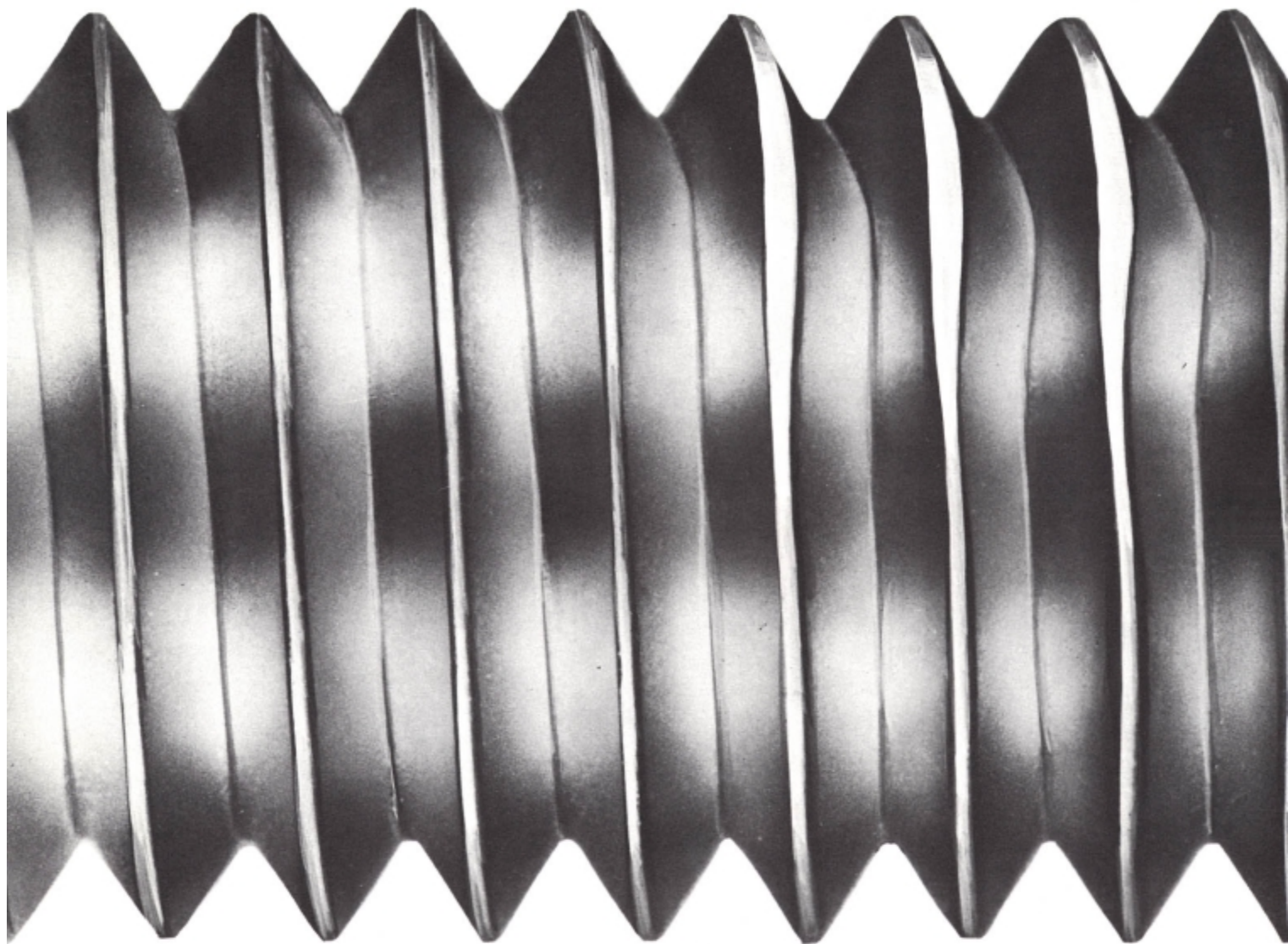


TRU-FLEX[®]

**All-Metal Prevailing Torque
Self-Locking Fastener**



TRU-FLEX



Tru-Flex fasteners are all-metal prevailing torque self locking bolts and screws. The locking action is achieved by a unique thread configuration near the end of the fastener. Tru-Flex screws and bolts are precisely repositioned at the root as well as the crest of at least five threads. This, combined with non-symmetrical lock location gives Tru-Flex its high performance characteristics of resiliency, reusability, size accommodation and

