336.4, 30/7							
0.742				477, 18/1				
0.743	397.5, 18/1							
0.770		450, 19W					450, 19W	
0.772	397.5, 24/7	450, 37W					450, 37W	
0.780					556, 19W			
0.782			397.5, 19W					
0.783	397.5, 26/7							
0.788								350 E
0.793		477, 19W						
0.795		477, 37W						
0.801				556.5, 18/1				
0.806	477, 36/1							
0.806	397.5, 30/7							
0.811		500, 19W					500, 19W	
0.813		500, 37W					500, 37W	
0.814	477, 18/1							
0.834					636, 19W			
0.846	477, 24/7							
0.853		550, 37W					550, 37W	
0.855		550, 61W					550, 61W	
0.856		556.5, 19W						
0.858	477, 26/7	556.5, 37W	477, 19W					
0.860		556.5, 61W						
0.862				636, 18/1				
0.870	556.5, 36/1							
0.879	556.5, 18/1							
0.883	477, 30/7							
0.891		600, 37W					600, 37W	
0.893		600, 61W					600, 61W	
0.904	500, 30/7							
0.907	605, 36/1							
0.914	556.5, 24/7							
0.918		636, 37W						
0.919		636, 61W						
0.927	556.5, 26/7		556.5, 19W					
0.928		650, 37W					650, 37W	
0.929		650, 61W					650, 61W	
0.930	636, 36/1							
0.932				795, 36/1	795, 19W			
0.940	636, 18/1							
0.953	556.5, 30/7							
0.953	605, 24/7							
0.953	605, 54/7							
0.953	666.6, 36/1							
0.962		700, 37W					700, 37W	
0.964		700, 61W					700, 61W	
0.966	605, 26/7							

(Continued)

Flexible Conductors

AWG and MCM Sizes Listed by Outside Diameter

Conductor Diameter (Inches)	ACSR	All-Aluminum	Alum. Alloy (5005-6201)	Compacted		AWAC®	Copper	Copperweld®
				ACSR	All-Alum.			
0.974		715.5, 37W						
0.975		715.5, 61W						
0.977	636, 24/7							
0.977	636, 54/7							
0.981					874.5, 37W			
0.987	715.5, 36/1							
0.990	636, 26/7		636, 37W					
0.994	605, 30/19			874.5, 36/1				
0.997		750, 37W					750, 37W	
0.998		750, 61W					750, 61W	
1.000	666.6, 24/7							
1.000	666.6, 54/7							
1.019	636, 30/19							
1.024					954, 37W			
1.026		795, 37W						
1.028		795, 61W						
1.029		800, 37W					800, 37W	
1.031		800, 61W					800, 61W	
1.036	715.5, 24/7							
1.039				954, 36/1				
1.040	795, 36/1							
1.051	715.5, 26/7							
1.061							850, 37W	
1.062							850, 61W	
1.063	795,45/7							
1.077		874.5, 37W						
1.078		874.5, 61W						
1.081	715.5, 30/19							
1.091	874.5, 36/1							
1.092	795, 24/7	900, 37W					900, 37W	
1.093	795, 54/7							
1.094		900, 61W					900, 61W	
1.108	795, 26/7		795, 37W					
1.111								
1.124		954, 37W						
1.126		954, 61W						
1.131	900, 45/7							
1.140	795, 30/19							
1.140	954, 36/1							
1.146	874.5, 24/7							
1.146	874.5, 54/7							
1.151		1000, 37W					1000, 37W	
1.152		1000, 61W					1000, 61W	
1.162	900, 54/7							
1.165	954, 45/7							
1.170		1033.5, 37W						
1.172		1033.5, 61W						
1.175	954, 48/7							
1.186	1033.5, 36/1							

(Continued)

Flexible Conductors

AWG and MCM Sizes Listed by Outside Diameter

Conductor Diameter (Inches)	ACSR	All-Aluminum	Alum. Alloy (5005-6201)	Compacted		AWAC®	Copper	Copperweld®
				ACSR	All-Alum.			
1.196	954, 54/7							
1.212	1033.5, 45/7							
1.216		1113, 61W						
1.218			954, 37W					
1.246	1033.5, 54/7							
1.258		1192.5, 61W						
1.259	1113, 45/7							
1.269			1033.5, 61W					
1.288				1468, 36/1				
1.293	1113, 54/19							
1.300		1272, 61W						
1.302	1192.5, 45/7							
1.333	1192.5, 54/19							
1.340		1351.5, 61W						
1.345	1272, 45/7							
1.379		1431, 61W						
1.382	1272, 54/19							
1.385	1351.5, 45/7							
1.417		1510.5, 61W						
1.424	1351.5, 54/19							
1.427	1431, 45/7							
1.443		1590, 61W						
1.454		1590, 91W						
1.465	1431, 54/19							
1.466	1510.5, 45/7							
1.504	1590, 45/7							
1.506	1510.5, 54/19							
1.545	1590, 54/19							
1.602	1780, 84/19							
1.630		2000, 91W						
1.737	2167, 72/7							
1.762	2156, 84/19							
1.823		2500, 91W						
1.996		3000, 127W						
2.158		3500, 127W						

AWAC and Copperweld are registered trademarks of the Copperweld Co.

Glossary

POWERFORMED™ Catalog

Glossary	
ANSI	American National Standards Institute
approx.	Approximately
CSA	Cross Sectional Area
Dim	Dimension
EHV	Extra High Voltage (245 to 500kV)
EWP	Elevated Work Platform
HV	High Voltage (up to 230kV)
ID	Inside Diameter
IEC	International Electrotechnical Commission
in	inches
MIG	Metal Inert Gas
mm	millimetres
NEMA	National Electrical Manufacturers Association
n/a	Not applicable/available
OD	Outside Diameter
PCD	Pitch Circle Diameter
RIV	Radio Interference Voltage
Run	Main Conductor
SPS	Standard Pipe Size
Tap	Secondary Conductor
TBA	To be advised
TBC	To be confirmed
TIG	Tungsten Inert Gas
WT	Wall Thickness

Material: Aluminum
Maximum Voltage Application: 230kV

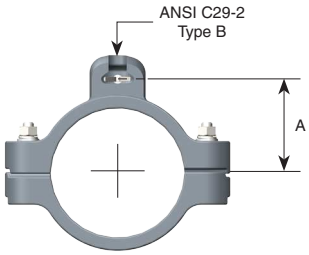
BUSLIGN™ Bolted - Fixed Or Sliding Support

SOCKET SUSPENSION
BBAH - FSSST

BUSLIGN™ socket suspension supports are designed to suspend busbar tubes beneath disk insulator strings which utilize ball and socket couplings. The BBAH-FSSST support can be installed in either fixed or sliding configuration by simply reversing the position of the lower clamp as shown below. ANSI C29-2 type B coupling supplied as standard; other couplings available on request. Busbar tube support sizes and centerlines for metric and SPS tubes other than those listed below are available on request, please consult PLP for details.

Fixed Tube Installation

Sliding Tube Installation



Hardware	Suffix
Grade A2 70 (304) Stainless Steel Fastenings, Metric	- SM
Grade A2 70 (304) Stainless Steel Fastenings, Imperial	- SI
Aluminum Anodized Fastenings, Metric	- AM
Aluminum Anodized Fastenings, Imperial	- AI
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Metric	- GM
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Imperial	- GI
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Metric	- HM
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Imperial	- HI

BUSLIGN™ Bolted Suspension Supports To Suit SPS Schedule 40 And 80 Aluminum Tubes

Catalog Number	Nominal Tube Size (in)	Tube OD (in)	Dim A (mm.)
BBAH-FSSST-A010 (EGAT No.12.53)	2	2.375	72.00 (TBC)
BBAH-FSSST-A020	2 1/2	2.875	80.01
BBAH-FSSST-A030 (EGAT No.12.55)	3	3.500	80.00 (TBC)
BBAH-FSSST-A040	3 1/2	4.000	85.09
BBAH-FSSST-A050	4	4.500	95.25
BBAH-FSSST-A060 (EGAT No.12.57)	5	5.563	106.00 (TBC)
BBAH-FSSST-A070	6	6.625	120.65
BBAH-FSSST-A080	8	8.625	154.94

Catalog Number Explained (Please Refer To User Guide)

B	B	A	H	-	F	S	S	S	T	-	A	010	-	SI
BUSLIGN™	Bolted	Aluminum	High Voltage (to 230kV)		Fixed	Sliding	Suspension	Support	Tube		American (Imperial)	Model Number		Stainless Steel Imperial Fastenings

Material: Aluminium
Maximum Voltage Application: 230kV

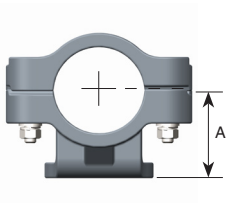
BUSLIGN™ Bolted - Fixed Or Sliding Support

TWIN CLAMP
BBAH - FSST

BUSLIGN™ BBAH-FSST busbar tube supports can be installed in fixed or sliding configuration. In fixed configuration, the two top caps of the support are oriented on the base so that the casting will firmly clamp the busbar tube in place. In sliding configuration, the two top caps of the support are turned around 180 degrees on the base from the fixed postion to allow the busbar tube to move freely within the support. The advantage of this design is that the locations of the fixed and sliding supports do not have to be determined prior to site construction. Standard mountings are 3 inch, 5 inch and 7 inch Pitch Circle Diameter (PCD). Other PCD's are available on request. Note that 8 holes are provided in the support base to suit any PCD orientation. Busbar tube support sizes and centerlines for metric and SPS tubes other than those listed below are available on request, please consult PLP for details.

