

STANLEY[®]
Engineered Fastening

HELI-COIL[®]
Stud-Lock Inserts

Technical Bulletin HC1048



HeliCoil[®]

STUD-LOCK

Heli-Coil® Stud-Lock Inserts are an extension of the Heli-Coil Screw Lock design, manufactured from the same 304 Stainless Steel material and diamond wire shape as that of traditional inserts. The Stud Lock series provide locking torque equivalent to that of the Class 5 interference fit using inexpensive /cost effective standardized Class 3A studs.

Extensive testing has been performed in multiple key markets:

- Aviation
- Industrial
- Automotive
- Military

Testing confirms that the Stud-Lock series is a superior alternative to the expensive and troublesome method of Class 5 interference fit.

REDUCE COSTS

- Special Class 5 studs require different major diameters, increments of oversize pitch diameters, selective assembly, special lead in threads, and external lubrication. Stud lock insert assemblies simply require a standard Class 3A threaded rod.
- Special tapped holes are not required to ensure interference fit. The simplified traditional Heli-Coil® hole preparation practice may be utilized (See table 3). Combined, the insert and threaded rod combination are less costly.
- Stud installation is simple and quick.
- Driving torque does not increase with depth of engagement.
- Replacement of damaged studs is easier and much less expensive than any other method.
- Inventory of replacement studs can be drastically reduced.
- The insert and threaded rod combination is significantly less costly than solid bushings studs.

IMPROVE RELIABILITY

- Driving torque is controlled within a narrower range and the minimum torque is higher than ANSI B 1.12 and Handbook H28 values for Interference fit studs (see Table 1).

- Stress concentration in the boss due to interference fit or the driving of prongs, keys or serrated rings is eliminated.
- In contrast to chemical locking compounds, the Stud-Lock Insert is not adversely affected by time, temperature (up to 800°), axial loads, cleaning compounds or solvents. In addition, the tapped hole and mating studs do not have to be scrupulously cleaned; therefore, the reliability of every Stud-Lock Insert assembly is virtually 100%.

FIELD TESTED EXTENSIVELY SINCE 1966

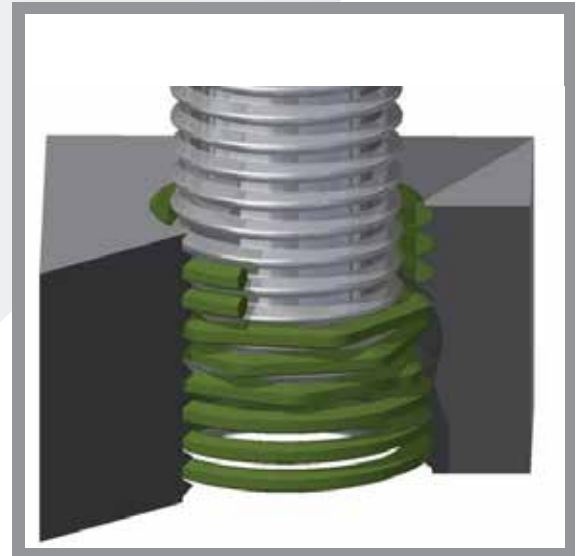
Testing and evaluation were conducted by several major aerospace companies and the military. Heli-Coil Stud-Lock Inserts passed all tests and are approved under Military standards AS1229 and AS3080, 81, 82 & 83.

Table 1
Stud Locking Torque

Thread Size	Straight Studs Per AS 1229-1			
	Insert Part Number		Max. Locking Torque (lbf-in.)	Min. Breakaway Torque (lbf-in.)
	Prefix	Length		
10 (.190)-24 10 (.190)-32	3758-3CN	285	45	23
	3759-3CN	380		
		475		
1/4 (.250)-20 1/4 (.250)-28	3758-4CN	375	90	52
	3759-4CN	500		
		625		
5/16 (.3125)-18 5/16 (.3125)-24	3758-5CN	469	180	105
	3759-5CN	625		
		781		
3/8 (.375)-16 3/8 (.375)-24	3758-6CN	562	240	140
	3759-6CN	750		
		938		
7/16 (.4375)-14 7/16 (.4375)-20	3758-7CN	656	300	175
	3759-7CN	875		
		1094		
1/2 (.500)-13 1/2 (.500)-20	3758-8CN	750	450	260
	3759-8CN	1000		
		1250		
		1500		

