Power•ac™
PRECISION ACME
SCREW ASSEMBLIES

Power•ac™
METRIC SCREW ASSEMBLIES

NOOK INDUSTRIES
...THE LINEAR MOTION PEOPLE

PowerAc™ Precision Lead Screw Assemblies

Powerac™ PRECISION ACME SCREW ASSEMBLIES

Powerac™ METRIC SCREW ASSEMBLIES

GLOSSARY AND TECHNICAL DATA

ACME THREAD FORM TERMS

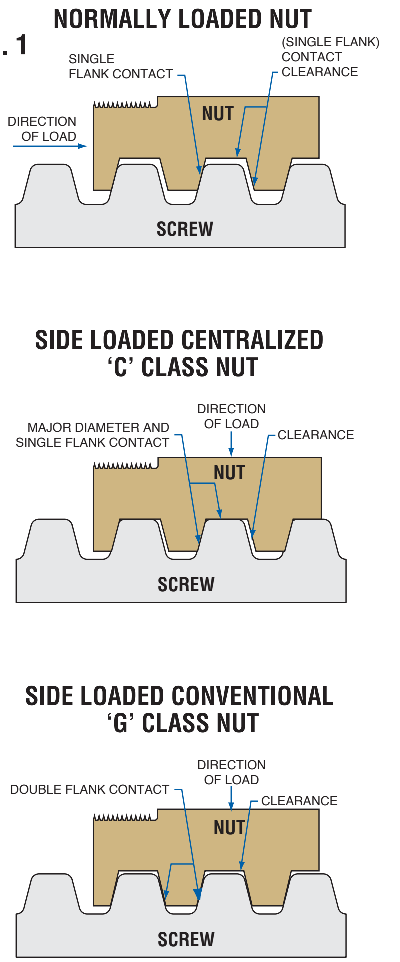
THREAD TYPES

The acme thread form, established over 100 years ago, replaced square thread screws, which had straight-sided flanks and were difficult to manufacture.

There are three main classes of Acme thread forms: General Purpose (G), Centralizing (C), and Stub Acme. The General Purpose and Centralizing thread form have a nominal depth of thread of 0.50 x pitch and have a 29° included thread angle resulting in a trapezoidal tooth shape (some sizes have 40°). Metric trapezoidal thread forms have a 30° included thread angle.

When compared to general-purpose thread forms, centralizing threads are manufactured with tighter tolerances and limited clearance on the major diameter.

FIG. 1



If an acme nut is side loaded, a "G" class acme nut will "wedge" when both of the nut thread flanks come in contact with the screw thread flanks. To prevent wedging, less clearance and tighter tolerances are allowed between the major diameter of the nut and the major diameter of the screw.

CAUTION - Although a side load will not cause a centralizing thread to wedge, the nut is not designed to operate with a side load such as a pulley, drive belt, etc. See "Load Definition" section for further information. **(SEE FIG. 1)**

Stub Acme threads follow the same basic design, but have a thread depth less than one half the pitch.

LAND (MAJOR) DIAMETER

The outside diameter of the screw.

PITCH DIAMETER

On an acme screw, this diameter is approximately halfway between the land diameter and the root diameter. It is the diameter at which the thread thickness is equal to the space between threads.

ROOT (MINOR) DIAMETER

The diameter of the screw measured at the bottom of the thread.

PITCH

The axial distance between threads. Pitch is equal to the lead in a single start screw.

LEAD

The axial distance the nut advances in one revolution of the screw. The lead is equal to the pitch times the number of starts.

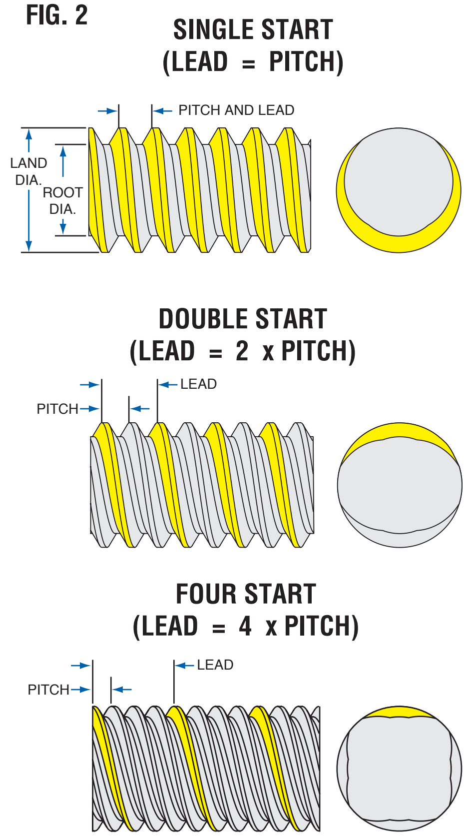
PITCH x STARTS = LEAD

NOTE: Nook Industries acme screw designations reference major diameter and effective turns per inch. For example: 1/4" – 4 RH requires four turns for one inch of travel. A 1/4" – 4 RH has four starts and a 0.062" pitch. 0.062" pitch X four starts = 0.250" lead.

SCREW STARTS

The number of independent threads on the screw shaft; example one, two or four. **(SEE FIG. 2)**

FIG. 2



LEAD ACCURACY

Lead accuracy is the difference between the actual distance traveled versus the theoretical distance traveled based on lead. For example: A screw with a 0.5 inch lead and 0.004 inch per foot lead accuracy rotated 24 times theoretically moves the nut 12 inches.

(24 Revolutions x .500 inches per revolution = 12.000 inches of travel)

With a Lead accuracy of 0.004 inch per foot, actual travel could be from 11.996 to 12.004 inches.

Refer to the listings in the design guide for the lead accuracy of a particular screw.

GLOSSARY AND TECHNICAL DATA

MATCHED LEAD

When multiple screws are used to move a load with precise synchronicity, screws of similar lead accuracy can be factory selected and supplied as sets. Consult factory for matched lead set tolerances.

STRAIGHTNESS

Although PowerAc™ Acme Screws are manufactured from straight, cylindrical material, internal stresses may cause the material to bend or yield. When ordering random lengths or cut material without end machining, straightening is recommended. Handling or machining of screws can also cause the material to bend or yield. Before, during and after machining, additional straightening is required.

