



AUSTRALIA



Substation Brochure

PLP is the trusted supplier of reliable substation busbar systems designed for Australian conditions.

The connection you can count on



AUSTRALIA

Precision Engineering | Quality Products | Unparalleled Service

PLP has been designing and manufacturing high-quality solutions for the energy, communications, and data network industries, as well as specialised niche markets in Australia since 1961.

Our precision-engineered products help build, protect, and maintain critical infrastructure, creating stronger, more reliable networks for customers across Australia and the Asia Pacific region.

Inventiveness, integrity, and foresight are the foundations of PLP. These core values guide our commitment to continuously improve our product offering through innovative engineered design solutions, ensuring the highest quality products, and delivering unparalleled service.



PLP Substation Solutions

Since 2003, PLP Australia has designed and manufactured substation busbar systems for utilities and contractors, delivering reliable, high-quality solutions built for long-term service.

Many of the original PLP busbar systems installed decades ago remain in service today, a testament to our commitment to exceptional quality, durability, and performance in demanding substation environments.

Our in-house capability spans every stage of the project lifecycle, from design and estimation through to manufacturing, testing, delivery, and ongoing customer support. This fully integrated approach ensures consistency, repeatability, and engineering excellence across every project.

PLP's substation product range includes supports, connectors, and hardware suitable for both bolted and welded applications.

Long-term partnerships with material suppliers enable our engineers to custom design high-quality aluminium busbars to meet virtually any size or project requirement.

All PLP substation products are manufactured to meet, and in many cases exceed, relevant Australian Standards.

With decades of experience in substation design and manufacturing, PLP Australia delivers proven solutions that provide performance, reliability, and long-term value.

PLP Substation Systems

PLP Australia's substation systems are built on strong engineering design, testing, and manufacturing capability.

Our substation products have years of proven reliability and in-service performance at voltages up to 500kV.

PLP supplies connectors, clamps, and hardware across two product categories, tubular aluminium busbars and flexible aluminium conductors.

PLP Tubular Aluminium Busbars

PLP tubular aluminium busbar systems are engineered for high-voltage AC substations.

Our aluminium fittings include both bolted and welded designs and are available for all aluminium busbar tube sizes.

Designed for long and reliable service life, PLP products are at the forefront of substation engineering design.

PLP Flexible Aluminium Conductors

PLP flexible conductor fittings include bolted, welded and compression solutions for AAC, AAAC and ACSR conductors.

PLP products are the preferred choice for substation assets with an extensive range of customisable designs to suit all Australian utility requirements.



PLP's Proven Performance

In 2008 and 2009, PLP New Zealand undertook a comprehensive programme to mathematically validate and physically short-circuit test a full-size, phase-to-phase insulated 220kV, 200mm OD (4000A) busbar and interplant connection system.

The objective was to verify the integrity of PLP's substation fitting designs and confirm the accuracy of calculation methods used to assess short-circuit performance.

Testing was conducted in June 2009 at Powertech Labs in Vancouver, Canada, following a global search for a laboratory capable of meeting the required scope.

Under varying short-circuit conditions ranging from 25kA/0.3s to 63kA/1s, and extended duration tests at 40 kA/3s, system loads and displacements were measured and recorded.

A total of 59 short-circuit tests were completed over a five-day period, with data captured using high-speed cameras, still photography, video recording, and fibre optic sensors.

The results from this full-scale short-circuit testing program strongly reinforce the quality, structural integrity, and reliability of PLP's substation hardware designs.