Fixed Tube Installation

Sliding Tube Installation



Hardware	Suffix
Grade A2 70 (304) Stainless Steel Fastenings, Metric	- SM
Grade A2 70 (304) Stainless Steel Fastenings, Imperial	- SI
Aluminum Anodized Fastenings, Metric	- AM
Aluminum Anodized Fastenings, Imperial	- AI
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Metric	- GM
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Imperial	- GI
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Metric	- HM
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Imperial	- HI

BUSLIGN™ Bolted Fixed Or Sliding Support To Suit SPS Schedule 40 And 80 Aluminum Tubes

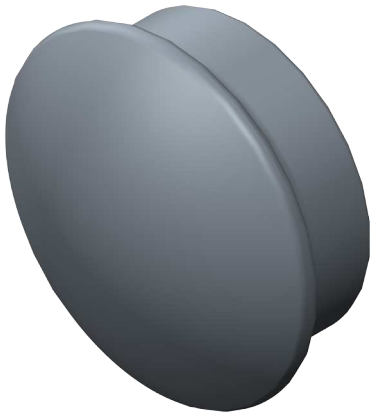
Nominal Tube	3 inch PCD		5 inch PCD		7 inch PCD	
Size (in)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)
2	BBAH-FSST-A2010 (EGAT No.15.23)	69.80	BBAH-FSST-A3010	69.85		
2 1/2	BBAH-FSST-A2020	79.38	BBAH-FSST-A3020	79.38		
3	BBAH-FSST-A2030 (EGAT No.15.25)	92.10	BBAH-FSST-A3030	92.08		
3 1/2	BBAH-FSST-A2040	101.60	BBAH-FSST-A3040	101.60		
4	BBAH-FSST-A2050	114.30	BBAH-FSST-A3050	114.30		
5	BBAH-FSST-A2060 (EGAT No.15.27)	127.00	BBAH-FSST-A3060	127.00	BBAH-FSST-A4010	127.00
6			BBAH-FSST-A3070	139.70	BBAH-FSST-A4020	139.70
8			BBAH-FSST-A3080	167.01	BBAH-FSST-A4030	167.01

Catalog Number Explained (Please Refer To User Guide)

B	B	A	H	-	F	S	S	T	-	A	2010	-	SI
BUSLIGN™	Bolted	Aluminum	High Voltage (to 230kV)		Fixed	Sliding	Support	Twin		American (Imperial)	Model Number		Stainless Steel Imperial Fastenings

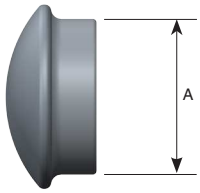
Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Corona Dome Cap



NON DAMPING CONDUCTOR TYPE
BWAH - CDND

This style of cast BUSLIGN™ welded corona dome cap is fixed onto the end of a busbar via Metal Inert Gas (MIG) or Tungsten Inert Gas (TIG) welding. For installation, the cap is simply pushed into the end of the tube and welded around its circumference. Corona end caps reduce electrical discharge/noise and seal the tubes to prevent the entry of dust, contaminants and wildlife.



BUSLIGN™ Welded Corona Dome Caps To Suit SPS Schedule 40 Aluminum Tubes

Catalog Number	Nominal Tube	Tube		Dim
	Size (in)	OD (in)	ID (in)	A (mm.)
BWAH-CDND-A2010	1	1.315	1.049	24.64
BWAH-CDND-A2020	1 1/4	1.660	1.38	33.02
BWAH-CDND-A2030	1 1/2	1.900	1.610	38.86
BWAH-CDND-A2040 (EGAT No.45.54)	2	2.375	2.067	48.00 (TBC)
BWAH-CDND-A2050	2 1/2	2.875	2.469	60.71
BWAH-CDND-A2060 (EGAT No.45.56)	3	3.500	3.068	
BWAH-CDND-A2070	3 1/2	4.000	3.548	88.14
BWAH-CDND-A2080	4	4.500	4.026	100.20
BWAH-CDND-A2090 (EGAT No.45.58)	5	5.563	5.047	122.00 (TBC)
BWAH-CDND-A2100	6	6.625	6.065	152.02
BWAH-CDND-A2110	8	8.625	7.981	200.66

BUSLIGN™ Welded Corona Dome Caps To Suit SPS Schedule 80 Aluminum Tubes

Catalog Number	Nominal Tube	Tube		Dim
	Size (in)	OD (in)	ID (in)	A (mm.)
BWAH-CDND-A3010	1	1.315	0.957	22.23
BWAH-CDND-A3020	1 1/4	1.660	1.278	30.48
BWAH-CDND-A3030	1 1/2	1.900	1.500	36.07
BWAH-CDND-A3040	2	2.375	1.939	47.24
BWAH-CDND-A3050	2 1/2	2.875	2.323	56.90
BWAH-CDND-A3060	3	3.500	2.900	71.63
BWAH-CDND-A3070	3 1/2	4.000	3.364	83.44
BWAH-CDND-A3080	4	4.500	3.826	95.12
BWAH-CDND-A3090 (EGAT No.45.59)	5	5.563	4.813	115.00 (TBC)
BWAH-CDND-A3100	6	6.625	5.761	144.27
BWAH-CDND-A3110	8	8.625	7.625	191.64

Catalog Number Explained (Please Refer To User Guide)

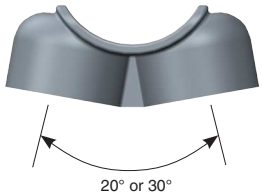
B	W	A	H	-	C	D	N	D	-	A	2010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Corona	Dome	Non	Damping Conductor Type		American (Imperial)	Model Number

Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - A Frame Connector

VEE CONNECTOR
BWAH - VC

BUSLIGN™ 20 and 30 degree welded vee connectors are used in combination with BUSLIGN™ welded or bolted/welded tee connectors to create rigid busbar tube A frame connections. Installation is normally made via Metal Inert Gas (MIG) welding. Use 75 degree tees with 30 degree vee connectors and 80 degree tees with 20 degree vee connectors.



BUSLIGN™ Welded - Vee Connectors To Suit SPS Schedule 40 And 80 Aluminum Tubes

Catalog Number		SPS	
20 Degree	30 Degree	Run (in)	Tap (in)
BWAH-VC-A2010 (EGAT No.41.13)	BWAH-VC-A3010	2	2
BWAH-VC-A2020	BWAH-VC-A3020	2 1/2	1 1/4
BWAH-VC-A2030	BWAH-VC-A3030	2 1/2	1 1/2
BWAH-VC-A2040	BWAH-VC-A3040	2-1/2	2
BWAH-VC-A2050	BWAH-VC-A3050	2 1/2	2 1/2
BWAH-VC-A2060	BWAH-VC-A3060	3	1 1/2
BWAH-VC-A2070 (EGAT No.41.32)	BWAH-VC-A3070	3	2
BWAH-VC-A2080	BWAH-VC-A3080	3	2 1/2
BWAH-VC-A2090 (EGAT No.41.34)	BWAH-VC-A3090	3	3
BWAH-VC-A2100	BWAH-VC-A3100	3 1/2	2
BWAH-VC-A2110	BWAH-VC-A3110	3 1/2	2 1/2
BWAH-VC-A2120	BWAH-VC-A3120	3 1/2	3
BWAH-VC-A2130	BWAH-VC-A3130	3 1/2	3 1/2
BWAH-VC-A2140	BWAH-VC-A3140	4	2
BWAH-VC-A2150	BWAH-VC-A3150	4	2 1/2

Catalog Number		SPS	
20 Degree	30 Degree	Run (in)	Tap (in)
BWAH-VC-A2160	BWAH-VC-A3160	4	3
BWAH-VC-A2170	BWAH-VC-A3170	4	4
BWAH-VC-A2180	BWAH-VC-A3180	5	2 1/2
BWAH-VC-A2190 (EGAT No.41.53)	BWAH-VC-A3190	5	3
BWAH-VC-A2200	BWAH-VC-A3200	5	3 1/2
BWAH-VC-A2210	BWAH-VC-A3210	5	4
BWAH-VC-A2220	BWAH-VC-A3220	5	5
BWAH-VC-A2230	BWAH-VC-A3230	6	3
BWAH-VC-A2240	BWAH-VC-A3240	6	3 1/2
BWAH-VC-A2250	BWAH-VC-A3250	6	4
BWAH-VC-A2260	BWAH-VC-A3260	6	5
BWAH-VC-A2270	BWAH-VC-A3270	6	6
BWAH-VC-A2280	BWAH-VC-A3280	8	4
BWAH-VC-A2290	BWAH-VC-A3290	8	5
BWAH-VC-A2300	BWAH-VC-A3300	8	6
BWAH-VC-A2310	BWAH-VC-A3310	8	8

Catalog Number Explained (Please Refer To User Guide)

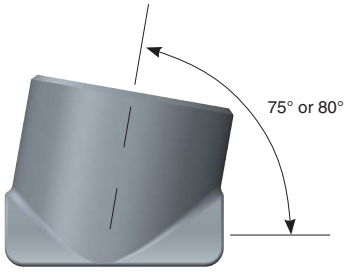
B	W	A	H	-	V	C	-	A	2010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Vee	Connector		American (Imperial)	Model Number

Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - A Frame Connector

TEE CONNECTOR
BWAH - TCWW

BUSLIGN™ 75 and 80 degree welded tee connectors are used in combination with BUSLIGN™ bolted vee connectors to create rigid tubular bus A frame connections. 75 degree tee connectors should be used with 30 degree vee connectors. 80 degree tee connectors should be used with 20 degree vee connectors.



BUSLIGN™ Welded - Welded / Welded Tee Connector To Suit SPS Schedule 40 And 80 Aluminum Tubes

Catalog Number		SPS	
80 Degree	75 Degree	Run (in)	Tap (in)
BWAH-TCWW-A2010	BWAH-TCWW-A3010	1	3/4
BWAH-TCWW-A2020	BWAH-TCWW-A3020	1	1
BWAH-TCWW-A2030	BWAH-TCWW-A3030	1 1/4	3/4
BWAH-TCWW-A2040	BWAH-TCWW-A3040	1 1/4	1
BWAH-TCWW-A2050	BWAH-TCWW-A3050	1 1/2	1
BWAH-TCWW-A2060	BWAH-TCWW-A3060	1 1/2	1 1/4
BWAH-TCWW-A2070	BWAH-TCWW-A3070	1 1/2	1 1/2
BWAH-TCWW-A2080	BWAH-TCWW-A3080	2	1
BWAH-TCWW-A2090	BWAH-TCWW-A3090	2	1 1/4
BWAH-TCWW-A2100	BWAH-TCWW-A3100	2	1 1/2
BWAH-TCWW-A2110 (EGAT No.39.07)	BWAH-TCWW-A3110	2	2
BWAH-TCWW-A2120	BWAH-TCWW-A3120	2 1/2	1 1/4
BWAH-TCWW-A2130	BWAH-TCWW-A3130	2 1/2	1 1/2
BWAH-TCWW-A2140	BWAH-TCWW-A3140	2 1/2	2
BWAH-TCWW-A2150	BWAH-TCWW-A3150	2 1/2	2 1/2
BWAH-TCWW-A2160	BWAH-TCWW-A3160	3	1 1/2
BWAH-TCWW-A2170 (EGAT No.39.27)	BWAH-TCWW-A3170	3	2
BWAH-TCWW-A2180	BWAH-TCWW-A3180	3	2 1/2
BWAH-TCWW-A2190 (EGAT No.39.29)	BWAH-TCWW-A3190	3	3

