

## Original Research Article

# Designation of American Screw Thread

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The designation of the screw threads is in a close connection with the system of measurement including the fact that this system influences the definition of the screw thread. In the U.S.A., it is a very special situation because they used both American customary system and metric system. This situation led to an original way of screw thread designation which combines experiences acquired for both systems and generalizes them. The paper presents the principles used for designations of American screw threads, starting from the general principles, and illustrates them by examples. In the same time, in the paper are done observations about some mismatch in the standards connected with the designation of screw thread and proposals to eliminate them and for designations of some screw thread.

**Keywords:** Screw thread, Screw thread designation, American system, Metric system.

## INTRODUCTION

A surface with a screw thread or, simple, a screw thread is a complex surface. It is the reason for which a complete designation of a screw thread must contain information about its shape, its dimensions and its precision. In the same time, designation of screw threads is in relationship with the system of measurement used to define it. In the U.S.A., both the United States customary (noted herein American system) and metric systems are used, they are two systems to designate screw threads. We will try to indicate the general principles of the designation, common to both, highlighting differences, and illustrating them by examples. Finally, we will do a proposal about improvement of correlation of standards and designation of some screw threads.

## GENERALITIES ABOUT SCREW THREAD DESIGNATION

In order to see in which way they can describe all the defining elements, we must come from the definition of the screw thread. A screw thread is, in an ultimate analysis, a helical rib, cylindrical or conical.

Starting our study, we can observe that the shape of the screw thread contains two aspects. The first aspect is the profile of the rib and the second is the form of the helix. Both aspects are usually clarified in defining standards of the screw threads. These standards indicate the angles of profile, the crests, roots, and fillets and its dimensions depending on the reference dimensions of the screw thread, directly or through a formula. These standards define also the relation for calculating the diameters of the screw thread (major, pitch and minor). For the conical screw thread, these standards specify the information about the taper and the position of the rib from the cone, perpendicular on the axis or on the generating surface. All these information are codified through a symbol which

represents the symbol of the screw thread and which is used in designations of the screw thread to send information about its shape. The method is common to both systems, American and metric, and the presence of this symbol in screw thread designation is obviously mandatory.

Concerning the dimensions of a screw thread, is necessary to observe these refer to the generating helix. In order to define the helix two dimensions are required, the first defining the size of the helix and the other defining the "periodicity" of the helix. The size of the helix and, at the same time of the screw thread is defined through reference diameter which is the major diameter of the male screw thread. For the cylindrical (straight or parallel) screw thread, the reference diameter is the diameter of the cylindrical helix proper to the maximum dimension of external screw thread. For the conical (taper) screw thread, the reference diameter is the diameter of the conical helix proper to the maximum dimension of the external thread measured in the section indicated (through distance from the maximum diameter of the cone) by defining standard.

Sometimes the reference diameter is not a diameter of the screw thread. To the pipe screw threads, the hose coupling screw threads and at the screw threads used for coupling for gas cylinders (NGS, NGT and SGT) the reference diameter is the reference (inner) diameter of the pipes or of the hoses for which is used screw thread (in a manner similar to that used in the metric system for the pipe screw threads, where the reference diameter is the historical inner diameter of the pipes to which the thread was first used screw thread). For some API screw thread defined in accordance with standard API specification 7-1,2 the reference diameter is the historical dimension of the drill pipes at which the screw thread was used the first time. To small UN screw threads, instead of dimension of reference, diameter is used symbol of the screw provided

with that screw thread. A special situation exists also for the British screw thread for finishes of plastic containers M and P types and to BA screw thread, where a numerical symbol is used instead of a reference dimension.

It is here where the first difference between American and metric systems appear. This difference consists in measure units in which are expressed the dimensions, inches in American and millimeters in the metric system. We remember the relation between these units in formulae (1) and (2):

$$d [\text{in}] = \frac{d [\text{mm}]}{25.4} \quad (1)$$

$$d [\text{mm}] = d [\text{in}] \times 25.4 \quad (2)$$

In formulae (1) and (2) symbol, “d” represents a straight dimension. The periodicity of the helix and, in the same time, of the screw thread is expressed in different ways in the two measurement systems.

In the American system, in order to measure the periodicity, the number of repeating elements contained in a length equal to one unit is used. For screw thread repeating element is thread and expression of periodicity is done through (number of) threads per inch, noted usually t.p.i.

In the metric system in order to measure the periodicity, the distance between repeating elements, considered a length is used. For screw threads, the measure of periodicity is the pitch. As a length, the pitch is measured in millimeters.

In the formulae (3) and (4) we present the relations between t.p.i. and pitch:

$$p = \frac{1}{n} [\text{in}] = \frac{25.4}{n} [\text{mm}] \quad (3)$$

$$n = \frac{1}{p [\text{in}]} = \frac{25.4}{p [\text{mm}]} [\text{in}^{-1}] \quad (2)$$

In formulae (3) and (4), symbol “p” represents pitch and “n” represents (number of) threads per inch, or t.p.i. But there are situations in the American system also, where the step is used. On screw threads with multiple starts, the helix periodicity is obligatory expressed in pitches, and, as an exception, it is also recommended to use the pitch instead of t.p.i. for the expression of screw thread periodicity. In these cases, the pitch is measured in inches. It is nevertheless allowed the use of t.p.i., too, but to express the periodicity of screw thread only. The two characteristics, the periodicity of helix and the periodicity of screw thread are in a well-established ratio formally expressed through the formula (5).

$$L = p \times N \quad (5)$$

In formula (5) “L” [in or mm] represents pitch of the helix, p [in or mm] represents pitch of the screw thread and N represents numbers of starts of the screw thread. It is obvious that the relationship remains valid even if the pitch for both the helix and the thread is replaced by the number of threads per inch (t.p.i.).

A first application of the formula (3) is related to the verification of the fulfilling of the relation (5) for the multi-strats screw threads belonging to the American system. If the relation is not verified, it is likely that the periodicity of the thread is

expressed by t.p.i. Therefore, it will convert the value of t.p.i. in the value of the pitch applying the formula (3) and check again if the relation (5) is respected. If the relation is not verified with these values either, it will be required explanations from the designer.

There is also a correlation between the thread size and the periodicity value which, for functional reasons, can not take any values. This correlation is usually present within the definition standards that associate each screw thread size with one or more periodicity sizes. For some types of threads, these combinations are defined as thread series. In the American system, these series are coarse, fine and extra-fine. However, there is a situation where the periodicity is constant regardless of screw thread size, as well as special combinations of screw thread size and periodicity, besides the usual combinations.

Regarding the indication of periodicity, a difference between the American system and the metric system can be found. In the American system, the periodicity must be indicated in any situation. In the metric system, according to ISO standards used at international level, prescribing periodicity is mandatory, only if a thread size is associated with more pitches values or, in the case of a metric screw thread, only when different pitches are used instead of the normal pitch associated with that size of the screw thread. However, in the case of the designation of screw threads used in the United States, irrespective of whether they belong to the American system or the metric system, the indication of the periodicity value is mandatory. However, there are exceptions. Designation of screw threads defined according to API standards does not require t.p.i. or pitches. It is not necessary to indicate the pitches either to UNM unified miniature screw threads, screw thread for finishes of plastic containers L, M and P types and to the British screw thread BA.

In the American measurement system, numerical values of the dimensional elements of the screw threads may be indicated either in the fraction system or in the decimals system. On the other hand, for the little dimension, it is usually to replace the dimension by numerical symbols, the method used inclusively to identify bolts of small diameters and, by extension, for their screw threads. If in the case of the machine screws, in order to avoid the confusion, the figure representing the dimensional symbol is preceded by the symbol No and, in some works, by the symbols # or Nr., in the case of the screw thread defining standard does not use such a solution, although there are recommendations in the ASME Y14.6 standard on the use of the symbol No. The numerical value of the diameter represented by the symbol may optionally be shown in brackets.

When is used the fractional system, it remained traditionally that the values less than the integer to be indicated in the fractional system, using a denominator being multiple of number 2, with a diagonal fraction bar (fraction slash) in the online system, using superscript for numerator and subscript for denominator. Sometimes in the fractional slash writing, numerator and denominator can be written with the same size as integer but separated from it by a dash. Writing with horizontal fraction bar is used, also using separation with a dash. In the paper, we will usually use the online writing mode, being the most used and inclusive recommended by ASME Y14.6 standard. Where we met the other modes, we presented them separately as an alternative. Below is an example of the writing of a numerical value in parallel in the three modes

$$2^{1/2} \quad 2-1/2 \quad 2-\frac{1}{2}$$

In the case of the decimal system, values lower than the unit, are mandatorily indicated by four digits after the decimal point. The figure 0 is omitted usually when it is in front of the decimal point (although it is not very advisable) or if it appears in the fourth position (after the figure in the third position) after the decimal point. As for integer numbers, is recommended to be represented followed by three digits 0 after the decimal point. When the numeric symbols are converted into a decimal system after decimal point are used only 3 significant digits. There is a recommendation to use the decimal system instead of ordinary fractions and symbols. This recommendation is the more advisable in the case of data processing by systems that cannot process ordinary fractions. At present, both systems are used in parallel, with the option for the system using ordinary fractions and symbols, to represent the decimal value in brackets.

It should be noted that initially the numerical value representing the reference diameter of the screw thread was followed by the symbols "or "in" representing the unit of measurement for the straight dimensions, the inch.

We illustrate the evolution of recommendations about writing mode of dimensions in the American system in the Table 1.

In the metric system, numerical values of the dimensional elements of the screw threads are indicated only in the decimal system, using the digit 0 before the decimal separator and removing it after the last digit with significant value after the decimal separator. The integer numbers are not followed by the decimal separator and 0 digits. Unlike the mode of writing in states using the metric system, the decimal separator commonly used is the point, according to the current practice in the United States.

The precision of the screw threads, in order to be complete, must contain information about tolerance grade of the screw thread, tolerance position of the screw thread and of the gender (male-bolt, external or female-nut, internal) of the screw thread. The combination between tolerance grade and tolerance position constitutes a class of fit in the American system and class of tolerance in the metric system.

Tolerance grade is indicated in both systems, American and metric, by a figure.

The designation of the tolerance position is resolved by different methods in two systems.

In the American system, the class of fit is indicated by a number. The suffixes which are added to this number, capital letters, represent the gender of the screw thread. This situation may lead to the conclusion that the position of tolerance for a particular class of adjustment is unique and therefore should not be expressed. An exception occurs for the ACME thread at which the suffix may be considered as the tolerance position, but the two suffixes are exclusively capital letters, not allowing the differentiation.

In the metric system the tolerance class is indicated by letters too, but for female screw threads (nuts) are utilized capital letters and for male screw threads (bolts) lowercased letters. In this system the tolerance positions are always designated. The class of tolerance is indicated by a combination between a figure (tolerance grade) and a capital or lowercase letter (tolerance position). In both systems in the case when, for a certain screw thread, is defined as a single precision, it is not necessary to indicate it.

The gender of the screw thread (female - nut or male - bolt) is an associated problem to the problem of precision because precision designation resolves the designation of gender.

Designation of gender is, again, resolved by different methods in the two systems.

In the American system is not a single method. In the case of UN and a few other screw threads gender is indicated by capital letters, B for internal screw thread (nut) and A for external screw (bolt), used for suffixes after grade of tolerance. In the case of ACME screw thread if it is necessary to indicate position it is used the symbols INT for internal (nut) and EXT for external (bolt). This solution is, also, used to indicate the gender of screw threads without indication of tolerance, when the gender cannot be identified in another way (for example by drawing).

In the metric system, as we already said, the difference between internal and external screw thread is made by using capital letters for the nuts and lowercase letters for the bolts. In the case of screw threads with unique precision, undesignated gender is designated, if it is necessary, by symbols INT and EXT as is indicated above.

Gauging system is a screw thread defining element specific to US standards. The gauging system is conventionally noted by a two-digit group. Gauging system are standardized only for unified inch screw thread (UN, UNR and UNJ) and metric threads (M and MJ), in which case the first digit in the system symbol is 2. It is possible to issue a similar standard for ACME and STUB ACME screw threads, based on the same principles as those used for UN, UNR, UNJ M and MJ screw threads. That is why we will consider the current standardized gauging system as also applicable to ACME and STUB ACME screw threads, as it appears in the example of designation of these threads.

A special mention is to be made for the national American screw thread class 5 interference fit NC-5 according to the standard ANSI B 1.12M to which is applied the ANSI B 1.3 gauging system. Usually, the calibration system is indicated in thread symbolization, but it is permitted to indicate it within general condition notes in the drawing field, purchase documents, company standards, etc. so that, on a case-by-case basis, it may be omitted from the thread designation. In the following, the gauging system symbol will appear in the screw thread designation only when it is specified in the designation examples presented by the normative documents defining the screw threads or if the ANSI B 1.3 standard or equivalent standard FED-STD-H 28/20 is included in the list of related standards presented at the beginning of the standards defining a certain type of screw thread.

## DESIGNATION OF SCREW THREAD USED IN THE USA

Designation of screw thread used in the USA is regulated by standard ANSI Y14.6. Because this standard shows examples of designations only for a certain number of threads and the examples are sometimes even contradictory to schemes and examples of designation shown in the standards defining those screw threads, we will synthesize and harmonize information on the screw threads designation from all American standards containing such information. The criteria in the base which we have selected some information instead others are related by frequency (we preferred the information that has a larger number of occurrences) and logic (in the case of equal number of occurrences, we preferred the information to better respect the general principles). An example of the second criterion is that we preferred positioning information on the number of starts of a screw thread with multiple starts immediately after the information about the pitch of screw thread and the pitch of the helix and not after the information about accuracy of the screw thread.

**Table 1: Evolution of numerical values presentation in US thread standards for screw threads**

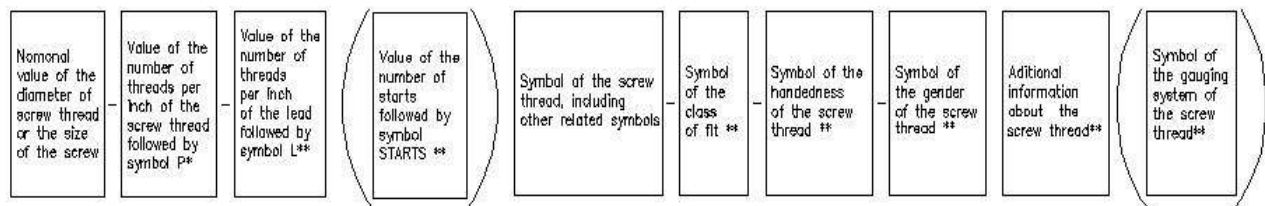
Fractional and symbolic system	Decimal system	Recommended decimal system
1/4-20 UNC	.250-20 UNC	0.250-20 UNC
(No. sau. #)10-32 UNF	.190-32 UNF	0.190-32 UNF
1-8 UNC	1.000-8 UNC	1.000-8 UNF
1 1/4-18 UNF	1.250-18 UNF	1.250-18 UNF

**Table 2: Evolution of the designation of elements in annotations for defining screw threads within American screw thread standards**

Major diameter	MAJOR DIA	Major diam.
Minor diameter	MINOR DIA.	Minor diam.
PD	PD	Pitch diam.
	UNIFIED FORM SPECIAL	Unified Form SPL
SPL	SPECIAL	Special
SPL Form	SPECIAL FORM	Special Form
Lenght of engagement	LE	Le
	RR	Root rad.
	T	tol
	THD	thd.
	MAX.	max.
	MIN.	min.
	RAD.	Rad.

**Table 3: Symbols for some of the elements used to define the screw threads recommended by American standards**

Symbol	Meaning	Symbol	Meaning
CR	Crest radius	T	Tolerance
G	Allowance	TGW	Thread groove width
P	Pitch	TPI	Thread per inch
PD	Pitch diameter	TRT	Thread ridge thickness
RR	Root radius		



symbol \* P is used only in case of multiple starts screw threads;

\*\* this information is indicated as appropriate for multiple starts screw threads, when the standards provides more classes of accuracy and / or calibration system for the respective type of screw threads, for screw threads left-handed and / or if they are necessary to fully identify the screw thread, in accordance with explanations in Table 4.

**Figure 1: Designation of American Screw Threads Defined in accordance whit American System**

It is possible that sometimes some aspects in standards (e.g. aspect shown above, the order in which information is presented) may not match the general scheme presented. These situations can be leakage of that standard which a review should harmonize with the other relevant standards.

We considered useful to present also the significance of letters used in symbols as they appear in the standard ASME Y 14.6, supplemented with some additional meanings found in the symbols not included in this standard. The meaning can vary from case to case. To clarify we submitted in the end of the article an appendix with all symbols of the American screw thread which we found in the bibliography.

