Dyna-Thred®II All-Metal Type

The unique, all-metal Dyna-Thred II design is a technological breakthrough in reliable self-locking fasteners. Extensive tests prove that the locking action of Dyna-Thred II fasteners maintains minimum torque requirements after more than 15 re-uses. The patented Dyna-Thred lock is formed of the fastener itself and requires use of no additional locking element materials. Locking action takes place in a full hoop, 360° around the thread, providing an equal load on all sides.

The useful temperature range of Dyna-Thred II fasteners is limited only by the physical characteristics of the parent bolt material. From cryogenic applications to sustained high temperatures, Dyna-Thred II fasteners stay locked in. And, of course, Dyna-Thred II fasteners are available in a wide variety of head styles, materials, finishes, and sizes.

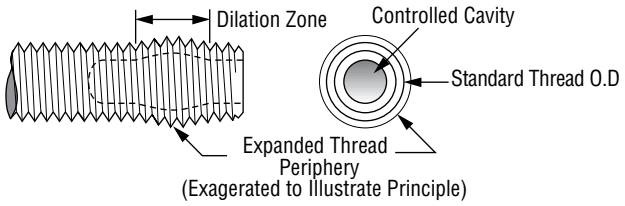
Typical Applications

Use Dyna-Thred II fasteners whenever extreme heat and punishing vibration loosen or destroy other fasteners.

- Airborne turbo-prop engines
- Ground-based turbines
- Commercial appliances such as restaurant coffee urns, etc.
- Commercial and military aircraft braking systems
- Auxiliary power units
- Rapid transit and rail subsystems

The Dyna-Thred II Principle

The Dyna-Thred II lock is made by forming a close tolerance hole axially into the threaded end of a fastener. A controlled area of the cavity is dilated to expand the periphery of a controlled thread area. The pitch diameter of the first thread is left unchanged for starting ease. The result: an easily installed, highly reliable, self-locking bolt or screw. Dyna-Thred II bolts meet all the performance requirements of, and is qualified to, Specification MIL-F-8961.



Dyna-Thread II Materials and Finishes

Materials	Tensile Strength, PSI	Maximum Temperature
Grade 5, Alloy Steel	125,000 minimum	up to 1200˚F
Grade 8, Alloy Steel	150,000 minimum	up to 1200˚F
A-286 CRES	160,000-170,000	up to 1200˚F
Mild Carbon Steel	55,000 minimum	up to 1200˚F
300 CRES	75,000 minimum	up to 1200˚F
Inconel®	185,000 minimum	up to 1200˚F

Finishes
Cadmium
Silver Plate
Dry Film Lube
Passivate
Plain

Performance

Laboratory Tests were independently conducted.*

Static Tensile Strength Tests

Dyna-Thred engagement was affected 2 threads above the cavity area. Comparisons were made between standard NAS1004 and Dyna-Thred at room temperature and Dyna-Thred alone at 1200°F. Tests proved that essentially no tensile strength difference existed between NAS1004 bolts and Dyna-Thred bolts.

Specimen No.	Part Type	Nom. Dia. & Thread 3A	Ult. Tensile Load Req't Lbs. Min.	Results Ult. Tensile Test Lbs.	Location of Failure	Test Temp. °F
1	Dyna-Thred	1/4-28	5150	6360	Bolt Thread	74
2	Dyna-Thred	1/4-28	5150	6240	Bolt Thread	74
3	Dyna-Thred	1/4-28	5150	6540	Bolt Thread	75
4	NAS1004	1/4-28	5150	6580	Bolt Thread	74
5	NAS1004	1/4-28	5150	6540	Bolt Thread	74
6	NAS1004	1/4-28	5150	6380	Bolt Thread	75
7	Dyna-Thred	1/4-28	—	4395	Bolt Thread	1200
8	Dyna-Thred	1/4-28	—	4425	Bolt Thread	1200

Tension-Fatigue Tests

Dyna-Thred was tested with the essentially comparable NAS1004 bolt to determine their strength characteristics. No appreciable strength difference between the two types of bolts was noted.

