

PIPE THREAD BASICS

The following pages are a comprehensive guide to threads and their design. Our Thread Guide explains in detail: how to read a thread description, the difference between taper and parallel threads, common thread forms and much more. We hope this information will help you choose the best grease fitting for your application.

DESIGNATION

H1644



The H1644 fitting is classified as a 1/8"-27 PTF Special Extra Short thread. This description can be broken down into three distinct segments in order to better understand its components.

Thread Description:

1/8"-27 PTF SPL. EXTRA SHORT



UNDERSTANDING THE THREAD DESCRIPTION WILL ALLOW YOU TO SELECT THE BEST GREASE FITTING FOR YOUR APPLICATION.



THREAD SERIES

Thread series is the thread "style" of a given grease fitting. There are many different thread series and each has specific attributes. For details on some of the most common thread series, see page 8.



THREAD SIZE

Thread size is the nominal size of pipe that the fitting mates with. Originally, the size referred to the inside diameter of the pipe at a time when pipes had very thick walls. That is why a 1/8" pipe has a 0.393" actual outside diameter. Measure threads using the Thread Size Chart on the next page.

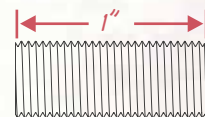


1/8"-27 PTF
0.393" Diameter



THREAD PITCH

Thread pitch refers to the distance "peak-to-peak" of each thread. Threads grouped close together are considered to be "fine," while threads that are spread out are "coarse." See the bottom of the next page for more information.



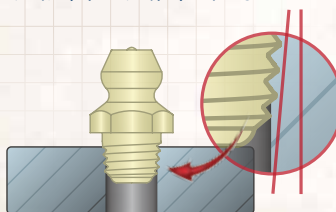
THREAD PITCH
THREADS PER INCH
(TPI)

TAPER VS. PARALLEL

- Taper threads begin at the shank and taper in toward the end of the fitting and mate into tapered or parallel threaded holes.

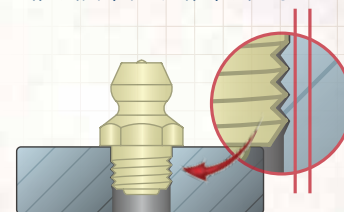
- Parallel threads are straight from shank to the end of the fitting. Parallel threads mate with parallel threaded holes and seat on the shoulder as a screw would, providing a consistent installation height.

TAPER THREADS



TAPER THREADS RUN
DIAGONAL TO MATING MATERIAL.

PARALLEL THREADS



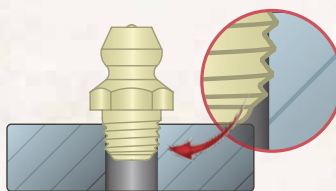
PARALLEL THREADS RUN
PARALLEL TO MATING MATERIAL.

SELF-SEAL VS. SEALANT

- Self-sealing pipe threads are designed to seal pressure-tight joints without the use of a sealing compound.

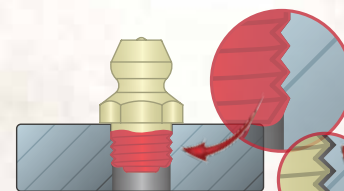
- Conversely, parallel type threads require the use of sealant to create a leak-proof seal. The sealant works as a joining agent between the parent material and the part itself.

SELF-SEALING



SOME, BUT NOT ALL TAPER
THREADS ARE SELF-SEALING.

SEALANT



PARALLEL THREADS ALWAYS
REQUIRE THE USE OF
THREAD SEALANT TO ENSURE
A LEAK-PROOF SEAL.

PARALLEL
THREADS
WITHOUT
SEALANT.

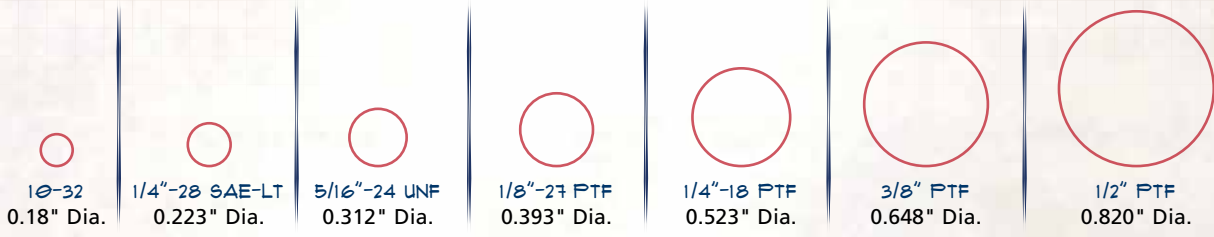
PIPE THREAD BASICS

Regrettably, pipe thread size designations have no connection to the part size because of how pipe sizing was conceived in the early 20th century. Use the size chart below for reference and see the next page for additional explanation.