**A-external, American, aeronautical; ACME screw thread**

**Am.-American;**

**B-internal, buttress;**

**C-coupling, coarse, centralizing, copper alloys, protective tube, pushing (compression type), copper alloy;**

**Cl for chlorine;**

**D-double;**

**E-Pitch diameter, Edison screw thread;**

**EF-extrafin;**

**EXT-external;**

**F-fine, fuel and oil, ferrous material;**

**FL-screw thread with flat bottom;**

**G general use, gas, for lubrication devices; allowance after coating, for garden;**

**H-for hoses, hard material;**

**HF-hard ferrous alloys;**

**I**-intermediate, interior, insertion;  
**INT**-interior;  
**J**-reinforced rounded root with radius  $R = 0.18402n$   $0.1501n$ ,  $n =$  t.p.i or  $R=0.1501-0.18042p$ ,  $p$ -pitch;  
**K**- rounded root, with radius  $R = 0.10829 n-0.14434n$ ,  $n =$  t.p.i. and having additional tolerated dimensions and measurement requirements, **K**-Monel;  
**L**-lead, locknut;  
**LE**-length of engagement;  
**LG** length of gauge;  
**LH**-left hand;  
**LO**,  $L_1$ ,  $L_2$ ,  $L_3$  – type of the gauge in accordance with gauging standards for the relative screw thread  
**LT**-lubrication thread;  
**M**-metric screw thread, metric, mechanical, microscope, miniature, Monel;  
**MOD**-modified;  
**N**-national (American);  
**Nat.**-national;  
**Nonstd**- nonstandard;  
**O**-outlet, objective;  
**OD**- outer diameter;  
**ONF**-nonferrous alloys different of copper;  
**P**-pipe, pitch, plain;  
**R**-railing, root radius, rounded root with radius  $R = 0.108 n-0.144 n$ ,  $n =$  t.p.i., rounded, using thin walled material which is formed to the desired thread. (for hose coupling threads for garden hoses);  
**RAD**- radius;  
**RH**-right hand;  
**R.S.M.**- roled sheet metal screw thread;  
**S**-straight (cylindrical), short, special, metric buttress (saw teeth shaped) screw thread, soft material;  
**SB**-stove bolts;  
**SE**-special lenght of engagement;  
**SF**- soft ferrous alloys;  
**Spec**-special, Specification (identifier for API regulations);  
**SPL**-special;  
**ST**-screw thread;  
**T**-taper (conical), thread, truncated, triple;  
**THD**-screw thread;  
**THRD**-threaded;  
**UN**-unified;  
**W**-Whitworth screw thread;

As part of ASME Y 14.6 standard, they are making a series of general recommendations that we present below. Recommendations are not mandatory but optional, their application being at the discretion of the one who determines the designation of the screw threads according to the actual situations.

It is recommended that, in order to avoid confusion, the standard defining the screw threads should be specified either after the screw thread designation or otherwise on the drawing, possibly by the notes in the drawing field.<sup>1</sup>

There is an optional possibility, as applicable, to indicate the pitch diameter with its deviations. A specific aspect of American thread designation is a recommendation to include any additional information on any relevant aspect of the screw thread characteristics in its designation. In this regard, they have used either additional special symbols with narrowly well-defined meaning in the proper designation, either, although ASME Y 14.6 standard does not explicitly indicate them, but only by way of example, the annotations placed under standard screw thread designation or both combined methods. Symbols and annotations refer to various deviations from the default conditions imposed by the standards or some additional conditions. In this sense the annotations specify: among other:

- deviations of the dimensions of diameters screw thread different of the deviations prescribed by standard. These deviations are expressed through system "size limit". When changes are made with a specific goal, difference from standard situation it is possible to express these differences through special symbols when exceptions refer to screw thread with a protective coating. In the situation of coated screw thread deviations are presented in two variants before and after the protective coating;
- screw length value, possibly followed by symbols indicating special circumstances;
- value of the thickness of protective coating through dimensional deviations (sometimes presented in the system of size limit, possibly by limit values) for cylindrical screw threads or through change of the position of the reference plane for tapered screw threads.

They were more ways to write annotations. Originally the old standards, now generally obsolete, write only the first letter capitalized, the rest lowercase, without using abbreviations. Subsequently, the capitalization was completely, possibly using abbreviations. Currently, it is usually the first writing form, but using abbreviation. Capitalization is used for some special annotations, as will be shown below. We present in an informative way the evolution of common annotations. We specify that, usually, when symbols or annotations differ only in the form of presentation, that is, by differences related to the use or not of capitals and abbreviations, we have only presented the variant that we consider more relevant. We present in the Table 2, the evolution of the designation mode of annotations.

It should also be noted that in order to prescribe uniformly the dimensional elements in the drawings but also implicitly for the ones contained in the annotations there were abbreviations for their denotation. We present the symbols applicable to the designation of the threads with their meaning in Table 3.

We consider that the meanings of abbreviations "diam.", "max." and "min." are obvious and need no explanation.

Finally, it should be noted that although the elements presented are applicable to any type of thread, the examples are limited to those types of screw threads for which there is a document issued by an officially recognized entity, in the form of standards, norms or drawings. Therefore, although some screw threads symbols appear in the table in the appendix, their designation mode does not appear in the examples due to the lack of an official document of definition.

### **Designation of screw thread in the American system**

General structure of designation is shown in Fig1 and explained in Table 4. but there are exceptions, screw threads defined according to API standards, which, although there are screw threads defined in the American system, present, in the problem of designation, some similarities with metric screw threads (e.g. order of elements in the designation and the absence of information about t.p.i.).

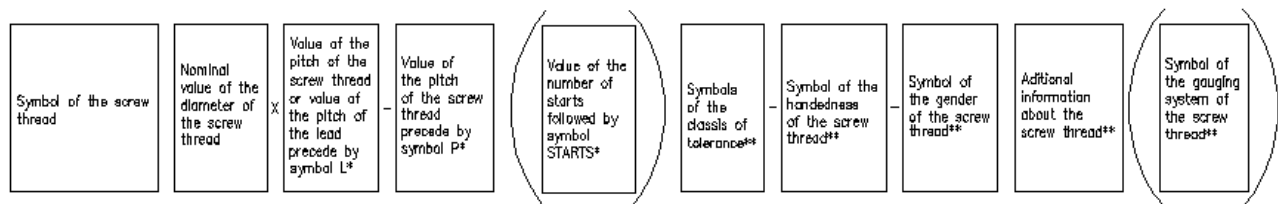
### **Designation of screw thread in metric system**

Designation of metric thread is done according to ISO standards. In the American standards referring to metric screw thread, designation contains also calibration system, identical to that used for UN screw threads.

<sup>1</sup> Usually, we did not apply this recommendation because the examples of screw threads designation in the screw thread definition standards do not apply it.

Table 4: Designation of American Screw Threads Defined in accordance whit American System

The sign precedes the item notation	Noted item	How item is noted	Case where item must be indicated
	Nominal size of the screw thread	The value of reference diameter in inch written in fractional or decimal, reference size or size of screw or reference size of screw thread	To all screw threads
- (dash)	Number of threads per inch of screw thread (in case of multiple starts screw thread t.p.i or pitch followed by the letter P)	The value of the number of threads per inch of screw thread or of the pitch of multiple starts screw thread in inch written in fractional or decimal	To all screw threads (letter P is used only to the pitch of multiple starts screw threads)
- (dash)	Pitch of the lead (followed by the letter L)	Value of the pitch of lead in inch written in fractional or decimal	Only to multiple starts screw threads
	Symbol of the screw thread	Symbols according to Appendix 1 including additional related symbols	To all screw threads
( (open parenthesis mark)	Number of the starts [followed by ) (closing parenthesis mark)]	Number of the starts followed by symbol STARTS	Only to multiple starts screw threads
- (dash)	Accuracy of the screw thread	According to standards for that type of thread- (usually class of fit, reference possibly preceded by SPL)	Only to the screw threads where there are several accuracy classes
- (dash)	Handedness of the screw thread	The letters RH for right-handed screw threads and LH for left-handed screw threads	Only for left handed screw threads. Right hand is specified only on the parts that are threaded with both handedness to avoid confusion
	Symbol of the gender of screw thread	Symbol EXT for external (male) screw threads and symbol INT for internal (female) screw threads	Only when the gender cannot be identified otherwise (eg on the drawing or by symbol of accuracy)
	Additional information about thread	Symbols defining according specific standards of the thread (eg thread bottom shape, the outer diameter of threaded pipe, etc.)	Only when definition standard indicates the need
( (open parenthesis mark)	Symbol of gauging system [followed by ) (closing parenthesis mark)]	Symbols by numbers of thread gauging system according standard ANSI B 1.3 or equivalent	Usually only for UN, UNR, UNJ screw threads



\* in the case of screw threads with a single start is directly written the pitch without symbol P;

\*\* this information is indicated as appropriate for multiple starts screw threads, when the standards provides more classes of accuracy and / or calibration system for the respective type of screw threads, for screw threads left handed and / or if they are necessary to fully identify the screw thread, in accordance with explanations in Table 5.

Figure 2: Designation of American Screw Threads Defined in accordance whit Metric System

Table 5: Designation of American Screw Threads Defined in accordance whit Metric System

The sign precedes the item notation	Noted item t	How item is noted	Case where item must be indicated
	Symbol of the screw thread	Symbols according to Appendix 1 including additional related symbols	To all screw threads
	Nominal size of the screw thread	The value of reference size in millimeters (usually major diameter of external screw thread) or reference dimension of the screw thread	To all screw threads
x (multiplication sign)	Pitch of the screw thread (in the case of multiple starts screw threads pitch of leads preceded by the letter L)	The value of pitch of the screw thread or of the pitch of the lead in millimetres	To all screw threads when the standard does not stipulate otherwise
- (dash)	Pitch of the screw thread (preceded by the letter P)	The value of pitch of the screw in millimetres	Only to multiple starts screw threads

( ( open parenthesis mark)	Number of the starts [followed by ) (closing parenthesis mark)]	Number of the starts followed by symbol STARTS	Only to multiple starts screw threads
- (dash)	Accuracy of the screw thread	According to standards for that type of thread- (usually class of tolerance reference possibly preceded by SPL)	Only to the screw threads where there are several accuracy classes
- (dash)	Handedness of the screw thread	The letters RH for right-handed screw threads and LH for left-handed screw threads	Only for left handed screw threads. Right hand is specified only on the parts that are threaded with both handedness to avoid confusion
	Symbol of the gender of screw thread	Symbol EXT for external (male) screw threads and symbol INT for internal (female) screw threads	Only when the gender cannot be identified otherwise (eg on the drawing or by symbol of accuracy)
	Additional information about thread	Symbols defining according to specific standards of the thread (eg modified root radius, modified limit deviations, etc)	Only when definition standard indicates the need
( ( open parenthesis mark)	Symbol of gauging system [followed by ) (closing parenthesis mark)]	Symbols by numbers of thread gauging system according to standard ANSI B 1.3 or equivalent	Only for metric screw threads (M and MJ)

Complete designation scheme of screw thread in metric system according to American standards is shown in Fig. 2 and explained in the Table 5. Although originating from states that are currently using imperial units system, in that the dimensions are expressed in millimeters and the periodicity by pitch, the unified miniature screw thread UNM and B.S.A screw thread BA belong to the metric system and will be presented within it, even if the order of the UNM screw thread definition elements is similar to the order for the screw threads in the American system.

#### EXAMPLES OF SCREW THREAD DESIGNATION

To illustrate the above principles in the following we present examples of designation of screw thread used in the United States of America. All examples relate to actual dimensions for the screw thread and, to this end, we used examples from the standards. It should be noted that the ways of designation shown in the examples are not limited to the type of screw thread that relates the example but also can be used when appropriate to any other application is possible. Presentation is structured according to the two types of designations.

##### **Designation of American screw threads defined in accordance with American system**

##### **Standard screw threads**

$\frac{1}{4}$ -20 UNC-2A (21) or 0.250-20 UNC-2A (21)

is a unified inch screw thread coarse series, external, with reference diameter  $\frac{1}{4}$  (0.250) in, t.p.i. 20 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 – 21.

$\frac{1}{4}$ -20 UNC-2A ASME B 1.1

represents the designation of the previous screw thread with specification of screw thread defining standard, as recommended by standard ASME Y 14.6. The gauging system according to the standard ANSI B 1.3 is not indicated in the screw thread designation because the indication of gauging system is not mandatory.

0.250–20UNRC–2B(22)

PD0.217–0.2164

represents the designation of the previous screw thread specifying the limit values of the pitch diameter, as recommended by the standard ASME Y 14.6. Specification is mandatory if the screw thread is subjected to a protective coating. If the screw thread is not subjected to protective coatings, the indication of the pitch diameter values is optional. 1-64 UNC-3B (23) or more correct #1-64 UNC-3B (23)

is a unified inch screw thread coarse series, internal, for a nut for a bolt conventionally noted #1 (with reference diameter 0.073 in), t.p.i. 64 in<sup>-1</sup>, class of fit 3, gauging system per standard ANSI B 1.3 – 22.<sup>2</sup>

10-30 UNJF-1B or, more correct, No. 10-30 UNJF-1B (22) or 0.190-32 UNJF-1B (22)

is a unified controlled radius root unified inch screw thread type UNJ with minor diameter increased type UNJ, fine series, internal, for a nut for a screw number 10 (with reference diameter 0.190 in), t.p.i. 30 in<sup>-1</sup>, class of fit 1, gauging system per ANSI B 1.3 – 22.

0.2500-28 UNJF-3A (22) AS 8879

is a unified controlled radius root unified inch screw thread with minor diameter increased type UNJ, fine series, internal, having reference diameter 0.2500 in, t.p.i. 28 in<sup>-1</sup>, class of fit 3, gauging system per standard ANSI B 1.3 – 22 for the case where the thread damage is not essential for safety, in accordance with standard SAE AS 8879.

0.2500-28 UNJF-3B- category 1 thread per SAE AS 8879

represents the designation of the screw thread above in an obsolete version according to standard SAE AS 8879-1996,

<sup>2</sup> Use of numeric symbols unmarked with the specific notation No. or # instead of size can cause confusion when this symbol is the same as the value of some reference dimensions (in the case of symbols represented by digits 1 to 6). Normally confusion should not occur because the reference diameters associated with these symbols have low values and implicitly t.p.i. have high values even in the case of threads of fine and extra-fine series. However, in order to avoid any confusion, we recommend consulting the standard to determine dimensional values

replaced. The specification "category 1" was considered default unless otherwise specified and may be omitted.

#### 0.2500-28 UNJF-3B - Other Thread MIL-S-8879

represents the designation of the previous screw thread in an obsolete version according to standard MIL-S-8879C-1991, canceled. The designer had mandatory to specify which features to be inspected and verified.

#### 0.2500-28 UNJF-3B- Other Thread MIL-S-7742

represents the designation of the previous screw thread in an obsolete version according to standard MIL-S-7742D-1991, currently inactive. The designer had mandatory to specify which features to be inspected and verified.

#### 0.2500-28 UNJF-3A (23) AS 8879

is a unified controlled radius root unified inch screw thread with minor diameter increased type UNJ, fine series, internal, with reference diameter 0.2500 in, t.p.i. 28 in<sup>-1</sup>, class of fit 3, gauging system per standard ANSI B 1.3 – 22, for the case where the thread damage is essential for safety in accordance with standard SAE AS 8879.

#### 0.2500-28 UNJF-3A category 2 thread per AS 8879

represents the designation of the screw thread above in an obsolete version according to standard SAE AS 8879-1996, replaced.

#### 0.2500-28 UNJF-3A-Safety Critical Thread per MIL-S-8879

represents the designation of the previous screw thread in an obsolete version according to standard MIL-S-8879C-1991, canceled.

#### 0.2500-28 UNF-3A-Safety Critical Thread MIL-S-7742

represents the designation of the previous screw thread in an obsolete version according to standard MIL-S-7742D-1991, currently inactive.

#### 0.250- 28 UNF- 2A (22)

PD 5.7353– 5.6515

(0.2258-0.2225in.)

is a unified inch screw, fine series, external, with reference diameter 0.250 in, t.p.i. 28 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 – 22, marked on a drawing in which the dimensions are indicated in millimeters. Specifying the limit values for the pitch diameter in inches is optional.

#### 0.250- 28 UNF- 2A (22)

PD 0.2258– 0.225

(5.753-5.715mm)

represents the designation of the previous screw thread, marked on a drawing in which the dimensions are indicated in inches. As we have shown above, if the thread is not subject to the coating, the indication of the pitch diameter values is optional. It is also optional to specify the limit values of the pitch diameter in millimeters.

#### 0.5-13 NC-5 HF (21)

is a standard Class 5 interference fit screw thread, external, with reference diameter 0.5 in, t.p.i. 13 in<sup>-1</sup> for ferrous alloy fasteners screwed into ferrous alloys with a hardness HB 160, gauging system per standard ANSI B 1.3 – 21.

#### 0.5-13 NC-5 IF (22)

is a standard Class 5 interference fit screw thread, internal, with reference diameter 0.5 in, t.p.i. 13 in<sup>-1</sup> for all ferrous materials, gauging system per standard ANSI B 1.3 – 22.