Specimen No.	Part Type †	Nom. Dia. & Thread 3A	Stress PSI High Ten. Load	Fatigue Loading Lbs.		Number of Cycles to Failure	Location of Failure
				Low Ten. Load ± 2%	High Ten. Load ± 2%		
1	Dyna-Thred	1/4-28	83,100	271	2710	65,000	Bolt Head
2	NAS1004	1/4-28	83,100	271	2710	58,000	Bolt Head
3	Dyna-Thred	1/4-28	61,350	200	2000	176,000	Bolt Head
4	NAS1004	1/4-28	61,350	200	2000	189,000	Bolt Head

Stress Rupture Tests

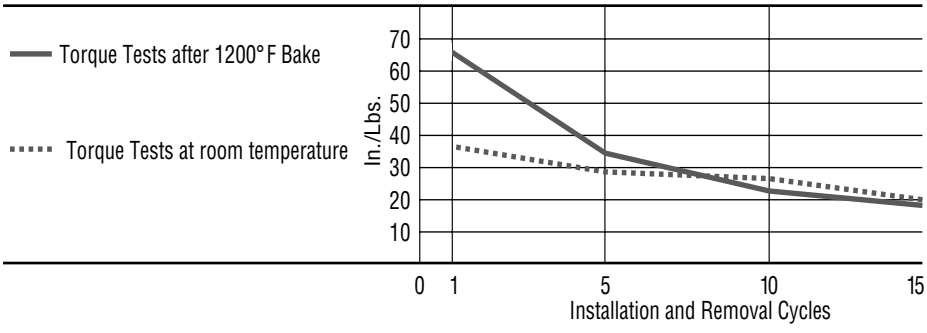
Dyna-Thred bolts were positioned so that 1-1/2 threads protruded through the end of the nut. The bearing face of the nut was within approximately 3 threads of the runout. The Dyna-Thred bolt and nut assembly was heated to 1200°F during the test period of 23 hours. All test bolts satisfactorily met stress rupture test requirements of Specification AMS 7478.

Specimen No.	Part Type †	Nom. Dia. & Thread 3A	Tensile Stress Area Sq. In.	Test Load Lbs.	Tensile Strength PSI	Rupture Life Hours	Location of Failure
1	Dyna-Thred	1/4-28	0.03553	2310	65,000	23.0	No Fail
2	Dyna-Thred	1/4-28	0.03553	2310	65,000	23.0	No Fail
3	Dyna-Thred	1/4-28	0.03553	2310	65,000	23.0	No Fail

† All Dyna-Thred bolts were corrosion-resistant steel fabricated from A286 and silver plated. Unplated hexagon A286 nuts were used in accordance with dimensions specified in MIL-F-18240D.

15-Cycle Locking Torque Tests**

Tests described were run at room temperature and after 1200°F bake for six hours, in accordance with military specification MIL-F-8961. All bolts tested were manufactured from A-286 CRES, and were Dyna-Thred part number DTF1004-21A, which has a 1/4-28 UNF-3A thread. Results indicated are minimum breakaway values measured in inch-pounds.



* Laboratory tests were conducted by Almay Research & Testing Corporation, Los Angeles, California. Complete certified test results available on all tests.

** Meets MIL-F-8961 Torque Requirements.

How to Specify — Dyna-Thred II All Metal Type

Dyna Thred II bolts and screws may be ordered using AN, MS or NAS specification numbers by using the part number scheme below. All other types may be specified by constructing a commercial part number using the tables at right. Either method is simple.

Options

Long-Lok offers optional Headmarking (six or more dots raised or recessed 0.010", maximum, in a circular pattern) at a nominal additional cost. Add the letter "M" at the end of the part number to order this option. Please consult with factory for other special requirements.

Metric Sizes

Though not cataloged here, metric size equivalents for most of our self-threaded fasteners are available. Please call Long-Lok if your application calls for metric dimensioned parts. We are prepared to handle your requirements!

AN, MS and NAS Part Numbers

1. Add a "DT" prefix in place of the "AN", "MS", "NAS" or other specification callouts of basic screws or bolts.
2. Add the following after DT when applicable:
   F = Dry lubrication finish per MIL-L-46010, Type 1
   A = Silver plate per AMS 2411
   C = Cadmium plating per QQ-P-416, Type II, Class 2
3. Add the following to the end of the part number when applicable:
   M = Headmarking - six or more dots raised or depressed 0.010 max.

Examples:

Note: Part Numbers here are spread apart for clarity. Please do not add spaces between codes when constructing your Part Number.

1. DT A 21280-10 M

Dyna-Thred II Prefix
Dyna-Thred Self-Locking
Male Threads

Screw Finish
A = Silver Plate per
AMS 2411 (optional)

MS21280-10
12 Point Hex Bolt ("MS" Prefix is Dropped)

Options
M = Headmarking

2. DT 1005-8A M

Dyna-Thred II Prefix

NAS1005-8A
Hex Head Bolt

Headmarking

Commercial Part Numbers

Follow the structure shown below to construct a complete Part Number for commercial grade Dyna-Thred II self-locking bolts and screws.