When ordering screws with machined ends from Nook Industries, the following straightness tolerances can be expected:

PowerAc™ Rolled and Milled Acme Screws are straight within 0.010 inch/foot and will not exceed 0.030 inch in any 6-foot section, when shipped from the factory.

PowerAc™ Ground Acme Screws are straight within 0.001 inch/foot when shipped from the factory.

If tighter straightness tolerances are required, contact Nook Industries customer service.

LIFE

PowerAc™ Acme Screws are manufactured from high quality materials with excellent dynamic properties. Because of the variable effects of friction, lubrication and cleanliness, a specific life cannot be predicted. Proper lubrication, regular maintenance, and operation within specified limits will extend the life of PowerAc™ Acme Screws.

EFFICIENCY

Efficiency of PowerAc™ Acme Screw assemblies range from 15% to 85%. These efficiencies are dependent upon nut material, lubrication, lead and thread form. The efficiencies for each assembly are listed on the following pages.

BACKDRIVING

Normally, acme screws are used to convert rotary motion into linear motion. Backdriving is the result of the load pushing axially on the screw or nut to create rotary motion.

Generally, a nut with efficiency greater than 50% will have a tendency to backdrive. If a self-locking assembly is required, select a nut with efficiency below 35%.

CAUTION - Vibration can cause any acme screw assembly to creep or backdrive. When using lead screws, applications should be analyzed to determine the necessity of a brake, especially when the possibility of injury may occur.

BACKLASH

Backlash (lash) is the relative axial movement between a screw and nut without rotation of the screw or nut. Backlash information for PowerAc™ Acme Screws and Nuts is listed within the data section of this catalog.

Lash will always increase with use. Nook Industries has developed several unique ways to reduce or remove the lash between the screw and nut.

For screw diameters over 5/8 inch, PowerAc™ No-Lash™ Flanges are available. The PowerAc™ No-Lash™ Flange is identical to a standard flange except for slotted mounting holes. The backlash can be removed by using a nut with a PowerAc™ No-Lash™ Flange in combination with a standard nut and flange. By rotating the slotted PowerAc™ No-Lash™ Flange and nut relative to the other, the thread in the second nut advances until the lash is reduced.

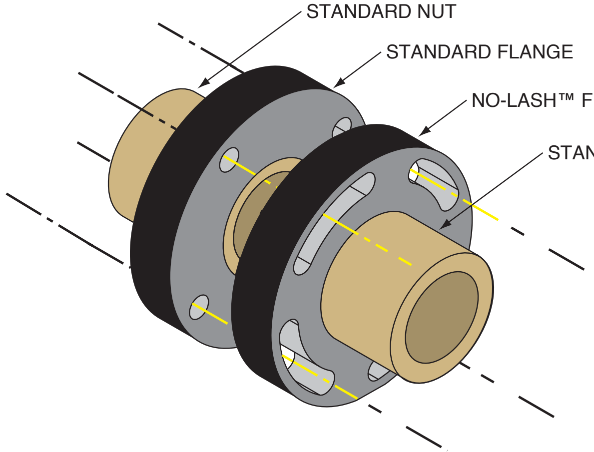
As the nuts wear and backlash increases, loosen the mounting bolts and readjust the PowerAc™ No-Lash™ Flange and nut until the lash is minimized. **(SEE FIG. 3)**

For a complete PowerAc™ No-Lash™ Flange assembly order 2 standard nuts, 1 standard flange and 1 No-Lash™ Flange. For example a 3/4"-2 assembly requires the following:

- 2 – 20072 Standard Nuts
- 1 – 70262 Standard Flange
- 1 – 73262 No-Lash™ Flange

CAUTION - When the uncompensated lash is equal to or greater than 1/4 times the pitch, the assembly should be replaced.

FIG. 3



LOAD DEFINITIONS

STATIC LOAD
The maximum thrust load – including shock – that should be applied to a non-moving PowerAc™ Acme screw and nut assembly.

DYNAMIC LOAD
The maximum recommended thrust load which should be applied to the PowerAc™ Acme screw and nut assembly while in motion.

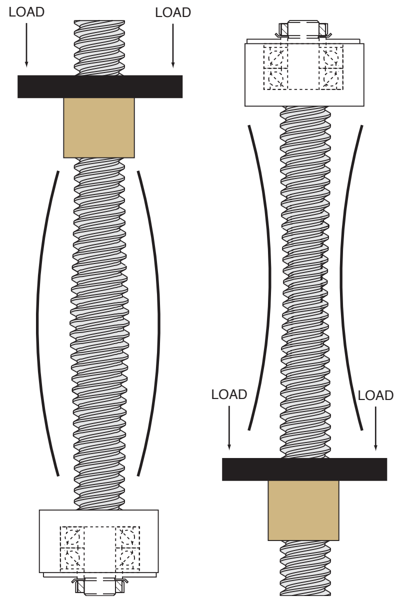
PV LOAD
Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

TENSION LOAD
A load that tends to "stretch" the screw. **(SEE FIG. 4)**

COMPRESSION LOAD
A load that tends to "squeeze" the screw. **(SEE FIG. 4)**

FIG. 4

COMPRESSION LOAD **TENSION LOAD**

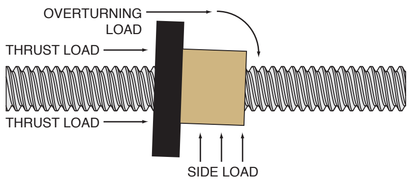


THRUST LOAD
A load parallel to and concentric with the axis of the screw.
(SEE FIG. 5)

OVERTURNING LOAD
A load that tends to rotate the nut around the longitudinal axis of the screw. **(SEE FIG. 5)**

SIDE LOAD
A load that is applied radially to the nut. **(SEE FIG. 5)**

FIG. 5



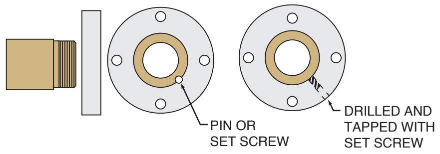
DESIGN CONSIDERATIONS

MOUNTING AND PINNING OF ACME NUT FLANGE
Flanges must be secured to acme nuts. The preferred method of locking a flange to a nut is a pin or set screw parallel to the screw which intersects the flange/nut mounting thread. Because of the dissimilarity of materials, the hole may need to be milled, not drilled.