#### 0.658-11 NC-5 HFM

is a standard Class 5 interference fit screw thread, external, with reference diameter 0.658 in, t.p.i. 11 in<sup>-1</sup>, for nickel-copper (monel), nickel-copper-aluminum (K-monel) and hard ferrous material fasteners screwed into hard ferrous materials with hardness greater than 160 HB. The gauging system according to the standard ANSI B 1.3 is not indicated in the screw thread designation because the indication of gauging system is not mandatory.

#### 0.658-11 NC-5 IFM

is a standard Class 5 interference fit screw thread, internal, with reference diameter 0.625 in, t.p.i. 11 in<sup>-1</sup>, for all non-ferrous material. The gauging system according to the standard ANSI B 1.3 is not indicated in the screw thread designation because the indication of gauging system is not mandatory.

#### 1/4-20 UNC-2B thread per ASME B18.29.1

is a screw thread for helical wire inserts for unified inch screw thread coarse series, internal, with reference diameter 1/4 (0.250) in, t.p.i. 20 in<sup>-1</sup>, class fit of fit 2.

#### 0.3125– 24 UNF – 3B HELICAL COIL

INSERT THD.PER NASM33537

is designation, according to standard NASM 33537, of a screw thread for helical wire inserts for a unified inch screw thread, fine series, internal, with reference diameter 0.3125 in, t.p.i. 24 in<sup>-1</sup>, class of fit 2.

#### .80-36 AMO

is standard microscope objectives screw thread, with reference diameter 0.80 in, t.p.i. 36 in<sup>-1</sup>.

#### 1.750-4 ACME-2G (21)

is a standard ACME screw thread general-purpose class, with reference diameter 1.750 in, t.p.i. 4 in<sup>-1</sup>, class of fit 2, gauging system per ANSI B 1.3 – 21.

#### 1 1/4-4 NA-2

represents the designation of the screw thread above as per an old, obsolete version, according to Handbook H28 (1944).

**1.750-4.0 ACME-4C (21)**

is a standard ACME screw thread centralizing class, with reference diameter 1.750 in, t.p.i. 4 in<sup>-1</sup>, class of fit 4, gauging system per ANSI B 1.3 – 21

**0.500-10 STUB ACME (22)**

(designation in accordance with the standard 0.500-10 Stub Acme) is a standard STUB ACME screw thread, with reference diameter 0.5 in, t.p.i. 10 in<sup>-1</sup>, class of fit 2, gauging system per ANSI B 1.3 – 22 (the unique default class of fit of STUB ACME screw thread is equivalent to the 2G class of fit of ANSI B 1.5 standard for ACME screw threads).<sup>3</sup>

**1.750 -4 STUB ACME -3G (22)**

(designation in accordance with the standard 1.750 -4 Stub Acme-3G) is a standard STUB ACME screw thread, with reference diameter 1.750 in, t.p.i. 6 in<sup>-1</sup>, class of fit 3, gauging system per ANSI B 1.3 – 22 (the standard ANSI B 1.8 that defines the STUB ACME screw thread allows the use of the 3G and 4G fit classes according to the standard ASME 1.5. regarding ACME screw threads, when the need arises.).<sup>4</sup>

**2.5-8 BUTT-2A**

is a standard BUTTRESS screw thread used for pulling, external, with reference diameter 2.5 in, t.p.i. 8 in<sup>-1</sup> class of fit 2.

**2.5-8 ←( N BUTT-2**

represents the designation of the screw thread above as per an old, obsolete version, according to standard ANSI B 1.9-1953, replaced.

**2. 2.5-8 PUSH-BUTT-2B**

is a standard BUTTRESS screw thread used for pushing, internal, with reference diameter 2.5 in, t.p.i. 8 in<sup>-1</sup> class of fit 2.

**2.5-8 (← N BUTT-2**

represents the designation of the screw thread above as per an old, obsolete version, according to standard ANSI B 1.9-1953, replaced.

**<sup>3</sup>/<sub>4</sub>-18 NPT**

is a standard tapered pipe screw thread, with reference diameter <sup>3</sup>/<sub>4</sub>(0.750) in, t.p.i. 18 in<sup>-1</sup>.

<sup>3</sup> Considering the situation of the 2G fit class, the unique default fit class, this is not specified, being understood when the designation does not provide any class of fit. On the other hand, the standard ANSI B 1.3 does not indicate this type of thread as being the subject of its provisions and the standard ANSI B 1.8 does not indicate it in the related standards category nor does it present the calibration system in the designation examples, although the designation according to the standard ANSI Y 14.2 provides it. The standard ANSI B 1.8 refers to a future standard on the gauging system for ACME and STUB ACME screw threads, and for this reason we have retained its indication

<sup>4</sup> The standard ANSI B 1.3 does not indicate this type of thread as being the subject of its provisions and the standard ANSI B 1.8 does not indicate it in the related standards category nor does not present the calibration system in the designation examples, although the designation according to the standard ANSI Y 14.2 provides it. The standard ANSI B 1.8 refers to a future standard on the gauging system for ACME and STUB ACME screw threads, and for this reason we have retained its indication.

**<sup>1</sup>/<sub>8</sub>-27 NPTF-1**

is a standard tapered dryseal pipe screw thread of type 1, without controlled crest and root truncation, with reference diameter <sup>1</sup>/<sub>8</sub> (0.125) in, t.p.i. 27 in<sup>-1</sup>.

**<sup>1</sup>/<sub>8</sub>-27 DRYSEL NPTF**

represents the designation of the screw thread above as per an old, obsolete version according to MIL-STD-9A 1960.

**<sup>1</sup>/<sub>8</sub>-27 NPSF**

is a standard cylindrical dryseal pipe screw threads for fuel, internal, with reference diameter <sup>1</sup>/<sub>8</sub> (0.125), in, t.p.i. 27 in<sup>-1</sup>.

**<sup>1</sup>/<sub>8</sub>-27 DRYSEAL NPSF**

represents the designation of the screw thread above as per standard SAE J-476.

**1-14 F-PTF**

is a dryseal fine taper pipe screw thread, with reference diameter 1 in, t.p.i. 14 in<sup>-1</sup>.

**1-14 DRYSEAL F-PTF**

represents the designation of the screw thread above as per an old, obsolete version according to Handbook H28 (1957).

**3 -6 NH**

is a standard screw thread for hose coupling, with hose nominal size (inner diameter) 3 in, , t.p.i. 6 in<sup>-1</sup>.

**3" -6 NH**

represents the designation of the screw thread above as per an obsolete version in accordance with Progress Report of the National Screw Thread Commission (1920).

**<sup>1</sup>/<sub>2</sub>-14 NPSH**

is a standard screw thread for hose coupling, usually made with straight internal and external loose-fitting screw thread for joining to American standard taper pipe screw, with hose nominal size (inner diameter) <sup>1</sup>/<sub>2</sub> in, t.p.i. 14 in<sup>-1</sup>.

**0.825-14 NGO-RH-EXT**

is a national standard thread for gas outlet, with external reference diameter 0.825 in, t.p.i. 14 in<sup>-1</sup>.

**<sup>3</sup>/<sub>4</sub>-14 NGT (CI) -3**

(designation in accordance with the standard FED STD H28/9

$$\frac{3}{4} - 14 \text{ NGT (CI) } - 3$$

is a national standard thread for gas outlet used to cylinder valve inlet connections for chlorine, tapered, with external reference diameter <sup>3</sup>/<sub>4</sub>, t.p.i. 14 in<sup>-1</sup>, with oversized length as per type 3 (Values of oversize are expressed in values of additional turns of the gauge. For type 3 this value is 8<sup>1</sup>/<sub>3</sub>).

$\frac{3}{4}$ -14 SGT

is a special gas taper screw threads for gas cylinder valves with reference diameter (nominal inner diameter of the pipe to which the thread is applied)  $\frac{3}{4}$  in, t.p.i. 14 in<sup>-1</sup>.

$1\frac{1}{8}$ -9 SPL 60° FORM-EXT (22)

Major diam.1.125-1.1150

Pitch diam.1.070-1.0697

Minor diam.1.0183max.

Le1

(designation in accordance with the standard

$1-\frac{1}{8}$ -9 SPL 60° FORM-EXT (22)

Major diam.1.125-1.1150

Pitch diam.1.070-1.0697

Minor diam.1.0183max.

Le1

is designation, according to standard FED-STD H28/19A for an ACME thread modified at 60°, stub, external, with reference diameter  $1\frac{1}{8}$  (1.125) in, t.p.i. 9 in<sup>-1</sup>, with major diameter and pitch diameter prescribed by limit values, minor diameter prescribed by the maximum value and length of engagement prescribed by the nominal value.<sup>5</sup>

$1\frac{1}{8}$ -9 SPECIAL FORM 60° thread-EXT

Major diam.1.125-1.1150

Pitch diam.1.070-1.0697

Minor diam.1.0183 max

Le1

represents the designation of the screw thread above as per an obsolete version according to federal standard FED-STD H28/19-1978, replaced.

$1\frac{3}{4}$ -6 SPL 10° FORM-EXT

Major diam.1.3756-1.3650

Pitch diam.1.1844-1.1730

Minor diam.0.9166-0.866

Le 2.00

is a modified at 10° square screw threads, external, with reference diameter  $1\frac{3}{4}$  (1.750) in, t.p.i. 6 in<sup>-1</sup>, major diameter, pitch diameter and minor diameter prescribed by limit values and length of engagement prescribed by nominal value.

$1\frac{3}{4}$ -6 SPECIAL FORM 10° thread-EXT

Major diam.1.3756-1.3650

Pitch diam.1.1844-1.1730

Minor diam.0.9166-0.866

Le 2.00

represents the designation of the screw thread above as per an obsolete version according to federal standard FED-STD H28/19-1978 replaced.

5 Spec 5 CSG

is a screw thread for casing pipes, round, short, with reference diameter 5 in;

$6\frac{5}{8}$  Spec 5 LCSG

is a screw thread for casing pipes, round, long, with reference diameter  $6\frac{5}{8}$  in;

$9\frac{6}{8}$  Spec 5 BCSG

is a screw thread for casing pipes, buttress, with reference diameter  $9\frac{6}{8}$  in;

$7\frac{6}{8}$  Spec 5 XCSG

is a screw thread for casing pipes, extreme line, with reference diameter  $7\frac{6}{8}$  in;

8 Spec 5 LP

is a screw thread for line pipes, with reference diameter 8 in;

$4\frac{1}{2}$  Spec 5 TBG

is a screw thread for not upset tubing pipes, with reference diameter  $4\frac{1}{2}$  in;

$2\frac{7}{8}$  Spec 5 UP TBG

is a screw thread for external upset tubing pipes, with reference diameter  $2\frac{7}{8}$  in.

**Screw threads with special combination between diameter and t.p.i.**

$\frac{1}{4}$ -24 UNS-3A (22)

MAJOR DIA. .2428-.2300

PD .2201-.2229

MINOR DIA. .205 MAX.

is a unified inch screw thread with special combination between diameter and t.p.i, external, with reference diameter  $\frac{1}{4}$  in, t.p.i. 24 in<sup>-1</sup>, class of fit 3, gauging system calibration per ANSI B 1.3 - 22, having special limits of size (for special combination between diameter and t.p.i) prescribed according to standard ANSI B 1.1. Major diameter and pitch diameter are

<sup>5</sup> The standard FED-STD H28/19 asks to prescribe a gauging system in designation of ACME screw thread with profile angle 60°, stub. Although nor standard ANSI B 1.3 nor standard FED-STD H28/20 do not indicate this type of screw thread as being subject to its stipulations, because the standard FED-STD H28/19A. quotes the standard FED-STD H28/20 as a related one this prescription is justified

prescribed by limit values and minor diameter by maximum value.

**8.750–28 UNJS–3A (22)**

Major diam. 8.735–8.750

Pitch diam. 8.6625–8.6688

Minor diam. 8.5918–8.6056

Root radius 0.0188–0.0226

is a unified controlled radius root unified inch screw thread with minor diameter increased type UNJ, with special combination between diameter and t.p.i., external, with reference diameter 0.875 in, t.p.i. 28 in<sup>-1</sup>, class of fit 3, gauging system calibration per ANSI B 1.3 – 22, having special limits of size (for special combination between diameter and t.p.i.) prescribed according to standard ANSI B 1.15. Major diameter, pitch diameter, minor diameter and radius of root are prescribed by limit values.

**1.200-10 UNRS-2B (21)**

Minor diam. 1.092–1.113

Pitch diam. 1.1350–1.1430

Min. Major diam. 1.200 min

is a controlled radius root unified inch screw thread with special combination between diameter and t.p.i., internal, with reference diameter 1.200 in, t.p.i. 10 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 – 21, having special limits of size (for special combination between diameter and t.p.i.) prescribed according to standard ANSI B 1.1. Pitch diameter and minor diameter are prescribed by limit values and major diameter by minimum value.

**1.3125–32 UNJS-3A (22)**

Major diameter 1.306 to 1.3125

Pitch diameter 1.2541 to 1.2922

Minor diameter 1.2365 to 1.2764

Root radius 0.047 to 0.056

**AS 8879**

is a unified controlled radius root unified inch screw thread with minor diameter increased type UNJ, with special combination between diameter and t.p.i. in accordance SAE AS 8879, external, having reference diameter 1.3125 in, t.p.i. 32 in<sup>-1</sup>, class of fit 3, gauging system per standard ANSI B 1.3 – 22, for the case where the thread damage is essential for safety in accordance with standard SAE AS 8879, with special limits of size (for special combination between diameter and t.p.i.) prescribed according to standard SAE AS 8879. Major diameter, pitch diameter, minor diameter and radius of root are prescribed by limit values.

**1.3125–32 UNJS-3A thread per AS 8879**

Major diam. 1.3065–1.3125

Pitch diam. 1.2541–1.2922

Minor diam. 1.2365–1.2764

Root radius 0.047–0.056

represents the designation of the screw thread above in an obsolete version according to standard SAE AS 8879, replaced.

**1.3125–32 UNJS-3A Other Thread**

Major diameter 1.306 to 1.3125

Pitch diameter 1.2541 to 1.2922

Minor diameter 1.2365 to 1.2764

Root radius 0.047 to 0.056

**MIL-S-8879**

represents the designation of the screw thread above in an obsolete version according to standard MIL-S-8879C-1991, currently inactive.

**DRYSEAL 1/2-27 SPL-PTF, OD 0,500**

is designation, according to standard SAE J-476, of a sealing cylindrical thread for pipes, with special combination between diameter and t.p.i., with reference diameter 1/2 (0.500) in, t.p.i. 27 in<sup>-1</sup>, to which the outer diameter of the pipe is also specified.

**4-6 NH (SPL)**

is a standard threaded for hose coupling, with special combination between nominal size of hose and t.p.i., with hose nominal size 4 in, t.p.i. 6 in<sup>-1</sup>, used in the applications of the Navy.

### **External screw threads and internal screw threads**

**0.825-14 NPTR-EXT**

is railing joint taper pipe thread, external, with external reference diameter 0.825 in, t.p.i. 14 in<sup>-1</sup>.

**1/8-27 NPSC –INT**

(designation in accordance with the standard 1/8-27 NPSC -2B) is a American Standard Straight pipe threads in pipe couplings, internal, with external reference diameter 1/8 (0.125) in, t.p.i. 27 in<sup>-1</sup>.<sup>6</sup>

<sup>6</sup> For straight screw thread for free fittings mechanical joints NPSC in the dimensional table is shown the class fit 2 for bolt (2A) and for nut (2B). Because for this screw thread fit class is unique we consider being in accordance with general principles of designation not to indicate class of fit as it is done in the example of designation in the standard ANSI B 1.20.1. The gender of the screw thread, potentially inside or outside can be indicated it is necessary by symbols EXT and INT as is shown here.

**Left handed screw threads**

1 $\frac{1}{4}$ -4 ACME-2G-LH

is a standard ACME screw thread general-purpose class, with reference diameter 1 $\frac{1}{4}$  (1.250) in, t.p.i. 4 in<sup>-1</sup>, class of fit 2, left-handed.

**Screw threads with multiple starts**

0.750-0,250P-0.5L (2 STARTS)-STUB ACME-LH  
(designation in accordance with the standard 0.750-0,250P-0.5L -STUB ACME-3G LH)

is a standard STUB ACME screw thread, with reference diameter 0.75 in, pitch 0.250 in, lead pitch 0,5 in, 2 starts, left-handed.<sup>7</sup>

$\frac{3}{4}$ -4-0.5L STUB ACME-LH  
 $\frac{3}{4}$ -4 STUB ACME-LH-2 STARTS

represent the designations of the screw thread above as per old, obsolete versions, written on the models presented in 1963 Supplement to Handbook H 28 (1957).