Catalog Number		SPS	
80 Degree	75 Degree	Run (in)	Tap (in)
BWAH-TCWW-A2200	BWAH-TCWW-A3200	3 1/2	2
BWAH-TCWW-A2210	BWAH-TCWW-A3210	3 1/2	2 1/2
BWAH-TCWW-A2220	BWAH-TCWW-A3220	3 1/2	3
BWAH-TCWW-A2230	BWAH-TCWW-A3230	3 1/2	3 1/2
BWAH-TCWW-A2240	BWAH-TCWW-A3240	4	2
BWAH-TCWW-A2250	BWAH-TCWW-A3250	4	2 1/2
BWAH-TCWW-A2260	BWAH-TCWW-A3260	4	3
BWAH-TCWW-A2270	BWAH-TCWW-A3270	4	4
BWAH-TCWW-A2280	BWAH-TCWW-A3280	5	2 1/2
BWAH-TCWW-A2290 (EGAT No.39.48)	BWAH-TCWW-A3290	5	3
BWAH-TCWW-A2300	BWAH-TCWW-A3300	5	4
BWAH-TCWW-A2310	BWAH-TCWW-A3310	6	3
BWAH-TCWW-A2320	BWAH-TCWW-A3320	6	3 1/2
BWAH-TCWW-A2330	BWAH-TCWW-A3330	6	4
BWAH-TCWW-A2340	BWAH-TCWW-A3340	6	5
BWAH-TCWW-A2350	BWAH-TCWW-A3350	6	6
BWAH-TCWW-A2360	BWAH-TCWW-A3360	8	4
BWAH-TCWW-A2370	BWAH-TCWW-A3370	8	5
BWAH-TCWW-A2380	BWAH-TCWW-A3380	8	6
BWAH-TCWW-A2390	BWAH-TCWW-A3390	8	8

Catalog Number Explained (Please Refer To User Guide)

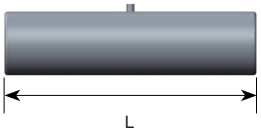
B	W	A	H	-	T	C	W	W	-	A	2010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Tee	Connector	Welded Run (in)	Welded Tap (in)		American (Imperial)	Model Number

Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Midspan Coupler

FIXED
BWAH - FMC

BUSLIGN™ welded fixed midspan couplers are used to connect busbar tubes midspan. Midspan couplers are supplied with a center stop so that they are equally inserted into each busbar tube being joined. Installation is normally made via Metal Inert Gas (MIG) welding. Fixed welded midspan couplers must never be deployed in the central 33% of a busbar tube span between post insulators.



BUSLIGN™ Welded Couplers to Suit SPS Schedule 40 Aluminum Tubes

Catalog Number	Nominal Tube	Tube		Dim
	Size (in)	OD (in)	ID (in)	L (mm.)
BWAH-FMC-A2010	1	1.315	1.049	152.40
BWAH-FMC-A2020	1 1/4	1.660	1.380	190.50
BWAH-FMC-A2030	1 1/2	1.900	1.610	228.60
BWAH-FMC-A2040 (EGAT No.44.02)	2	2.375	2.067	300.00
BWAH-FMC-A2050	2 1/2	2.875	2.469	381.00
BWAH-FMC-A2060 (EGAT No.44.04)	3	3.500	3.068	300.00
BWAH-FMC-A2070	3 1/2	4.000	3.548	533.40
BWAH-FMC-A2080	4	4.500	4.026	609.60
BWAH-FMC-A2090 (EGAT No.44.06)	5	5.563	5.047	457.00
BWAH-FMC-A2100	6	6.625	6.065	609.60
BWAH-FMC-A2110	8	8.625	7.981	609.60

BUSLIGN™ Welded Couplers to Suit SPS Schedule 80 Aliminum Tubes

Catalog Number	Nominal Tube	Tube	Tube	Length "L"
	Size (Inches)	OD (in)	ID (in)	(mm.)
BWAH-FMC-A3010	1	1.315	0.957	152.40
BWAH-FMC-A3020	1 1/4	1.660	1.278	190.50
BWAH-FMC-A3030	1 1/2	1.900	1.500	228.60
BWAH-FMC-A3040	2	2.375	1.939	304.80
BWAH-FMC-A3050	2 1/2	2.875	2.323	381.00
BWAH-FMC-A3060 (EGAT No.-)	3	3.500	2.900	300.00
BWAH-FMC-A3070	3 1/2	4.000	3.364	533.40
BWAH-FMC-A3080	4	4.500	3.826	609.60
BWAH-FMC-A3090 (EGAT No.44.08)	5	5.563	4.813	457.20
BWAH-FMC-A3100	6	6.625	5.761	609.60
BWAH-FMC-A3110	8	8.625	7.625	609.60

Catalog Number Explained (Please Refer To User Guide)

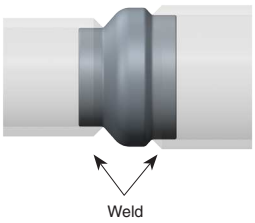
B	W	A	H	-	F	M	C	-	A	2020
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Fixed	Mid Span	Coupler		American (Imperial)	Model Number

Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Midspan Coupler

FIXED DIFFERENT SIZED
BWAH - FMCD

BUSLIGN™ BWAH-FMCD welded couplers are used to connect different sized busbar tubes midspan. Installation is normally made via Metal Inert Gas (MIG) welding. Fixed welded midspan couplers must never be deployed in the central 33% of a busbar tube span between post insulators. For combinations of tubes other than those listed below, or for SPS schedule 40 to SPS schedule 80 connections, please contact PLP.



BUSLIGN™ Welded Couplers To Suit SPS Schedule 40 To Schedule 40 Aluminum Tube Connections

Catalog Number	SPS	
	Run (in)	Tap (in)
BWAH-FMCD-A2010	2	1
BWAH-FMCD-A2020	2	1 1/4
BWAH-FMCD-A2030	2	1 1/2
BWAH-FMCD-A2040	2 1/2	1
BWAH-FMCD-A2050	2 1/2	1 1/4
BWAH-FMCD-A2060	2 1/2	1 1/2
BWAH-FMCD-A2070	2 1/2	2
BWAH-FMCD-A2080	3	1 1/2
BWAH-FMCD-A2090	3	2
BWAH-FMCD-A2100	3	2 1/2
BWAH-FMCD-A2110	3 1/2	2
BWAH-FMCD-A2120	3 1/2	2 1/2
BWAH-FMCD-A2130	3 1/2	3
BWAH-FMCD-A2140	4	2
BWAH-FMCD-A2150	4	2 1/2
BWAH-FMCD-A2160	4	3
BWAH-FMCD-A2170	5	2 1/2
BWAH-FMCD-A2180 (EGAT No.44.15)	5	3
BWAH-FMCD-A2190	5	3 1/2
BWAH-FMCD-A2200 (EGAT No.44.56)	5	4
BWAH-FMCD-A2210	6	3
BWAH-FMCD-A2220	6	3 1/2
BWAH-FMCD-A2230	6	4
BWAH-FMCD-A2240	6	5
BWAH-FMCD-A2250	8	4
BWAH-FMCD-A2260	8	5
BWAH-FMCD-A2270	8	6

BUSLIGN™ Welded Couplers To Suit SPS Schedule 80 To Schedule 80 Aluminum Tube Connections

Catalog Number	SPS	
	Run (in)	Tap (in)
BWAH-FMCD-A3010	2	1
BWAH-FMCD-A3020	2	1 1/4
BWAH-FMCD-A3030	2	1 1/2
BWAH-FMCD-A3040	2 1/2	1
BWAH-FMCD-A3050	2 1/2	1 1/4
BWAH-FMCD-A3060	2 1/2	1 1/2
BWAH-FMCD-A3070	2 1/2	2
BWAH-FMCD-A3080	3	1 1/2
BWAH-FMCD-A3090	3	2
BWAH-FMCD-A3100	3	2 1/2
BWAH-FMCD-A3110	3 1/2	2
BWAH-FMCD-A3120	3 1/2	2 1/2
BWAH-FMCD-A3130	3 1/2	3
BWAH-FMCD-A3140	4	2
BWAH-FMCD-A3150	4	2 1/2
BWAH-FMCD-A3160	4	3
BWAH-FMCD-A3170	5	2 1/2
BWAH-FMCD-A3180	5	3
BWAH-FMCD-A3190	5	3 1/2
BWAH-FMCD-A3200	5	4
BWAH-FMCD-A3210	6	3
BWAH-FMCD-A3220	6	3 1/2
BWAH-FMCD-A3230	6	4
BWAH-FMCD-A3240	6	5
BWAH-FMCD-A3250	8	4
BWAH-FMCD-A3260	8	5
BWAH-FMCD-A3270	8	6

Catalog Number Explained (Please Refer To User Guide)

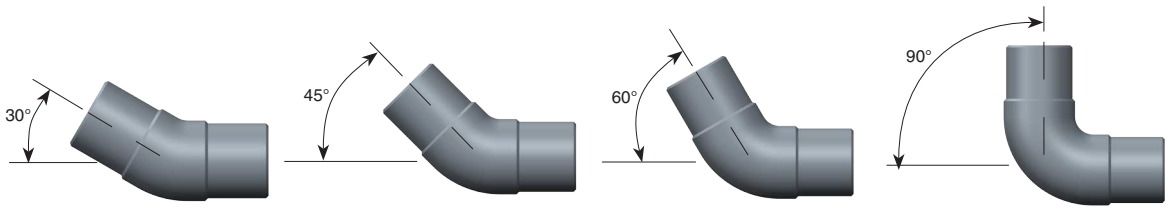
B	W	A	H	-	F	M	C	D	-	A	2010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Fixed	Midspan	Coupler	Different Sized Tubes		American (Imperial)	Model Number

Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Elbow Connector

FIXED 30, 45, 60 & 90 DEGREE
BWAH - EBO

BUSLIGN™ welded elbows are used to create horizontal or vertical angles within busbar tube assemblies. Installation is normally made via Metal Inert Gas (MIG) welding. Standard angles are 30, 45, 60 and 90 degrees. Other angles are available on request.