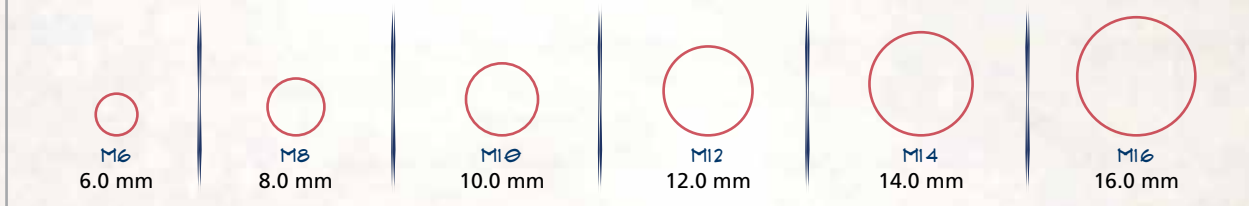
THREAD SIZE CHART

TO MEASURE THREAD SIZE: PLACE THE FITTING IN THE CENTER OF THE CLOSEST SIZED CIRCLE.

IMPERIAL SIZE CHART

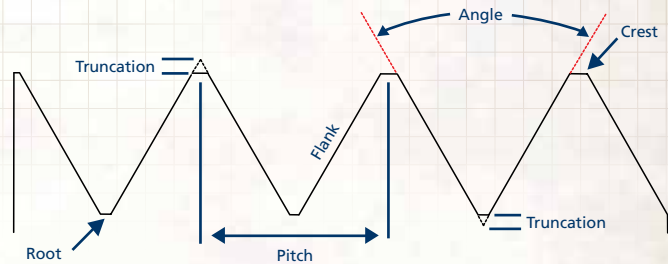


METRIC SIZE CHART



THREAD TERMS

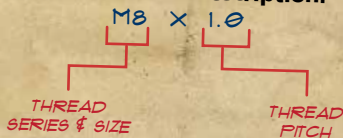
- **TRUNCATION** - Material removed from the theoretical V-thread triangle of the thread form.
- **CREST** - Highest point of a thread, opposite the root.
- **ROOT** - The lowest point of a thread, opposite the crest.
- **FLANK** - Thread portion joining the thread root and crest.
- **ANGLE** - The angle between the adjacent thread flanks.



THREAD PITCH

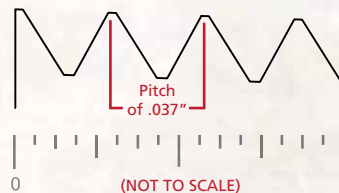
- When describing thread pitch, Imperial and British standards call out threads per inch. Metric standards specify thread pitch in millimeters.
- **THREADS PER INCH** - number of complete threads that are on a fitting in exactly one inch.
- **METRIC** - distance from one thread to the next measured from corresponding points.

Metric Thread Description:



IMPERIAL THREAD DESIGNATION

(THREADS PER INCH)



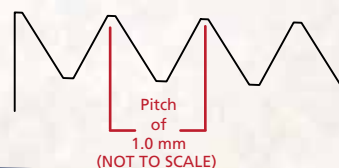
TO FIGURE THE THREAD PITCH OF AN IMPERIAL (OR BRITISH) FITTING, TAKE THE NUMBER OF THREADS PER 1 INCH AND DIVIDE 1 BY THAT NUMBER.

EXAMPLE:
A 1/8"-27 THREAD DESIGNATION HAS 27 THREADS IN ONE INCH.

1 DIVIDED BY 27 EQUALS .037"

METRIC THREAD

(COARSE & FINE)



THE THREAD PITCH ON A METRIC FITTING IS CALLED OUT IN THE DESCRIPTION. FOR EXAMPLE, A M8 X 1.0 FITTING HAS A THREAD PITCH OF 1.0 MILLIMETERS. THREADS PER INCH ARE NOT RELEVANT IN METRIC FITTINGS.

POPULAR THREAD SERIES

The following pages are a comprehensive guide to threads and their design. Please contact our engineering team at engineering@huyett.com with additional questions.

