Aerospace Fasteners and Precision Components

PCC offers one of the industry’s broadest ranges of aerospace fasteners and precision components. With applications that span an aircraft from nose to tail and wing to wing, our products are found in nearly every aviation platform. We support the entire product lifecycle — from prototype to production, and throughout sustainment. PCC delivers innovative solutions today for tomorrow’s most demanding design, manufacturing, and service requirements.

With a history that begins well over 100 years ago, PCC’s success is based on extensive experience and leadership in the field of metallurgy. Today, Airframe Products’ operations spread over 4 continents—a network of industry leading companies allowing our customers to utilize our experience and deep product knowledge wherever they need it—worldwide. Embedded in a culture of continuous improvement, our assets and industry leadership insure that we continue to deliver our customers the best value in the industry.

FASTENERS

Designing and manufacturing high performance, high-strength fasteners for critical applications and severe environments is our focus. We ensure product performance and consistency by carefully monitoring and controlling specific manufacturing practices and thoroughly testing our products. PCC has been an industry leader in this area since the early days of aviation, creating new materials, designs, and manufacturing practices to satisfy an ever-changing industry—from the first generation of propeller-driven military aircraft to today’s higher temperature gas turbine engines and composite airframes.

PCC offers complete technical support in specifying the best fastener for your application. We work with all the standard fastener configurations, materials, and finishes and are qualified to the majority of commercial and military aerospace standards including ABS, AN, AGA, BAC, DAN, EN, MS, NAS, NSA, 3D, 3M, and others. Our threaded fasteners are widely available in both unified and metric standard sizes covering the entire spectrum of diameters and lengths.

When application requirements call for performance that far exceeds that available from traditional materials, PCC turns to its expertise in superalloys to achieve a combination of unique properties. Fasteners made from our proprietary materials such as MP35N®, MP159®, AEREX®, MP98T®, and SPS TITAN™ titanium alloy deliver strength-to-weight and elevated temperature strength and corrosion resistance to meet the most demanding airframe structural and engine requirements.

In the pages that follow, we are proud to present a summary of our vast product and solution capability. For additional detail, current information, and electronic part and specification search capability we encourage you to visit PCCfasteners.com.
Selection of the optimal fastener for an application involves both in-service and installation considerations including required clamp-up, available space and access, weight, service loads and environment, joint materials, and assembly goals and tolerances. Today encompass nearly every bolt, pin, and screw style, material, and thread size, and length used in the aerospace industry.

Expandable diameter fasteners are used in critical joints to adjust hole fill to desired levels of interference. They are used in a variety of high vibration and high load transfer joints to provide superior alignment, reduce or eliminate relative movement and wear, and provide quick change capability. Among the many uses are helicopter rotor blade attachments, engine attachments, and external muntions attachments. PCC designs and manufactures expandable diameter fasteners in pin, bolt, blindbolt, and special configurations to suit customer requirements.

Self-retaining bolts are fail-safe shear bolts for use in dynamic joint assemblies such as control linkages for flight surfaces, engine mechanisms, and fuel systems. PCC produces a variety of self-retaining bolt systems, which are available in any style shear bolt. Self-retaining configurations include: Circular Spring, Positive Lock, Impedance, Pawl and Thread End Release.

Hook bolts (also known as retainer bolts) eliminate loosening in assembly. The retainer, permanently affixed to the head of the bolt, is engaged in an adjacent hole, slot, or over-the-edge of the assembly. Hook bolts provide superior alignment, reduce or eliminate relative movement and wear, and provide quick change capability. Among the many uses are helicopter rotor blade attachments, engine attachments, and external muntions attachments. PCC designs and manufactures expandable diameter fasteners in pin, bolt, blindbolt, and special configurations to suit customer requirements.

Sleeved fastening systems provide fatigue life enhancement in metal and hole fill in composite aircraft structures. The hole fill provided by both systems has been shown to improve lightning strike performance, electrical conductivity, and mechanical strength in composite joints. The SLEEVbolt® system installs in a straight hole and uniformly expands to an interference fit as the tightening of the nut causes the sleeve to expand and engage the threads of the bolt. The GromEx® system expands a straight walled sleeve into the structure to be used with any class of fit fastener. The GromEx® system also allows the fastener to be removed and re-installed without removing the sleeve from the hole.

PCC manufactures pins and collars in a variety of materials including Inconel® alloy 718, and aluminum. We are licensed to manufacture brand name pin systems sold under the trademarks HE, HI-Lok®, HI-Tigue®, and HST HI-Lite®.