0.250-0.05P-0.1L (2 STARTS)-DS-INT (22)  
(designation in accordance with the standard 0.2500-0.05P-0.1-DS-2B)

is a ACME screw thread modified at 60°, stub, with two starts, external, with reference diameter 0.250 in, screw thread pitch 0.05 in, lead pitch 0.1 in, gauging system per standard ANSI B 1.3 – 22.<sup>8</sup>

0.250-0.05P-0.1L (2 STARTS)-DS-EXT (22)  
(designation in accordance with the standard 0.2500-0.05P-0.1-DS-2A)

is an ACME screw thread modified at 60°, stub, with two starts, internal, with reference diameter 0.250 in, screw thread pitch 0.05 in, lead pitch 0.1 in, gauging system per standard ANSI B 1.3 – 22.

**Screw threads with special<sup>9</sup> and alternative forms**

$\frac{7}{16}$ –18 SPL 60 deg.Form–EXT (23)

Major diam.0.8750–0.8668

Pitch diam. 0.8384–0.8343

Minor diam.0.8068max.

Le 0.69

is a screw thread of UN type with a different form than the standard one, external, with reference diameter  $\frac{7}{16}$  (0.3475) in, t.p.i. 18 in<sup>-1</sup> gauging system per standard ANSI B 1.3 – 23. For this screw thread, major diameter and pitch diameter are prescribed by limits values, minor diameter by maximum value and length of engagement by nominal value.

$\frac{7}{16}$ –18 SPECIAL FORM-EXT

THREAD ANGLE 60°

MAJORDIA. .8750 - .8668

PD.8384 - .8343

MAX MINOR DIA .8098

LE .69

represents the designations of the screw thread above as per an old, obsolete version, according to 1963 Supplement to Handbook H 28 (1957).

$\frac{1}{2}$ -20 STUB ACME M1

is a standard STUB ACME screw thread, modified in accordance with shape M1 (with reference high of the screw thread reduced) with reference diameter  $\frac{1}{2}$  (0.5) in, t.p.i. 20 in<sup>-1</sup>.

2.500-8 BUTT-2A-LH-FL

is a standard BUTTRESS screw thread used for PULLING, external with reference diameter 2.5 in, t.p.i. 8 in<sup>-1</sup> class of fit 2, left-handed, with flattened root.

**Screw threads with modified crests**

$\frac{3}{8}$ –24 UNF–3A MOD (21)

Major diam.0.3720–0.3648MOD

is a unified inch screw thread fine series, external, with reference diameter  $\frac{3}{8}$  (0.375) in, t.p.i. 24 in<sup>-1</sup>, class of fit 3, gauging system per standard ANSI B 1.3 – 21, modified for different crests from the standard ones (situation denoted by MOD),. For this screw thread, major diameter is modified being prescribed by limits values (situation denoted by MOD).

(0.372\*) -24 UNF modified\*-3A (21)

represents the designation of the previous screw thread in an obsolete version according to 1950 Supplement to Handbook H 28 (1944).

<sup>9</sup> (for deviations from the standard form of the thread, for example, by the shape of the bottom and not conforming to another standard).

<sup>7</sup> The standard ANSI B 1.3 does not indicate this type of thread as being the subject of its provisions and the standard ANSI B 1.8 does not indicate it in the related standards category nor does it present the calibration system in the designation examples, although the designation according to the standard ANSI Y 14.2 provides it. The standard ANSI B 1.8 refers to a future standard on the gauging system for ACME and STUB ACME screw threads, and for this reason we have retained its indication. On the other hand, in order to observe the mode of designation of threads with multiple starts, we inserted in the designation the number of starts

<sup>8</sup> For this type of screw thread, standard MIL-STD-1373, which define it, indicates the class of fit 2 for bolt (2A) and for nut (2B). Because for this screw thread fit class is unique we consider being in accordance with general principles of designation not to indicate class fit as it is done in the example of designation in the standard MIL-STD-1373. The gender of the screw thread, potentially inside or outside can be indicated, it is necessary, by symbols EXT and INT as is shown here. At the same time, in order to observe the mode of designation of threads with multiple starts, we inserted in the designation the number of starts. On the other hand, although MIL-STD-1373 does not indicate the FED-STD-H28 / 20 standard (equivalent to ANSI B 1.3 standard) as related standards, by the fact that in this standard is quoted as a related standard FED-STD H28/19, which define STUB ACME screw thread with profile angle 60°, we indicated the calibration system as prescribed therein.

1½-10UNS-3BMOD (21)

Minor diameter.1.389–1.409MOD

PD1.4350–1.4412

Min.Major diameter1.500

is a unified inch screw thread with special combination between diameter and t.p.i, internal, with reference diameter 1½ in, t.p.i. 10 in<sup>-1</sup>, class fit of fit 3, gauging system per standard ANSI B 1.3 – 21, with minor diameter modified in order to modify crests (symbol MOD), with special limits of size (for special combination between diameter and t.p.i) prescribed according to standard ANSI B 1.1. For this screw thread minor diameter modified (situation denoted by MOD) and pitch diameter are prescribed by limits values and major diameter by minimum value.

1½-10UNS-3BMOD

MINOR DIA. 1.389–1.409–MOD

PITCH DIA. 1.4350–1.4412

MAJOR DIA. 1.500MIN

represents the designation of the previous screw thread in an obsolete version according to MIL-STD-9A-1960.

#### ***Screw threads with special tolerances***

#### ***Screw threads with tolerances not corresponding to computational formulae<sup>10</sup>***

7/16–24 UnifiedForm SPL – EXT (22)

Major diam.0.4340–4280SPL

Pitch diam.0.4065–0.4025SPL

Minor diam.0.3853max.

Le 0.38

is a screw thread with the form corresponding to standard unified inch screw thread but having tolerances not conform to standard, with reference diameter 7/16 (0.3475) in, t.p.i. 24 in<sup>-1</sup>, gauging system per standard ANSI B 1.3 – 22. For this screw thread, major diameter and pitch diameter are prescribed by limits values different from requirements of the standard (situation denoted by SPL), minor diameter by maximum value and engagement length by nominal value.

7/16–24 UNIFIED FORM – SPL

MAJOR DIA. .4340–.4280SPL

PITCH DIA. .4065–.4025SPL

MINOR DIA. .3853MAX.

LENGHT OF ENGAGEMENT = .38-IN.MIN.

represents the designation of the previous screw thread in an obsolete version according to MIL-STD=9A-1960.

7/16–24 UNIFIED FORM SPECIAL – EXT

Major diam.0.4340–4280SPL

Pitch diam.0.4065–0.4025SPL

Minor diam.0.3853max.

Le 0.38

represents the designation of the previous screw thread in an obsolete version according to 1963 Supplement to Handbook H28 (1957).

#### ***Screw threads with modified tolerances***

0.3125–24 UNF – 3B HELICAL COIL

INSERT THD.PER NASM33537

Minor diam.0.3215–0.3288

Pitch diam.0.3395–0.3421

Major diam.0.3666min.

(designation in accordance with the standard

MINOR DIA .3215-.3288

THD PER NASM33537FOR

.3125-24 UNF - 3B HELICAL COIL INSERT

PITCH DIA .3395–.3421

MAJOR DIA .3666MIN.

is designation, according to standard NASM 33537, of a screw thread for helical wire inserts for a thru-hole for a unified inch screw thread, fine series, internal, with reference diameter 0.3125 in, t.p.i 24 in<sup>-1</sup>. class of fit 3. For this screw thread, minor diameter and pitch diameter are prescribed by limits values, and major diameter by minimum value.<sup>11</sup>

#### ***Screw thread with lengths of engagement different from the standard ones***

½–13 UNC – SE2A (23)

Pitch diam.0.4485–0.4423

Le 1.00

is a unified inch screw thread, coarse series, external, with reference diameter ½ (0.500) in, t.p.i 13 in<sup>-1</sup> class of fit 2, with special length of engagement and modified tolerances according to this (SE symbol), gauging system per standard ANSI B 1.3 – 23. For this screw thread pitch diameter are prescribed by limits values and length of engagement by nominal value. Length of engagement is adjusted to two decimal places for use in determining GO gage length.

<sup>10</sup> (except for those modified for reason of special engagement length, truncating of screw threads crests and changing thread heights or adjusting diameters to allow coating)

<sup>11</sup> The order of the designation elements is different from the one in the reference standard to comply the order of the ANSI standards

½-13UNC-2 A (1" length of engagement)

represents the designation of the previous screw thread in an obsolete version according to 1950 Supplement to Handbook H28 (1944).

½-13UNS-2A

PITCH DIA. .4485-.4423

LENGHT OF ENGAGEMENT = 1.00-IN. MIN

represents the designation of the previous screw thread in an obsolete version according to MIL-STD-9A-1960, where the length of engagement is prescribed by minimum value.

¼-24UNS-SE3A (23)

Major diameter 0.2500-0.2428

PD 0.2290-0.2194

LE 0.88

is a unified inch screw thread with special combination between diameter and t.p.i, external, with reference diameter ¼ in, t.p.i 24 in<sup>-1</sup>, class of fit 3, with special length of engagement and modified tolerances according to this (symbol SE), gauging system calibration per ANSI B 1.3 - 23. For this screw thread major diameter and pitch diameter are prescribed by limits values, and length of engagement by nominal value.

¼-24UNS-3A

MAJOR DIA. .2500-.2428

PITCH DIA. .2290-.2428

MINOR DIA. .2049MAX.

LENGHT OF ENGAGEMENT = .88-IN. MIN.

represents the designation of the previous screw thread in an obsolete version according to MIL-STD-9A-1960.

¼-24UNS-SE3A (23)

Major diameter 0.2500-0.2428

PD 0.2290-0.2194

LE 0.88

is a unified inch screw thread with special combination between diameter and t.p.i, internal, with reference diameter ¼ in, t.p.i 24 in<sup>-1</sup>, class of fit 2, with special length of engagement and modified tolerances according to this (symbol SE), gauging system calibration per ANSI B 1.3 - 22. For this screw thread minor diameter and pitch diameter are prescribed by limits values and length of engagement equal to the length of gauge used for gauging by nominal value. Gauging will be done with gauge calculated for the prescribed values and with the length equal to the indicated length of engagement. This situation is indicated by setting the size of the length of the gauge instead of the length of engagement.

0.5025-13UNS-SE2B(22)

Minor diam. 0.420-0.437

PD 0.4525-0.4606

LG 1.00

represents the designation of the previous screw thread in an obsolete version according to standard ANSI B1.1-1982. In this variant, was indicated only the length of engagement, the gauge information being defaulted.

0.3706-24UNS-2A(22)

Major diameter 0.3965-0.3623

PD 0.3424-0.3386

LG Std.

is a unified inch screw thread with special combination between diameter and t.p.i, external, with reference diameter 0.3706 in, t.p.i 24 in<sup>-1</sup>, class of fit 2, with special length of engagement and tolerances, gauging system calibration per ANSI B 1.3 - 22. For this screw thread major diameter and pitch diameter are prescribed by limits values and length of engagement not indicated. Gauging will be done with gauge calculated for the prescribed values and with the standard length, This situation is indicated by the symbol standard (Std.) written for gauge length.

0.3706-24UNS-2A(22)

Major diameter 0.3965-0.3623

PD 0.3424-0.3386

LG Std.

represents the designation of the previous screw thread in an obsolete version according to standard ANSI B1.1-1982. In this variant, the length of engagement was conventionally indicated having a value equal to the reference diameter rounded to 2 digits after the decimal point, which implicitly indicates that the length of the gauge is the standard length.

0.500-20UNF-3A SPL (21)

LG 1.00 SPL

is a unified inch screw thread fine series, external, with reference diameter 0.500 in, t.p.i 20 in<sup>-1</sup>, class of fit 3, with special length of engagement (symbol SPL), but with tolerances according to standard length of engagement, gauging system per standard ANSI B 1.3 - 21. The length of engagement, expressed through the length of the gauge, is prescribed by the nominal value. The gauge will be executed for standard tolerances but will have the length modified according to the length of the screw thread, situation indicated by the symbol SPL.

0.500-20UNF-3A SPL (21)

Le 1.00 SPL

represents the designation of the previous screw thread in an obsolete version according to standard ANSI B1.1-1982. In this

variant was indicated only the length of engagement, the gauge information being defaulted. The fact that the length of the gauge was increased was indicated by the symbol SPL.

#### $\frac{1}{8}$ -27 PTF-SPL SHORT

is a standard tapered sealing pipe screw thread shorter than PTF SAE SHORT, with reference diameter  $\frac{1}{8}$  (0.125) in, t.p.i. 27 in<sup>-1</sup>.

0.500–16 ACME–3G–SPL–EXT (22)

Major diam.0.4900–0.5000

Pitch diam.0.4586–0.461

Minor diam.0.4193–0.4275

Le1.50

(designation in accordance with the standard

0.500–16 ACME–3G–SPL (22)EXT)

Major diam.0.4900–0.5000

Pitch diam.0.4586–0.461

Minor diam.0.4193–0.4275

Le1.50

is a standard ACME screw thread general-purpose class, but having modified tolerances according to the calculation formulae for a length of engagement greater than twice the reference diameter (situation marked by the symbol SPL) with reference diameter 0.500 in, t.p.i. 16 in<sup>-1</sup>, class of fit 3, gauging system per ANSI B 1.3 – 22, having major, pitch and minor diameter prescribed by limits values, and length of engagement prescribed by nominal value.<sup>12</sup>

#### **Screw threads with modified gauging system**

$\frac{1}{4}$ –20 UNF–2A (22S)

Size Measurement Value Required

is a unified inch screw thread, fine series, external, with reference diameter  $\frac{1}{4}$  (0.250) in, t.p.i. 20 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 – 21 modified (situation denoted by S), in the sense of requirement to measure dimension values.

$\frac{1}{4}$ –20 UNRC–2A (22S)

Root Radius Control Required

is a controlled radius root unified inch screw thread, coarse series, external, with reference diameter  $\frac{1}{4}$  (0.250) in, t.p.i. 20

in<sup>-1</sup>, class fit of 2, gauging system per standard ANSI B 1.3 – 22 modified (situation denoted by S), in the sense of requirement to control root radius.

#### **Coated screw threads**

$\frac{3}{4}$ –18 NPT

AFTER PLATING

is a standard tapered pipe thread, with reference diameter  $\frac{3}{4}$  (0.750) in, t.p.i. 18 in<sup>-1</sup>, which dimensions are prescribed before plating. Dimensions are to be held after plating with the allowance not used to accommodate plating.

$\frac{3}{4}$ –10 UNC–2A(21) AFTER COATING

Coating Thickness 0.0002–0.0003 in

is a unified inch screw thread, coarse series, external, with reference diameter  $\frac{3}{4}$  (0.750) in, t.p.i. 10 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 – 21, having after coating a layer with thickness between 0.0002 and 0.0003 in.

$\frac{1}{2}$ –13 UNC–2A(21)

Coating Thickness 0.0004 in

is a unified inch screw thread, coarse series, external, with reference diameter  $\frac{1}{2}$  (0.500) in, t.p.i. 13 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 – 21, having after coating a layer with thickness 0.0004 in.

$\frac{3}{4}$ –10 UNC–2A (21)

After Coating

Max. major diameter 0.7500

Max. PD 0.6850

Before Coating

Major diameter 0.7482–0.7353

PD 0.6832–0.6773

is a unified inch screw thread, coarse series, external, with reference diameter  $\frac{3}{4}$  (0.750) in, t.p.i. 10 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 – 22. For this thread are prescribed maximum values for the major diameter and pitch diameter after coating and limit values before protective coating. The limit values before coating correspond to the values for a standardized fit class of the thread and their prescription is optional. Specified standard class 2A dimensions are to be held before coating and allowance is to accommodate coating (default condition).

$\frac{3}{4}$ –10 UNC–2A (21)

Major diam.0.7500max.

Pitch diam.0.6850max.

} AFTER COATING

Major diam.0.7482–0.7353

Pitch diam.0.6832–0.6773

} BEFORE  
COATING

<sup>12</sup> Although the standard ANSI B 1.3 does not indicate this type of thread as being subject to its provisions and the standard ANSI B 1.5 does not present this system in the designation examples, because the standard ANSI B 1.3 is quoted as a related standard in the standard ANSI B 1.5 we have prescribed the gauging system as required by the ANSI Y 14.2. The order of the elements in the designation is different from the one in the reference standard, in order to comply with the general order of the ANSI standards.

represents the designation of the previous screw thread in an obsolete version according to standard ANSI B1.1-1982.