30 Degree | 45 Degree | 60 Degree | 90 Degree

BUSLIGN™ Welded ElbowS To Suit SPS Schedule 40 Aluminum Tubes

Nominal Tube	Tube		Catalog Number			
Size (in)	OD (in)	ID (in)	30 Degree	45 Degree	60 Degree	90 Degree
2	2.375	2.067	BWAH-EBO-A2010	BWAH-EBO-A3010	BWAH-EBO-A4010	BWAH-EBO-A5010
2 1/2	2.875	2.469	BWAH-EBO-A2020	BWAH-EBO-A3020	BWAH-EBO-A4020	BWAH-EBO-A5020
3	3.500	3.068	BWAH-EBO-A2030	BWAH-EBO-A3030 (EGAT No.44.24)	BWAH-EBO-A4030	BWAH-EBO-A5030 (EGAT No.44.34)
3 1/2	4.000	3.548	BWAH-EBO-A2040	BWAH-EBO-A3040	BWAH-EBO-A4040	BWAH-EBO-A5040
4	4.500	4.026	BWAH-EBO-A2050	BWAH-EBO-A3050	BWAH-EBO-A4050	BWAH-EBO-A5050
5	5.563	5.047	BWAH-EBO-A2060	BWAH-EBO-A3060 (EGAT No.44.26)	BWAH-EBO-A4060	BWAH-EBO-A5060 (EGAT No.44.36)
6	6.625	6.065	BWAH-EBO-A2070	BWAH-EBO-A3070	BWAH-EBO-A4070	BWAH-EBO-A5070
8	8.625	7.981	BWAH-EBO-A2080	BWAH-EBO-A3080	BWAH-EBO-A4080	BWAH-EBO-A5080

BUSLIGN™ Welded Elbows To Suit SPS Schedule 80 Aluminum Tubes

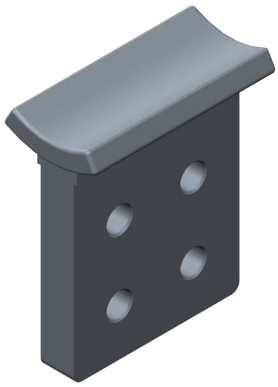
Nominal Tube	Tube		Catalog Number			
Size (in)	OD (in)	ID (in)	30 Degree	45 Degree	60 Degree	90 Degree
2	2.3750	1.939	BWAH-EBO-A6010	BWAH-EBO-A7010	BWAH-EBO-A8010	BWAH-EBO-A9010
2 1/2	2.8750	2.323	BWAH-EBO-A6020	BWAH-EBO-A7020	BWAH-EBO-A8020	BWAH-EBO-A9020
3	3.5000	2.900	BWAH-EBO-A6030	BWAH-EBO-A7030	BWAH-EBO-A8030	BWAH-EBO-A9030
3 1/2	4.0000	3.364	BWAH-EBO-A6040	BWAH-EBO-A7040	BWAH-EBO-A8040	BWAH-EBO-A9040
4	4.5000	3.826	BWAH-EBO-A6050	BWAH-EBO-A7050	BWAH-EBO-A8050	BWAH-EBO-A9050
5	5.5630	4.813	BWAH-EBO-A6060	BWAH-EBO-A7060	BWAH-EBO-A8060	BWAH-EBO-A9060
6	6.6250	5.761	BWAH-EBO-A6070	BWAH-EBO-A7070	BWAH-EBO-A8070	BWAH-EBO-A9070
8	8.6250	7.6250	BWAH-EBO-A6080	BWAH-EBO-A7080	BWAH-EBO-A8080	BWAH-EBO-A9080

Catalog Number Explained (Please Refer To User Guide)

B	W	A	H	-	EBO	-	A	2010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Elbow		American (Imperial)	Model Number

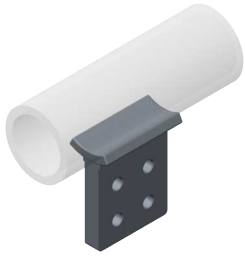
Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Tee Connector



PALM TAP
BWAH - TBPTZ2

BUSLIGN™ BWAH-TBPTZ2 welded tee connectors allow flexible conductors or primary equipment to be attached to the midspan section of busbar tube. Manufactured as a casting, the BWAH-TBPTZ2 is installed via Metal Inert Gas (MIG) welding to the busbar tube.



Terminal Palm Details

Select the standard terminal palm type from terminal palm drawings and dimensions listed in Section 1 of this catalog. Add terminal palm type as a suffix to the catalog number as illustrated below. For non standard terminal palms, contact PLP.

BUSLIGN™ Welded Tee Connectors To Suit SPS Schedule 40 And 80 Aluminum Tubes

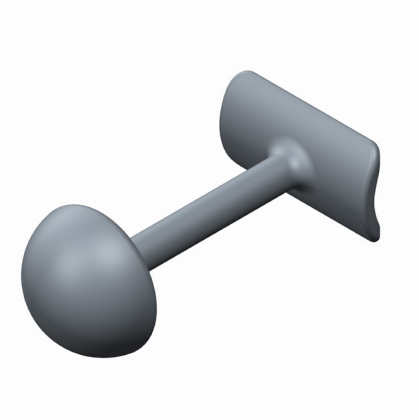
Catalog Number	Nominal Tube Size (in)	Tube OD (in)
BWAH-TBPTZ2-A010	1	1.315
BWAH-TBPTZ2-A020	1 1/4	1.660
BWAH-TBPTZ2-A030	1 1/2	1.900
BWAH-TBPTZ2-A040 (EGAT No.42.02)	2	2.375
BWAH-TBPTZ2-A050	2 1/2	2.875
BWAH-TBPTZ2-A060 (EGAT No.42.04)	3	3.500
BWAH-TBPTZ2-A070	3 1/2	4.000
BWAH-TBPTZ2-A080	4	4.500
BWAH-TBPTZ2-A090 (EGAT No.42.06)	5	5.563
BWAH-TBPTZ2-A100	6	6.625
BWAH-TBPTZ2-A110	8	8.625

Catalog Number Explained (Please Refer To User Guide)

B	W	A	H	-	T	B	P	T	Z2	-	A	010	-	NC4
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Tubular	Busbar	Palm	Terminal	Style 2		American (Imperial)	Model Number		Terminal Palm Type

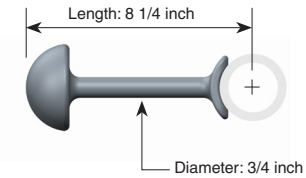
Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Earth Ground Point



TUBE CONNECTION
BWAH - EGPMZ2

BUSLIGN™ welded earth ground points are designed to be welded to busbar tubes so that a temporary earth lead or ground lead can be applied to the busbar. The ball shaped head of the earth point is designed to eliminate corona and Radio Interference Voltage (RIV) while at the same time providing a solid stop to eliminate the risk of the earth lead or ground lead sliding off the end of the earth point when it is being applied via hotstick. Installation of the BWAH-EGPMZ2 to the basbar tube is normally made via Metal Inert Gas (MIG) welding.



BUSLIGN™ Welded Earth Ground Points To Suit SPS Schedule 40 And 80 Aluminum Tubes

Catalog Number	Nominal Tube Size (in)	Tube OD (in)
BWAH-EGPMZ2-A010	1	1.315
BWAH-EGPMZ2-A020	1 1/4	1.660
BWAH-EGPMZ2-A030	1 1/2	1.900
BWAH-EGPMZ2-A040 (EGAT No.47.51)	2	2.375
BWAH-EGPMZ2-A050	2 1/2	2.875
BWAH-EGPMZ2-A060 (EGAT No.47.52)	3	3.500
BWAH-EGPMZ2-A070	3 1/2	4.000
BWAH-EGPMZ2-A080	4	4.500
BWAH-EGPMZ2-A090 (EGAT No.47.54)	5	5.563
BWAH-EGPMZ2-A100	6	6.625
BWAH-EGPMZ2-A110	8	8.625

Catalog Number Explained (Please Refer To User Guide)

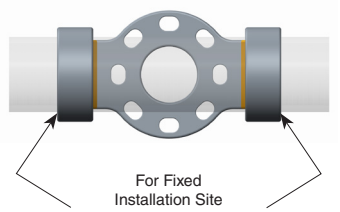
B	W	A	H	-	E	G	P	M	Z2	-	A	010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Earth	Ground	Point	Midspan	Style2		American (Imperial)	Model Number

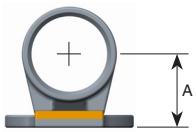
Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Fixed Or Sliding Support

TWIN SUPPORT
BWAH - FSST

BUSLIGN™ BWAH-FSST support can be installed in fixed or sliding configuration. In fixed configuration, the support must be Metal Inert Gas (MIG) welded to the busbar tube around its circumference at each end. In sliding configuration, the busbar simply rests in the support and is free to move longitudinally as busbar expansion and contraction occurs under varying thermal circumstances. Standard mountings are 3 inch, 5 inch and 7 inch Pitch Circle Diameter (PCD). Other PCD's available on request. Note that eight holes are provided in the suppport base to suit any PCD orientation. Busbar tube support sizes and centerlines for metric and SPS tubes other than those listed below are available on request, please consult PLP for details.





BUSLIGN™ Welded Fixed Or Sliding Supports To Suit SPS Schedule 40 And 80 Aluminum Tubes

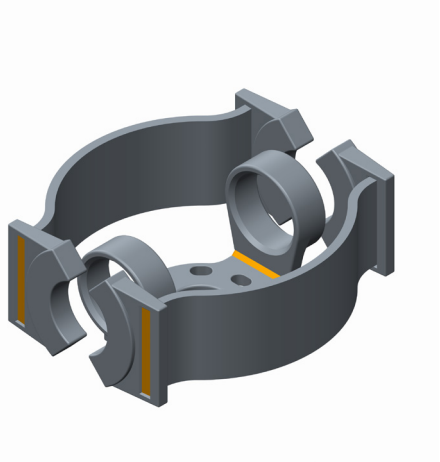
Nominal Tube	3 inch PCD		5 inch PCD		7 inch PCD	
Size (in)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)
1	BWAH-FSST-A2010	50.80	BWAH-FSST-A3010	57.15		
1 1/4	BWAH-FSST-A2020	57.15	BWAH-FSST-A3020	60.33		
1 1/2	BWAH-FSST-A2030	63.50	BWAH-FSST-A3030	63.50		
2	BWAH-FSST-A2040	69.85	BWAH-FSST-A3040 (EGAT No.15.43)	69.80		
2 1/2	BWAH-FSST-A2050	79.38	BWAH-FSST-A3050	79.38		
3	BWAH-FSST-A2060	92.08	BWAH-FSST-A3060 (EGAT No.15.45)	92.10		
3 1/2	BWAH-FSST-A2070	101.60	BWAH-FSST-A3070	101.60		
4	BWAH-FSST-A2080	114.30	BWAH-FSST-A3080	114.30		
5			BWAH-FSST-A3090 (EGAT No.15.47)	127.00	BWAH-FSST-A4010	127.00
6			BWAH-FSST-A3100	139.70	BWAH-FSST-A4020	139.70
8			BWAH-FSST-A3110	167.01	BWAH-FSST-A4030	167.01

Catalog Number Explained (Please Refer To User Guide)

B	W	A	H	-	F	S	S	T	-	A	2010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Fixed	Sliding	Support	Twin		American (Imperial)	Model Number

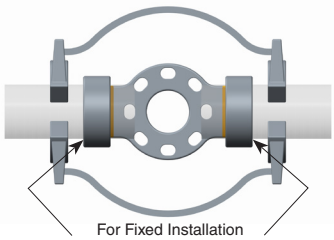
Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Expansion Support

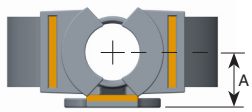


FIXED / SLIDING OR SLIDING / SLIDING
BWAH - STXZ2

BUSLIGN™ BWAH-STXZ2 expansion supports can be installed in either fixed/sliding or sliding/sliding configuration. In fixed configuration, the support must be Metal Inert Gas (MIG) welded to the busbar tube around its circumference. In sliding configuration the busbar tube simply rests in the support and is free to move longitudinally as busbar tube expansion and contraction occurs under varying thermal circumstances. In either case, the flexible Aluminum connectors are MIG welded to the busbar tube to carry the current across the expansion joint. Standard mountings are 3 inch, 5 inch and 7 inch Pitch Circle Diameter (PCD). Other PCD's available on request. Note that 8 holes are provided in the suppport base to suit any PCD orientation. Busbar tube support sizes and centerlines for metric and SPS tubes other than those listed below are available on request, please consult PLP for details.