Lockbolt fastening systems are installed in direct tension by swaging a collar into the lock grooves of the pin. This fastener type provides a high-strength, vibration resistant joint with uniform clamp-up and excellent fatigue properties. PCC offers a complete line of lockbolts, collars, and high speed installation tools. Products are available in all popular pin types and may be coupled with other fastener systems to provide maximum performance and capacity for these products and offer alternative finishes for a full range of corrosion and wear-resistant bolts for use in critical applications.

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PCC is a leader in manufacturing high-strength bolts. We utilize standard head configurations (hex, 10-point, 12-point, spline) and materials (alloy steel, corrosion-resistant steel, INCONEL® alloy, WASPALOY®, titanium), as well as our own array of materials to tailor individual requirements to specific applications.

BOLTS AND SCREWS

Selection of the optimal fastener for an application involves both in-service and installation considerations including required clamp-up, available space and access, weight, service loads and environment, joint materials, and assembly goals and tolerances. Throughout the years PCC has worked closely with our customers in this pursuit, developing the experience, manufacturing capability, and capacity that today encompass nearly every bolt, pin, and screw style, material, thread size, and length used in the aerospace industry.

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PCC offers a comprehensive line of nut products covering every application and environment. Engineers can select the exact features they need from our broad design database, and, if you need something purpose specific, we’ll work with you to develop a solution.

**WRENCHABLE NUTS**

From microlage to 2.5 inches in diameter, PCC offers hex, double hex, and spline drive self-locking nuts in a variety of configurations including castellated, lightweight, self-aligning, close clearance, captive washer, flanged, shear, structural shear, high temperature, and high tensile. The products are available in carbon steel, stainless steel, A-286, alloy steel, aluminum, and brass with a wide range of finish options including cadmium, zinc, dull nickel, black oxide, cadmium type II, silver, and dry film lube. Both unified and metric sizes are available per AN, NAS, MS, NSA, and OEM standards. Please refer to the FLEXLOC®, ESNA®, and GREER STOP NUT product linecatalogs for additional details on PCC standard designs.

**SHANK NUTS**

Shank nuts are high temperature, high tensile strength nuts that are used primarily in aircraft engine applications. The nuts are installed by flaring the nut shank with a conical tool. Standard shank nuts are manufactured in a variety of configurations and materials to OEM standards and specifications.

**CLINCH AND SWAGE NUTS**

Gang channel nuts are designed for shaft or spindle applications in aircraft engines, gearboxes and transmissions to provide a positive rotational lock under vibratory conditions and maintain pre-twist torque pre-loads. PCC’s STA-LOK® system uses a serrated washer that installs onto a serrated shaft and then snaps over the nut to retain it. The precision and effectiveness of this mechanical lock has made the design standard.

Bearing locknuts are available in advanced aerospace alloys with either internal or external threads, internal or external wrenching slot or holes, and metallic or nonmetallic locking devices in sizes from 0.5 to 8 inches in diameter.

**ANCHOR NUTS**

Anchor nuts, also called nut plates, are self-wrenching, self-locking nuts used for use in closeout or space-constrained areas to provide a permanent nut element on the inside of the joint so that a skin, access panel, fairing, or other member can be attached with a screw. PCC manufactures an extensive line of nut plates covering a full range of sizes, materials, and finishes per AN, AS, NAS, MS, EN, and OEM standards. Nut plate product lines include riveted, clip nut, and rivetless in a variety of configurations including close structural tolerance, high float, ultra high float, self-sealing, and spring-loaded configurations.

**RIVETLESS NUT PLATES**

RNP® and Frenufer® rivetless nut plates meet customer requirements for fast assembly, reduced part count, enhanced fatigue and damage tolerance performance, and improved electromagnetic effect performance in metal and composite structure.

**BEARING LOCKNUTS**

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BLIND RIVETS
For over 70 years, Cherry® has been a leading aerospace rivet brand. Cherry® Blind Rivets were originally developed for structural assembly in areas of the aircraft where installation access is limited to one side of the structure. However, the wide range of standard designs, installation efficiency, and ergonomic benefits has made them a preferred alternative to solid rivets in many applications.

The Cherry™ MAX® system utilizes a simple, single pulling head to install many diameters, head configurations and materials including bulbed versions for thin sheet and bearing load sensitive applications and wiredraw versions for sheet take-up and hole filling.

The CherryLock® system is designed with high tensile, shear, and fatigue strengths and is particularly well suited to double dimple and high vibration areas.