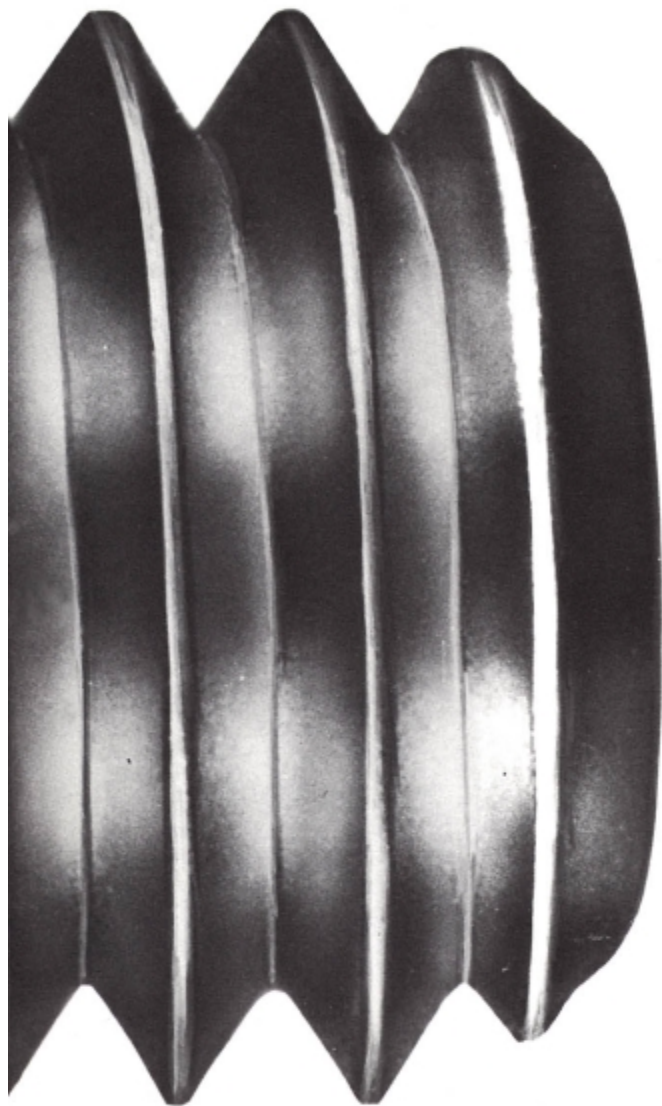
minimal distortion.

Tru-Flex fasteners are classified as one-piece, all-metal, self-locking screws. The only temperature limit on their application is that of the fastener metal or coatings. For this reason, Tru-Flex fastener thread-locking configuration can be applied to almost all male fasteners where self-locking is required, including those fabricated from corrosion resistant, high temperature, and cryogenic alloys.

These alloys include iron base, nickel base, nickel cobalt, and cobalt base materials. The addition of the locking feature has no effect on the hardness, shear, or tensile strength of the fastener. Other fasteners, with threads in a locking configuration around their entire circumference, are relatively inflexible and are sensitive to mating thread size. When thread fit is "loose", prevailing torque tends to be low; when "tight", mating

The locking fastener that

- has excellent accommodation to thread size
- retains locking action after repeated applications
- can be made from virtually all fastener materials
- unique thread contours minimizes distortion



End of a Tru-Flex fastener, enlarged several times to show the unique configuration of the locking threads, which give the Tru-Flex screws and bolts good locking action with minimal thread distortion.

threads may be damaged. Thereby severely limiting the reuseability of the fastener and reducing the reliability of the joint.

The ability of Tru-Flex to stay reuseable while maintaining its locking action sets it apart from other locking fasteners. In a controlled performance specification test it was found that Tru-Flex fasteners can be cycled a minimum of 5 times and still provide excellent locking action. You may well obtain

