AMERICAN STANDARD PIPE THREAD

INTRODUCTION

The threaded pipe joint has been in use for more than one hundred years. During this period it has proved to be an excellent leakproof connection for steel and wrought-iron pipe and fittings. However, its use has not been limited to steel and wrought iron. It is used today with materials such as brass, copper, plastic, etc.

The threaded joint is still considered to be an excellent method of connecting pipe to fittings and is used for many piping installations.

STANDARDIZATION

The threaded joint for steel and wrought-iron pipe was standardized as early as 1913 and is called the *American Standard Pipe Thread.*

ADVANTAGES OF STANDARDIZATION

a) Pipe can be manufactured and threaded in one country and the fittings for the same pipe produced in another country.

b) Threading tools (dies and taps) can be standardized, again permitting manufacture of tools in various countries.

Valves, flanges, machines, pumps and many other ...es of equipment requiring threaded pipe attach...ents can be produced to a standard in many countries.

TECHNICAL TERMS

An understanding of the various technical terms used with threads is necessary. These terms are outlined below.

a) A.S.P.T. – American Standard Pipe Thread

b) N.P.S. – Nominal Pipe Size

c) A.P.S. – Actual Pipe size

d) O.D. – Outside Diameter

e) I.D. – Inside Diameter

f) Male Thread – Exterior thread on pipe or fitting

g) Female Thread – Internal thread on fittings or valves

h) Thread Taper – Necessary for pipe to tighten into fitting

i) Thread Pitch – Referred to as the number of threads per inch

j) Thread Angle – The angle at which the threads are cut (60°)

Running Thread – This is a long thread that does not have any taper. Usually made leak-proof with a locknut.

l) Right-Hand Thread – Normal direction for thread on pipe and fittings

m) Left-Hand Thread – This thread is cut in the opposite direction and is used on left and right nipples and couplings. A left-hand nipple and coupling may be used in place of a union coupling. The nipples are identified with a color on the left-hand thread and the couplings usually have four straight bars on the side.

NOTE: Special *dies* and *taps* are required to cut left-hand male and female threads. It is not a general practice to cut left-hand threads on the job as the nipples and couplings are available from the manufacturer.

Figure 1

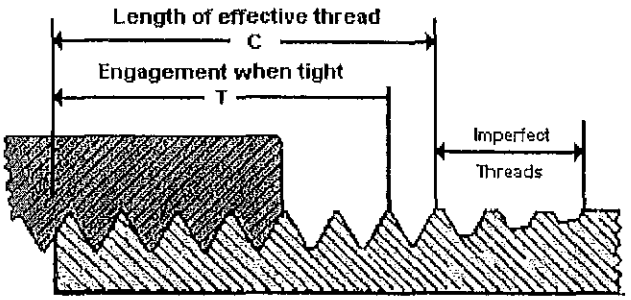


TABLE A

NOMINAL DIAMETER INCHES	THREADS PER INCH	LENGTH OF THERMO (C) INCHES	ENGAGEMENT WHEN TIGHT (T) INCHES
1/8	27	0.25	1/4
1/4	18	0.40	3/8
3/8	18	0.41	3/8
1/2	14	0.53	1/2
3/4	14	0.55	9/16
1	11 1/2	0.68	11/16
1 1/4	11 1/2	0.71	11/16
1 1/2	11 1/2	0.72	11/16
2	11 1/2	0.76	3/4
2 1/2	8	1.14	15/16

NOTE: Nominal pipe sizes larger than 2 1/2 inch use the same pitch, namely 8 threads per inch.

THREAD ENGAGEMENT

Thread engagement is the amount of pipe thread necessary to make a tight connection between pipe and fitting. Refer to T on Figure 1.

For the length of thread engagement for the various nominal diameters of pipes, refer to T on Table A.

NOTE: When cutting threads on various diameters of pipe, it is usual practice to add approximately two additional threads to the length of thread shown in (T) of Table A.

Example: *A 1/2-inch diameter pipe.*
Engagement when tight in inches (T) equals 1/2 inch. Thread length will equal 1/2 inch plus approximately two additional imperfect threads.

THREADS PER INCH

It is possible to cut threads on pipes of different diameters with the same die chasers. The following examples show the nominal pipe diameters that have the same number of threads per inch.