Alternatively, the flange may be drilled and tapped radially for a set screw. After assembly of the flange to the nut, spot drill the nut threads through the flange and install a dog point set screw from the flange O.D. into the nut O.D. threads. Avoid getting metal chips in the nut when drilling. **(SEE FIG. 6 and 7 for pin size)**

Commercially available thread adhesives may be used for light load applications. Follow the manufacturers recommendations to ensure a satisfactory bond. Avoid getting the adhesive onto the acme screw thread.

FIG. 6



LUBRICATION
Proper lubrication must be provided to achieve satisfactory service life. Nook PowerAc™ lubricant (E-100 spray lube or PAG-1 grease) is recommended for applications using PowerAc™ nuts.

NOTE: PowerAc™ PLAST/AC™ nuts are considered self-lubricating and may be operated without lubrication. To maximize the life of PLAST/AC™ nuts an initial lubrication is recommended.

Lubrication intervals are determined by the application. It is required that screw assemblies are lubricated often enough to maintain a film of lubricant on the screw.

DRIVING TORQUE
Driving torque is the torque required to move a load and is calculated by multiplying the force needed by the "Torque to raise one lb." value listed in the technical data section for each screw and nut size.

EXAMPLE: To lift a 1,000 lb. load using a 1"- 6 RH acme screw with plastic nut, 74 in. lbs of torque are required.

.074in.-lb/lb. x 1000 lb. = 74 in.-lb.

FIG. 7

DIAMETER	DESCRIPTION	QUANTITY
Up to 1	#10 - 24 x 1/4 Set Screw	1
1.125 to 1.375	1/4 - 20 x 1/4 Set Screw	2
1.5 to 3	5/16 - 18 x 1/2 Set Screw	2
3.375	3/8 - 16 x 3/4 Set Screw	2
4 +	1/2 - 13 x 1 Set Screw	2

GLOSSARY AND TECHNICAL DATA

TEMPERATURE

With proper lubrication, PowerAc™ Acme Screws with BRONZ/AC™ nuts operate efficiently between 15°F and 350°F, and PLAST/AC™ nuts between 15°F and 175°F. Consult the factory for low temperature applications.

END MACHINING

To obtain optimum performance of your acme screw assembly, it is recommended that the machining be performed at the Nook Industries factory. Screws may be purchased machined to your specifications or to standard end machining designs shown on pages 212-213.

EZZE-MOUNT™

Lead screws in operation generate an axial load and a radial load; therefore, end mounts must be designed to accommodate these loads. Nook Industries has designed precision end mounts to work specifically with lead screws. For a detailed description of these bearing supports, see pages 214-218.

An EZZE-MOUNT™ can be shipped pre-assembled to a PowerAc™ Acme Screw. For complete PowerAc™ Acme Screw Assemblies refer to pages 41-43.

OPTIONAL SURFACE COATINGS

PowerAc™ Acme Screws are available with optional corrosion resistant and/or lubricated finishes like Nickel, Teflon, or Hard Chrome; consult Nook Industries for detailed specifications.

BOOTS AND BELLOWS

For contaminated environments, use of a boot or metal cover to protect the acme screw assembly is recommended.

ACME SCREW SELECTION

The selection of the correct acme screw and nut for a particular application involves four interrelated factors. Before attempting to determine the acme screw and nut combination, the following values must be known:

- Load measured in pounds or newtons
- Speed measured in inches or millimeters per minute
- Length between bearings measured in inches or millimeters
- End fixity type

LOAD

The loads that need to be considered are the static loads, dynamic loads, reaction forces and any external forces affecting the screw. See Load definitions section above for details.

SPEED

The travel rate (linear speed) is the rpm at which the screw or nut is rotating multiplied by the lead of the screw.

LENGTH

The unsupported length of the screw.

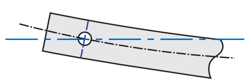
END FIXITY

End fixity refers to the method by which the ends of the screw are supported. The degree of end fixity is related to the amount of restraint of the ends of the screw.

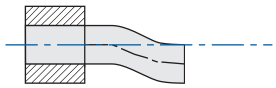
Examples of the three basic types of end fixity are:

Free No support.

Simple Shaft supported at a single point.



Fixed Shaft rigidly restrained against axial rotation.

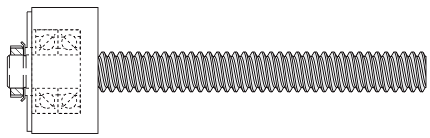


Simple End fixity can be provided through a single bearing support.

Multiple or spaced pairs of bearings are more rigid than a "Simple" support, but because of their compliance are not truly "Fixed".

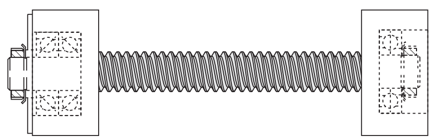
A screw can be supported with different combinations of end fixity. **(SEE FIG. 8: A – D)**

FIG. 8: A & B



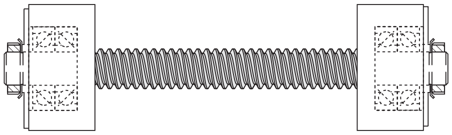
A: One end supported with a Double Bearing EZZE-MOUNT™, other end Free. Use Line "A" in reference to the charts shown on pages 10-11 and 48-49.

NOTE: Not recommended for any application other than short travels and slow speeds.

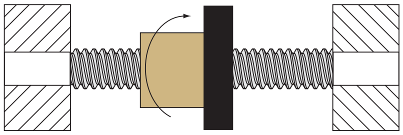


B: One end supported with a Double Bearing EZZE-MOUNT™, other supported with a Single Bearing EZZE-MOUNT™. Use Line "B" in reference to the charts shown on pages 10-11 and 48-49.

FIG. 8: C & D



C: Both ends supported with a Double Bearing EZZE-MOUNT™. Use Line "C" in reference to the charts shown on pages 10-11 and 48-49.



D: Both ends rigidly mounted with a rotating nut or both ends mounted with a double preloaded angular contact bearing spaced apart by at least 1.5 time the diameter of the mounting journal. Use Line "D" in reference to the charts shown on pages 10-11 and 48-49.