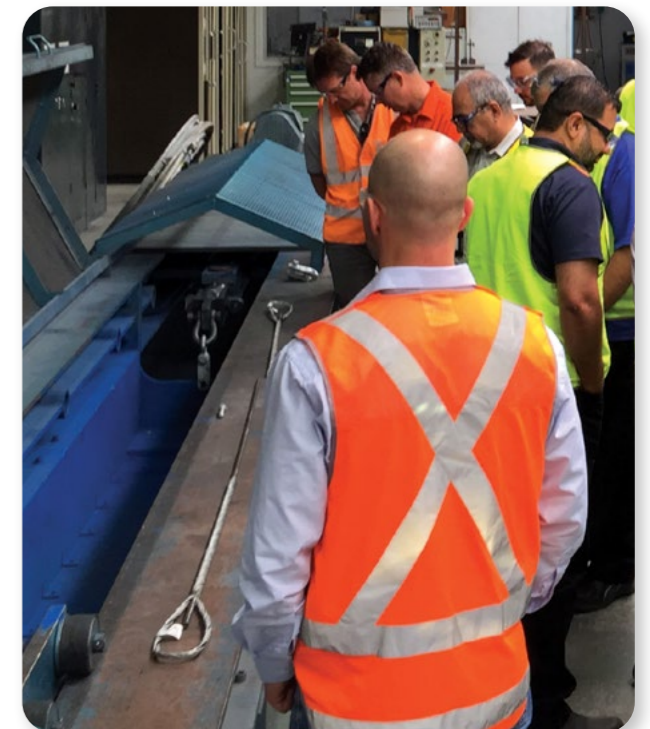
Full scale short circuit testing to 63kA/1sec.

PLP Testing Capabilities

PLP Australia's Quality Assurance Department and Engineering Department work together collaboratively and are responsible for product design, product development and to ensure quality procedures comply with NATA and ISO accreditation standards.

Manufacturing processes are continuously monitored, audited, tested, and improved using statistical analysis and quality control procedures.

PLP Australia's local NATA-accredited testing laboratory uses calibrated equipment to test tensile loads from 1N to 500kN. Tests include industrial hardness, galvanising, fatigue testing and heat cycle for overhead conductors.



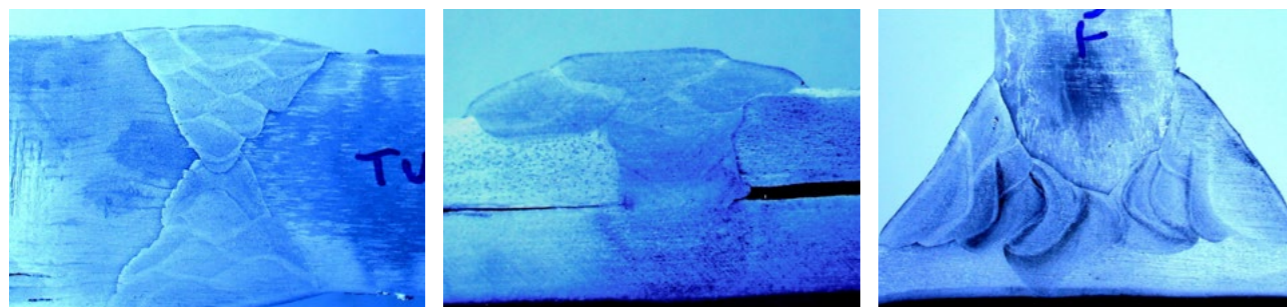
PLP Aluminium Fittings for Substations

Welding of high-current aluminium substation busbar tubes, fittings, and flexible conductor components is performed in accordance with approved Welding Procedure Specifications (WPS).

All welding is completed by trained and qualified personnel to ensure structural integrity, safety, and long-term performance.

Welding of Substation Tubes and Fittings

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 PLP 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 PLP 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 welding 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 pre-qualifying weld test pieces.
Welding Non-Destructive Testing	Both X-Ray and Ultrasound are acceptable non-destructive testing techniques for pre-qualifying weld test pieces and in-process testing of aluminium welds. Typical industrial X-ray images or busbar tube welds are shown 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.



Images above show typical X-ray of non-destructive testing (NDT) and demonstrate the high standard of weld quality achieved in PLP manufacturing processes.