EXAMPLE 1

1/4-inch and 3/8-inch nominal pipe size have 18 threads per inch.

EXAMPLE 2

1/2-inch and 3/4-inch nominal pipe size have 14 threads per inch.

EXAMPLE 3

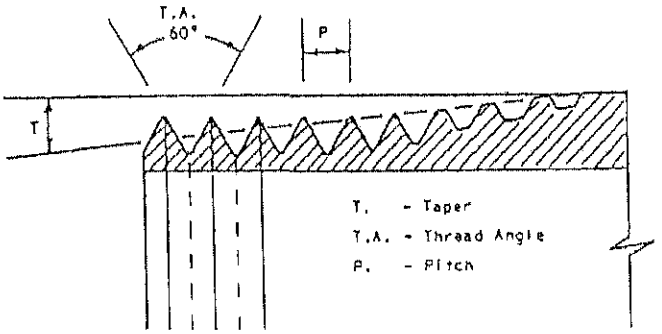
1-inch, 1 1/4-inch, 1 1/2-inch and 2-inch nominal pipe size have 11 1/2 threads per inch.

EXAMPLE 4

2 1/2-inch nominal pipe size and larger have 8 threads per inch.

NOTE: The above examples of threads per inch are shown in Table A.

Figure 2 PIPE THREAD

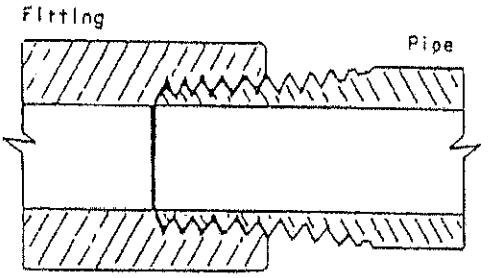


Length of Thread

It is of the utmost importance when threading pipe to cut the correct length of thread for a given pipe diameter.

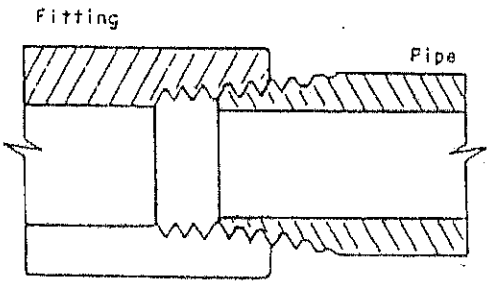
Too long a pipe thread allows the pipe to travel too far into the fitting. The pipe is prevented from turning any further when it reaches the end of the thread inside the fitting. Correct thread engagement of the taper is not made since most of the tapered threads remain outside the fitting. This can cause damage to the fitting and possible leakage.

Figure 3 Too long a pipe thread



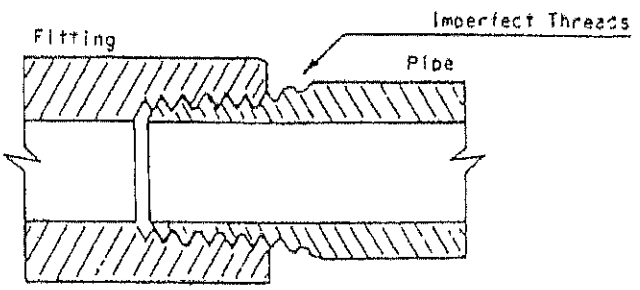
Too short a pipe thread does not allow enough thread to enter the fitting. This prevents the proper use of all the threads in the fitting and can result in a weakened connection and possible leakage.

Figure 4 Too short a pipe thread



Correct length of pipe thread allows the pipe to enter the fitting with the proper number of threads. The thread taper is able to make a tight connection.

Figure 5 Correct pipe thread



NOTE: With the *Correct* thread engagement, approximately *two* imperfect threads should remain outside the fitting.

PIPE FITTINGS AND THREAD ALLOWANCES

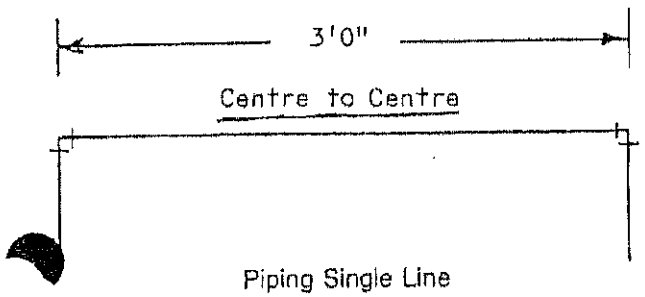
INTRODUCTION

This package has been developed to show how steel pipe and fittings are measured to a given length from diagrams for on-the-job installation. Pipes must be cut to various lengths and threaded for many different installations.