BLIND BOLTS
PCC’s MAXIBOLT® and MAXIBOLT® PLUS blind fasteners install quickly and provide high-strength fastening in a wide range of structural materials and joints. The original MAXIBOLT® line is available in alloy steel, titanium, and CRES in flush and protruding head styles.

The MAXIBOLT® PLUS system comes in stainless steel and titanium in all standard head configurations and grips. Its larger blind side footprint gives excellent performance in thin sheet and non-metallic applications.

BLIND NUTS
Blind nuts are self-wrenching, self-locking nuts that install through the hole in the structure from the bolt side. A press nut is a versatile blind nut style that is used in a variety of applications including wet wing panel attachment. PCC manufactures a broad range of press nuts in both stainless and alloy steel in open and capped styles.

SOLID RIVETS
Solid rivets are high-strength fasteners used in aircraft shear joint structural assemblies. PCC manufactures a broad selection of solid rivets including the CherryBUCK® line of titanium rivets.

FASTENERS
PCC produces a broad range of structural panel fastener systems to fulfill almost every application requirement including high vibration, variable grip length, composite installation, curved surfaces, misaligned holes, and high cycle use. The products are available with external or internal threads and non-exposed working components in both unified and metric sizes.

AVILOK® structural panel fasteners combine a unique ratchet design with quad lead threads for quick installation and removal plus a positive lock for use in severe vibration conditions.

E-Nut® is a top-down, flush fit, captive blind fastener designed to provide installation time and weight savings over clamp nuts in floor and wall installations. The product is water tight, satisfies rotation requirements, and accommodates a variety of material types and depths including composite materials.

Series 3000® fasteners incorporate a unique locking device designed for structural doors and panels that are frequently removed and replaced. The system features positive hold out of the sleeve bolt and hole lining to eliminate panel dimpling.

PRELOAD INDICATING WASHERS
PCC developed Preload Indicating Washers to provide a more accurate bolt preload indication than can be achieved with conventional tightening and torque wrenches. These fasteners are available in stainless steel and under bolt head standard and oversize configurations for stress levels between 80 ksi and 260 ksi.

FASTENERS FOR SANDWICH STRUCTURE
PCC inserts are potted in mechanically installed sandwich material, like honeycomb, to allow fabrication of aircraft interior secondary structure including stove bins, galleys, and lavatories. Insert types include threaded or non-threaded, through or blind, locking or non-locking. Floating inserts feature a nut component that can move to compensate for screw misalignment.

Our line of spacers includes one piece and two piece plug and sleeve designs for use in structural applications such as aircraft floors.
MECHANICAL HARDWARE

PCC’s mechanical hardware product lines include locking and support systems, fluid fittings and connector, manufactured shafts, and a variety of other complex, precision machined components and assemblies delivered on a build-to-solution or build-to-print basis.

LOCKING AND SUPPORT SYSTEMS
PCC offers both application-specific and vendor standard solutions to a wide range of aircraft locking and support requirements, including both structural and aircraft interior solutions.

LATCHES AND KEEPER ASSEMBLIES
Our array of latches and keeper assemblies includes hook, rotary, shear pin and slide bolts, flush lever, pressure relief, adjustable keepers, and hinges. Adjustable features compensate for structure wear.

The Quick Change Track Lock System™ is an easy and complete solution for changing aircraft floor plans. Typical applications of the system include aircraft seats, lavatories, galleys and bulkheads — anything that attaches to seat tracks.

STRUTS AND HOLD OPEN RODS
Designed for structural and flight control actuation applications as well as to keep doors, drawers, aircraft maintenance access panels, and cowling open, PCC’s strut and rods come in fixed length, telescoping, swaged, scissor-folding, and special configurations. Available with secondary locking features, these products are designed for tension and compression applications.

BALL-LOK® PINS
Ball-Lok® Quick Release Pins, also called safety pins and pippins, are used in place of nuts and bolts wherever quick or frequent assembly or disassembly is required. Typical Ball-Lok® pin applications include airplane seat back locks and overhead luggage bins. We manufacture the Ball-Lok® line to meet MS, NAS, and tailored customer specifications.

FLUID FITTINGS AND CONNECTORS
PCC designs and manufactures a broad range of fluid fittings, connectors, and installation tools for all types of systems, environments, and end user needs.

METALLIC FITTING SYSTEMS
PCC manufactures inch and metric fluid fittings using externally swaged, internally swaged, beam seal, flared, and flareless designs suitable for hydraulic, pneumatic, ECS and fuel systems. Products include a full range of AN/MS/NAS standards, OEM source controlled designs, and ring locked boss adapters and self-locking nuts for high vibration environments.