Example:

Note: Part Numbers here are spread apart for clarity. Please do not add spaces between codes when constructing your Part Number.

DT 4 3 U 083 J 16

Dyna-Thread II Prefix

Screw Material
4 = A286 CRES

Screw Finish
3 = Dry Film Lubrication

Head Style
U = Socket Cap

Screw Size — Diameter and Thread Specification
083 = 1/2-13, UNC

Recess or Drive Style
J = Internal Hex

Length (1/16″ Increments)
16 = 1 inch

Screw Material	
Description	Code
Steel Grade 5 (125M psi Minimum)	1
Steel Grade 8 (150M psi Minimum)	2
	3
A-286 CRES	4
Steel, Mild Carbon (55 psi Minimum)	5
300 CRES	6
Inconel ™	8

Screw Finish	
Description	Code
Cadmium per QQ-P-416,Type II, Class 2	1
Silver Plate per AMS 2411 (1200° F)	2
Dry Film Lubrication per MIL-L-46010, Type I	3
Passivate per QQ-P-35	4
Plain, No Finish*	5

*While available with no finish, application of a lubricating coating is recommended to prevent part seizure in the mating thread form at time of installation.

See for Yourself

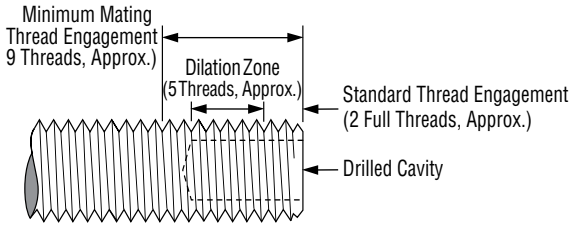
Send us a sample of your part or fastener, along with a brief description of its application and performance requirements, and we'll process it using the most appropriate Long-Lok thread locking or sealing method. Or, to sample a standard Long-Lok fastener, simply supply us with a Part Number. Samples are provided free of charge. Call your nearest Long-Lok facility for assistance.

Design Notes

1. Applicable Standards:
   Military Specification: MIL-F-8961
   Commercial Standards: IFI 124, IFI 524 (Metric)
2. Additional Materials and Finishes are available upon request.
3. Not all Material/Finish combinations are available for every head style.
4. Consult factory for minimum thread lengths.
5. Consult factory for additional details.
6. Note: Unless otherwise specified, thread fit classes and configuration envelope dimensions are per the applicable head style ANSI/ASME commercial standard. See Appendix.
7. Studies have shown that the greatest percentage of tensile load of a fastener is carried in the first two threads of engagement in the mating thread form. As evidenced by the static tensile test described on Page 25, DynaThred fasteners easily meet minimum tensile strength requirements when used in this way.

As shown in Figure 1 below, the standard drilled cavity depth of a typical Dyna-Thred fastener is approximately 7 thread pitches. For this reason, mating thread engagement of 9 threads minimum is required to ensure tensile strength performance consistent with test results on Page 25. Prevailing torque performance, however, can be achieved with thread engagement of 7 threads, minimum.

Figure 1



DT 4 3 U 083J 16

Head Style		
Description		Code
Round		A
Button		B
Pan		D
Oval		F
100° Flat		G
82° Flat		J
Binder		M
Fillister		N
Truss		T
Socket Cap		U
Hex Tap Bolt		V
Hex Cap Screw		W

Screw Size			
Coarse Thread		Fine Thread	
Size	Code	Size	Code
6-32	62	6-40	60
8-32	82	8-36	86
10-24	04	10-32	02
1/4-20	040	1/4-28	048
5/16-18	058	5/16-24	054
3/8-16	066	3/8-24	064
7/16-14	074	7/16-20	070
1/2-13	083	1/2-20	080
9/16-12	092	9/16-18	098
5/8-11	101	5/8-18	108
3/4-10	120	3/4-16	126
7/8-9	149	7/8-14	144
1-8	168	1-12	162

Recess or Drive Style		
Description (Applicable Head Style Codes)		Code
Cruciform (A, D, F, G, J, M, N, T)		P
Spline Socket (B, U)		K
Slotted Recess (A, D, F, G, J, M, N, T, V, W)		S
External Hex (V, W)		H
Internal Hex (B, G, J, U)		J
Offset Cruciform (A, D, F, G, J, M, N, T)		T

Length	
Description	Code
Lengths in increments of 1/16"; tolerances per applicable specifications. Consult Long-Lok for applicable minimum thread lengths.	
Examples:	
1/4"	4
5/16"	5
3/8"	6