CRITICAL SPEED

Once the load, speed, length and end fixity are identified, the next factor to consider is the critical speed.

The speed that excites the natural frequency of the screw is referred to as the critical speed. Resonance at the natural frequency of the screw will occur regardless of the screw orientation (vertical, horizontal etc.) or if the system is designed so the nut rotates about the screw.

The critical speed will vary with the diameter, unsupported length, end fixity and rpm. Since critical speed can also be affected by shaft straightness and assembly alignment, it is recommended the maximum speed be limited to 80% of the calculated critical speed. The theoretical formula to calculate critical speed in rpm is:

$$N = \frac{C_s \times 4.76 \times 10^6 \times d}{L^2}$$

WHERE:

- N = Critical Speed
- d = Root Diameter of Screw
- L = Length Between Bearing Supports
- C_s = .36 for one end fixed, one end free
  - 1.00 for both ends simple
  - 1.47 for one end fixed, one end simple
  - 2.23 for both ends fixed

The critical speed chart on page 11 is provided to quickly determine the minimum screw size applicable for Nook EZZE-MOUNT™ designs.

If the selected Acme screw does not meet critical speed criteria, consider the following options:

a) Increase screw lead (reduces rpm)

b) Change end fixity (e.g. simple to fixed)

c) Increase screw diameter

COLUMN STRENGTH

When a screw is loaded in compression (see compression load definition on page 5), its limit of elastic stability can be exceeded and the screw will fail through bending or buckling.

The theoretical formula to calculate the column strength in pounds is:

$$P_{cr} = \frac{14.03 \times 10^6 \times F_c \times d^4}{L^2}$$

WHERE:

- P_{cr} = Maximum Load
- F_c = End Fixity Factor
  - .25 for one end fixed, one end free
  - 1.00 for both ends supported
  - 2.00 for one end fixed, one end simple
  - 4.00 for both ends rigid
- d = Root Diameter of Screw
- L = Distance between nut and load carrying bearing

The column strength chart, on page 10, may be used to verify that the screw can carry the required load without buckling.

The charts show the theoretical limitations of each screw on a separate line. The lines are limited horizontally by the slenderness ratio and vertically by the maximum static capacity of the BRONZ/AC™ nut. Actual load is limited by maximum nut capacity.

If the selected acme screw does not meet compression load criteria, consider the following options:

a) Change end fixity (e.g. simple to fixed)

b) Design to use screw in tension

c) Increase screw diameter

PV VALUE

For PLAST/AC™ nuts, the PV value needs to be checked (see the PV load definition page 5) The operating load values for the PLAST/AC™ nuts are based on a pressure of 1,250 lbs. per square inch. Any loads less than the operating load can be evaluated by using the following formula:

$$P = \frac{\text{Actual Operating Load}}{\text{Chart Operating Load}} \times 1250$$

V is the relative speed between the nut and the screw in feet per minute. V can be calculated by using the following formula:

$$V\ (\text{ft./min}) = \frac{\text{Outside Dia. (in.) of the Screw} \times \pi \times \text{Operating Speed (rpm)}}{12}$$

It is recommended that P x V be limited to values less than 10,000.

APPLICATION EXAMPLE

APPLICATION

Given the following requirements, select an acme screw for an application which uses Acme screws for an automatic part feeder on a machine.

Specifications:

- 5000 lb load supported and guided on linear bearings moving horizontally
- 36" travel
- Complete 36" travel in 10 seconds
- Bearing Support Undecided
- Positioning accuracy $\pm^{1}/_{4}$"

STEP 1

Find the axial force required to move load. The axial force is determined by multiplying the coefficient of friction of the guidance system by the load.

F = μ x N
μ = coefficient of friction of the guidance system

Using Nook linear bearings in this application;
μ = Coefficient of Friction for lubricated Nook Linear Bearings = .0013 (Refer to linear ball bearing engineering data found on page 223.)

N = Load = 5000 pounds
F = μ x N
F = .0013 x 5000 lbs.
F = 6.5 lbs.

Therefore:
The Axial Force the screw must produce to move the load is 6.5 lbs.

STEP 2

Find Average Travel Rate. The average travel rate is determined by dividing travel distance by travel time.
V average = D/t

D = distance = 36 inches
t = total time = 10 seconds
V avg. = D/t
V avg. = 36 in. / 10 sec.
V avg. = 3.6 in / sec. or 216 in/minute

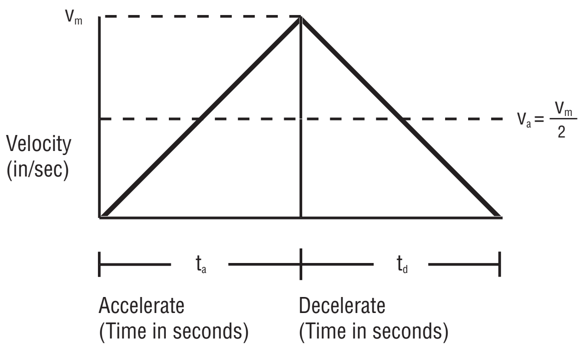
Therefore the average travel rate is 216 in/min.

STEP 3

Find Maximum Travel Rate. When considering critical speed, peak velocity should be used. Using a basic triangular motion profile (acceleration = deceleration with no constant velocity travel), the peak velocity equals twice the average velocity.

V peak = 2 x V avg.
V avg. = 3.6 in / sec. or 216 in/minute
V peak = 2 x V avg.
V peak = 432 in/min

The Maximum Travel Rate is 432 in/min during the traverse of 36 inches in 10 seconds.



STEP 4

Determine total unsupported length. Total Travel is given as 36 inches, but extra screw length should be considered for travel nut, carriage, and or any extra screw length for over-travel.

Based on the travel nut and attachment of the nut to the carriage in this application, it is determined an extra 4" of screw length will be required. (Refer to the dimensional information of the particular nut used)

L total = 36 in + 4 in = 40 inches

The total unsupported length to be used for critical speed and column loading calculations is 40 inches.

