



Materials

PowerCoil standard inserts are manufactured from fully certified, aircraft quality, 304 (18/8) austenitic stainless steel in accordance with DTD 734A. Alternative materials include 316 stainless steel and a variety of application specific surface coatings.

Alternative Materials

Phosphor Bronze

Non ferrous copper/tin alloy in accordance with BS2783 PB 102 EH – is suitable for operation in temperatures ranging from -200°C to +300°C.

Inconel X-750

Heat resisting precipitation hardenable nickel base alloy (equivalent specifications SAE AS 7246, DIN/NF 3018, W.NR 2.4669, UNS N07750). Inconel X-750 is suitable for operation in temperatures ranging from -200°C to +550° degrees celsius.

Nimonic 90

Heat resisting precipitation hardenable nickel base alloy in accordance with BS2 HR 501 (equivalent specifications W.NR 2.4632, UNS N07090).

Nimonic 90 is suitable for operation in temperatures ranging from -100°C to +650° degrees celsius.

Insert Material	Max. Temperature		Typical Applications	Coatings
	Peak	Continuous		
Stainless 304	425°C 800°F	315°C 600°F	Most general applications in all materials	FL, AG, CD
Stainless 316	425°C 800°F	315°C 600°F	Increased corrosion resistance for salt water applications	FL, AG, CD
Phosphor Bronze	300°C 572°F	235°C 455°F	Copper parts, non-magnetic, low permeability applications	AG, CD
Inconel X-750	650°C 1200°F	550°C 1020°F	Aerospace, turbines, corrosive environments, high temp. use	AG
Nimonic 90	650°C 1200°F	550°C 1020°F	Aerospace and turbine applications	AG

Alternative Finishes & Coatings

Cadmium Plate

Electro-deposited Cadmium in accordance with DTD 904/Def Stan 03-19 (equivalent specifications FED. QQ-P-416, LN 9368). Cadmium plating provides an excellent barrier between dissimilar metals dramatically reducing the effects of galvanic corrosion, its high lubricity and excellent corrosion resistance prevents seizure and galling between threaded components. Cadmium plate is suitable for operation in temperatures ranging from -200°C to +235°C.

Cadmium plated parts must not be

- subjected to temperatures exceeding 235°C (455°F)
- come into contact with fuel or hot oil
- come into contact with food or drinking water
- be used with titanium components (either directly or indirectly). At elevated temperatures embrittlement and subsequent component failure may occur.
- Cadmium is highly toxic – consequently extreme care must be taken when shipping, handling and installing.

Zinc Plate

Electrolytically deposited zinc in accordance with BS 3382. Electro-deposited zinc is the most widely applied electroplated finish in industry. Zinc is suitable for operation in temperatures ranging from -200°C to +250°C.

Silver Plate

Electrolytically deposited silver in accordance with DTD 939. Silver plating is used to prevent seizure and galling between thread components in high temperature applications and is most commonly applied to aero-engine fasteners. Silver plate is suitable for operation in temperatures ranging from -200°C to +650°C. Silver plated wire inserts may be installed in various materials including aluminium alloys, magnesium alloys, corrosion and heat resistant materials etc.

Silver plated inserts are not recommended for installation in titanium alloy which may exceed a service temperature of 300°C (570°F). Stress corrosion as a result of the combination of silver and titanium may occur in the housing material.

Dry Film Lubricant

Solid film heat cured molybdenum disulphide dry film lubricant coating in accordance with MIL-L-0046010 provides a low frictional coefficient coating with excellent load bearing capabilities. Dry film lubricant prevents seizing and galling between threaded components and is particularly effective in screw locking insert applications. Dry film lubricant is suitable for operation in temperatures ranging from -100°C to +250°C.

Plating / Finish	Part No. Suffix	Applicable Process Specification
Silver Plating	AG	DTD 939
Cadmium Plating	CD	QQP-416 or DEF STD 03-19
Dry Film Lubricant	FL	MIL-L-8937 or MIL-L-46010
Red Dye	–	Applied to locking inserts for identification purposes*

* other color dyes may also be utilised for specific identification purposes

Selection of Correct Insert Length

PowerCoil wire thread inserts are available in all popular thread types. Five insert lengths are available for each thread size. It is important to select the correct insert length in order to balance the bolt tensile strength against the shear strength of the parent material. The five insert lengths (recommended thread engagement of the PowerCoil wire thread insert), 1D, 1.5D, 2D, 2.5D and 3D are shown in the shaded area of the table below. These are calculated numbers since the inserts cannot be measured in the free (un-installed) state. The numbers are multiples of the nominal thread size, or diameter, of the insert. The actual insert lengths in the installed position are listed in the insert selection tables. There they represent the actual installed length plus 1/2 pitch. Using the table below, an insert length can be selected which will produce a thread system strong enough to fracture a bolt before it will strip or damage either the parent material or the insert.

Recommended Nominal Insert lengths Based on Parent Material Versus Bolt Material Strengths

UNIFIED (source BS7752 Part 1:1994)

Shear Strength of Parent Material (KSI)	Bolt Material Minimum Ultimate Tensile Strength (KSI)								
	54	75	96	108	125	132	160	180	220
10	2.0	2.5	3.0	3.0	–	–	–	–	–
15	1.5	1.5	2.0	2.5	2.5	3.0	–	–	–
20	1.0	1.5	1.5	2.0	2.0	2.0	2.5	3.0	3.0
25	1.0	1.0	1.5	1.5	1.5	2.0	2.0	2.5	2.5
30	1.0	1.0	1.0	1.5	1.5	1.5	2.0	2.0	2.5
40	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5	2.0
50	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5

EXAMPLE: If parent material shear strength is 10KSI and the bolt tensile strength is 54 KSI, the correct insert length is 2.0 diameters (2D).

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Shear Strength of Parent Material (MPa)	Bolt Material Minimum Ultimate Tensile Strength (MPa)							
	300	400	500	600	800	1000	1200	1400
70	1.5	2.0	2.5	2.5	–	–	–	–
100	1.0	1.5	1.5	2.0	2.5	3.0	–	–
150	1.0	1.0	1.5	1.5	2.0	2.0	2.5	3.0
200	1.0	1.0	1.0	1.0	1.5	1.5	2.0	2.5
250	1.0	1.0	1.0	1.0	1.0	1.5	1.5	2.0
300	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5
350	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5

EXAMPLE: If parent material shear strength is 150Mpa and the bolt tensile strength is 600Mpa, the correct insert length is 1.5 diameters (1.5D).

Bolt Projection

PowerCoil wire thread inserts are designed to be used with standard, readily available bolts and screws that require no special hardware.