SAE STANDARD

SAE-LT threads are a common taper thread which are used primarily on grease fittings. This thread form is a modification of the standard 1/4"-28 UNF thread and is intended to thread into a parallel 1/4"-28 UNF-3B hole with a maximum minor diameter of 0.215" if a 75% minimum thread height is to be maintained. This thread type will seal heavy lubricants without the aid of thread sealant.

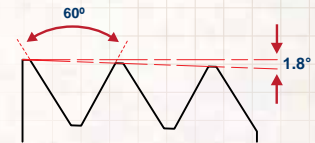
SAE-LT THREADS ARE OFTEN GENERICALLY REFERRED TO AS "TAPER THREAD."

SAE-LT

SOCIETY OF AUTOMOTIVE ENGINEERS

- Taper Thread
- Self-sealing

• 1/4"-28 SAE-LT is the most common thread size in the automotive industry. These fittings are also used on industrial machines and many other standard duty applications.

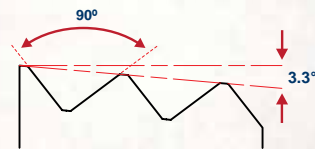


SAE-THREAD FORMING

SOCIETY OF AUTOMOTIVE ENGINEERS

- Taper Thread
- Self-sealing

• Thread forming threads possess a larger thread angle and are hardened which enables them to be installed into an untapped hole without deformation. Standard SAE-LT and PTF fittings may be used to replace a thread forming fitting.



AMERICAN STANDARD

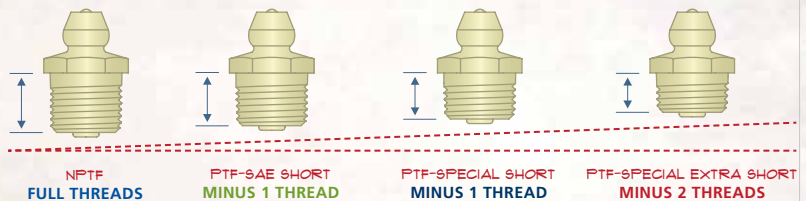
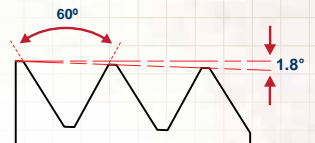
American Standard Threads were adopted by the American Standards Association (ASA) in 1921. Unlike many other threads, American Standard Thread sizes are confusing by the fact that the thread designation is based off nominal pipe sizes and does not refer to any physical dimension. For example, a 1/4"-18 NPTF fitting does not have an inside or outside diameter of 1/4". This is because, during the early days of manufacturing, pipes (which were measured by inside diameter) were made much thicker than they are today resulting in 1/4" pipes no longer measuring 1/4". External thread physical dimensions remained unchanged and retained their old 1/4" thread designations. These threads are designated with a nominal internal pipe size followed by a thread count, i.e. 1/4"-18. **FULL THREADS**

NPTF A.K.A. PTF

AMERICAN STANDARD PIPE THREAD

- Taper Thread
- Self-sealing

• These dryseal threads are specially designed to form a leak-free seal without the use of thread sealant. The seal is created by controlling truncation at the crest and root of NPT form threads to allow for an interference fit, closing the pathway and preventing spiral leakage. Please see below for the four main variations on NPTF threads.



VARIATIONS OF THE NPTF THREAD PROFILE:

PTF-SAE Short: Identical to NPTF threads, but the thread length has been reduced by eliminating one full thread from the small end of male threads or the large end on female threads. - **MINUS 1 THREAD**

PTF-Special Short: Identical to PTF-SAE Short threads, but with one thread removed from the large end of male threads or the small end of female threads. - **MINUS 1 THREAD**

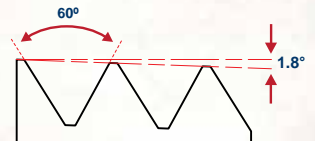
PTF-Special Extra Short: Identical to PTF-SAE Short threads, but with two threads removed from the large end of male threads or the small end of female threads. - **MINUS 2 THREADS**

NPT

AMERICAN STANDARD PIPE THREAD

- Taper Thread
- **Thread sealant recommended**

• National Pipe threads are designed to thread into each other. In most cases there will be no interference between the root and crest of the threads at assembly.
NOTE: NOT ALL AMERICAN STANDARD THREADS ARE NPT.



NPSM

AMERICAN STANDARD PIPE THREAD

- Parallel Thread
- **Thread sealant recommended**

• While not a dryseal type thread, National Pipe Straight (parallel) Mechanical threads will seal when paired with an NPTF male fitting.