$\frac{3}{4}$ –10UNC–2B(21)

#### After Coating

Min.minordiameter.0.196

Min.PD 0.2175

#### Before Coating

Minor diameter 0.197–0.208 SPL

PD 0.2186–0.2259 SPL

is a unified inch screw thread, coarse series, internal, with reference diameter  $\frac{3}{4}$  (0750) in, t.p.i. 20 in<sup>-1</sup>, class of fit 2, gauging system per standard ANSI B 1.3 - 21. For this thread are prescribed minimum values for the minor diameter and pitch diameter after coating and their limit values before protective coating, calculated according to special rules, situation indicated by the symbol SPL. For this thread are prescribed minimum values for the minor diameter and pitch diameter after coating and limit values before protective coating. The limit values before coating do not correspond to the values for a standardized fit class of the thread and their prescription is mandatory when the manufacturer and the user have agreed that, in order to align the cover with the thread precision fit, is needed a certain tolerance. Sizes are to be held after coating and there is no allowance to accommodate coating (default condition). Specifying the dimensions obtained after coating is optional.

$\frac{1}{4}$ –20UNC–2B(21)

Minor diam.0.196min.	}	AFTER COATING
Pitch diam.0.2175 min.		
Minor diam.0.197–0.208 SPL	}	BEFORE , COATING
Pitch diam.0.2186–0.2259 SPL		

represents the designation of the previous screw thread in an obsolete version according to standard ANSI B1.1-1982.

$\frac{3}{8}$ –18NPTF–1L<sub>1</sub> RING GAGE LIMITS

$2\frac{3}{4}$  to  $4\frac{3}{4}$  turns engagement before plating

$2\frac{1}{4}$  to  $4\frac{3}{4}$  turns engagement after plating

is a standard tapered sealing pipe screw thread of type 1, without controlled crest and root truncation, external, with reference diameter  $\frac{3}{8}$  (0.375) in, t.p.i. 18 in<sup>-1</sup>. For this thread values of tolerances are prescribed by positions of reference plane of plug gauge L<sub>1</sub> defined in standard ANSI B 1.20.5, expressed in turns (equivalent to the displacements measured in pitches) against the theoretical reference plane of the screw thread before and after plating with a thickness of 0.00002 in.

$\frac{3}{8}$ –18NPTF–1L<sub>2</sub> RING GAGE LIMITS

$2\frac{1}{4}$  to  $3\frac{1}{4}$  turns beyond actual L<sub>1</sub> gage

turns engagement before and after plating

is a standard tapered sealing pipe screw thread of type 1, without controlled crest and root truncation, external, with reference diameter  $\frac{3}{8}$  (0375) in, t.p.i. 18 in<sup>-1</sup>. For this thread values of tolerances are prescribed by positions of reference plane of plug gauge L<sub>3</sub> defined in standard ANSI B 1.20.5, expressed in turns (equivalent to the displacements measured in pitches) against the theoretical reference plane of the screw thread before and after plating with a thickness of 0.00002 in.

$\frac{3}{8}$ –18NPTF–1L<sub>1</sub> PLUG GAGE LIMITS

3 to  $4\frac{3}{4}$  turns engagement before plating

$2\frac{3}{4}$  to  $4\frac{3}{4}$  turns engagement after plating

is a standard tapered sealing pipe screw thread of type 1, without controlled crest and root truncation, internal, with reference diameter  $\frac{3}{8}$  (0375) in, t.p.i. 18 in<sup>-1</sup>. For this thread values of tolerances are prescribed by positions of reference plane of plug gauge L<sub>1</sub> defined in standard ANSI B 1.20.5, expressed in turns (equivalent to the displacements measured in pitches) against the theoretical reference plane of the screw thread before and after plating with a thickness of 0.00002 in.

$\frac{3}{8}$ –18NPTF–1L<sub>3</sub> PLUG GAGE LIMITS

$2\frac{1}{4}$  to  $3\frac{1}{4}$  turns beyond actual L<sub>1</sub> gage

turns engagement before and after plating

is a standard tapered sealing pipe screw thread of type 1, without controlled crest and root truncation, with reference diameter  $\frac{3}{8}$  (0375) in, t.p.i. 18 in<sup>-1</sup>. For this thread values of tolerances are prescribed by positions of reference plane of plug gauge L<sub>3</sub> defined in standard ANSI B 1.20.5, expressed in turns (equivalent to the displacements measured in pitches) against the theoretical reference plane of the screw thread before and after plating with a thickness of 0.00002 in.

#### Obsolete designation

$\frac{1}{4}$ -27 UNS-2A

was a unified inch screw thread with special combination between diameter and t.p.i., external, with reference diameter  $\frac{1}{4}$  in, t.p.i. 27 in<sup>-1</sup>, class of fit 2, used for threaded thin-walled pipes and tubing.

$\frac{1}{4}$ -24 UNS-1AR

was a unified inch screw thread with special combination between diameter and t.p.i., external, with reference diameter  $\frac{1}{4}$  (0.250) in, t.p.i. 24 in<sup>-1</sup>, class of fit 1R with minimal clearance and increased tolerance for quick and easy assembly for damaged or dirty threads, situation noted with R, which provides an increased medium clearance for the screw thread (limit deviations and tolerances defined by this symbol were a combination between tolerances of class of fit 1 for unified inch screw threads type UN and deviations of class of fit 1 of American national form screw thread type N).

0.2500-32 UNJEF-3BG-Safety Critical Thread per MIL-S-8879

was a unified inch screw thread with controlled radius root, extra fine series, internal, with reference diameter 0.250 in,

t.p.i.  $32\text{ in}^{-1}$ , class of fit 3, for high-temperature use (symbol G), for the case where the thread damage is essential for safety in accordance with standard MIL-S-88798C-1991, obsolete. Marking with the letter G was used for quick assemblies when there needs to be a clearance between the thread and the nut for correct lubrication or compensation of the expansion, highlighted the need for special measures..This class of fit (3G) is no longer used in new constructions.

$\frac{3}{4}$  – 10 SPL FORM

THREAD ANGLE  $55^\circ$

MAJORDIA. .7500 - .7428

PITCH DIA. .6860 - .6820

MINOR DIA .6220MAX.

LENGHT OF ENGAGEMENT – .80 - IN. MIN

was a thread with a different shape from the standard UN thread shape, external, with reference diameter  $\frac{3}{4}$  (0.750) in, t.p.i  $10\text{ in}^{-1}$ , having profile angle  $55^\circ$  For this screw thread major and pitch diameter are prescribed by limits values, minor diameter by maximum value and lenght of engagement by minimum value.

$\frac{3}{4}$  – 16 UNS – 2A

MAJOR DIA. .7385 – .7300 – MOD

PITCH DIA. .7079 – .7026

MINOR DIA. .6718MAX.

LENGHT OF ENGAGEMENT = .1.50 - IN. MIN.

was a unified inch screw thread, fine series, external, with reference diameter  $\frac{3}{4}$  in, t.p.i  $16\text{ in}^{-1}$ , class of fit 2, with major diameter modified and special length of engagement and modified tolerances in accordance with the length of engagement, situation marked by the transformation of the UNF symbol into the UNS, having major diameter and pitch diameter by limits values, minor diameter by maximum value and length of engagement by minimum value. The fact that the limit values prescribed for the external diameter are determined for the particular length of engagement is marked by the symbol MOD.

$\frac{3}{4}$  – 16 UNF – 3A

PD .3468 – .3430

LOFUNCTIONAL DAMETER

was a unified inch screw thread, fine series, external, with reference diameter  $\frac{3}{4}$  (0.750) in t.p.i  $24\text{ in}^{-1}$ , class of fit 3, to which was required only checking the minimum value of the pitch diameter, as virtual functional diameter, by LO gauge.

$\frac{3}{4}$  – 24 UNC – 2A

PD .3331 – .3287

LOPITCH DAMETER

was a unified inch screw thread, coarse series, external, with

reference diameter  $\frac{3}{4}$  (0.750) in, t.p.i  $24\text{ in}^{-1}$ , class of fit 2, to which is required only checking the minimum value of the pitch diameter, as single control element, by LO gauge.

$\frac{3}{4}$  - 10 UNC - 2A - COATED

PITCH DIA .2175 MAX AFTER COATING

was a unified inch screw thread, coarse series, external, with reference diameter  $\frac{3}{4}$  (0.750) in, t.p.i.  $10\text{ in}^{-1}$ , class of fit 2, to which was prescribed maximum value of pitch diameter after coating. The method was used for general purpose applications.

$\frac{3}{4}$  - 10 UNC - 2A

PITCH DIA.  $\left\{ \begin{array}{l} .2164 - .2127 \\ \text{(BEFORE COATING)} \\ .2175\text{MAX} \\ \text{(AFTREER COATING)} \end{array} \right.$

was a unified inch screw thread, coarse series, external, with reference diameter  $\frac{3}{4}$  in, t.p.i.  $10\text{ in}^{-1}$ , class of fit 2, to which was prescribed limits values of pitch diameter after coating and maximum value of pitch diameter before coating. The method was used for threads for critical application where uncoated thread and coating build-up must be controlled.

$\frac{3}{4}$  – 10 UNC – 2AG (22)

Major diam.0.7482max.  $\left\{ \begin{array}{l} \text{AFTER COATING} \\ \text{BEFORE COATING} \end{array} \right.$   
Pitch diam.0.6832 max  
Major diam.0.7464 – 0.7335SPL  
Pitch diam.0.6814 – 0.6755SPL

was a unified inch screw thread, coarse series, external, with reference diameter  $\frac{3}{4}$  (0.750) in, t.p.i.  $10\text{ in}^{-1}$ , class of fit 2, gauging system per standard ANSI B 1.3 – 22. Marking with the letter G was used for quick assemblies when there needs to be a clearance between the thread and the nut for correct lubrication or compensation of the expansion, highlighted the need for special measures. This class of fit (2G) is no longer used in new constructions. For this thread were prescribed maximum values for the major diameter and pitch diameter after coating and theirs limit values before protective coating, calculated according to special rules, indicated by the symbol SPL. Gauging was done with gauge calculated for the prescribed values and with the standard lenght.

### Obsolete screw threads<sup>13</sup>

#### Standard screw threads

1-8 NC-1

was an American national form screw thread coarse series with reference diameter 1 in, t.p.i.  $8\text{ in}^{-1}$ , class of fit 1.

1"-8 NC-I

<sup>13</sup>We refer only to the obsolete screw threads which designation was prescribed by some officil documents (standards, norms, or drawing issued by an officially recognized entity ).

represented the designation of the previous screw thread in an obsolete version according to Progress Report of the National Screw Thread Commission (1920).

1 in.-8 NC-I

represented the designation of the previous screw thread in an obsolete version according to standard ASA B 1.1-1935.

1-8 NC-1; PD 09154-0.9043

represented the designation of the previous screw thread in an obsolete version specifying the pitch diameter by the limit values according to the recommendations from SAE Screw Thread Manual (1947).

$\frac{1}{2}$ -13 NC-2A

was an American national form screw thread, coarse series, with reference diameter  $\frac{1}{2}$  in, t.p.i. 13 in<sup>-1</sup>, class of fit 2 having the dimensions according to the American national screw thread type N and deviations and tolerances according to unified screw thread type UN, designated in accordance with recommendations from 1950 Supplement to Handbook (1944).

1-14 NF-4

was a American national form screw thread, fine series, with reference diameter 1 in, t.p.i. 14 in<sup>-1</sup>, class of fit 4.

1-20 NEF-3

was an American national form screw thread, extra fine series, with reference diameter 1 in, t.p.i. 20 in<sup>-1</sup>, class of fit 3.

$1\frac{1}{8}$ -8N-2

was an American national form screw thread with constant t.p.i., with reference diameter  $1\frac{1}{8}$  in, t.p.i. 8 in<sup>-1</sup>, class of fit 2.

$1\frac{1}{8}$ -8 L.H. N-2

represented the designation of the previous screw thread, left-handed, in an obsolete version according to Report of the National Screw Thread Commission (1924)

$\frac{1}{4}$ -24 NS-3

was an American national form screw thread with special combination between diameter and t.p.i. which was found in standardized combinations, with reference diameter  $\frac{1}{4}$  in, t.p.i. 24 in<sup>-1</sup>, class of fit 3.

$3\frac{1}{4}$ -16NS-1

MAJOR DIA. .3.2482-3.2356

PITCH DIA. 3.2076-3.1981

MINOR DIA. 3.1715MAX.

LENGHT OF ENGAGEMENT = .1.50-IN.MIN.

was an American national form screw thread with special combination between diameter and t.p.i. which was not found in standardized combinations, with reference diameter  $3\frac{1}{4}$  in,

t.p.i. 16 in<sup>-1</sup>, class of fit 13 having major diameter and pitch diameter prescribed by special limits values, minor diameter by maximum value and length of engagement by minimum value.

$\frac{3}{4}$  in.-210 NC-7

was a screw thread for high strength bolting coarse series, with reference diameter  $\frac{3}{4}$  in, t.p.i. 0.210 in<sup>-1</sup>, class of fit 7 (characteristic of this type of screw thread)

2 in.-8 N-7

was a screw thread for high strength bolting with constant t.p.i., with reference diameter 2 in, t.p.i. 8 in<sup>-1</sup>, class of fit 7 (characteristic of this type of screw thread).

$\frac{1}{4}$ -24NS-3A

PD 0.2229-0.2198

Length of engagement 0.875

was an American national form screw thread with special combination between diameter and t.p.i. which did not find in standardized combinations, with reference diameter  $\frac{1}{4}$  in, t.p.i. 24 in<sup>-1</sup>, class of fit 3 and dimensions and deviations calculated according to the standard for unified screw thread type UN, according to the Handbook H28 (1957). In the designation had to prescribe the extreme values for the pitch diameter and nominal value of the length of engagement.

1-14 UNK-2A

was a controlled radius root unified inch screw thread, dimensionally identical to the UNR but having tolerated dimension of minor diameter and additional measurement requirements (root radius, minor diameter, angle and lead tolerance), external, with reference diameter 1 in, t.p.i. 14 in<sup>-1</sup> class of fit 2.<sup>14</sup>

$1\frac{1}{2}$ -6 TWC 2

was an (American) truncated Whitworth form screw thread in accordance with War Standard ASA B. 1.6, coarse series, with reference diameter  $1\frac{1}{2}$  in, t.p.i. 6 in<sup>-1</sup>, class of fit 2.

$\frac{1}{2}$ -16 TWF-  $1\frac{1}{2}$

was an (American) truncated Whitworth form screw thread in accordance with War Standard ASA B. 1.6, fine series, with reference diameter  $\frac{1}{2}$  in, t.p.i. 16 in<sup>-1</sup>, class of fit  $1\frac{1}{2}$ .

1-11-TWPP-2

was an (American) truncated Whitworth form screw thread in accordance with War Standard ASA B. 1.6 for pipe (parallel), with reference diameter 1 in, t.p.i. 11 in<sup>-1</sup>, class of fit 2.

1-18 TWS-2

was an (American) truncated Whitworth form screw thread in accordance with War Standard ASA B. 1.6 with special

<sup>14</sup> Presumed designation based on general designation rules, in the absence of access to the draft standard ASME B 1.14.

combination between diameter and t.p.i., with reference diameter 1 in, t.p.i. 18 in<sup>-1</sup>, class of fit 2.

1-11<sup>1</sup>/<sub>4</sub> NPS

was an American standard pipe screw threads, straight, internal, with reference diameter 1 in, t.p.i. 11 in<sup>-1</sup>.<sup>15</sup>

1"-11<sup>1</sup>/<sub>4</sub> NPS

represented the designation of the previous screw thread in an obsolete version according to Progress Report of the National Screw Thread Commission (1920).

<sup>1</sup>/<sub>8</sub>-27 NPSG

was a standard pipe screw thread, used for lubricators with cup, with reference diameter <sup>1</sup>/<sub>8</sub> (0.1250) in, t.p.i. 27 in<sup>-1</sup>.

1.034-14 NGO (CI)

was a national standard thread for gas outlet used to cylinder valve inlet connections for chlorine, tapered, with external reference diameter 1.034 in, t.p.i. 14 in<sup>-1</sup>.

<sup>3</sup>/<sub>4</sub>-14 NPT Spec 2

was a standard tapered pipe screw thread used to cylinder valve inlet connections for chlorine, with external reference diameter <sup>3</sup>/<sub>4</sub>, t.p.i. 14 in<sup>-1</sup>, with oversized length as per type 2 (values of oversize are 0.0179 in for the length, respectively 4 turns).

4-7 Spec 3

(designation in accordance with gages marking 4 CABLE)

was a screw thread for cable drilling tools, with reference diameter (maximum major diameter of the pin) 4 in t.p.i. 7 in<sup>-1</sup>.<sup>16</sup>

### **Screw threads with special forms**

<sup>7</sup>/<sub>8</sub> – 24 SPECIAL FORM - EXT

THREAD ANGLE 60°

MAJORDIA. .8384 - .8668

PD.8384- .8343

MAX MINOR DIA .8068(as gaged)

LE <sup>1</sup>/<sub>16</sub> in.min

was a screw thread with special forme, profile angle 60°, with reference diameter <sup>7</sup>/<sub>8</sub> in, t.p.i. 24 in<sup>-1</sup>. For this screw thread major diameter and pitch diameter were prescribed by limits values, minor diameter by maximum value and and length of engagement by minimum value. Value of minor diameter is checked only by the gages.