For Fixed Installation
Site Weld At Both
Points Indicated Around
Circumference.



BUSLIGN™ Welded Expansion Supports To Suit SPS Schedule 40 And 80 Aluminum Tubes

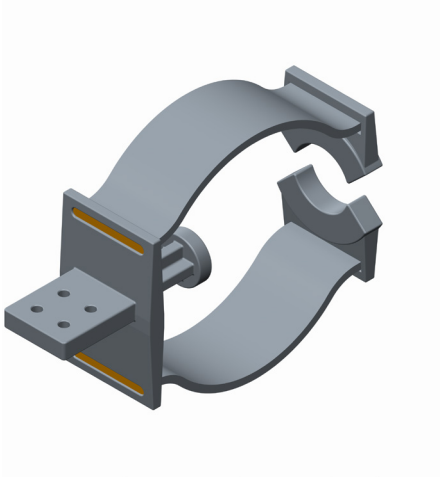
Nominal Tube	3 inch PCD		5 inch PCD		7 inch PCD	
Size (in)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)
2	BWAH-STXZ2-A2010	69.85	BWAH-STXZ2-A3010	69.85		
2 1/2	BWAH-STXZ2-A2020	79.38	BWAH-STXZ2-A3020	79.38		
3	BWAH-STXZ2-A2030	92.08	BWAH-STXZ2-A3030 (EGAT No.15.55)	92.10		
3 1/2	BWAH-STXZ2-A2040	101.60	BWAH-STXZ2-A3040	101.60		
4	BWAH-STXZ2-A2050	114.30	BWAH-STXZ2-A3050	114.30		
5			BWAH-STXZ2-A3060 (EGAT No.15.57)	127.00	BWAH-STXZ2-A4010	127.00
6			BWAH-STXZ2-A3070	139.70	BWAH-STXZ2-A4020	139.70
8			BWAH-STXZ2-A3080	167.01	BWAH-STXZ2-A4030	167.01

Catalog Number Explained (Please Refer To User Guide)

B	W	A	H	-	S	T	X	Z2	-	A	2010
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Single	Tube	Expansion	Style 2		American (Imperial)	Model Number

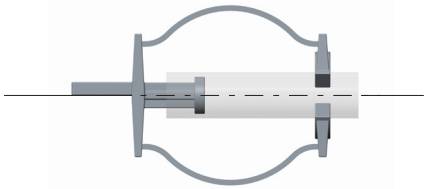
Material: Aluminum
Maximum Voltage Application: 230kV

BUSLIGN™ Welded - Primary Equipment Connector



SLIDING HORIZONTAL CENTER PALM
BWAH - SPEXHZ2

BUSLIGN™ BWAH-SPEXHZ2 primary equipment supports allow a busbar tube attached to an item of substation primary equipment to expand and contract in response to changes in busbar operating temperature. In doing so, the expansion support eliminates the possibility of the busbar tube applying a mechanical load to the substation primary equipment. Mechanical load applied to the substation primary equipment can potentially damage the equipment or pre-load the equipment terminal palm so that in the event of a short circuit, the mechanical forces applied to the equipment are intensified. The BWAH-SPEXHZ2 primary equipment busbar tube support is installed via Metal Inert Gas (MIG) welding to the busbar tube. The terminal palm sits on the centerline of the tube, so the assembly can be bolted to the top side or underside of the primary equipment terminal palm.



Terminal Palm Details

Select the standard terminal palm type from terminal palm drawings and dimensions listed in Section 1 of this catalog. Add terminal palm type as a suffix to the catalog number as illustrated below. For non standard terminal palms, contact PLP.

BUSLIGN™ Welded Primary Equipment Connectors To Suit SPS Schedule 40 Tubes

Catalog Number	Nominal Tube	Tube	
	Size (in)	OD (in)	ID (in)
BWAH-SPEXHZ2-A2010 (EGAT No.30.13)	2 (4H)	2.375	2.067
BWAH-SPEXHZ2-A2010B (EGAT No.30.13B)	2 (6H)	2.375	2.067
BWAH-SPEXHZ2-A2020	2 1/2	2.875	2.469
BWAH-SPEXHZ2-A2030 (EGAT No.30.15)	3 (4H)	3.500	3.068
BWAH-SPEXHZ2-A2030B (EGAT No.30.15B)	3 (6H)	3.500	3.068
BWAH-SPEXHZ2-A2040	3 1/2	4.000	3.548
BWAH-SPEXHZ2-A2050	4	4.500	4.026
BWAH-SPEXHZ2-A2060	5 (4H)	5.563	5.047
BWAH-SPEXHZ2-A2060B (EGAT No.30.17B)	5 (6H)	5.563	5.047
BWAH-SPEXHZ2-A2070	6	6.625	6.065
BWAH-SPEXHZ2-A2080	8	8.625	7.981

BUSLIGN™ Welded Primary Equipment Connectors To Suit SPS Schedule 80 Tubes

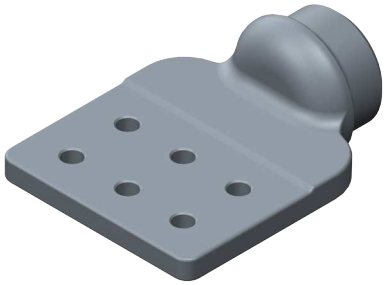
Catalog Number	Nominal Tube	Tube	
	Size (in)	OD (in)	ID (in)
BWAH-SPEXHZ2-A3010	2	2.375	1.939
BWAH-SPEXHZ2-A3020	2 1/2	2.875	2.323
BWAH-SPEXHZ2-A3030	3	3.500	2.900
BWAH-SPEXHZ2-A3040	3 1/2	4.000	3.364
BWAH-SPEXHZ2-A3050	4	4.500	3.826
BWAH-SPEXHZ2-A3060	5 (4H)	5.563	4.813
BWAH-SPEXHZ2-A3060B (EGAT No.30.19)	5 (6H)	5.563	4.813
BWAH-SPEXHZ2-A3070	6	6.625	5.761
BWAH-SPEXHZ2-A3080	8	8.625	7.6250

Catalog Number Explained (Please Refer To User Guide)

B	W	A	H	-	S	P	E	X	H	Z2	-	A	2010	-	NC4
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Support	Primary	Equipment	Expansion	Horizontal	Style 2		American (Imperial)	Model Number		Terminal Palm Type

Material: Aluminum
Maximum Voltage Application: 230kV

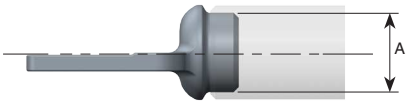
BUSLIGN™ Welded - Primary Equipment Connector/End Terminal



CENTER PALM TERMINAL OR TUBE SUPPORT
BWAH - ETTPZ2

BUSLIGN™ welded end terminals allow flexible conductors or primary equipment to be connected to a busbar tube. In straight configuration, the terminal palms sits exactly on the centerline of the busbar tube. When used as a busbar tube support, it can be attached to wither the top or bottom of the substation primary equipment terminal. The BWAH-ETTPZ2 is installed via Metal Inert Gas (MIG) welding to the busbar tube and can be used as a bus support as well as a terminal palm.

90 Degree



Straight

Terminal Palm Details

Select the standard terminal palm type from terminal palm drawings and dimensions listed in Section 1 of this catalog. Add terminal palm type as a suffix to the catalog number as illustrated below. For non standard terminal palms, contact PLP.

BUSLIGN™ Welded Primary Equipment Connectors Or End Terminals To Suit SPS Schedule 40 Aluminum Tubes

Catalog Number		Nominal Tube	Tube	Dim
Straight	90 Degree	Size (in)	OD (in)	A (mm.)
BWAH-ETTPZ2-A2010	BWAH-ETTPZ2-A3010	1	1.315	24.64
BWAH-ETTPZ2-A2020	BWAH-ETTPZ2-A3020	1 1/4	1.660	33.05
BWAH-ETTPZ2-A2030	BWAH-ETTPZ2-A3030	1 1/2	1.900	38.89
BWAH-ETTPZ2-A2040 (EGAT No.30.03)	BWAH-ETTPZ2-A3040 (EGAT No.30.23)	2 (4H)	2.375	-
BWAH-ETTPZ2-A2040B (EGAT No.30.03B)	BWAH-ETTPZ2-A3040	2 (6H)	2.375	48.01 (TBC)
BWAH-ETTPZ2-A2050	BWAH-ETTPZ2-A3050	2 1/2	2.875	60.71
BWAH-ETTPZ2-A2060	BWAH-ETTPZ2-A3060 (EGAT No.30.25)	3 (4H)	3.500	-
BWAH-ETTPZ2-A2060B (EGAT No.30.05)	BWAH-ETTPZ2-A3060	3 (6H)	3.500	-
BWAH-ETTPZ2-A2070 (EGAT No.30.05B)	BWAH-ETTPZ2-A3070	3 1/2	4.000	-
BWAH-ETTPZ2-A2080	BWAH-ETTPZ2-A3080	4	4.500	100.25
BWAH-ETTPZ2-A2090	BWAH-ETTPZ2-A3090	5 (4H)	5.563	123.06
BWAH-ETTPZ2-A2090B (EGAT No.30.07B)	BWAH-ETTPZ2-A3090	5 (6H)	5.563	-
BWAH-ETTPZ2-A2100	BWAH-ETTPZ2-A3100	6	6.625	152.04
BWAH-ETTPZ2-A2110	BWAH-ETTPZ2-A3110	8	8.625	200.71

BUSLIGN™ Welded Primary Equipment Connectors Or End Terminals To Suit SPS Schedule 80 Aluminum Tubes

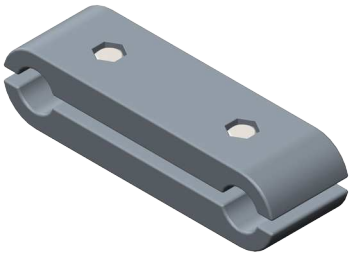
Catalog Number		Nominal Tube	Tube	Dim
Straight	90 Degree	Size (in)	OD (in)	A (mm.)
BWAH-ETTPZ2-A4010	BWAH-ETTPZ2-A5010	1	1.315	22.30
BWAH-ETTPZ2-A4020	BWAH-ETTPZ2-A5020	1 1/4	1.660	30.45
BWAH-ETTPZ2-A4030	BWAH-ETTPZ2-A5030	1 1/2	1.900	36.09
BWAH-ETTPZ2-A4040	BWAH-ETTPZ2-A5040	2	2.375	47.24
BWAH-ETTPZ2-A4050	BWAH-ETTPZ2-A5050	2 1/2	2.875	57.00
BWAH-ETTPZ2-A4060	BWAH-ETTPZ2-A5060	3	3.500	71.65
BWAH-ETTPZ2-A4070	BWAH-ETTPZ2-A5070	3 1/2	4.000	83.44
BWAH-ETTPZ2-A4080	BWAH-ETTPZ2-A5080	4	4.500	95.17
BWAH-ETTPZ2-A4090	BWAH-ETTPZ2-A5090	5 (4H)	5.563	115.06
BWAH-ETTPZ2-A4090B (EGAT No.30.09)	BWAH-ETTPZ2-A5090	5 (6H)	5.563	-
BWAH-ETTPZ2-A4100	BWAH-ETTPZ2-A5100	6	6.625	144.32
BWAH-ETTPZ2-A4110	BWAH-ETTPZ2-A5110	8	8.625	191.67