STEP 5

Determining end fixity. The layout of the application shows that adequate space is available to use a double bearing EZZE-MOUNT™ at each end. (See end fixity definitions on page 6)

End Fixity = Type "C"

STEP 6

Select a screw based on the critical speed. Use previously determined values with the Critical Speed chart on page 11.

Max Travel Rate = 432 in/min

End Fixity = Type "C"

Length Between Bearing Supports = 40 inches

Based on the Critical Speed Chart, a 1"- 5 Acme Screw (1 inch diameter, 5 threads per inch) is selected.

STEP 7

Check Column Strength of screw. Use previously determined values with the Column Strength chart on page 10.

Load = 6.4 pounds
End Fixity = Type "C"
Length Between Bearing Supports = 40 inches

Based on the Column Strength Chart, the load is within the column strength of this screw.

NOTE: If this were a vertical application, the full 5000 pound load would be used. Also, under high acceleration conditions, the inertia load must be determined and added to the total load for column considerations.

STEP 8

Check the PV Value. This relates the pressure load to the speed of the nut. First find the actual "P" value based on the calculation. Using the formulas from page 7:

$$P = \frac{\text{Actual Operating Load}}{\text{Nut Dynamic Load Capacity}} \times 1250 \text{ psi}$$

$$\frac{6.5 \text{ pounds}}{2{,}500 \text{ pounds}} \times 1250 \text{ psi} = 3.2 \text{ psi}$$

Next the "V" value or maximum relative speed between the screw and nut is:

$$\underset{(\text{ft./min})}{V} = \frac{\text{Outside Dia. (in.) of the Screw} \times \pi \times \text{Operating Speed (rpm)}}{12\text{"/ft.}}$$

$$\frac{1\text{"} \times \pi \times 2160 \text{ rpm}}{12\text{"/ft.}} = 565 \text{ ft/per minute}$$

This results in a "PV" value of 3.2 times 565 or 1808 which is below the maximum recommended value of 10,000.

STEP 9

Create a reference number for the assembly. See page 15 for Reference Number System Chart.

The 1"- 5 Acme Screw is thread form code 105. The screw material is right-hand thread, alloy steel. The end code used for machining this screw is end code 17. The type of machining will be a Type 3 on both ends of screw to allow for mounting a double bearing EZZE-MOUNT™. One end will have a section to attach a coupling, the other will not. To determine the overall length of the assembly, add up the length of the ends plus the unsupported length:

One end Type 3K (drive end with keyway) = 3.65"
One end Type 3N (no drive end) = 2.33"
40 inches between supports
Over-all length is 40" + 3.65"+ 2.33" = 45.98"

The Part List Includes:

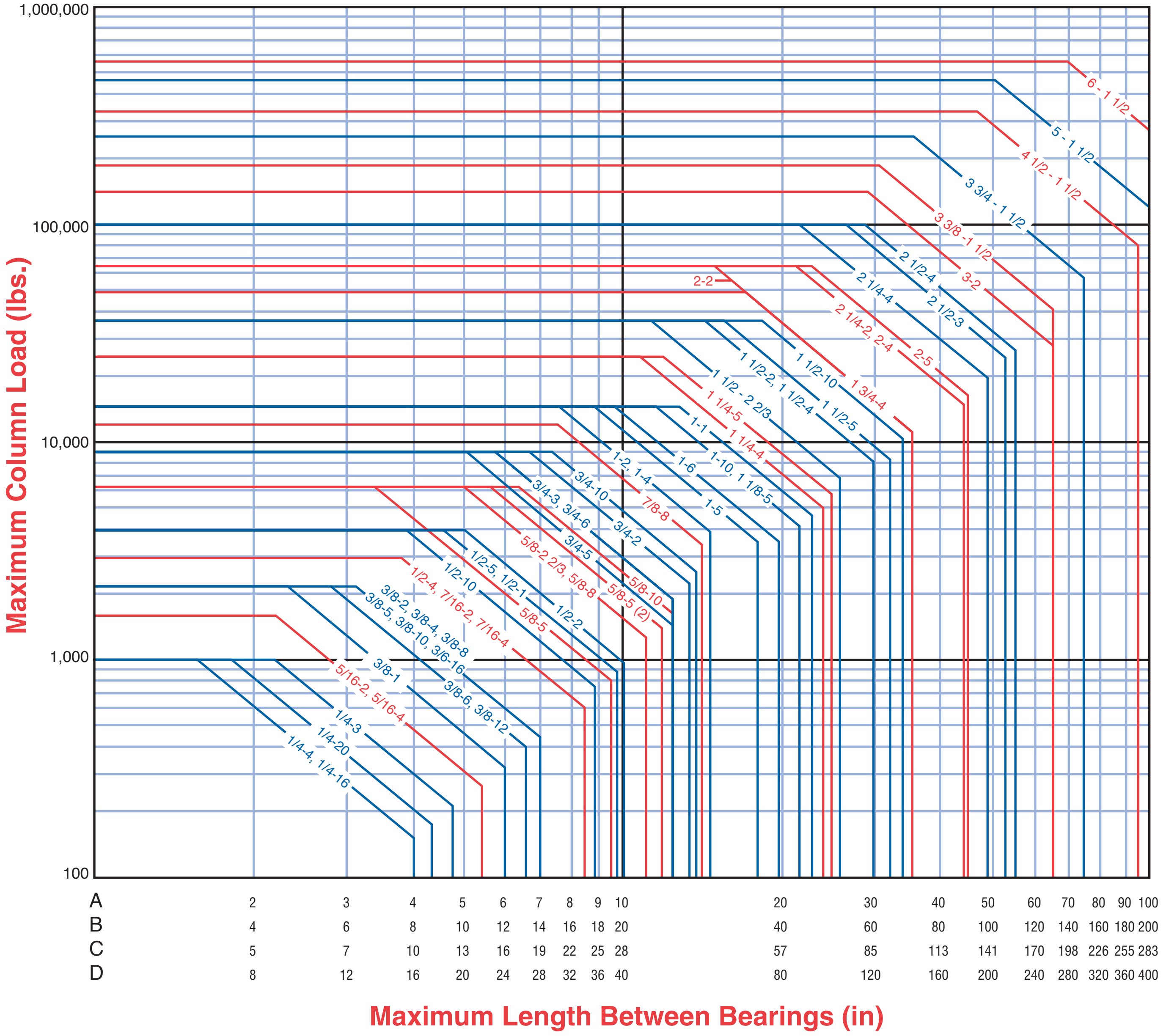
One PLAST/AC™ Acme Nut – RH30105
One Steel Flange - 70275
EZZE-MOUNT™ Bearing blocks (2 req'd) - EZM-3017

To receive an assembly of these components with the EZZE-MOUNT™, nut, and flange installed on the screw, the order reference number is:

105 - RA/EK/EN/45.98/30105/FS

NOTE: The nut will be installed with the flange facing towards the first specified end. In this example, the EK end.