### **Screw threads with modified crests**

2 - 14 NS - 2 MOD

(Major diameter 1.998 - 1.985 MOD)

was an American national form screw thread with special combination between diameter and t.p.i., with reference diameter 2 in, t.p.i. 14 in<sup>-1</sup>, class of fit 2, modified for to different crests from the standard ones (situation denoted by MOD). For this screw thread, major diameter was modified being prescribed by limits values (situation denoted by MOD).

(1.998)\*-14 NS nonstd.\*-2

represented the designation of the previous screw thread in an obsolete version according to Handbook H28 (1944).

### **Screw threads with tolerances not to standard formulation**

<sup>7</sup>/<sub>16</sub> – 24 Am Nat Form – SPECIAL

Major diam.0.4340– 0.4250SPL

Pitch diam.0.4065– 0.4025SPL

Length of engagement <sup>8</sup>/<sub>4</sub> min

was a screw thread with the form corresponding to standard American national form screw thread but having tolerances not conform to standard (situation denoted by SPECIAL), with reference diameter <sup>7</sup>/<sub>16</sub> in, t.p.i. 24 in<sup>-1</sup>. For this screw thread major diameter and pitch diameter were prescribed by limits values different from requirements of the standard (situation denoted by SPL), and the length of engagement by nominal value.

<sup>1</sup>/<sub>4</sub> -20 NC (modified); PD 0.2175-0.2139 (undersize)

was an American national form screw thread, coarse series, with reference diameter <sup>1</sup>/<sub>4</sub> in, t.p.i. 20 in<sup>-1</sup>, at which pitch diameter was reduced (situation marked with modified), being prescribed by the limit values and the fact that it was reduced is indicated by the notation "undersize" as recommended in SAE Screw Thread Manual (1947).

### **Foreign screw threads which have been prescribed for use in the US<sup>17</sup>**

<sup>1</sup>/<sub>4</sub> in-20 BSW (close) external threads

is a British screw thread Whitworth standard, coarse-pitch series, external, with reference diameter <sup>1</sup>/<sub>4</sub> in, t.p.i. 20 in<sup>-1</sup>, tolerance class close.

<sup>1</sup>/<sub>2</sub> in-10 BSF (free) internal thread

is a British screw thread Whitworth standard, fine-pitch series, internal, with reference diameter <sup>1</sup>/<sub>2</sub> in, t.p.i. 10 in<sup>-1</sup>, tolerance class free.

0.8-36 BSMO

<sup>15</sup> The straight American standard pipe screw threads without specified use was presented in the standardization documents until 1942 although the symbol of this thread existed within standardization documents until 1969.

<sup>16</sup> API Specification 3-1988 did not specify the designation of the screw threads. This designation mode is compliant with the marking requirements of the parts connections.

<sup>17</sup>We refer only to the obsolete screw threads which designation were prescribed by some official documents (standards, norms or drawing issued by an officially recognized entity). These screw threads may still be in use in their home country (UK) but American documents prescribing their use in the U S are obsolete.

is a British standard microscope objectives screw thread, with reference diameter 0.80 in, t.p.i., 36 in<sup>-1</sup>.

20 BS Buttress thread 8 tpi medium class

is a British screw thread BUTTRESS, standard form, with profile angles 45° and 7°, with reference diameter 20 in, t.p.i. 8 in<sup>-1</sup>, tolerance class medium.

6 BS Buttress thread (special form) 5 tpi close

is a British screw thread BUTTRESS, special form with profile angles 52° and 0°, with reference diameter 6 in, t.p.i. 5 in<sup>-1</sup>, tolerance class close.

1.0×8 R.S.M. (B) INT for 0.01 in. sheet

is a British rolled sheet metal screw thread general purpose, internal, with reference diameter (major diameter of internal screw thread) 1.0 in, t.p.i. 8 in<sup>-1</sup>, grade B (free fit), and the thickness of the metal for which the thread form is required 0.01 in.

### ***Screw thread without standardized designation***

#### ***American national screw thread with rounded root, modified as per SAE AS 82<sup>18</sup>***

1<sup>1</sup>/<sub>8</sub>-16 NR PER AS 82 (22)

is a national American screw thread with rounded root, modified, with reference diameter 1<sup>1</sup>/<sub>8</sub> (1.125) in, t.p.i. 16 in<sup>-1</sup> and precision in accordance with standard SAE AS 82, gauging system per standard ANSI B 1.3 – 22.<sup>19</sup> This type of screw thread is not used for new construction.

#### ***Standard class 5 interference fit screw thread<sup>20</sup>***

0.250-20 NC-5 HFK

is a standard class 5 interference fit screw thread, external, with reference diameter 0.250 in, t.p.i. 20 in<sup>-1</sup> for nickel-copper-aluminum (K-monel) fasteners screwed into hard ferrous alloys with a hardness more HB 160. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized; gauging system per standard ANSI B 1.3

0.3125-18 NC-5 CSFK

is a standard class 5 interference fit screw thread external with reference diameter 0.3125 in, t.p.i. 18 in<sup>-1</sup> nickel-copper-aluminum (K-monel) fasteners screwed into soft ferrous and copper alloys with a hardness 160 HB or less. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized;

<sup>18</sup> The standard does not prescribe a designation for these screw threads. We propose this method of designation, in accordance with general structures of designation

<sup>19</sup> Although the standard ANSI B 1.3 does not indicate this type of thread as being subject to its provisions because to national American screw thread class 5 interference fit NC-5 according to the standard ANSI B 1.12M is applied ANSI B 1.3 gauging system, it is justified the use of the gauging system also to national American screw thread with rounded root NR according to SAE AS 82B-1996

<sup>20</sup> The standard does not prescribe a designation for these screw threads. We propose this method of designation, in accordance with general structures of designation

0.3750-16 NC-5 ONFK

is a standard class 5 interference fit screw thread, external, with reference diameter 0.3750 in, t.p.i. 16 in<sup>-1</sup>, for nickel-copper-aluminum (K-monel) fasteners screwed into non-ferrous alloys other of those of copper. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized.

0.500-13 NC-5 HFS

is a modified class 5 interference fit screw thread, external, with reference diameter 0.500 in, t.p.i. 13 in<sup>-1</sup>, for ferrous alloys fasteners screwed into hard ferrous alloys with a hardness more HB 160. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized.

0.5625-12 NC-5 CSFS

is a modified class 5 interference fit screw thread, external, with reference diameter 0.5625 in, t.p.i. 12 in<sup>-1</sup>, for ferrous alloys fasteners screwed into soft ferrous and copper alloys with a hardness 160 HB or less. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized;

0.6258-11 NC-5 ONFS

is a modified class 5 interference fit screw thread, external, with reference diameter 0.6258 in, t.p.i. 11 in<sup>-1</sup>, for ferrous alloys fasteners screwed into soft non-ferrous alloys other of those of copper. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized;

0.2500-20 NC-5 IFS

is a standard class 5 interference fit screw thread, internal, with reference diameter 0.250 in, t.p.i. 20 in<sup>-1</sup>, for all ferrous alloys. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized;

0.3125-18 NC-5 INFS

is a standard class 5 interference fit screw thread, internal, with reference diameter 0.3125 in, t.p.i. 18 in<sup>-1</sup>, for a non-ferrous alloys. Gaging system is the one specified in the standard, 23 per standard ANSI B 1.3 with some modifications, and is not symbolized;

½-13 NC - TENTATIVE 5 (22)

is a class 5 interference fit screw thread in accordance with Report of the National Screw Thread Commission 1928, identified as the variant TENTATIVE, for hardened steel screwed into hard materials cast iron, steel, bronze, with reference diameter ½ in, t.p.i. 13 in<sup>-1</sup>, gauging system calibration per ANSI B 1.3 – 22.<sup>21</sup>

<sup>21</sup> This designation is proposed based on the way of identifying the TENTATIVE variant for the class 5 interference fit screw thread in the 1950 Supplement to Handbook H-28 (1944)

**$7/8$ -9 NC - ALTERNATE 5 (22)**

is a class 5 interference fit screw thread in accordance with Handbook H 28 Screw-Thread Standards for Federal Services (1942), identified as the variant ALTERNATE, for hardened steel screwed into hard materials cast iron, steel, bronze, with reference diameter  $7/8$  in, t.p.i.  $13 \text{ in}^{-1}$ , gauging system per standard ANSI B 1.3 – 22.<sup>22</sup>

***Screw threads having tolerances not to ACME standard formulation*<sup>23</sup>**

1–8 ACME – SPL EXT

Major diam.1.462–1.444

Pitch diam.1.400–1.382

Minor diam.1.317–1.299

is an ACME screw thread having tolerances not conform to standard, in accordance with 3A Sanitary Standard No 08-17 of Dairy and Food Industries Supply Association, presented also in standard FED-STD H28/19 (situation denoted by SPL); external, with nominal fitting size 1 in, t.p.i.  $8 \text{ in}^{-1}$ . For this screw thread major diameter, pitch diameter and minor diameter are prescribed by limits values.

1–8 ACME – 2G INT

Minor diam.1.370–1.252

Pitch diam.1.433–1.415

Major diam.1.515–1.497

is an ACME screw thread general-purpose class, but having tolerances not conform to standard, in accordance with 3A Sanitary Standard No 08-17 of Dairy and Food Industries Supply Association, presented also in standard FED-STD H28/19 (situation denoted by SPL), with nominal fittings size 1 in, t.p.i.  $8 \text{ in}^{-1}$ . For this screw thread major diameter, pitch diameter and minor diameter are prescribed by limits values.

***Screw threads ACME modified at 60° with multiple starts***

0.8750-0.1P-0.3L (3 STARTS)-TS-EXT (21)

(designation in accordance with the standard FED-STD H28/19

0.8750–0.1P-0.3L(3 STARTS)SPL 60° FORM –EXT(21)

Major diam.0.8735–0.8655

Pitch diam.0.8475–0.8395

Minor diam.0.8175–0.8035.

is a ACME screw thread modified at 60°, stub, with three starts, exterior, with reference diameter 0.8750 in, screw thread pitch 0.1 in, lead pitch 0.3 in, gauging system per standard ANSI B 1.3 – 21.<sup>24</sup>

<sup>22</sup> This designation is proposed based on the way of identifying the ALTERNATE variant for the class 5 interference fit screw thread in the 1950 Supplement to Handbook H-28 (1944)

<sup>23</sup> 3A Sanitary Standard No 08-17 of Dairy and Food Industries Supply Association, presented also in standard FED-STD H28/19 defines an ACME screw thread for fittings for sanitary lines conducting milk and milk product with specific tolerances. We propose the manner of designation as is shown here.

<sup>24</sup> For this type of screw thread, standard MIL-DTL-39888, which define it, indicate the class of fit 2 for bolt (2A) and for nut (2B). Because for this screw

***Special screw threads for pipe general purpose******Screw threads with tolerances not to pipe general purpose thread standard formulation*<sup>25</sup>**

2-11.5NPSMSPL – EXT

Minor diam.2.3395–2.3195SP

Pitch diam. 2.2830- 22610SPL

Major diam.2.2328max.

is a screw thread with the form corresponding to standard for screw thread for pipe general purpose for plug of the vent of finished drums, in accordance with Appendix B of standard FED-STD H28/7A, straight, external, having tolerances not conform to standard ANSI B 1.20.1 (situation denoted by SPL), with reference diameter 2 in, t.p.i.  $11.5 \text{ in}^{-1}$ . For this screw thread major diameter and pitch diameter are prescribed by limits values and minor diameter prescribed by maximum value;

$3/4$ –14 NPSM SPL –INT

Minor diam.0.9648–0.9448SPL

Pitch diam. 0.9810–0.9630SPL

Major diam.1.0324 min

is a screw thread with the form corresponding to standard for screw thread for pipe general purpose for flange of bung of finished drums, in accordance with Appendix B of standard FED-STD H28/7A, straight, internal, having tolerances not conform to standard ANSI B 1.20.1(situation denoted by SPL), with reference diameter  $3/4$  in, t.p.i.  $14 \text{ in}^{-1}$ . For this screw thread minor diameter and pitch diameter are prescribed by limits values and major diameter prescribed by minimum value.

***Screw threads with special forms*<sup>26</sup>**

2.3–8 SPL 60° Form –EXT

Major diam.2.287–2.277

Pitch diam.2.1887

Minor diam.2.1004–2.0904

Rootradius0.0025

Crestradius0.0025

Le  $1\frac{1}{16}$

thread fit class is unique we consider being in accordance with general principles of designation not to indicate class fit. The gender of the screw thread can be indicated, it is necessary, by symbols EXT and INT as is shown here. On the other hand, the standard FED-STD H28/19 asks to prescribe a gauging system in designation of ACME screw thread with profile angle 60°, stub. Although nor standard ANSI B 1.3 nor standard FED-STD H28/20 do not indicate this type of screw thread as being subject to its stipulations, because the standard FED-STD H28/19A. quotes the standard FED-STD H28/20 as a related one this prescription is justified,

<sup>25</sup> Appendix B of standard FED-STD H28/7A defines particular screw threads for plug of the vent and flange of bung of finished drums and steel barrels, based on a screw thread for pipe general purpose with special tolerances. We propose the manner of designation as is shown here.

<sup>26</sup> Based on fact that the screw thread used for the plug of valve and flange of the bung for containers for explosive and dangerous materials developed by the American Interstate Commerce Commission is shown on the standard pipe threads for general purpose FED-STD H28/7A Appendix B, we present the proposal of designation of this screw thread as is shown here

is a screw thread with profile angle  $60^\circ$  with different shape than the form standard used for plug of the vent of containers for explosives and dangerous materials, in accordance with Appendix B of standard FED-STD H28/7A, straight, external, with reference diameter 2.3 in, t.p.i.  $8\text{ in}^{-1}$ . For this screw thread major diameter and minor diameter are prescribed by limits values and pitch diameter, root and crest radii and length of engagement by nominal value.

### 2.3 – 8 SPL $60^\circ$ Form – INT

Minor diam. 2.1184 – 2.1084

Pitch diam. 2.2067

Major diam. 2.305 – 2.295

Root radius 0.0025

Crest radius 0.0025

Le  $\frac{11}{16}$

is a screw thread with profile angle  $60^\circ$  with different shape the form standard used for flange of bung of containers for explosives and dangerous materials, in accordance with Appendix B of standard FED-STD H28/7A, straight, external, with reference diameter 2.3 in, t.p.i.  $8\text{ in}^{-1}$ . For this screw thread major diameter and minor diameter are prescribed by limits values and pitch diameter, root and crest radii and length of engagement prescribed by nominal values

### **Screw threads with special length of engagement**<sup>27</sup>

$1\frac{1}{4}$  – 11.5 NPT – SPL

L<sub>2</sub> 1.1468 SPL

is a screw thread for pipe general purpose use for a pipe assembled with a steel threaded flange Class 1500, NPS  $1\frac{1}{4}$  with length of engagement defined in accordance with standard ANSI B 16.5, presented also in Appendix B of standard FED-STD H28/7A. This tapered, external screw thread has reference diameter  $1\frac{1}{4}$  t.p.i.  $11.5\text{ in}^{-1}$  and special length of engagement (situation denoted by SPL). For this screw length of engagement is prescribed by nominal values

### **Aeronautical national form taper pipe screw thread**<sup>28</sup>

$\frac{1}{8}$ -27 ANPT or 0.125-27 ANPT

is an aeronautical national form screw thread with reference diameter  $\frac{1}{8}$  (0.125) in, t.p.i.  $27\text{ in}^{-1}$ .

### **Screw thread for electrical conduits**<sup>29</sup>

2-11 $\frac{1}{2}$  NTC

is a screw thread for electrical conduits and other similar parts, internal, tapered, type NPT having tolerances extended, with reference diameter 2 in, t.p.i.  $11\frac{1}{2}\text{ in}^{-1}$ .

### 1-27 NTCM

is a screw thread for electrical conduits and other similar parts, internal, tapered, type NPT having tolerances extended, with reference diameter 1 in, t.p.i.  $27\text{ in}^{-1}$ .

### **Screw thread for rotary drilling equipment for petroleum industries**<sup>30</sup>

Spec 7-2 NC 38

(designation in accordance with marking of rotary shouldered connection according standard API Spec 7-1 - 7-1 THD NC 38) (designation in accordance with gages marking NC 38 Rotary)

is a screw thread for rotary drilling equipment type NC (Number style), with reference size 38 (rounded value of pitch diameter of the pin thread at the gauge point, 3.808 in);

Spec 7-2  $1\frac{1}{2}$  REG

(designation in accordance with gages marking 1-1/2 REG Rotary)

is a screw thread for rotary drilling equipment type REG (Regular style), with conventional size  $1\frac{1}{2}$ . Numerical value of the size is historical drill pipe size;

Spec 7-2  $6\frac{5}{8}$  REG LH

is a screw thread for rotary drilling equipment type REG (Regular style), with conventional size  $6\frac{5}{8}$ , left handed. Numerical value of the size is historical drill pipe size;

Spec 7-2  $6\frac{5}{8}$  FH

is a screw thread rotary drilling equipment type FH (Full Hole style), with conventional size  $6\frac{5}{8}$ . Numerical value of the size is historical drill pipe size;

Spec 7-2  $4\frac{1}{2}$  SH

is a screw thread for rotary drilling equipment type SH (Slim Hole style), with conventional size  $4\frac{1}{2}$ . Numerical value of the size is historical drill pipe size.