DIAGRAMS

In general, piping diagrams as supplied by engineers show measurements as centre to centre. Refer to Figure 1.

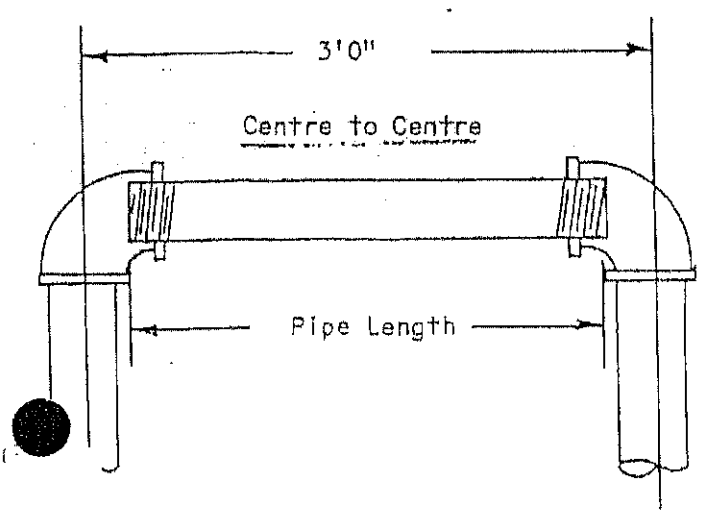
Figure 1



Piping Single Line

To convert the centre to centre measurements to actual length of pipe, it is necessary to measure the fittings being used because the pipe does not travel into the centre of the fitting. Refer to Figure 2.

Figure 2



Piping Double Line

METHODS OF MEASURING

As mentioned, piping diagrams usually give measurements as centre to centre of fittings. However, all piping measurements *are not* taken from centre to centre because many have to be taken on the job site when the pipes are fitted.

It is important that the learner be familiar with the various terms used when measuring pipes and fittings. Figure 3 below shows many of these.

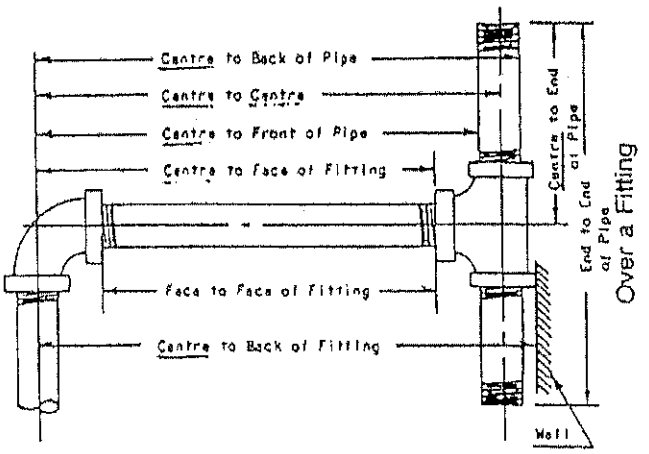


Figure 3

Abbreviations of Terms used when measuring pipes and fittings.

Centre to Back of Pipe	-	C.	to	B.	of P.
Centre to Centre	-	C.	to	C.	
Centre to Front of Pipe	-	C.	to	F.	of P.
Centre to Face of Fitting	-	C.	to	F.	of F.
Face to Face of Fitting	-	F.	to	F.	of F.
Centre to Back of Fitting	-	C.	to	B.	of F.
Centre to End of Pipe	-	C.	to	E.	of P.
End to End of Pipe	-	E.	to	E.	of P.

THREAD ENGAGEMENT AND FITTING ALLOWANCE

Before pipes can be cut and fitted to a given measurement, the "fitting allowance", "thread engagement" and "pipe diameter" must be known.

TABLES

American Standard Pipe Thread tables are available giving the fitting allowance and thread engagement for various pipe and fitting diameters.