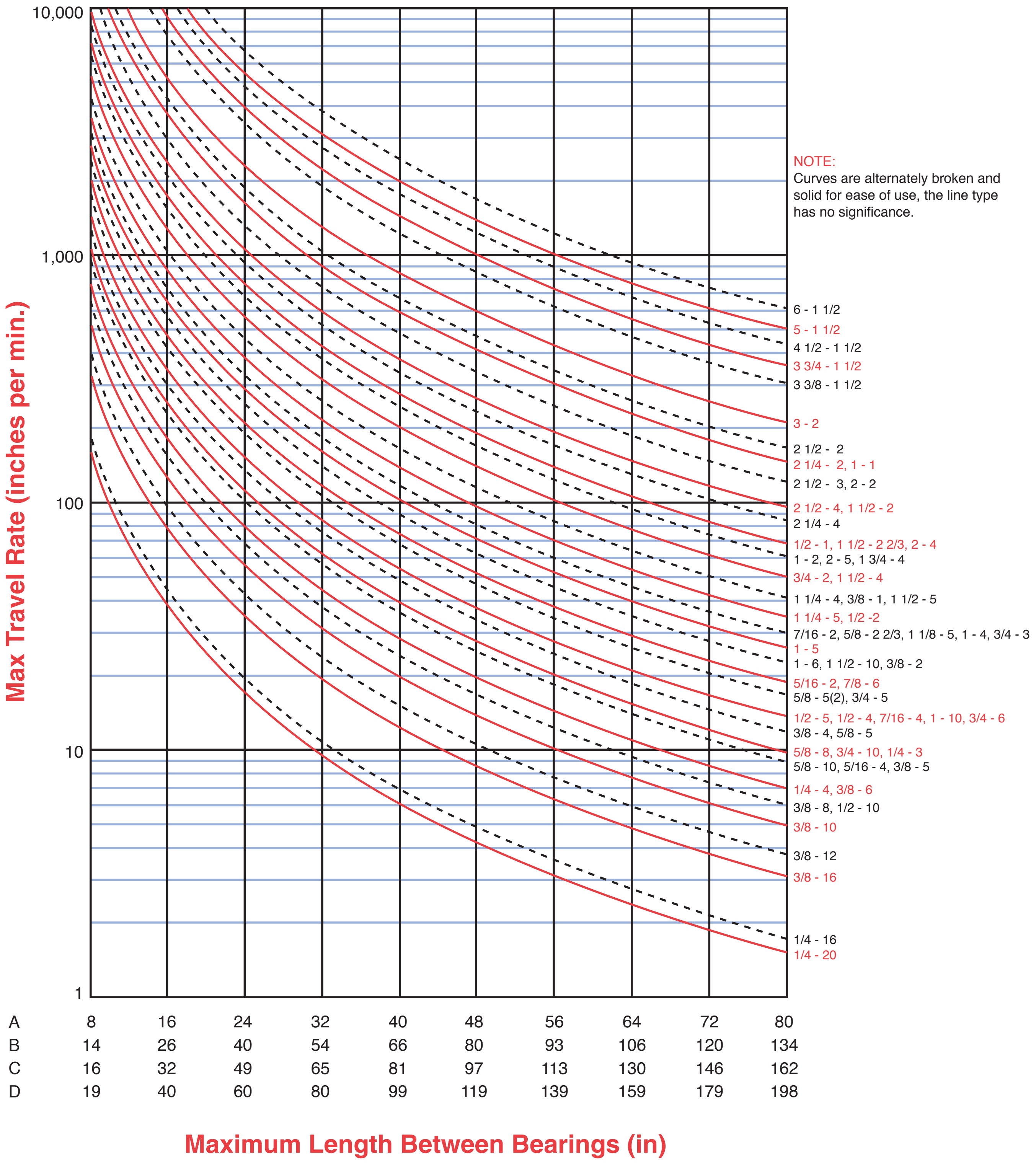
COLUMN STRENGTH: ACME INCH SCREWS



NOTE: Acme Screws are limited by both Maximum Static Load and Slenderness Ratio

See Page 6 for Reference Description on “A-B-C-D” end fixity.

CRITICAL SPEED: ACME INCH SCREWS



NOTE: Maximum Speed is limited to 80% of the calculated critical speed

See Page 6 for Reference Description on “A-B-C-D” end fixity.

ACME SCREW MANUFACTURING PROCESSES

Nook Industries expertly manufactures precision acme screws through thread rolling, thread milling, or thread grinding processes. Each process produces unique qualities in precision screws. Nook acme screw products feature centralizing thread forms for smooth, no-wedging performance.

ROLLED ACME SCREWS

Nook rolled thread acme screws offer the largest selection of size and pitch choices in the industry. Rolled thread screws are cost effective and are stocked for quick delivery.

	THREAD CLASS	LEAD ACCURACY	SCREW DIAMETERS	SCREW LENGTHS
ALLOY	Centralizing 2C or Stub	± .0003"/" up to 2-1/2" diameter	1/4" to 6"	limited only by material availability
STAINLESS	Centralizing 2C or Stub	± .0003"/" up to 1-1/2" diameter	1/4" to 1-1/2"	limited only by material availability

MILLED ACME SCREWS

Milled thread screws allow more variety in journal machining, particularly where a design requires the journal O.D. to be larger than the screw major diameter.

THREAD CLASS	LEAD ACCURACY	SCREW DIAMETERS	SCREW LENGTHS
Centralizing 2C or 3C General Purpose 2G or 3G	± .002"/ft.	1/2" to 3" (Single Starts)	up to 96"

GROUND ACME SCREWS

Ground thread screws offer higher lead accuracy performance for applications where positioning tolerances are extremely critical.