Spec 7-2  $2\frac{7}{8}$  IF

is a screw thread for rotary drilling equipment type IF (Internal Flush style), with conventional size  $2\frac{7}{8}$ . Numerical value of the size is historical drill pipe size.

Spec 7-2  $2\frac{3}{8}$  OH LW

is a screw thread for rotary drill stem elements type OH (Open-Hole Light Weight style), with conventional size  $2\frac{3}{8}$ . Numerical value of the size is historical drill pipe size;

<sup>27</sup> Appendix B of standard FED-STD H28/7A defines a screw thread for pipe general purpose for pipes assembled with steel threaded flanges defined in accordance with standard ANSI B 16.5, with special length of engagement. We propose the manner of designation is shown here

<sup>28</sup> The standard SAE AS 71051-2004 does not specify how to designate these screw threads. We propose the method of designation for these types of screw threads, based on the general structures of designation as is shown here

<sup>29</sup> The standard does not specify how to design these screw threads. We propose the method of designation for these types of screw threads, based on the general structures of designation as is shown here

<sup>30</sup> The API specification 7-1 and Specification 7-2 do not specify the designation of the screw threads. We propose the method of designation based on the marking requirements of the connections on the parts according the standard API Specification 7-1, but referring to the standard API Specification 7-2 defining screw threads. We illustrate our proposal with examples of designation for all types of screw thread defined by this standard

**Spec 7-2 2<sup>7</sup>/<sub>8</sub> OH SW**

is a screw thread for rotary drill stem elements type SW OH (Open-Hole Standard Weight style), with conventional size 2<sup>7</sup>/<sub>8</sub>. Numerical value of the size is historical drill pipe size;

**Spec 7-2 7<sup>5</sup>/<sub>8</sub> PAC**

is a screw thread for rotary drilling equipment type PAC (Philip A. Cornell style), with conventional size 7<sup>5</sup>/<sub>8</sub>. Numerical value of the is historical of the size drill pipe size

**Spec 7-2 3<sup>1</sup>/<sub>2</sub> H90**

is a screw thread for rotary drilling equipment type H90 (Hughes H-90 style), with conventional size 3<sup>1</sup>/<sub>2</sub>. Numerical value of the is historical of the size drill pipe size;

**Spec 7-2 2<sup>7</sup>/<sub>8</sub> SL H90**

is a screw thread for rotary drilling equipment type SL H90 (Hughes H-90 tip Slime Line style), with conventional size 2<sup>7</sup>/<sub>8</sub>. Numerical value of the size is historical drill pipe size;

**GOST Z (3)-189**

is a screw thread for rotary drilling equipment type ГОСТ (GOST) 28487:1990, with reference size 189 (rounded value of pine base-diameter, 189.4 mm).<sup>31</sup>

**1<sup>1</sup>/<sub>4</sub> AMMT**

is a screw thread for rotary drilling equipment type AMMT (American Mining Macaroni Tubing style), with conventional size 1<sup>1</sup>/<sub>4</sub>. Numerical value of the size is historical drill pipe size.<sup>32</sup>

**Screw thread for sucker rods for petroleum industries<sup>33</sup>****5<sup>5</sup>/<sub>8</sub> 2A-PIN**

(designation in accordance with standard ANSI B 1.1 5<sup>5</sup>/<sub>8</sub>-10 UNRS-2A)

is a screw thread for sucker rods, external, with reference diameter 5<sup>5</sup>/<sub>8</sub> in

**7<sup>7</sup>/<sub>8</sub> 2B-BOX**

(designation in accordance with standard ANSI B 1.1

7<sup>7</sup>/<sub>8</sub>-10UNS-2B  
RootRadius0.010max.)

is a screw thread for sucker rods, internal, with reference diameter 7<sup>7</sup>/<sub>8</sub> in

**Thread for screw shells of electric sockets and lamp bases<sup>34</sup>****1.28-18 UNO**

is the screw thread UNO with theoretical major diameter 1.28 in and t.p.i. 18 in<sup>-1</sup>. designated in American system.

**Thread for Glass containers<sup>35</sup>****33-8 Glass Finish Number 495**

is a screw thread for glass containers in accordance with Glass Packing Institute drawing No. 495 having conventional size 33 and t.p.i. 8 in<sup>-1</sup>

**Special screw threads for lubrication fittings as per SAE J 534<sup>36</sup>****1/4-28 SAE-LT**

is a screw thread for lubrication fittings, external, tapered, with reference diameter 1/4 (0.250) in and t.p.i. 28 in<sup>-1</sup>.

**1/8 -27 Pipe Special Thread Forming**

is a screw thread for lubrication fittings, external, tapered, with reference diameter 1/8 (0.1250) in and t.p.i. 27 in<sup>-1</sup>

**1/4-28 Special Taper Thread Forming**

is a screw thread for lubrication fittings, external, tapered, with reference diameter 1/4 (0.250) in and t.p.i. 28 in<sup>-1</sup>

**Screw thread for fire hose coupling<sup>37</sup>****2.990-7.5 SPL 60° Form-EXT**

Major diam 2.990-2.980.

Pitch diam. 2.904-2.894

Minor diam. 2.817-2.807

Rootrad. 0.016

Crest rad. 0.016

is a screw thread for fire hose coupling, triangular with profile angle 60°, external, with reference diameter 2.990 in, t.p.i. 7.5 in<sup>-1</sup>. For this screw thread major diameter, pitch diameter and

<sup>34</sup> The standards ANSI/ANSLG C 81.61-2009 and ANSI/ANSLG C 81.62-2009 do not make any references concerning the designation or the screw threads used to screw shells of electric sockets and lamp bases. As will be explained further, we suppose that Edison screw thread is designate according to IED standards so the designation of Edison screw thread according to American standards, the more it is made references to the IEC standards, is in the metric system. The screw thread UNO is similar with Edison screw thread, so the designation should be done in the metric system. We still propose also a designation in American system.

<sup>35</sup> The Glass Packing Institute drawings concerning glass container finishes do not contain stipulations about designation of screw threads. We propose, for the screw thread defined in American system, a method of designation in accordance with general structures of designation.

<sup>36</sup> The standard does not specify how to design these screw threads. We propose the method of designation for these types of screw threads, based on the general structures of designation as is shown here.

<sup>37</sup> They are many non standard screw threads for fire hose coupling. Because, thanks to Mr. Wayne R. Meulendyk's goodwill, we had access for information to some drawings that define these threads completely, as an exception to those exposed at the beginning of the work, we propose the method of designation further illustrated, in accordance with general general structures of designation.

<sup>31</sup> Designation in accordance with the standard GOST (ГОСТ) 28487:1990. The screw thread is actually a metric screw thread, being taken from ГОСТ (GOST) 28487:1990, even if it is presented in a US screw thread standard.

<sup>32</sup> This type of thread is not defined in the standard API Spec 7-2. As it is mentioned in standard API Specification 7-1, we propose this form of designation by similarity with the threads defined in the standard API Specification 7-2.

<sup>33</sup> The standard API specification 11B-1998 does not specify the designation of the screw threads. We propose the method of designation based on the requirements of the markind of the gauges.

minor diameter are prescribed by limits values, root and crest radii by nominal values.

2.990–7.5 SPL 60° Form–INT

Minor diam. 2.847–2.837.

Pitch diam. 2.934–2.824

Major diam. 3.020–3.010

Root rad. 0.016

Crest rad. 0.016

is a screw thread for fire hose coupling, triangular with profile angle 60°, internal, with reference diameter 2.990 in, t.p.i. 7.5 in<sup>-1</sup>. For this screw thread major diameter, pitch diameter and minor diameter are prescribed by limits values, root and crest radii by nominal values

### **Designation of American screw threads defined in accordance with metric system**

#### **Standard screw threads**

M 6×1-4g6g (22)

is a metric screw thread, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4g for major diameter, 6g for pitch diameter and gauging system per standard ANSI B 1.3 – 22.

M6×1-5H6H (21)

is a metric screw thread, internal, with reference diameter 6 mm, pitch 1 mm, tolerance classes 5H for minor diameter and 6H for pitch diameter and gauging system per standard ANSI B 1.3 – 21.

M6×1-5H6H ASME B 1.13 M

represents the designation of the previous screw thread, with specification of screw thread defining standard as recommended by standard ASME Y 14.6. The gauging system according to the standard ANSI B 1.3 is not indicated in the thread designation because the indication of gauging system is not mandatory.

M6×1-6H (21)

is a metric screw thread, internal, with reference diameter 6 mm, pitch 1 mm, tolerance classes 6H for minor diameter and pitch diameter, and gauging system per standard ANSI B 1.3 – 21.

MJ 6×1-4h6h (22)

is a metric screw thread with controlled radius root, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4g for major diameter, 6g for pitch diameter, and gauging system per standard ANSI B 1.3 – 22.<sup>38</sup>

<sup>38</sup> Although the standard ANSI B 1.21 does not provide the indication of gauging system starting from stipulations of standard ANSI B 1.3 and from the fact that, for the inch equivalent screw thread, standard ANSI B 1.15 provides indication of this system in all cases we considered appropriate and in accordance with the general designation system to prescribe the gauging system in all cases of metric screw threads with controlled radius root.

0.80 UNM (0.0315)

is a unified miniature screw, with reference diameter 0.80 mm (0.0315 in), pitch 0.200 mm (t.p.i. 317.5 in<sup>-1</sup>). Indicating the size of the reference diameter in inches is optional and may be omitted

0.80 UNM (0.0315) – 217.5 EXT

represents the designation of the previous screw thread in an obsolete version according to standard MIL-S-7742D-1991, currently inactive, in which the gender of the screw thread was also specified.<sup>39</sup>

.80 MM (.0318-IN.) UNM

represents the designation of the previous screw thread in an obsolete version according to standard MIL-STD-9A-1960.

M8×1.25-5H-STI per ASME B1.29.2M

is a screw thread for helical wire inserts for metric screw thread internal with reference diameter 8 mm, pitch 1.25 mm, tolerance class is for pitch diameter and minor diameter 5H.

MJB 50×1.5-4d

is a metric buttress screw thread for aeronautical use with controlled radius root used to pull, external, with reference diameter 50 mm, pitch 1.5 mm, and tolerance classes for major diameter and pitch diameter 4d.

MJB 50×1.5-4H

is a metric buttress screw thread for aeronautical use with controlled radius root used to pull, internal, with reference diameter 50 mm, pitch 1.5 mm, and tolerance classes for minor diameter and pitch diameter 4H.

MJB 50×1.5-4d-C

is a metric buttress screw thread for aeronautical use with controlled radius root used to push, external, with reference diameter 50 mm, pitch 1.5 mm, and tolerance classes for major diameter and pitch diameter 4d.

E 5

is a screw thread for screwed shells for electric lamp holders and lamp bases (Edison screw thread), with the theoretical major diameter of 5 mm.<sup>40</sup>

<sup>39</sup> Standard MIL-S-7742 asked to prescribe a class of fit for designation of unified miniature inch screw thread. It is not possible to indicate the symbol of class of fit because standard ANSI B 1.10 indicates for this type of screw thread a single tolerance class without symbol. On the other hand, general principle of designation of screw thread stipulates not to indicate class of fit if it is unique.

<sup>40</sup> Standard does not explicitly indicate how to design the screw thread but indicates symbols of electric sockets and lamp bases similarly with designation of the screw thread according to IEC standards. Although in some works the symbol and the value of nominal thread size are replaced by the conventional name of the size of electric sockets and lamp bases, respectively, midget, miniature, mini candelabra, intermediate, medium and mogul, we assume that this is also the designation of Edison threads according to American standards, the more so as they refer to IEC standards. For this reason, we did not comply with the requirement to indicate the pitch, mandatory for designation of screw thread used in the United States, even if they belong to the metric system. At the same time, the standard also makes the equivalence between the screw thread

**L28SP400**

is a screw thread L type profile (trapezoidal, with profile angle 30° rounded) for finishes of plastic bottles used from plastic or metallic caps with dimension of the profile, in accordance with finish type SP 400, with conventional size 28.

**M22SP410**

is a screw thread M type profile (buttress, with profile angles 45° and 10° rounded) for finishes of plastic bottles, used from plastic caps with dimension of the profile, in accordance with finish type SP 410, with conventional size 22.<sup>41</sup>

**P28SP110**

is a screw thread P-type profile (buttress, with profile angles 50° and 10° rounded) for finishes of plastic bottles, used from plastic with dimension of the profile, in accordance with finish type SP 110, with conventional size 28.<sup>42</sup>

**Rd 40x3.63**

is a screw thread for NBC protective mask and filter canister, with reference diameter 40 mm and pitch 3.63 mm.

**S 38x5**

is a screw thread for canteen of mask drinking system, with major diameter 38 mm and pitch 5 mm.

***Screw threads with special combination between diameter and pitch***

**MJS 6,5×1-4h6h–SPL(22)**

Major diam.= 6.320-6.500

Pitch diam.= 5.779-5.850

Minor diam.= 5.213-5.45

Rootrad.= 0.15-0.180

is a metric screw thread with controlled radius root with special combination between diameter and pitch which cannot be found among the combinations existing within the definition standard, situation indicated by the symbol SPL, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4g for major diameter and 6g for pitch diameter, gauging system per standard ANSI B 1.3 – 22. For this screw thread major diameter, pitch diameter, minor diameter and radius of root are prescribed by limit values.

**MJS 6.5×1–4h6h**

MAJOR DIA 6.320–6.500

PITCH DIA 5.779-5.850

MINOR (FORM) DIA 5.526MAX

ROOT DIA 5.213-5.342

ROOT RAD 0.150–0.180

represents the designation of the previous screw thread, defined in accordance with the standard SAE MA 1370. In this variant is specified in addition the basic (form) minor diameter by maximum value.

**M 6,5×1-4H5H–SPL(22)**

Major diam.= 6.500min.

Pitch diam.= 5.850-5.945

Minor diam.= 5.417-5.607

is a metric screw thread with special combination between diameter and pitch which cannot be found among the combinations existing within the definition standard, situation indicated by the symbol SPL, internal, with reference diameter 6.5 mm, pitch 1 mm, tolerance classes 4H for minor diameter and 5H for pitch diameter, gauging system per standard ANSI B 1.3 – 22. For this screw thread minor diameter and pitch diameter are prescribed by limit values and major diameter by minimum value.

**MJS 6,5×1-4H5H**

MAJOR(FORM) DIA 6.500MIN

PITCH DIA 5.850–5.945

MINOR DIA 5.528–5.716

is a metric screw thread with controlled radius root with special combination between diameter and pitch which cannot be found among the combinations existing within the definition standard, in accordance with standard SAE MA 1370, internal, with reference diameter 6.5 mm, pitch 1 mm, tolerance classes 4H for minor diameter and 5H for pitch diameter. For this screw thread minor diameter and pitch diameter are prescribed by limit values and basic (form) major diameter by minimum value.

***External and internal screw threads***<sup>43</sup>

**M 6×1-4G6G-EXT (21)**

is a metric screw thread, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4g for major diameter, 6g for pitch diameter, and gauging system per standard ANSI B 1.3 – 21.

**M 6×1-6H-INT (21)**

is a metric screw thread, internal, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4H for both, pitch and

symbols and the conventional name of the socket and famp holders. E5 is equivalent to the size midget

<sup>41</sup> We think is no possibility of confusing this screw thread with the metric screw thread, although the symbol is common, because the data contained in its designatin were completely different from those used for the metric screw thread

<sup>42</sup> The designation of this type of screw thread is not defined in the standard ASME D2911-2010. We propose this form of designation by similarity with the other screw threads defined in the standard ASME D2911-2010.

<sup>43</sup> Designation for a data transmission system which only allow the use of uppercase letters

minor diameter, and gauging system per standard ANSI B 1.3 – 21.

### Left handed screw threads

MJB 50x1,5-4c-LH

is a metric buttress screw thread for aeronautical use with controlled radius root used to pull, external, with reference diameter 50 mm, pitch 1,5 mm, and tolerance class for major diameter and pitch diameter 4c, left-handed

### Screw threads with multiple starts

M16xL 4-P 2 (2 STARTS) -4h6h (22)

is a metric screw thread, external, with reference diameter 16 mm, pitch of leads 4 mm, pitch of screw thread 2 mm, 2 starts, tolerance classes 4g for major diameter and 6h for pitch diameter, gauging system per standard ANSI B 1.3 – 22.