TECHNICAL DATA

1. The parent materials in which Stud-Lock Inserts were evaluated ranged from soft cast magnesium (AZ92A) to wrought aluminum (2024-T-4).
2. Tapped hole preparation is identical to that of traditional Screw-Lock Insert assemblies, using a 3B Class of Fit per the NASM33537.
3. Stud-Lock Insert installation tools have a reduced pitch diameter to accommodate the deeper grip coil configuration. All other tooling is the same as that used for Standard and Screw-Lock Inserts.
4. The stud locking torque is controlled within the range shown in Table I for a minimum of three cycles of installing and removing the stud. A new stud may be used for each cycle. In practice, however, the same stud can be



Installed Stud Lock Insert

Table 2
Stud Locking Torque

Table 3
Hole and Installation Data

Thread Size	Step Studs Per AS 1229-2					Suggested Drill Size		Straight Flute Tap (3B)		Installation Tooling	
	Insert Part Number		Max. Locking Torque (lbf-in.)	Min. Breakaway Torque (lbf-in.)	Nut End Thread Size	Aluminum	Steel/Magnesium	Plug	Bottoming	Hand	Pneumatic
	Prefix	Length									
10 (.190)-24 10 (.190)-32						13/64 (.2031) #7 (.2010)	#5 (.2055) 13/64 (.2031)	3CPB 3FPB	3CBB 3FBB	5551-3 5552-3	5651-3 5652-3
1/4 (.250)-20 1/4 (.250)-28	5759-4CN 5759-4CN	375 500 625 750	45	23	10-24 10-32	H (.266) G (.2610)	H (.266) 6.7 mm (.2638)	4CPB 4FPB	4CPB 4FBB	5551-4 5552-4	5651-4 5652-4
5/16 (.3125)-18 5/16 (.3125)-24	5758-5CN 5759-5CN	469 625 781 938	90	52	1/4-20 1/4-28	Q (.332) 21/64 (.3281)	Q (.332) 21/64 (.3281)	5CPB 5FPB	5CBB 5FBB	5551-5 5552-5	5651-5 5652-5
3/8 (.375)-16 3/8 (.375)-24	5758-6CN 5759-6CN	562 750 938 1125	180	100	5/16-24 5/16-18	X (.3970) 25/64 (.3906)	X (.3970) 25/64 (.3906)	6CPB 6FPB	6CBB 6FBB	5551-6 5552-6	5651-6 5652-6
7/16 (.4375)-14 7/16 (.4375)-20	5758-7CN 5759-7CN	656 875 1094 1312	240	140	3/8-16 3/8-24	29/64 (.4531) 29/64 (.4531)	29/64 (.4531) 29/64 (.4531)	7CPB 7FPB	7CBB 7FBB	5551-7 5552-7	5651-7 5652-7
1/2 (.500)-13 1/2 (.500)-20	5758-8CN 5759-8CN	750 1000 1250 1500	300	175	7/16-14 7/16-20	33/64 (.5156) 33/64 (.5156)	17/32 (.5312) 33/64 (.5156)	8CPB 8FPB	8CBB 8FBB	5551-8 5552-8	5651-8 5652-8

re-installed until the torque falls below minimum, at which point the installation of a new stud will increase the locking torque because the wear is primarily on the stud. The locking torque for Step Studs, (ie., studs which have the “nut end” one size smaller than the “stud end” or “fast end”) is shown in Table 2.

5. The recommended studs for use with Stud-Lock inserts are Class 3A unified threads (per MIL-S-7742 (UN) or MIL-S-8879 (UNJ), cadmium plates per AMS 2400, with a hardness of RC 26-32 and a minimum

thread length to engage the complete length of the insert plus one full turn. When using these studs, no additional lubrication is required. It is possible to use Class 5 interference fit (NC series) studs because of the resilient locking chords. The driving torque however, will be much higher than that for Class 3A studs but will still conform to ANSI B 1.12 and H28 values when a lubricant such as Molykote® G, Lubriplate® or MIL-T-5544 type grease is applied to the stud.