Catalog Number Explained (Please Refer To User Guide)

B	W	A	H	-	E	T	T	P	Z2	-	A	2010	-	NC6
BUSLIGN™	Welded	Aluminum	High Voltage (to 230kV)		End	Tube	Terminal	Palm	Style2		American (Imperial)	Model Number		Terminal Palm Type

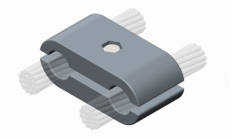
Material: Aluminum
Maximum Voltage Application: 230kV

SUBLIGN™ Bolted - Midspan Spacer

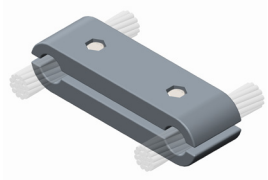


TWIN CONDUCTOR
SBAH - SCM2Z2

The SBAH-SCM2Z2 flexible conductor rigid spacer is manufactured as standard at 4 inch (100mm) and 8 inch (200mm) centers for interplant applications and is commonly used at voltages to 275kV. For interplant conductor connections, PLP recommends at least one spacer is placed between every piece of substation equipment (e.g. between circuit breaker and current transformer) and/or one spacer is placed every 10 feet (3 meters). Other conductor center spacers are available on request. For ordering, the flexible conductor size should be specified in the catalog number below together with the conductor centers if different from standard.



4 inch Centers



8 inch Centers

Hardware	Suffix
Grade A2 70 (304) Stainless Steel Fastenings, Metric	- SM
Grade A2 70 (304) Stainless Steel Fastenings, Imperial	- SI
Aluminum Anodized Fastenings, Metric	- AM
Aluminum Anodized Fastenings, Imperial	- AI
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Metric	- GM
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Imperial	- GI
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Metric	- HM
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Imperial	- HI

Conductor	Catalog Number	
OD Range (mm.)	100 mm. Centers	200 mm. Centers
8.89 to 15.24	SBAH-SCM2Z2-A2010	SBAH-SCM2Z2-A3010
15.24 to 20.06	SBAH-SCM2Z2-A2020	SBAH-SCM2Z2-A3020
20.06 to 27.94	SBAH-SCM2Z2-A2030	SBAH-SCM2Z2-A3030
27.94 to 35.05	SBAH-SCM2Z2-A2040	SBAH-SCM2Z2-A3040
EGAT 1272 MCM (33.91)	SBAH-SCM2Z2-A2040A (EGAT No.47.05)	SBAH-SCM2Z2-A3040A (EGAT No.47.15)
32.00 to 36.07	SBAH-SCM2Z2-A2045	SBAH-SCM2Z2-A3045
35.05 to 41.91	SBAH-SCM2Z2-A2050	SBAH-SCM2Z2-A3050
41.91 to 50.80	SBAH-SCM2Z2-A2060	SBAH-SCM2Z2-A3060

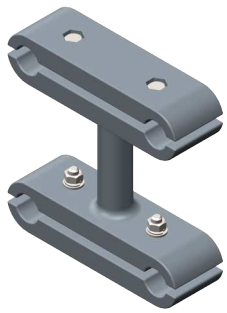
Catalog Number Explained (Refer to User Guide)

S	B	A	H	-	S	C	M	2	Z2	-	A	2010	-	SI	-	0500*
SUBLIGN™	Bolted	Aluminum	High Voltage (to 230kV)		Spacer	Conductor	Midspan	Twin	Style 2		American (Imperial)	Model Number		Stainless Steel Imperial Fastenings		Conductor Centers If Different From Standard (in)

*Express as a 4 digit non decimal value. For example, a flexible conductor OD of 0.795 inches becomes 0795, a busbar tube with an OD of 1.375 inches becomes 1375, a flexible conductor center of 2.75 inches becomes 0275, a stud length of 3.15 inches becomes 0315, and a stud length of 5 inches becomes 0500.

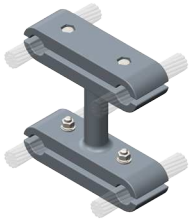
Material: Aluminum
Maximum Voltage Application: 230kV

SUBLIGN™ Bolted - Midspan Spacer



QUAD SQUARE CONDUCTOR
SBAH - SCM4SZ2

The SBAH-SCM4SZ2 flexible conductor rigid spacer is manufactured as standard at 8 inch (200mm) centers for interplant applications and is commonly used at voltages to 275kV. For interplant bundles, PLP recommends at least one spacer is placed between every (e.g. between circuit breaker and current transformer) and/or one spacer is placed every 10 feet (3 meters). Other conductor center spacers are available on request. For ordering, the flexible conductor size and conductor centers should be specified in the catalog number below.



Hardware	Suffix
Grade A2 70 (304) Stainless Steel Fastenings, Metric	- SM
Grade A2 70 (304) Stainless Steel Fastenings, Imperial	- SI
Aluminum Anodized Fastenings, Metric	- AM
Aluminum Anodized Fastenings, Imperial	- AI
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Metric	- GM
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Imperial	- GI
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Metric	- HM
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Imperial	- HI

Catalog Number	Conductor OD Range (mm.)
SBAH-SCM4SZ2-A010	8.89 to 15.24
SBAH-SCM4SZ2-A020	15.24 to 20.06
SBAH-SCM4SZ2-A030	20.06 to 27.94
SBAH-SCM4SZ2-A040	27.94 to 35.05
SBAH-SCM4SZ2-A040A (EGAT No.47.22)	EGAT 1272 MCM (33.91)
SBAH-SCM4SZ2-A050	35.05 to 41.91
SBAH-SCM4SZ2-A060	41.91 to 50.80

Catalog Number Explained (Refer to User Guide)

S	B	A	H	-	S	C	M	4S	Z2	-	A	010	-	SI	-	0500*
SUBLIGN™	Bolted	Aluminum	High Voltage (to 230kV)		Spacer	Conductor	Midspan	Quad (Square)	Style 2		American (Imperial)	Model Number		Stainless Steel Imperial Fastenings		Conductor Centers (in)

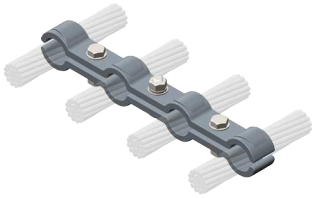
*Express as a 4 digit non decimal value. For example, a flexible conductor OD of 0.795 inches becomes 0795, a busbar tube with an OD of 1.375 inches becomes 1375, a flexible conductor center of 2.75 inches becomes 0275, a stud length of 3.15 inches becomes 0315, and a stud length of 5 inches becomes 0500.

Material: Aluminum
Maximum Voltage Application: 230kV

SUBLIGN™ Bolted - Midspan Spacer

QUAD FLAT CONDUCTOR
SBAH - SCM4FZ2

The SBAH-SCM4FZ2 flexible conductor rigid spacer is manufactured as standard at 4 inch (100mm) centers for interplant applications and is commonly used at voltages to 275kV. For interplant quad conductor connections, PLP recommends at least one spacer is placed between substation equipment (e.g. between circuit breaker and current transformer) and/or one spacer is placed every 10 feet (3 meters). Other conductor center spacers are available on request. For ordering, the flexible conductor size and conductor centers should be specified in the catalog number below.



Hardware	Suffix
Grade A2 70 (304) Stainless Steel Fastenings, Metric	- SM
Grade A2 70 (304) Stainless Steel Fastenings, Imperial	- SI
Aluminum Anodized Fastenings, Metric	- AM
Aluminum Anodized Fastenings, Imperial	- AI
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Metric	- GM
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Imperial	- GI
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Metric	- HM
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Imperial	- HI

Catalog Number	Conductor OD Range (mm.)
SBAH-SCM4FZ2-A2010	8.89 to 15.24
SBAH-SCM4FZ2-A2020	15.24 to 20.06
SBAH-SCM4FZ2-A2030	20.06 to 27.94
SBAH-SCM4FZ2-A2040	27.94 to 35.05
SBAH-SCM4FZ2-A2040A (EGAT No.47.21)	EGAT 1272 MCM (33.91)
SBAH-SCM4FZ2-A2050	35.05 to 41.91
SBAH-SCM4FZ2-A2060	41.91 to 50.80

Catalog Number Explained (Refer to User Guide)

S	B	A	H	-	S	C	M	4F	F	Z2	-	A	2010	-	SI	-	0500*
SUBLIGN™	Bolted	Aluminum	High Voltage (to 230kV)		Spacer	Conductor	Midspan	Quad (Flat)	Flat	Style 2		American (Imperial)	Model Number		Stainless Steel Imperial Fastenings		Conductor Centers (in)

*Express as a 4 digit non decimal value. For example, a flexible conductor OD of 0.795 inches becomes 0795, a busbar tube with an OD of 1.375 inches becomes 1375, a flexible conductor center of 2.75 inches becomes 0275, a stud length of 3.15 inches becomes 0315, and a stud length of 5 inches becomes 0500.

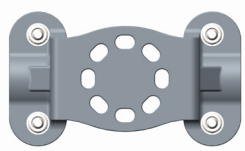
Material: Aluminum
Maximum Voltage Application: 230kV

SUBLIGN™ Bolted - Conductor Support

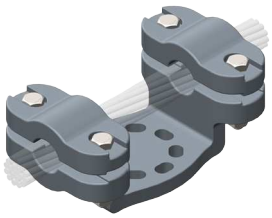
SINGLE FLEXIBLE CONDUCTOR OR TUBE

SBAH - SCZ2A

Type SBAH-SCZ2A fixed post insulator conductor supports can be used to secure all types of flexible conductors or small Aluminum busbar tubes to the top of substation post insulators. Designed to have a range taking ability, the SBAH-SCZ2A is available with a 3 inch (76mm) or 5 inch (127mm) Pitch Circle Diameter (PCD) as standard. 8 holes are provided in the support base to suit either post insulator mounting orientation.