Standards

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

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


Design Standards		
AS 62271.301	High Voltage Switchgear and Controlgear Part 301: Dimensional Standardisation of Terminals.	2022
NEMA CC 1	Electric Power Connection for Substations.	2009
AS1154.1	Insulator and Conductor Fittings for Overhead Power Lines. Part 1: Performance, Material, General Requirements and Dimensions.	2009
AS1154.3	Insulator and Conductor Fittings for Overhead Power Lines, Part 3: 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.	2023
Testing Standards		
IEC 61238-1 2nd Edition	Compression and Mechanical Connectors for Power Cables with Copper or Aluminium Conductors – Part 1: Test Methods and Requirements.	2018
IEC 61284	Overhead Lines – Requirements and Tests for Fittings.	1997
ANSI C119.4	Connectors for Use between Aluminium-to-Aluminium and Aluminium-to-Copper Conductors Designed for Normal Operation at or Below 93°C and Copper-to-Copper Conductors Designed for Normal Operation at or Below 100°C.	2022
Material Standards		
AS/NZS 1531	Conductors – Bare Overhead – Aluminium and Aluminium Alloy.	1991
BS 2898	Specification for Wrought Aluminium and Aluminium Alloys for Electrical Purposes. Bars, Extruded Round Tube and Sections.	1970
AS 1866	Aluminium and Aluminium Alloys – Extruded Rod, Bar, Solid and Hollow Shapes.	1997
AS 2848.1	Aluminium and Aluminium Alloys – Compositions and Designations, Part 1: Wrought Products.	1998
AS 3607	Conductors – Bare Overhead, Aluminium and Aluminium Alloy – Steel Reinforced.	1989
BS EN 755-2	Aluminium and Aluminium Alloys – Extruded Rod and Bar, Tube and Profiles – Part 2: Mechanical Properties.	2025
BS EN 1706	Aluminium and Aluminium Alloys – Castings – Chemical Composition and Mechanical Properties.	2020
Manufacturing Standards		
AS 1665	Welding of Aluminium Structures.	2004
Miscellaneous Standards		
AS/NZS 4680	Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles – Specifications and Test Methods.	2025
IEC 17025	General Requirements for the Competence of Testing and Calibration Laboratories.	2018

PLP Substation Product Index

Palms and Flags	
	Aluminium Adaptor Plates AAP
	Busbar Aluminium Palm (Inline) BBAP
	Busbar Aluminium Palm (Transverse) BBAPT
	Busbar End Cap Palm BBEC
	Busbar End Palm (Capped) BBEP
	Busbar End Palm (L-Type) BBEPL
Flexible Connectors	
	Aluminium Flexible Connectors AFC
	Copper Flexible Connectors D-FL
End Caps	
	Busbar End Caps BBEC
Joint Sleeves	
	Busbar Joint Sleeves BBJS

Supports	
	Busbar Fixed Conductor Support BBFCS
	Busbar Support Assembly BBSA
	Bolted Run Post Insulator BRPI
	Aluminium Busbar Support Clamp (Type ABS) D-ABS
	Copper Busbar Support Clamp (Type BS) D-BS
	Double Conductor Run Insulator Post DCRIP
	Tube Connector (Type PTC Copper) D-PTC
	Tube Connector (Type TF Copper & ATF Aluminium) D-TF
	Parallel Spacer Double Post Insulator Mounted SPSD
	Parallel Spacer Quad Post Insulator Mounted SPSQ
	Parallel Spacer Triple Post Insulator Mounted SPST
A-Frames	
	Busbar A-Frames Aluminium BBAFA

Bolted Connections	
	Aluminium Parallel Groove Clamp APG
	Busbar Terminal Lug BBTL
	Bolted Run Bolted Stem BRBS
	Bolted Run Bolted Tee BRBT
	Bolted Run Compression Tee BRCT
	Bolted Run Palm Tap BRPT
	Bolted Run Terminal Lug BRTL
	Aluminium Terminal Lug Busbar to Palm D-ABT
	Aluminium End Connector Busbar to Conductor (Type AE) D-AE
	Aluminium Terminal Lug Conductor to Palm (Types AN & AN-B22) D-AN
	Aluminium Straight Connector Busbar to Busbar D-AST
	Aluminium Tee Connector Busbar to Conductor (Type AT) D-AT