FUEL, AIR, INERT GAS, AND DRAIN TUBE CONNECTORS
In addition to standard connectors, PCC offers two unique technologies. Make from Solid Technology’s MFS®, lowers cost by eliminating welds and associated inspections and reduces part weight by allowing for constant, minimum wall thickness in complex shapes. FlexMate® expanded through-wall fittings increase routing efficiency and reduce cost and weight by eliminating fasteners and associated structural pad-ups and by allowing more lines to pass through a given area.

PRECISION MACHINED COMPONENTS
PCC has extensive experience supplying both rotationally symmetrical and prismatic engine and structural components and sub-assemblies in all aerospace materials including high-alloyed steels, stainless steels, high-temperature-resistant and titanium.

AERO ENGINE COMPONENTS
PCC manufactures a variety of critical engine components from hard metals such as front bearing supports, parts for the low-pressure compressor, and turbine lock plates.

LANDING GEAR COMPONENTS
We manufacture stainless steel pins, locking rings, and other components for landing gear undercarriages.

WING LEADING EDGE ROLLER ASSEMBLIES
Produced as a ship set, PCC manufactures aluminum roller assemblies with phosphor bronze bushings for movable leading edges.

LARGE SHAFTS
PCC manufactures shafts up to 30 inches in length and up to 4 inches in diameter, with tolerances to ±.002 inch. Materials include Inconel alloy 718, MP15® MP35N® WASPALOY® RENé 41, HASTELLOY®, A286, 422, H-11, 4340 and 8740.

FLEXPLO® MATERIALS
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FLEXMATE® EXPANDED THROUGH-WALL FITTINGS
Produced as a ship set, PCC manufactures aluminum roller assemblies with phosphor bronze bushings for movable leading edges.

ENGINEERED RODS
To date, PCC has designed more than 5,000 rod and wire rope cable assemblies, plus many of their end fittings.

PCCfasteners.com
HOLE COLD WORKING AND FASTENING SYSTEMS

For over 40 years, PCC has been the leader in the science of hole cold expansion to induce beneficial residual stresses to improve the fatigue and damage tolerance properties of holes and joints in metallic aircraft structures. The cold expansion process has further been adapted for installation of bushings, fasteners, and fittings in metallic and composite structures to reduce manufacturing and maintenance flow time and cost. We produce complete lines of hole cold expansion tooling, bushings, fasteners, and other products that utilize the cold expansion method. ForceMate® provides a lower cost installation method for bushings and has been proven through years of testing and in-service history to enhance the fatigue and damage tolerance of fastened installations. The system also offers superior resistance to corrosion, vibration, and bushing migration under applied loads.

AEROSTRUCTURE DETAILS AND ASSEMBLIES

PCC is a vertically integrated operator of world class flexible manufacturing facilities in both country and international environments. PCC applies the same LEAN principles and jif-free assembly philosophy across our sites to economically produce a wide range of products for some of the most successful commercial and military aircraft programs in the industry. We manufacture primary structural details from forgings, billet, and extrusions to aluminum and titanium. Our broad portfolio includes the following products:

LEADING EDGE

We manufacture complete rib assemblies for commercial aircraft including Telo, Track, and Inter ribs.

TRAILING EDGE

We manufacture trailing edge and false rear spar assemblies for commercial aircraft. We make these parts entirely from components produced by PCC facilities— from the spar to the smallest nut plate. These long aluminum assemblies are well suited to our jif-free assembly for enhanced production cost, accuracy, and repeatability.

WING RIBS AND SPARS

Product line includes the delivery of complete rib assemblies for large aircraft and tight positional tolerance, complex aluminum wing tip spars.

AIR INTAKES

Our air intake product line includes bulkheads for rotocraft and fabricated air intake vent assemblies for commercial aircraft fuel systems.

STRINGERS, CORNER DETAILS, AND SPAR ANGLES

PCC’s product line includes a variety of aluminum details, which are included in JIt kits.

BRACKETS

PCC manufactures complex aluminum, stainless steel, and titanium brackets for airframe and engine applications. Brackets are available on a build to order basis or as a JIT-VM kit for line side build.

TOOLING

Just as important as the flying product is the installation tooling. PCC offers a complete range of manual, electric, hydraulic, and pneumatic tooling systems for the installation of products. Many of the tooling systems have become industry standards that can be found almost anywhere an aircraft or engine is being manufactured or repaired.