3 inch or 5 inch PCD
Base



Hardware	Suffix
Grade A2 70 (304) Stainless Steel Fastenings, Metric	- SM
Grade A2 70 (304) Stainless Steel Fastenings, Imperial	- SI
Aluminum Anodized Fastenings, Metric	- AM
Aluminum Anodized Fastenings, Imperial	- AI
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Metric	- GM
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Imperial	- GI
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Metric	- HM
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Imperial	- HI

Conductor	Catalog Number	
OD Range (mm.)	3 inch PCD	5 inch PCD
8.89 to 15.24	SBAH-SCZ2A-A3010	SBAH-SCZ2A-A5010
15.24 to 20.06	SBAH-SCZ2A-A3020	SBAH-SCZ2A-A5020
20.06 to 27.94	SBAH-SCZ2A-A3030	SBAH-SCZ2A-A5030
EGAT 477 MCM (21.81)	SBAH-SCZ2A-A3030A (EGAT No.13.34)	SBAH-SCZ2A-A5030A (EGAT No.13.24)
27.94 to 35.05	SBAH-SCZ2A-A3040	SBAH-SCZ2A-A5040
EGAT 1272 MCM (33.91)	SBAH-SCZ2A-A3040A (EGAT No.13.55)	SBAH-SCZ2A-A5040A (EGAT No.13.45)
35.05 to 41.91	SBAH-SCZ2A-A3050	SBAH-SCZ2A-A5050
41.91 to 50.80	SBAH-SCZ2A-A3060	SBAH-SCZ2A-A5060

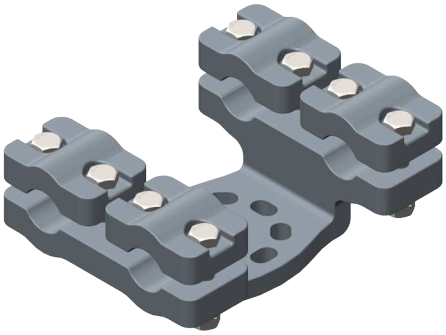
Catalog Number Explained (Refer to User Guide)

S	B	A	H	-	S	C	Z2A	-	A	3010	-	SI
SUBLIGN™	Bolted	Aluminum	High Voltage (to 230kV)		Support	Conductor	Style 2A		American (Imperial)	Model Number		Stainless Steel Imperial Fastenings

*Express as a 4 digit non decimal value. For example, a flexible conductor OD of 0.795 inches becomes 0795, a busbar tube with an OD of 1.375 inches becomes 1375, a flexible conductor center of 2.75 inches becomes 0275, a stud length of 3.15 inches becomes 0315, and a stud length of 5 inches becomes 0500.

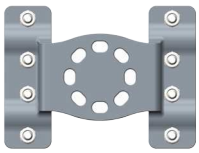
Material: Aluminum
Maximum Voltage Application: 230kV

SUBLIGN™ Bolted - Conductor Support

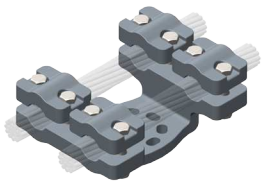


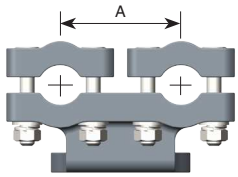
TWIN FLEXIBLE CONDUCTOR OR TUBE
SBAH - SC2Z2A

Type SBAH-SC2Z2A fixed post insulator conductor supports can be used to secure all types of flexible conductors or small aluminum busbar tubes to the top of substation post insulators. Designed to have a range taking ability, the SBAH-SC2Z2A is available with a 3 inch (76mm), 5 inch (127mm) or 7 inch (178mm) pitch circle diameter as standard. 8 holes are provided in the support base to suit either post insulator mounting orientation. Standard conductor centers are 3.35 inches (85mm) or 3.75 inches (95mm) depending on conductor size. Other conductors centers available on request.



3 inch, 5 inch or 7 inch
PCD Steel Base





Hardware	Suffix
Grade A2 70 (304) Stainless Steel Fastenings, Metric	- SM
Grade A2 70 (304) Stainless Steel Fastenings, Imperial	- SI
Aluminum Anodized Fastenings, Metric	- AM
Aluminum Anodized Fastenings, Imperial	- AI
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Metric	- GM
Standard Hot Dip Galvanized Fastenings, Grade 4.6, Imperial	- GI
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Metric	- HM
High Tensile Hot Dip Galvanized Fastenings, Grade 8.8, Imperial	- HI

Conductor	3 inch PCD		5 inch PCD		7 inch PCD	
OD Range (mm.)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)	Catalog Number	Dim A (mm.)
8.89 to 15.24	SBAH-SC2Z2A-A3010	85.09	SBAH-SC2Z2A-A5010	85.09	SBAH-SC2Z2A-A7010	85.09
15.24 to 20.06	SBAH-SC2Z2A-A3020	85.09	SBAH-SC2Z2A-A5020	85.09	SBAH-SC2Z2A-A7020	85.09
20.06 to 27.94	SBAH-SC2Z2A-A3030	85.09	SBAH-SC2Z2A-A5030	85.09	SBAH-SC2Z2A-A7030	85.09
EGAT 477 MCM (21.81)	SBAH-SC2Z2A-A3030A (EGAT No.-)	85.00	SBAH-SC2Z2A-A5030A (EGAT No.-)	85.00	SBAH-SC2Z2A-A7030A	85.00
27.94 to 35.05	SBAH-SC2Z2A-A3040	95.25	SBAH-SC2Z2A-A5040	95.25	SBAH-SC2Z2A-A7040	95.25
EGAT 1272 MCM (33.91)	SBAH-SC2Z2A-A3040A (EGAT No.13.73)	95.00	SBAH-SC2Z2A-A5040A (EGAT No.13.68)	95.00	SBAH-SC2Z2A-A7040A	95.00
35.05 to 41.91	SBAH-SC2Z2A-A3050	114.30	SBAH-SC2Z2A-A5050	114.30	SBAH-SC2Z2A-A7050	114.30
41.91 to 50.80	SBAH-SC2Z2A-A3060	5.00	SBAH-SC2Z2A-A5060	5.00	SBAH-SC2Z2A-A7060	5.00

Catalog Number Explained (Refer to User Guide)

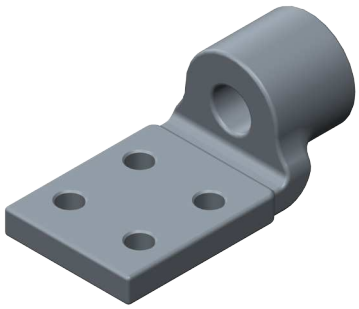
S	B	A	H	-	S	C	2	Z2A	-	A	3010	-	SI
SUBLIGN™	Bolted	Aluminum	High Voltage (to 230kV)		Support	Conductor	Twin Conductor	Style 2A		American (Imperial)	Model Number		Stainless Steel Imperial Fastenings

*Express as a 4 digit non decimal value. For example, a flexible conductor OD of 0.795 inches becomes 0795, a busbar tube with an OD of 1.375 inches becomes 1375, a flexible conductor center of 2.75 inches becomes 0275, a stud length of 3.15 inches becomes 0315, and a stud length of 5 inches becomes 0500.

Material: Aluminum
Maximum Voltage Application: 230kV

Material: Aluminum
Maximum Voltage Application: 230kV

SUBLIGN™ Welded - Terminal Palm



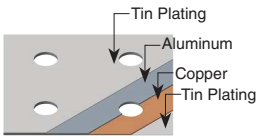
SINGLE CONDUCTOR
SWAH - TCW

Type SWAH-TCW welded aluminum terminals are designed for connecting single AAC, ACSR or AAAC conductors to the terminal palms of substation primary equipment. Straight, 45 degree and 90 degree angles of the SWAH-TCW connector are available as standard. For installation, the flexible conductor should be positioned 1/8" to 1/16" (3mm to 5mm) from the edge inside the barrel prior to Metal Inert Gas (MIG) puddle welding.

Straight

45 degree

90 degree



Terminal Palm Details

Select the standard terminal palm type from terminal palm drawings and dimensions listed in Section 1 of this catalog. Add terminal palm type as a suffix to the catalog number as illustrated below. For non standard terminal palms contact PLP.

Terminal Palm Options

For an undrilled terminal palm with outside dimensions specified by the standard palm type, add a "–U" suffix to the end of the catalog number described below.

Bi Metal Transition Plate

If the equipment terminal is copper bronze alloy a bi metal transition plate may be required. High conductivity copper on one side and aluminum alloy on the other side, the 1/16 inch (1.5mm) thick transition plate is electro-tin plated. Bi metal transition plates are sized to fit the substation equipment terminal and at installation are sandwiched between the POWERFORMED™ connector and the equipment terminal to create a long lasting reliable connection free from dissimilar metals corrosion.

Material: Aluminum
Maximum Voltage Application: 230kV

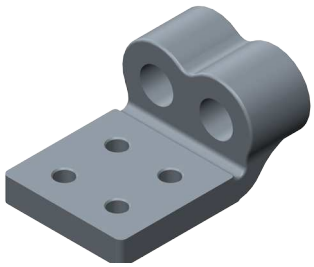
Conductor		Catalog Number		
Size (in)	Diameter (mm.)	Straight	45 Degree	90 Degree
3/0	11.35 - 11.94	SWAH-TCW-A2010	SWAH-TCW-A3010	SWAH-TCW-A4010
4/0	12.75 - 13.41	SWAH-TCW-A2020	SWAH-TCW-A3020	SWAH-TCW-A4020
250 - 268.8 MCM	14.30 - 15.06	SWAH-TCW-A2030	SWAH-TCW-A3030	SWAH-TCW-A4030
300 - 336.4 MCM	15.88 - 17.02	SWAH-TCW-A2040	SWAH-TCW-A3040	SWAH-TCW-A4040
336.4 - 350 MCM	16.92 - 17.37	SWAH-TCW-A2050	SWAH-TCW-A3050	SWAH-TCW-A4050
397.5 - 400 MCM	18.31 - 18.49	SWAH-TCW-A2060	SWAH-TCW-A3060	SWAH-TCW-A4060
450 - 477 MCM	19.61 - 20.19	SWAH-TCW-A2070	SWAH-TCW-A3070	SWAH-TCW-A4070
EGAT 477 MCM	21.81	SWAH-TCW-A2070A (EGAT No.29.81)	SWAH-TCW-A3070A	SWAH-TCW-A4070A
500 MCM	20.47 - 21.49	SWAH-TCW-A2080	SWAH-TCW-A3080	SWAH-TCW-A4080
550 - 556.5 MCM	21.72 - 22.43	SWAH-TCW-A2090	SWAH-TCW-A3090	SWAH-TCW-A4090
600 - 650 MCM	22.63 - 23.62	SWAH-TCW-A2100	SWAH-TCW-A3100	SWAH-TCW-A4100
750 - 795 MCM	25.15 - 26.11	SWAH-TCW-A2110	SWAH-TCW-A3110	SWAH-TCW-A4110
900 - 954 MCM	27.76 - 28.58	SWAH-TCW-A2120	SWAH-TCW-A3120	SWAH-TCW-A4120
1000 - 1033.5 MCM	28.96 - 29.77	SWAH-TCW-A2130	SWAH-TCW-A3130	SWAH-TCW-A4130
1100 - 1113 MCM	30.38 - 31.62	SWAH-TCW-A2140	SWAH-TCW-A3140	SWAH-TCW-A4140
1200 - 1300 MCM	32.08 - 33.40	SWAH-TCW-A2150	SWAH-TCW-A3150	SWAH-TCW-A4150
EGAT 1272 MCM	33.91	SWAH-TCW-A2150A (EGAT No.29.83)	SWAH-TCW-A3150A	SWAH-TCW-A4150A (EGAT No.29.93)
1351.5 MCM	33.53 - 34.19	SWAH-TCW-A2160	SWAH-TCW-A3160	SWAH-TCW-A4160
1431 MCM	34.65 - 35.86	SWAH-TCW-A2170	SWAH-TCW-A3170	SWAH-TCW-A4170
1590 - 1700 MCM	36.93 - 38.20	SWAH-TCW-A2180	SWAH-TCW-A3180	SWAH-TCW-A4180
2000 MCM	41.40 - 41.43	SWAH-TCW-A2190	SWAH-TCW-A3190	SWAH-TCW-A4190
2250 MCM	43.92 - 44.75	SWAH-TCW-A2200	SWAH-TCW-A3200	SWAH-TCW-A4200
2500 MCM	46.30 - 46.33	SWAH-TCW-A2210	SWAH-TCW-A3210	SWAH-TCW-A4210

