Slide Screws/Trapezoidal Screws/Components for Trapezoidal Screws

Slide Screws Trapezoidal Screws Components for Trapezoidal Screws

Product Name	Miniature Slide Screws–Straight–	Nut Brackets	–One End Stepped / Both Ends Stepped–	–One End Double Stepped / One End Stepped, One End Double Stepped–
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–Both Ends Double Stepped–	Trapezoidal Screw Threads–Straight–	–One End Stepped–	–One End Double Stepped–	–One End Stepped Key Groove / One End Double Stepped Key Groove–
578	579	580	581	582

–Both Ends Stepped–	–Both Ends Stepped Key Groove / Both Ends Double Stepped Key Groove–	–One End Stepped, One End Double Stepped–	–Both Ends Double Stepped–	–One End Double Stepped, One End Triple Stepped–
583	584	585	586	587

–One End Double Stepped, One End Triple Stepped–	30 Degree Trapezoidal Screw Threads, Fine Pitch	Nut, Round Flanged	30 Degree Trapezoidal Screw Threads, Fine Pitch
588	589	589	590

Stainless Steel Trapezoidal Screw Threads	–Right and Left Thread Center Part h7–	Nuts for 30 Degree Trapezoidal Screw Threads–Straight–	–Flanged–
591	593, 594	595	595

–Backlashless–	–Compact–	–Inlay / Tapped Hole / Slotted Hole–	–Resin–	–Oil Free Flanged–	–High Load Flanged Resin–
596	597	597	597	598	598

Block Nuts for Trapezoidal Screw Threads–Tall Block–	–Wide Block–	–Spacers for Wide Block–	Brackets for 30 Degree Trapezoidal Screw Threads	–Block–
599	599	600	600	601

Information

30 Degree Trapezoidal Screw Threads - One End Triple Stepped Type and Both Ends Triple Stepped Type - and Stop Plate Sets are listed on our website.

http://fa.misumi.jp/hp-item.jsp

These products are still available. Visit the web site above.(Only in Japanese)

–L-Shaped–	Digital Position Indicators	Indicator Collars	Clamp Plates–Standard–	–Miniature Lever–
601	603	603	604	604

–Bearings with Housings–	Stop Plate Sets for 30 Degree Trapezoidal Screw Threads	–Round Flanged–	Stop Plate Sets for 30 Degree Trapezoidal Screw Threads–Square, Bearing–	–Flanged, Bearing–
604	605	605	606	606

Trapezoidal Screws Technical Data

■Trapezoidal Screw Technical Calculation

1.Selection of Nut Material

(1)Contact Pressure P (N/mm^2)

$$P=\frac{Fs}{Fo}x\alpha$$

Fs : Axial Load (N)
Fo : Allowable Dynamic Thrust (N)
α : α=9.8 (Brass), 0.98 (Resin)

(Allowable Dynamic Thrust: The thrust when the contact pressure acting on the thread shaft and nuts is 9.8N (0.98N)/mm^2)

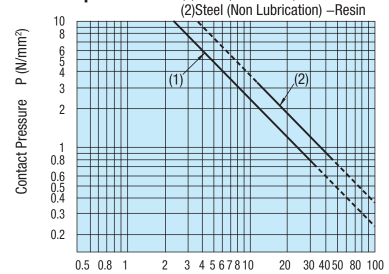
(2)Slide Speed V (m/min)

$$V=\frac{\pi \cdot d_2 \cdot n}{\cos(d)}x10^{-3}$$

d_2 : Effective Dia. of Thread Shaft (mm)
n : Thread Shaft Revolution Frequency per Minute (min^{-1})
d : Thread Shaft Lead Angle (Degree)

PV Value Graph

(1)Steel (Lubrication) –Brass
(2)Steel (Non Lubrication) –Resin



2. Screw Efficiency and Generated Thrust

(1)Screw Efficiency η

$$\eta=\frac{1-\mu\tan(d)}{1+\mu/\tan(d)}$$

μ : Dynamic Friction Coefficient
d : Thread Shaft Lead Angle (Degree)

(2)Generation Thrust Fa (N)

$$Fa=\frac{2\pi \cdot \eta \cdot T}{R}x10^3$$

η : Screw Efficiency
T : Input Torque (N · m)
R : Lead (mm)

Calculation Example

When using thread shaft MTSR16 and nut MTSFR16 for axial load 300 (N) and thread shaft rotary speed 500min^{-1}

(1)Contact Pressure P (N/mm^2)

$$P=\frac{Fs}{Fo}x\alpha=\frac{300}{6670}x9.8=0.44(N/mm^2)$$

(2)Slide Speed V (m/min)

$$V=\frac{\pi \cdot d_2 \cdot n}{\cos(d)}x10^{-3}=\frac{\pi x14.5x500}{\cos(3°46')}x10^{-3}=22.8(m/min)$$

See the calculated value of P and V from the PV value graph, the value is less than allowable speed when P=0.44 (N/mm^2). This indicates the fact that abnormal abrasion cannot occur.

Calculation Example

Required torque when thread shaft MTSR16 and nut MTSFR16 are used.

(1)Screw Efficiency η

$$\eta=\frac{1-\mu\tan(d)}{1+\mu/\tan(d)}=\frac{1-0.21x\tan(3°46')}{1+0.21/\tan(3°46')}=0.24$$

(2)Generation Thrust Fa (N)

$$Fa=\frac{2\pi \cdot \eta \cdot T}{R}x10^3=\frac{2\pi x0.24x8}{3}x10^3=4.02(kN)$$

When calculating required torque T (N · m) to obtain thrust Fa4.02 (kN).

(3)Required Torque T (N · m)

$$T=\frac{Fa \cdot R}{2\pi \cdot \eta}x10^{-3}=\frac{4.02x10^3x3}{2\pi x0.24}x10^{-3}=8(N \cdot m)$$

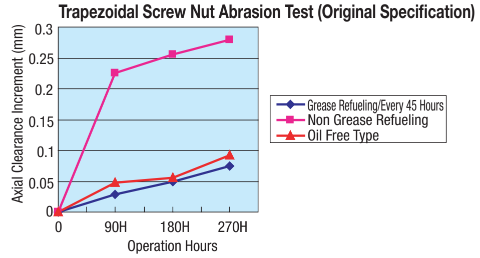
■Reference Value

Thread	Nuts	Dynamic Friction Coefficient μ
Steel (Lubrication)	Brass	0.21
Steel (Non Lubrication)	Polyacetal/PPS Resin with Sliding Property	0.13

■Features of Oil Free Nut for 30 Degree Trapezoidal Screw Thread

MISUMI oil free nut has the same effect as that of greased nut refueled every 45 hours, as shown in the abrasion result on the right.
After initial greasing, this realizes oil-free operation.
It presents high performance especially under low-speed operation.

Trapezoidal Screw Nut Abrasion Test (Original Specification)



Test Conditions: Sample Thread Shafts: MTSRW10–270 Nut: MTSFR10 · MTSMR10 (Oil Free Type)
Movable Load 220N Shaft Revolution Frequency 1500rpm