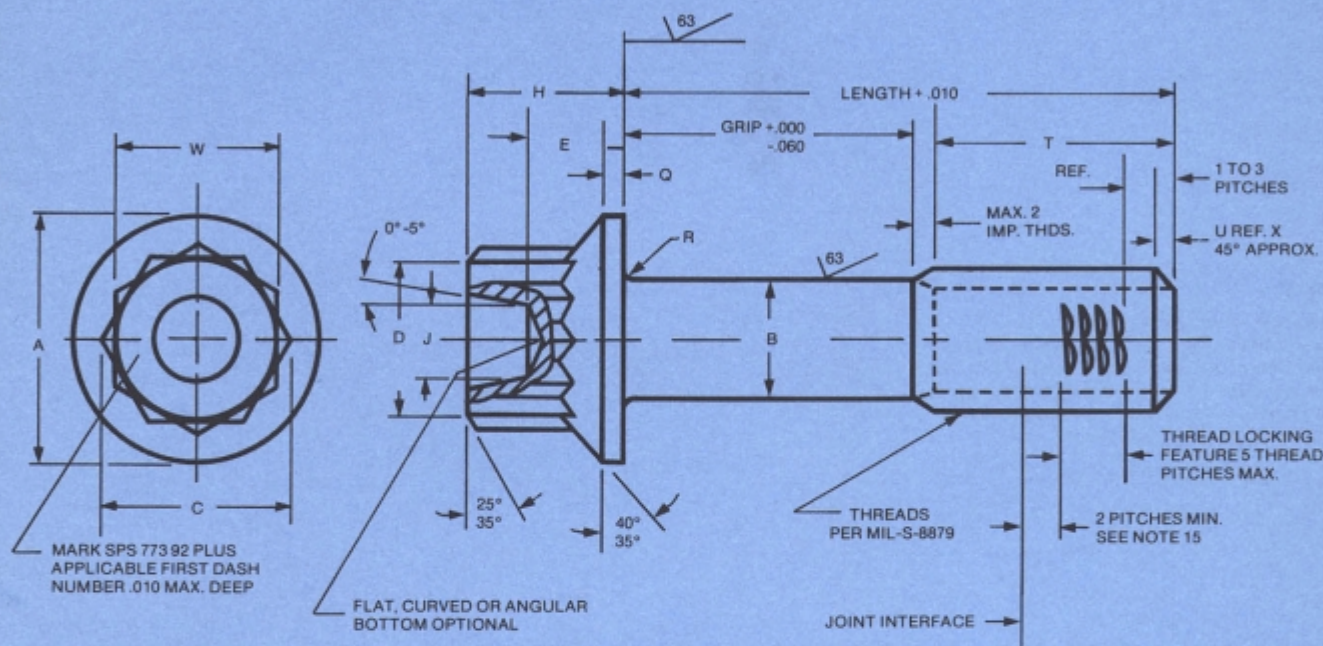
more than 5 cycles, except during exceptionally severe applications which may negatively effect reuseability. Overall, Tru-Flex fasteners provide superior torque without excessive wear; a necessary performance factor in costly tapped holes.

Tru-Flex fasteners can be assembled in threaded holes with pitch diameters from the minimum to the maximum of the class 3B tolerance range while exhibiting excellent torque characteristics. They

provide a high degree of locking ability even when mated with the maximum size internal thread. Their ability to accommodate such a wide range of mating thread size is an important performance feature that effects both the resiliency of the fastener and that of the tapped hole.

TRU-FLEX

Double Hex Flanged All-Metal Prevailing Torque Locking Fastener



SPS PART NO.	THREAD	A	B ±.005	C MIN.	D	E	H	J +.010 -.030	Q ±.005	R	T REF.	U REF.	W	X	Y
77392-3	.190-32 UNJF-3A	.375	.166	.278	.250	.130	.260	.100	.045	.025-.015	.625	.031	.257-.243	.003	.011
77392-4	.250-28 UNJF-3A	.438	.223	.348	.312	.168	.330	.150	.065	.025-.015	.750	.031	.313-.304	.003	.013
77392-5	.312-24 UNJF-3A	.500	.281	.419	.375	.176	.375	.206	.075	.025-.015	.875	.047	.376-.367	.003	.015
77392-6	.375-24 UNJF-3A	.562	.344	.490	.438	.184	.422	.260	.095	.025-.015	1.000	.047	.439-.430	.0025	.017
77392-7	.437-20 UNJF-3A	.688	.401	.563	.500	.212	.490	.310	.115	.030-.015	1.125	.047	.502-.492	.0025	.019
77392-8	.500-20 UNJF-3A	.750	.463	.633	.562	.250	.530	.370	.130	.030-.015	1.250	.047	.564-.553	.002	.023

NOTES:

- Material — Corrosion and heat resistant steel — per AMS 5735.
- Heat Treatment — 130,000 PSI minimum tensile strength at room temperature.
- Finish — Silver plate per AMS 2410, .0002 — .0004 thick.
- Fluorescent penetrant inspection per AMS 2645.
- Straightness — Shank shall be straight within "X" T.I.R. per inch of bolt length.
- Concentricity — Thread P.D. and shank within .006 T.I.R.
— Head O.D. and shank within "Y" T.I.R.
- Squareness — Bearing surface of the head to be square with body within .003 T.I.R.
- Surface Texture — ANSI B46. 1. Unless otherwise specified, the surface texture shall not exceed 125 micro inches.
- Part Numbers — The part number shall consist of a basic part number plus applicable dash numbers to designate diameter and grip length. The first dash number designates the diameter in sixteenths. The second dash number designates the grip length in sixteenths. Example — 77392 4-16 designates .250-28 UNJF-3A bolt, 1.750 long with 1.000 grip. Length of bolt is grip length plus thread length.
- Break all sharp edges.
- Reference dimensions are for design purposes only and are not inspection requirements.
- Point chamfer plus incomplete threads not to exceed two pitches.
- Dimensions in inches.
- Parts having less than .125 grip are threaded to the head. Maximum two imperfect threads.
- Two threads minimum in this area must be engaged.

TRU-FLEX

All-Metal Prevailing Torque Self-Locking Fasteners

Fig. 1

Average values for removal of .250-28 Tru-Flex bolts at minimum and maximum pitch diameters for companion threads. Note that these values are considerably higher than the minimum removal torques specified for self-locking bolts of this type.

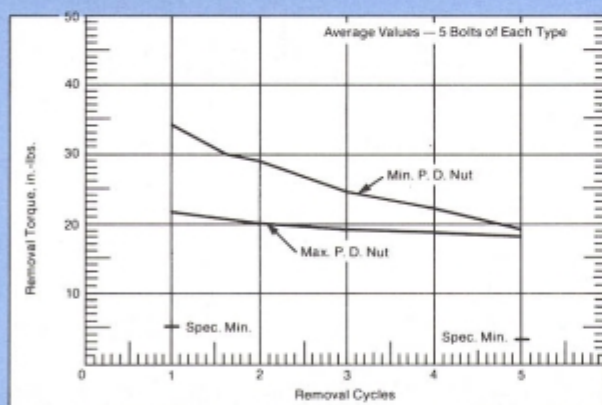
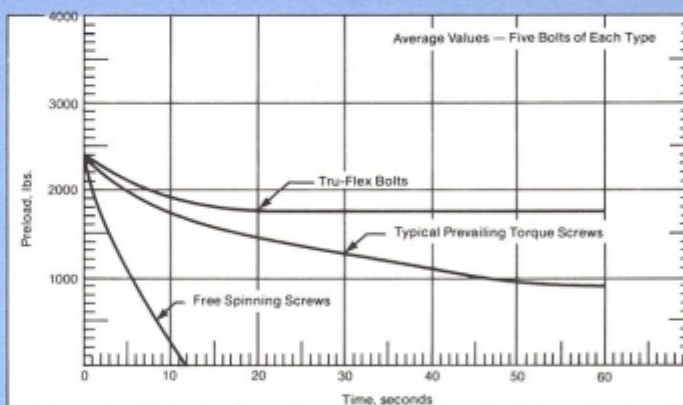


Fig. 2

Transverse vibration test results for .250-28 Tru-Flex bolts. Induced load was 2375 lbs.; frequency, 750 cpm; transverse amplitude, $\pm .025$.



Virtually all threaded bolts are available as Tru-Flex fasteners, including standard size and aerospace fasteners — with various head styles and wrenching recesses. Depending on fastener material, they may be used from -423°F to 1600°F . Maximum temperature for bolts with a plastic locking element is generally limited to 250°F . The Tru-Flex feature does not effect the tensile strength of a bolt.

The locking ability of the fasteners is higher at the minimum pitch diameter for companion

threads, as might be expected; however, the removal torque at maximum pitch diameter is well within accepted SPS specifications. Average values for removals at minimum and maximum pitch diameters are shown in Fig. 1.

Tru-Flex bolts were tested for effective locking action after repeated seated applications, both at room temperature and after exposure to 1200°F . The results are significant because they represent what happens in actual use.

The resistance to vibration loosening of Tru-Flex screws com-

pared with other types of prevailing torque locking fasteners is outstanding and indicates their use in applications where fasteners have loosened because of vibration.

.250-28 bolts were tested on an SPS transverse vibration test unit, developed to simulate as closely as possible actual vibration conditions encountered by fasteners. The standard test speed of 750 cycles per minute was used in all tests, with an induced load of 2375 lbs. (65,000 psi) and a transverse amplitude of $\pm .025$ in. Test results are shown in Fig. 2.



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