THREAD CLASS	LEAD ACCURACY	SCREW DIAMETERS	THREAD LENGTH
Centralizing 3C or 4C General Purpose 3G or 4G	± .0005"/ft.	5/8" to 3"	up to 69"

ACME NUT AND SCREW MATERIALS

Materials used in Nook acme nuts have been selected for low friction, minimum wear, long life, and clean operation.

Nut specifications can be found in the Quick References on pages 39-40 and 77-78. Flange and nut dimensions are listed with the appropriate screw data on pages 18-38 and 50-76.

BRONZ/AC™ ACME & ISO NUT

Special high tensile bronze is selected for our smooth running, anti-wedging BRONZ/AC™ nuts.

BRONZ/AC™ BRONZE NUT	
MATERIAL	NOOK BRONZE
TENSILE YIELD	50,000 psi
TENSILE ULTIMATE	65,000 psi
HARDNESS	RB75
DYNAMIC CO-EFFICIENT OF FRICTION	0.125 with NOOK Lubricant

PLAST/AC™ ACME, ISO TRAPEZOIDAL AND SPEEDY™ NUT

The high strength and inherent lubricity of PLAST/AC™ Acme, ISO Trapezoidal and Speedy™ material can result in product life that can equal or exceed conventional nut materials.

ACME & ISO PLASTIC NUT SPECIFICATIONS	
TENSILE STRENGTH @ 70ºF	8,000 psi
COMPRESSIVE STRENGTH @ 70ºF	16,000 psi
PV LIMIT @ ft-lbs./in^2-min	10,000
CO-EFFICIENT OF FRICTION	0.10

SPEEDY™ PLASTIC NUT SPECIFICATIONS	
TENSILE STRENGTH @ 70ºF	9,500 psi
COMPRESSIVE STRENGTH @ 70ºF	15,000 psi
PV LIMIT @ ft-lbs./in^2-min	2,700
CO-EFFICIENT OF FRICTION	0.17

ACME, ISO & SPEEDY™ SCREW SPECIFICATIONS	ACME & ISO ALLOY	STAINLESS STEEL	SPEEDY™ ALLOY
MATERIAL	4140 Series	300 Series	420 Series
MINIMUM HARDNESS	200 Brinnel	170 Brinnel	240 Brinnel
TENSILE ULTIMATE STRENGTH	95,000 psi	85,000 psi	100,000 psi
FINISH	Black Oxide	Natural	Natural

POWERAC™ FLANGES FOR BRONZ/AC™ & PLAST/AC™ NUTS

Made of black oxided carbon steel. See page 5 for Mounting and Pinning Acme Nut flange installation instructions.

LEAD SCREW AND NUT LUBRICATION

Prolong Acme Screw Assembly Reliability and Life

Proper lubrication is the key to continued performance and reliability of acme screw assemblies.

Use E-100 spray and PAG-1 grease lubricants to maximize life of your acme screw assembly.

PAG-1 and E-100 LUBRICANT BENEFITS

- Sheer Stability
- High Temperature Resistant
- Corrosion Protection
- Separation Resistant
- Extreme Pressure Properties
- Shelf Stable
- Water Resistant

PAG-1 and E-100 SPECIFICATIONS		
NLGI GRADE NUMBER		2
PENETRATION (worked)		285
DROPPING POINT		550° F
GELLING AGENT		Synthetic
OIL VISCOSITY	cst @ 40°C	96
	cst @ 100°C	11.3
TEMPERATURE RANGE		15° F TO 400° F

PAG-1 GREASE

1 lb. Can or One-time use packets.

PAG-1 GREASE	
PART NAME	PAG-1
NET CONTENTS PER UNIT	1 lb.
PART # NLU-1001	1 CAN weight of 1 lbs.
PART # NLU-2001	1 CASE with 12 cans total weight of 13 lbs.
PART NAME	PAG-45
NET CONTENTS PER UNIT	.45 oz.
PART # NLU-2000	1 CASE with 50 packets weight of 1 lb. 6.5.oz.

E-100 SPRAY 12 oz. Spray Can

E-100 SPRAY CAN	
PART NAME	E-100
NET CONTENTS PER UNIT	12 oz.
PART # NLU-1002	1 CAN weight of 1 lb.
PART # NLU-2002	1 CASE with 12 cans total weight of 15 lbs.

REFERENCE NUMBER SYSTEM: INCH ACME SCREWS AND NUTS

105 – RA / EK / 4N / 41.87 / 20105 / FS

ACME SCREW

Thread Form Codes

025 = 1/4"–3	**044** = 7/16"–4	**070** = 3/4"–10	**150** = 1-1/2"–10
024 = 1/4"–4	**051** = 1/2"–1	**086** = 7/8"–6	**174** = 1-3/4"–4
026 = 1/4"–16	**052** = 1/2"–2	**111** = 1"–1	**202** = 2"–2
020 = 1/4"–20	**054** = 1/2"–4	**112** = 1"–2	**204** = 2"–4
022 = 5/16"–2	**055** = 1/2"–5	**104** = 1"–4	**205** = 2"–5
028 = 5/16"–4	**050** = 1/2"–10	**105** = 1"–5	**222** = 2-1/4"–2
031 = 3/8"–1	**063** = 5/8"–2-2/3	**106** = 1"–6	**224** = 2-1/4"–4
037 = 3/8"–2	**065** = 5/8"–5	**110** = 1"–10	**252** = 2-1/2"–2
034 = 3/8"–4	**652** = 5/8"–5(2)	**115** = 1-1/8"–5	**253** = 2-1/2"–3
035 = 3/8"–5	**068** = 5/8"–8	**124** = 1-1/4"–4	**254** = 2-1/2"–4
036 = 3/8"–6	**060** = 5/8"–10	**125** = 1-1/4"–5	**302** = 3"–2
038 = 3/8"–8	**072** = 3/4"–2	**152** = 1-1/2"–2	**332** = 3-3/8"–1-1/2
030 = 3/8"–10	**073** = 3/4"–3	**153** = 1-1/2"–2-2/3	**372** = 3-3/4"–1-1/2
032 = 3/8"–12	**075** = 3/4"–5	**154** = 1-1/2"–4	**452** = 4-1/2"–1-1/2
033 = 3/8"–16	**076** = 3/4"–6	**155** = 1-1/2"–5	**552** = 5"–1-1/2
042 = 7/16"–2			**602** = 6"–1-1/2

MATERIAL

RA

R = Right Hand Thread
L = Left Hand Thread

A = Alloy Steel, Rolled
B = Alloy Steel, Milled
C = Alloy Steel, Ground
S = Stainless Steel, Rolled
T = Stainless Steel, Milled
U = Stainless Steel, Ground

NOTE: Not all threads/materials are available for all sizes.