Catalog Number Explained (Please Refer To User Guide)

S	W	A	H	-	T	C	W	-	A	2010	-	ND2-1
SUBLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Terminal	Connector	Welded		American (Imperial)	Model Number		Palm Type

Material: Aluminum
Maximum Voltage Application: 230kV

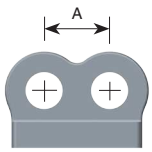
SUBLIGN™ Welded - Terminal Palm

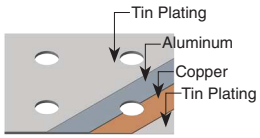


TWIN CONDUCTOR
SWAH - TCW2

Type SWAH-TCW2 welded aluminum terminals are designed for connecting single AAC, ACSR or AAAC conductors to the terminal palms of substation primary equipment. Straight, 45 degree and 90 degree angles of the SWAH-TCW2 connector are available as standard. For installation, the flexible conductor should be positioned 1/8" to 1/16" (3mm to 5mm) from the edge inside the barrel prior to Metal Inert Gas (MIG) puddle welding.

Straight 45 degree 90 degree





Terminal Palm Details

Select the standard terminal palm type from terminal palm drawings and dimensions listed in Section 1 of this catalog. Add terminal palm type as a suffix to the catalog number as illustrated below. For non standard terminal palms contact PLP.

Terminal Palm Options

For an undrilled terminal palm with outside dimensions specified by the standard palm type, add a "–U" suffix to the end of the catalog number described below.

Bi Metal Transition Plate

If the equipment terminal is copper bronze alloy a bi metal transition plate may be required. High conductivity copper on one side and aluminum alloy on the other side, the 1/16 inch (1.5mm) thick transition plate is electro-tin plated. Bi metal transition plates are sized to fit the substation equipment terminal and at installation are sandwiched between the POWERFORMED™ connector and the equipment terminal to create a long lasting reliable connection free from dissimilar metals corrosion.

Material: Aluminum
Maximum Voltage Application: 230kV

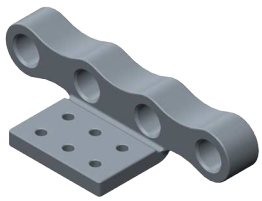
Conductor		Catalog Number			Dim
Size (in)	Diameter (mm.)	Straight	45 Degree	90 Degree	A (mm.)
336.4 - 350 MCM	16.92 - 17.37	SWAH-TCW2-A2010	SWAH-TCW2-A3010	SWAH-TCW2-A4010	38.10
397.5 - 400 MCM	18.31 - 18.49	SWAH-TCW2-A2020	SWAH-TCW2-A3020	SWAH-TCW2-A4020	38.10
450 - 477 MCM	19.61 - 20.19	SWAH-TCW2-A2030	SWAH-TCW2-A3030	SWAH-TCW2-A4030	50.80
EGAT 477 MCM	21.81	SWAH-TCW2-A2030A (EGAT No.-)	SWAH-TCW2-A3030A (EGAT No.-)	SWAH-TCW2-A4030A (EGAT No.-)	50.80
500 MCM	20.47 - 21.49	SWAH-TCW2-A2040	SWAH-TCW2-A3040	SWAH-TCW2-A4040	50.80
550 - 556.5 MCM	21.72 - 22.43	SWAH-TCW2-A2050	SWAH-TCW2-A3050	SWAH-TCW2-A4050	50.80
600 - 650 MCM	22.63 - 23.62	SWAH-TCW2-A2060	SWAH-TCW2-A3060	SWAH-TCW2-A4060	50.80
750 - 795 MCM	25.15 - 26.11	SWAH-TCW2-A2070	SWAH-TCW2-A3070	SWAH-TCW2-A4070	50.80
900 - 954 MCM	27.76 - 28.58	SWAH-TCW2-A2080	SWAH-TCW2-A3080	SWAH-TCW2-A4080	50.80
1000 - 1033.5 MCM	28.96 - 29.77	SWAH-TCW2-A2090	SWAH-TCW2-A3090	SWAH-TCW2-A4090	50.80
1100 - 1113 MCM	30.38 - 31.62	SWAH-TCW2-A2100	SWAH-TCW2-A3100	SWAH-TCW2-A4100	50.80
1200 - 1300 MCM	32.08 - 33.40	SWAH-TCW2-A2110	SWAH-TCW2-A3110	SWAH-TCW2-A4110	50.80
EGAT 1272 MCM	33.91	SWAH-TCW2-A2110A (EGAT No.28.63)	SWAH-TCW2-A3110A (EGAT No.-)	SWAH-TCW2-A4110A (EGAT No.28.73)	44.50
1351.5 MCM	33.53 - 34.19	SWAH-TCW2-A2120	SWAH-TCW2-A3120	SWAH-TCW2-A4120	63.50
1431 MCM	34.65 - 35.86	SWAH-TCW2-A2130	SWAH-TCW2-A3130	SWAH-TCW2-A4130	76.20
1590 - 1700 MCM	36.93 - 38.20	SWAH-TCW2-A2140	SWAH-TCW2-A3140	SWAH-TCW2-A4140	76.20
2000 MCM	41.40 - 41.43	SWAH-TCW2-A2150	SWAH-TCW2-A3150	SWAH-TCW2-A4150	76.20
2250 MCM	43.92 - 44.75	SWAH-TCW2-A2160	SWAH-TCW2-A3160	SWAH-TCW2-A4160	76.20
2500 MCM	46.30 - 46.33	SWAH-TCW2-A2170	SWAH-TCW2-A3170	SWAH-TCW2-A4170	82.55

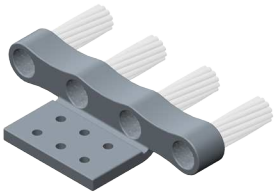
Catalog Number Explained (Please Refer To User Guide)

S	W	A	H	-	T	C	W	2	-	A	2010	-	NC4
SUBLIGN™	**W**elded	**A**luminum	**H**igh Voltage (to 230kV)		**T**erminal	**C**onnector	**W**elded	Twin		**A**merican (Imperial)	Model Number		Palm Type

Material: Aluminum
Maximum Voltage Application: 230kV

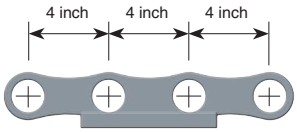
SUBLIGN™ Welded - Terminal Palm

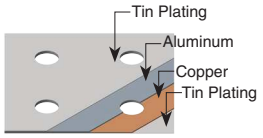




QUAD CONDUCTOR
SWAH - TCW4

Type SWAH-TCW4 welded aluminum terminals are designed for connecting quad flat AAC, ACSR or AAAC conductors to the terminal palms of substation primary equipment. For installation, the flexible conductor should be positioned 1/8" to 1/16" (3mm to 5mm) from the edge inside the barrel prior to Metal Inert Gas (MIG) puddle welding.





Terminal Palm Details

Select the standard terminal palm type from terminal palm drawings and dimensions listed in Section 1 of this catalog. Add terminal palm type as a suffix to the catalog number as illustrated below. For non standard terminal palms contact PLP.

Terminal Palm Options

For an undrilled terminal palm with outside dimensions specified by the standard palm type, add a "–U" suffix to the end of the catalog number described below.

Bi Metal Transition Plate

If the equipment terminal is copper bronze alloy a bi metal transition plate may be required. High conductivity copper on one side and aluminum alloy on the other side, the 1/16 inch (1.5mm) thick transition plate is electro-tin plated. Bi metal transition plates are sized to fit the substation equipment terminal and at installation are sandwiched between the POWERFORMED™ connector and the equipment terminal to create a long lasting reliable connection free from dissimilar metals corrosion.

Catalog Number	Conductor	
	Size (in)	Diameter (mm.)
SWAH-TCW4-A010	336.4 - 350 MCM	16.92 - 17.37
SWAH-TCW4-A020	397.5 - 400 MCM	18.31 - 18.49
SWAH-TCW4-A030	450 - 477 MCM	19.61 - 20.19
SWAH-TCW4-A030A (EGAT No.-)	EGAT 477 MCM	21.81
SWAH-TCW4-A040	500 MCM	20.47 - 21.49
SWAH-TCW4-A050	550 - 556.5 MCM	21.72 - 22.43
SWAH-TCW4-A060	600 - 650 MCM	22.63 - 23.62
SWAH-TCW4-A070	750 - 795 MCM	25.15 - 26.11
SWAH-TCW4-A080	900 - 954 MCM	27.76 - 28.58
SWAH-TCW4-A090	1000 - 1033.5 MCM	28.96 - 29.77
SWAH-TCW4-A100	1100 - 1113 MCM	30.38 - 31.62
SWAH-TCW4-A110	1200 - 1300 MCM	32.08 - 33.40
SWAH-TCW4-A110A (EGAT No.28.48)	EGAT 1272 MCM	33.91
SWAH-TCW4-A120	1351.5 MCM	33.53 - 34.19
SWAH-TCW4-A130	1431 MCM	34.65 - 35.86
SWAH-TCW4-A140	1590 - 1700 MCM	36.93 - 38.20
SWAH-TCW4-A150	2000 MCM	41.40 - 41.43
SWAH-TCW4-A160	2250 MCM	43.92 - 44.75
SWAH-TCW4-A170	2500 MCM	46.30 - 46.33

Catalog Number Explained (Please Refer To User Guide)

S	W	A	H	-	T	C	W	4	-	A	010	-	NC7
SUBLIGN™	Welded	Aluminum	High Voltage (to 230kV)		Terminal	Connector	Welded	Quad		American (Imperial)	Model Number		Palm Type

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