POPULAR THREAD SERIES

A thread is defined as a ridge wrapped around a cylinder or cone in the form of a helix. Threads can be tapered or straight, male or female.

UNIFIED NATIONAL

In 1949, the American National Standard (ANS) was made obsolete and was replaced with the Unified National Standard (UNS) in an effort to increase interchangeability between American, Canadian and British threads. Every effort was made to ensure that the threads made to the new UNS standard would mate with threads made to the obsolete ANS standard. Manufacturers were instructed to update all existing drawings to comply with the new standard. It is common to still see ANS thread types referenced. These threads are designated by a thread diameter followed by a thread count, i.e. 1/4"-28.

VARIATIONS OF THE UNS THREAD PROFILE:

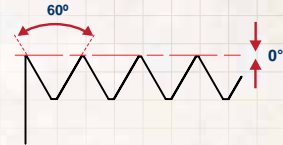
UNS: Unified National Special diameter thread is an umbrella thread form which covers those thread forms which existed under the ANS standard, but which do not fit into any other category.

"NS" TAPER: NS Taper threads are a unique fine thread which was developed specifically for pneumatic lubricant delivery systems.

UNF

UNIFIED NATIONAL FINE THREAD

- Parallel Thread
- **Thread sealant recommended**

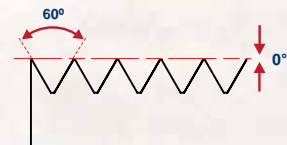


- *Unified National Fine thread is a common mechanical thread type used in the U.S. for screws and bolts.*

UNEF

UNIFIED NATIONAL EXTRA FINE THREAD

- Parallel Thread
- **Thread sealant recommended**

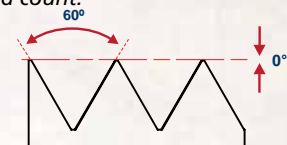


- *United National Extra Fine thread is a common mechanical thread type, similar to UNF, but with a finer thread count.*

UNC

UNIFIED NATIONAL COURSE THREAD

- Parallel Thread
- **Thread sealant recommended**



- *Unified National Course thread is a common mechanical course thread.*

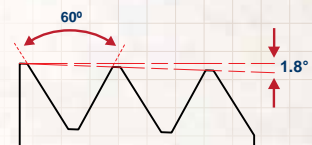
FOREIGN STANDARD

Many thread standards exist outside the U.S., the most common are detailed below. Metric threads are denoted by an M (for standard threads) or an S (for thread forming threads) which are preceded by a pitch diameter, followed by a thread pitch (mm), i.e. M8x1.5 or S6x1.0. Traditionally, if no thread pitch is identified, it is understood to be 1.0. British threads are denoted by a nominal internal pipe size, followed by a thread pitch (tpi), i.e. 1/4"-29.

ISO METRIC

FOREIGN STANDARD PIPE THREAD

- Taper Thread
- **Thread sealant recommended**

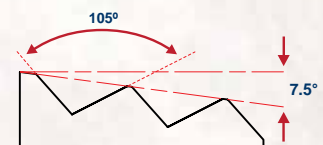


- *ISO Metric threads were one of the first international standards agreed upon when the International Organization for Standardization was created in 1947.*

METRIC- THREAD FORMING

FOREIGN STANDARD PIPE THREAD

- Taper Thread
- Self-sealing

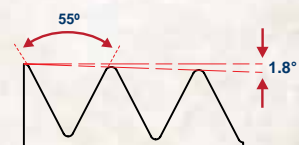


- *Metric Thread Forming threads (S) perform similar to American thread forming versions, but metric threads have a much wider 105° thread angle.*

BRITISH A.K.A. WHITWORTH

FOREIGN STANDARD PIPE THREAD

- Taper Thread
- **Thread sealant recommended**



- *British threads, also known as Whitworth threads, encompass several distinct variations including fine, course and pipe threads.*

VARIATIONS OF THE BRITISH THREAD PROFILE:

BSPT: British Standard Pipe Tapered threads are a Whitworth form tapered male thread. Female threads are typically parallel.

BSF: British Standard Fine threads are a parallel threaded Whitworth form thread.

BSPP/BSPF: British Standard Pipe Parallel or British Standard Pipe Fastening threads are coarse threaded Whitworth form threads with a parallel thread profile.

German: What is often referred to as German threads are really a German designation of British coarse threads.