FIRST END CONFIGURATION

EK

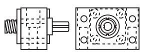
EK = Universal Double Bearing Support, with Keyway

EZZE-MOUNT™ / End Machining

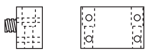
(see page 214 & 212)

1 = Type 1
2 = Type 2
3 = Type 3
4 = Type 4

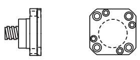
B = Universal Double Bearing Support End Cap Facing Screw Thread



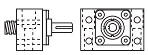
C = Universal Single Bearing Support



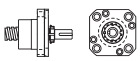
D = Flanged Single Bearing Support Flange Facing Screw Thread



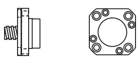
E = Universal Double Bearing Support End Cap Facing Away From Screw Thread



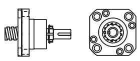
F = Flanged Double Bearing Support Flange Facing Screw Thread



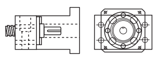
G = Flanged Single Bearing Support Flange Facing Away From Screw Thread



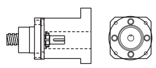
H = Flanged Double Bearing Support Flange Facing Away From Screw Thread



U_ = Universal Double Bearing Support with Motor Mount (see page 217)



Y_ = Flanged Double Bearing Support with Motor Mount (see page 218)



Shaft Extension

(see page 212)

K = Shaft Extension with Keyway
L = Shaft Extension without Keyway
Q = HandWheel
N = No Shaft Extension

NOTE: Both Ends must be specified.

Single Bearing Supports are used in conjunction with Type 1N end machining.

Double Bearing Supports are used in conjunction with Type 3K, 3L, or 3N end machining.

00 = No End Machining (Screw will be cut to desired length).
XX= Custom Machining (Print or specified data must be provided).

SECOND END CONFIGURATION

Refer to the First End Configuration.

NOTE: Both Ends must be specified.

OVER - ALL - LENGTH (OAL)

Length in inches, 2 place decimal.

ACME NUT

Nut will be installed with flange or threaded end toward first end designation. 00000 = No Nut

MODIFIER LIST

F Optional
F = Round Flange

S or M Required
S = Standard. no additional description required
M = Modified, additional description required

ACME SCREW AND NUT CHARACTERISTICS DEFINED

These definitions/descriptions are for the Product Specifications listed on the acme screw pages. Additional technical information on the following pages is designed to help in selecting an acme screw and nut that is best for your application. For additional assistance please contact our Application Engineers at 800-321-7800.

1/4" ACME THREAD

LEAD ACCURACY: ±0.0003 in./in.

LOAD CAPACITY (lbs.)	DYNAMIC	STATIC
BRONZE NUT	312	1.000
PLASTIC NUT	156	156

PRODUCT SPECIFICATIONS			SC	
Lead			.333	.250
Pitch			.083	.062
Starts			4	4
Threads Per Inch			12	16
Lash (Maximum Axial)			.005	.007
"A" – Root Diameter (min.)			.192	.162
Weight (lbs./ft.)			.13	.13
Thread Code			025	024
Form			Stub	2C
36" Standard Length Part No.*	RH	4140	11025	—
		Stainless	91025	910
	LH	4140	—	—
		Stainless	—	—
72" Standard Length Part No.*	RH	4140	12025	—
		Stainless	92025	920
	LH	4140	—	—
		Stainless	—	—

*** Custom Lengths Available -** See Reference Number Configu

Lead Accuracy Measured in inch/inch or μm/25mm. See page 12 for additional screw lead accuracy specifications.

Load Capacity Measured in lbs. or N, this is the dynamic and static load rating of the nut.

Nut Materials See page 13 for additional specifications for BRONZ/AC and PLAST/AC nuts.

Lead The distance the nut advances in one revolution (lead = pitch x number of starts).

Pitch The distance along the screw axis from a point on one thread to a corresponding point on the adjacent thread.

Starts The integral number of helical thread elements on the screw shaft.

Lash Maximum axial free travel of the nut relative to the screw when new.

Root Diameter The diameter of the screw at the bottom of the thread groove.

Thread Code Used to build the "Reference Number". See page 15.

Form This describes the accuracy and geometry of the screw and nut.

Standard Screw Threads, Lengths and Materials All screws are available in sizes that have a right hand thread and many sizes that have a left hand thread.

Standard cut lengths are 36", 72", 144" and 240" (depending on screw size), custom cut screws up to 240" (depending on screw size) in length are available. Custom length screws over 144" can be manufactured, based on material availability. See the Reference Number Configurator on page 15 for additional explanation on specifying a custom length screw.

Standard length part number product or unmachined cut to length material may have approximately one inch of lead in taper on one or both ends.

ACME NUT AND FLANGE CHARACTERISTICS DEFINED

Bronze Nut Material See page 13 for additional specifications.

Efficiency The ratio of work output to work input. These are calculated as lubricated efficiencies.

Torque to Raise A linearly scalable value measured in in.-lb./lb. or N•m/kN. This is the torque required to keep one pound or one N of load in motion.

Plastic Nut Material See page 13 for additional specifications.

Flange Made of steel and black oxided. These flanges are manufactured to be pinned to the nut.

BRONZ/AC BRONZE NUT		
Efficiency		73%
Torque to Raise 1 lb. (in.-lb.)		.073
Weight (lbs.)		.13
Part No.	RH	20025
	LH	—

PLAST/AC PLASTIC NUT		
Efficiency		82%
Torque to Raise 1 lb. (in.-lb.)		.065
Weight (lbs.)		.06
Part No.	RH	30025
	LH	—

FLANGE - STEEL	
Weight (lbs.)	.23
Part No.	70160