Bolted Connections	
	Aluminium Tee Connector Conductor to Conductor (Type ATC) D-ATC
	Aluminium Tee Connector Busbar to Busbar (Type ATT) D-ATT
	Terminal Lug Busbar to Palm (Type BT - Copper) D-BT
	Terminal Lug Stud or Busbar to Palm (Type CS Copper) D-CS
	Double Conductor Run Bolted Stem DCRBS
	Double Conductor Run Bolted Tee DCRBT
	Double Conductor Run Palm Tap DCRPT
	Right Angle Aluminium Terminal Lug Busbar to Palm D-LS
	Terminal Lug Conductor to Palm (Type NT Copper) D-NT
	Palmless Connector (Type PC/PCS Copper & APC/APCS Aluminium) D-PC
	Reducer Busbar or Studs (Type RS - Copper) D-RS
	Reducer Busbars (Type RT Copper) D-RT

Bolted Connections	
	Straight Connector Conductor to Conductor (Type SC Copper) D-SC
	Straight Connector Busbar to Busbar (Type ST Copper) D-ST
	Tee Connector Busbar to Conductor (Type TT Copper) D-T
	End Connector Busbar to Conductor (Type E Copper) D-E
	Tee Connector Conductor to Conductor (Type TC Copper) D-TC
	Tee Connector Busbar to Busbar (Type TT Copper) D-TT
	Terminal Lug Conductor to Palm (Type TL Copper & ATL Aluminium) D-TL
	Right Angle Terminal Lug Conductor to Palm (Type TLC Copper & ATLC Aluminium) D-TLC
Spacers	
	Substation Parallel Spacer Double SPSD
	Substation Parallel Spacer Triple SPST
	Substation Parallel Spacer Quad SPSQ

Overhead & Landing Span Fitting	
	Hardware Fitting Range
High Voltage Disconnectors	
	36kV - 362kV
Conductors	
	AAC, AAAC, ACSR SC/AC & OPGW
Conductor Termination	
	Compression Deadend (AAC) CDEA
	Compression Deadend (AAAC) CDEAAAC
	Aluminium Compression Terminals Compression Deadend Terminal CTA/CDET
	Compression Terminal Aluminium Pin-Type CTAPTW
	Compression Terminal Aluminium Twin-Type CTAT

Protection, Earthing & Accessories	
	Electrical Jointing Compound ALMINOX & ALVANIA
	Busbar Earthing Stirrup BBES
	Busbar Earthing Stirrup Assembly BBESA
	Copper Bonding Leads CBL
	Earth Mats EARTHMAT
	Earth Rods & Accessories ER
	Earth Stub Brass ESB
	Earthing Stirrup Plate ESP
	Earthing Stirrup Transverse Double ESTD
	Earthing Stirrup Transverse Single ESTS
	Earthing Stirrup Transverse Triple ESTT
	Grading Rings GRS

Insulators	
	Glass Disc Insulators
	Porcelain Disc Insulators
	Station Post Insulators
	Polymeric Insulators
Covered Conductor Clamps & Blocks	
	Cable Clamps D-CAB
	Plastic Substation Cable Clamp Blocks PSCCB
	Plastic Substation Cable Clamp Single PSCCS
	Plastic Substation Cable Clamp Triple PSCCT

PLP's precision-engineered products and technical services support critical infrastructure networks across the energy and communications sectors.

Trusted by utility providers, our solutions deliver proven performance and long-term reliability.

Operating as a united global organisation, PLP delivers high-quality products and unparalleled service.



PLP Australia

ABN 27 004 533 877

190 Power Street, Glendenning,
NSW 2761 Australia
PO Box. 626 St. Marys,
NSW 1790 Australia

Phone: 1300 550 322

Email: sales@plp.com

Website: www.plp.com/au