MJB 50xL 3-P 1.5 (2 STARTS)-4c

(designation in accordance with the standard MJB 50x1.5 P-4c x3 L (2 STARTS) )

is a metric buttress screw thread for aeronautical use with controlled radius root used to pull, external, with reference diameter 50 mm, pitch of leads 3 mm, pitch of screw thread 1,5 mm, 2 starts, tolerance class for major diameter and pitch diameter 4c, left-handed<sup>44</sup>

### Screw threads with special forms

(regarding rounding of the crests of external screw thread)

M 42x4,5-6g-0.63 R (22)

(designation in accordance with the standard M 42x4,5-6g-0.63 R)

is a metric screw thread, external, with reference diameter 42 mm, pitch 4,5 mm, tolerance classes 6g for major diameter and pitch diameter, gauging system per standard ANSI B 1.3 – 22 and rounding radius of crest minimum 0.63 mm.<sup>45</sup>

### Screw threads with modified crests

MJ 6x1–4h6h–MOD (22)

Major diam.= 5,745–5.925MOD

(designation in accordance with the standard

MJ 6x1–4h6h–MOD

Major diam.= 5.745–5.925MOD)

is a metric screw thread, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4g for major diameter and 6h for pitch diameter, with major diameter modified for to modify crests (situation denoted by MOD), gauging system per

standard ANSI B 1.3 – 22. For this screw thread major diameter is modified being prescribed by limit values (situation denoted by MOD).<sup>46</sup>

MJ 6x1–4H5H–MOD (23)

Minor diam.= 5.101–5.291MOD

(designation in accordance with the standard

MJ 6x1–4H5H–MOD

Minor diam.= 5.101–5.291MOD)

is a metric screw thread with controlled radius root, internal, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4H for pitch diameter and 5H for minimum diameter, having minimum diameter modified in order to modify the crests (symbol MOD), prescribed by limit values (symbol MOD)<sup>47</sup>

### Screw threads with tolerances not corresponding to computational formulae

M 24x3 -SPL –EXT (22)

MAJOR DIA. = 23.664–23.900SPL

PD = 21.826–21.951SPL

MINOR DIA. = 20.652MAX. SPL

is a metric screw thread, external, with reference diameter 25 mm, pitch 3 mm having tolerances not conform to standard, situation indicated by the symbol SPL, gauging system per standard ANSI B 1.3 – 22. For this screw thread major diameter and pitch diameter are prescribed by limit values and major diameter by maximum value different from the values calculated according to the standard, situation marked by the symbol SPL

M 24x3 -SPL –INT (22)

MINOR DIA. = 20.752–21.115SPL

PD = 22.051–22.269SPL

MAJOR DIA. = 24.000MIN.

is a metric screw thread, internal, with reference diameter 24 mm, pitch 3 mm having tolerances not conform to standard, situation indicated by the symbol SPL, gauging system per standard ANSI B 1.3 – 22. For this screw thread minor diameter and pitch diameter are prescribed by limit values, different from the values calculated according to the standard, situation marked by the symbol SPL and major diameter by minimum value.

<sup>44</sup> Because the order of identification element in the reference standard for multiple starts screw thread is different from the order of general designation system, we propose to change it to correspond to ANSI standards established order.

<sup>45</sup> Although the standards ANSI B 1.13 and B 1.18 do not provide an indication of the gauging system for this type of thread, basis on the provisions of ANSI B 1.3 and on the fact that equivalent standard ANSI B 1.1 for screw thread in inch provides gauging system in all cases we considered necessary and in accordance with standardized stipulation to prescribe the gauging system in the designation for this type of thread.

<sup>46</sup> Although the standards ANSI B 1.13 and B 1.18 do not provide an indication of the gauging system for this type of thread, basis on the provisions of ANSI B 1.3 and on the fact that equivalent standard ANSI B 1.1 for screw thread in inch provides gauging system in all cases we considered necessary and in accordance with standardized stipulation to prescribe the gauging system in the designation for this type of thread

<sup>47</sup> Although the standards ANSI B 1.13 and B 1.18 do not provide an indication of the gauging system for this type of thread, basis on the provisions of ANSI B 1.3 and on the fact that equivalent standard ANSI B 1.1 for screw thread in inch provides gauging system in all cases we considered necessary and in accordance with standardized stipulation to prescribe the gauging system in the designation for this type of thread

**Screw threads with length of engagement different from the standard ones****MJ10×1.5-4h6hSE(22)****Pitch diam.5.256-5.535****Le18**

is a metric screw thread with controlled radius root, external, with reference diameter 10 mm, pitch 1.8 mm, tolerance classes 4h for major diameter and 6h for pitch diameter, with adjusted pitch diameter limits in accordance with special length of engagement (symbol SE) and gauging system per standard ANSI B 1.3 – 22.. For this screw thread pitch diameter is prescribed by limits values and length of engagement by nominal value. Length of engagement is specified for use in determining GO gage length.

**MJ8×1.25 4H5HSPL(22)****LG10**

is metric screw thread with controlled radius root, internal, with reference diameter 8 mm, pitch 1.25 mm, tolerance classes 4H for pitch diameter and 5H for minimum diameter with standard pitch diameter limits even if the length of engagement has a value different from the standard ones (symbol SPL), gauging system per standard ANSI B 1.3 – 21.The length of engagement, expressed by the length of the gauge, is prescribed by the nominal value. The gauges will be executed for standard tolerances but will have the length modified according to the length of the screw thread. Designation is in accordance with standard ASME Y 14.6.

**MJ8×1.25 4H5HSPL (22)****LE10**

represents the designation of the previous screw thread in a version in accordance with standard ANSI B 1.21M . In this variant is indicated only the length of engagement, the gauge information being implicit.

**MJB 50×1.5 – 4d SE****Major diam.49.906–49.908****Pitch diam.47.748–48.906****Rootdiam.47.819–48.044****Rootrad.0.160-0.206****Helix tol.0.024****Le 30**

is a metric buttress screw thread for aeronautical use with controlled radius root used to pull, external, with special tolerances and length of engagement (symbol SE) reference diameter 50 mm, pitch 1,5 mm, and tolerance classes for pitch diameter 4d. For this screw thread major diameter, pitch diameter minor diameter and root radius are prescribed by limits values and length of engagement by nominal value. It is prescribed also the tolerance of the helix.

**Screw threads with modified gauging system****M6×1–6g(23S)****Surface Texture ControlNot Required**

is a metric screw thread, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 6g for major diameter and pitch diameter, gauging system per standard ANSI B 1.3 – 23 modified (situation denoted by S), in the sense of lack of surface texture control requirement.

**M6×1–6g (21S)****RootRadiusControl Required**

is a metric screw thread, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 6g for major diameter and pitch diameter, gauging system per standard ANSI B 1.3 – 23 modified (situation denoted by S), in the sense of requirement to control root radius.

**M6×1–6g (23S)****FunctionalLimitper Gauge1.1SolidRingRequired**

is a metric screw thread, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 6g for major diameter and pitch diameter, gauging system per standard ANSI B 1.3 – 23 modified (situation denoted by S), in the sense of requirement to control of the functional limit per solid ring gauge 1.1 as defined in the standard ANSI B 1.16M.

**MJ10×1.25–4h6h(22S)****CumulativeForm Variation $0.5 \times T_{D_2}$** 

is a metric screw thread with controlled radius root, external, with reference diameter 10 mm, pitch 1.25 mm, tolerance classes 4h for major diameter and 6h for pitch diameter, gauging system per standard ANSI B 1.3 – 22 modified (situation denoted by S), in the sense of requirement of framing the cumulative form variation within the limits of value  $0.5 \times T_{D_2}$

**MJ12×1–4h6h (22S)****Leadandanglecontrolrequired**

is a metric screw thread with controlled radius root, external, with reference diameter 10 mm, pitch 1.25 mm, tolerance classes 4h for major diameter and 6h for pitch diameter, gauging system per standard ANSI B 1.3 – 22 modified (situation denoted by S), in the sense of requirement to control of the lead and profile angle of the screw thread

**MJ8×0.75–4h6h(22S)****RunoutVariation $0.5 \times T_{D_2}$** 

is a metric screw thread with controlled radius root, external, with reference diameter 8 mm, pitch 0.75 mm, tolerance classes 4h for major diameter and 6h for pitch diameter, gauging system per standard ANSI B 1.3 – 22 modified (situation denoted by S), in the sense of requirement of framing the runout variation within the limits of value  $0.5 \times T_{D_2}$

**Coated screw threads<sup>48</sup>****M 6×1-6h (21) AFTER COATING**

is a metric screw thread, external with reference diameter 6 mm, pitch 1 mm, tolerance classes 6g for major diameter and pitch diameter, gauging system per standard ANSI B 1.3 – 21 after coating. If not given as AFTER COATING, then the class of tolerance refers to the situation before coating, according to ISO practice. After covering the classes of tolerance of the thread must not exceed the limits of the material for tolerance position h.

**M 6×1-6H (21) AFTER PLATING**

is a metric screw thread, internal with reference diameter 6 mm, pitch 1 mm, tolerance classes 6H for pitch diameter and minor diameter, gauging system per standard ANSI B 1.3 – 21 after coating. If not given as AFTER COATING, then the classes of tolerance refers to the situation before plating, according to ISO practice. After covering the classes of tolerance of the thread must not exceed the limits of the material for tolerance position H.

**M 6×1- 4h6hAFTRE COATING****BEFORE COATING**

Major diam.= 5.800- 5.970

Pitch diam.= 5.239- 5.290

Minor diam.= 4.674 max.

is a metric screw thread, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4h for major diameter, 6h for pitch diameter. For this thread the tolerances are not sufficient for the material limits for the position h to not be exceeded after coating, so it is necessary to prescribe limits values for major diameter, and pitch diameter and maximum value for minor diameter before coating.

**M 6×1- 4h6hAfter Coating****Before Coating.**

Major diam.= 5.800- 5.970

Pitch diam.= 5.293- 5.200

represents the designation of the previous screw thread in an obsolete version according to standard ANSI B1.13M-2001, replaced. In this variant, was indicated only the major diameter and and pitch diameter by limits values.

**MJ 6×1- 4h6h****BEFORE COATING**

MAJOR DIA 5.800MIN

PITCH DIA 5.239MIN.

ROOT DIA 4.674MIN

is a metric screw thread with controlled radius root, with special combination between diameter and pitch in accordance with standard SAE MA 1370, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4h for major diameter, 6h for pitch diameter, for which is provided a coating with a thickness of 0.010 mm. For this thread are prescribed limits values for major diameter, pitch diameter and minor diameter before coating.

**MJ 6×1- 4H5H****BEFORE COATING**

MINOR DIA 5.236MAX

PITCH DIA. 5.485MIN.

is a metric screw thread with controlled radius root, with special combination between diameter and pitch in accordance with standard SAE MA 1370, internal, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4H for minor diameter and 5H for pitch diameter, for which is provided a coating with a thickness of 0.010 mm. For this thread are prescribed limits values for minor diameter and pitch diameter before coating.

**Obsolete designation****M10×1,5- 6g (21)****AFTER COATING**

Coating Thickness 0.005- 0.008 mm

was a metric screw thread, external, with reference diameter 10 mm, pitch 1.5 mm, tolerance classes 6g for major diameter and pitch diameter, gauging system per standard ANSI B 1.3 – 21, having after coating a layer with thickness between 0.005 mm and 0.008 mm.

**M14×1,5 – 6g (21) AFTER COATING**

Coating Thickness 0,008

was a metric screw thread, external, with reference diameter 14 mm, pitch 1.5 mm, tolerance classes 6g for major diameter and pitch diameter, gauging system per standard ANSI B 1.3 – 21, having after coating a layer with thickness 0.008 mm.

**MJ 6×1- 4h6h(21)****BEFORE COATING**

Major diam.= 5.800 min.

Pitch diam.= 5.239 min

Minor diam.= 4.674 min

was a metric screw thread with controlled radius root, external, with reference diameter 6 mm, pitch 1 mm, tolerance classes 4h for major diameter and 6h for pitch diameter, gauging system per standard ANSI B 1.3 – 21. For this thread, the standard tolerances were not sufficient for the material limits to not exceed the position h after coating, so it was necessary to prescribe extreme values for major diameter, pitch diameter, and minor diameter.

<sup>48</sup> . Although the ANSI standards B 1.13 and B 1.18 do not provide an indication of the gauging system for this type of thread, basis on the provisions of ANSI B 1.3 and on the fact that equivalent standard ANSI B 1.1 for screw thread in inch provides gauging system in all case we considered appropriate and in accordance with the general designation system to prescribe the gauging system in all cases of metric screw threads.

**Foreign screw threads prescribed for use in the US<sup>49</sup>**

S 0.6×0.15 5h3

is a metric screw thread, external, with reference diameter 0.6 mm, pitch 0.15 mm, tolerance class 5h for pitch diameter, tolerance grade 3 for major diameter.

S 0.6×0,15 4H3

is a metric screw thread, internal, with reference diameter 0.6 mm, pitch 0.15 mm, tolerance class 4H for pitch diameter, tolerance grade 3 for minor diameter.

**Obsolete screw threads<sup>50</sup>****Standard screw threads**

80 NM (.0315)

was a American national form screw thread miniature series with reference diameter 0.80 mm (0.0315 in), pitch 0,2 mm (t.p.i. 127 in<sup>-1</sup>).

**Foreign screw threads whose use has been prescribed in the U S<sup>51</sup>**

BA 10

was a British screw thread B.A. (British Science Association), number 10 with reference diameter 1.9 mm, pitch.0.35 mm

**Screw thread without standardized designation****Thread for screw shells of electric sockets and lamp bases<sup>52</sup>**

UNO 32×1.41

is a screw thread, for medium screwed lamp holders with theoretical major diameter 32 mm and pitch 1.41 mm.<sup>53</sup>

**Glass containers screw thread<sup>54</sup>**

Glass Finish Number 400M 24×3.20

is a screw thread for glass containers in accordance with Glass Packing Institute drawing No. 400 having conventional size 24 and pitch 3,2 mm

Glass Containers Finishes R3 60×4.25

is a screw thread for finishes of glass containers R3 form in accordance with BS 1918-1, having conventional size 60 and pitch 4.25 mm.

**Plastic containers screw thread<sup>55</sup>**

M 40°22SP103

is a screw thread M 40° type profile (buttress, with profile angles 40° and 10° rounded) for finishes of plastic bottles, in accordance with finish type SP 410, with conventional size 22.<sup>56</sup>

Plastic Containers Finish long neck No 103.

is a screw thread for finishes of plastic containers "long neck" form in accordance with standard BS 5789 with conventional size 15 and pitch 2.10 mm.

**CONCLUSIONS**

Following the analysis made to draw up the study about designation of screw threads used In US, some problems arose. There is, in connection with the thread designation, some mismatch of the standards. We found some of them and we propose solutions for their elimination, including correlation and uniform way of designation. There are threads derived from standard threads but having characteristics (dimensions and tolerances) specified for certain uses, but completely different those provided of standards. We propose a way of designation for them based on general principles and specific provisions for the standard designation for the type of thread from which they are derived. There are some threads without a standardized designation, too. We propose a way of designation for them, also, based on general principles of designation of the two types of scoring

On the other hand, apparently the American designation method for screw thread, presents understanding difficulties for an user of metric system, particularly regarding those defined in accordance with American system, including due to unit of measure system used (inch instead of millimetres for diameter size and t.p.i. instead of pitch) and to the mode of expression of tolerances.

However, overcoming this barrier, analyzing including designation of metric screw threads, which, both in American and metric system of designation, dimensions and the general principles are identical, is easy to see greater flexibility and possibility of transmission more information about screw threads than classical designation in accordance with metric system.

It is why it would be desirable that, after a careful analysis, some principles of designation of screw threads used by American standards to be taken and used for designation of metric screw threads by the users of this system.

<sup>49</sup>We refer only to the screw threads which designation is prescribed by some official documents (standards, standards, norms or drawing issued by an officially recognized entity)..

<sup>50</sup>We refer oly to the obsolete screw threads which designation was prescribed by some official documents (standards, norms, or drawing issued by an officially recognized entity..

<sup>51</sup> We refer only to the obsolete screw threads which designation were prescribed by some official documents (standards, norms or drawing issued by an officially recognized entity ). These screw threads may still be in use in their home country (UK) but American documents prescribing their use in the U S are obsolete.

<sup>52</sup> The standard does not prescribe a designation for these screw threads. We propose this method of designation, in accordance with general structures of designation.

<sup>53</sup> The standard does not specify how to design UNO screw threads. We propose the method of designation for these types of screw threads, based on the general structures of designation. We consider, being given the similarity of Edison screw thread, this screw thred must be designed in accordance with the metric system. However we proposed above a designation in accordance with American system.

<sup>54</sup> Nor the Glass Packing Institute drawings concerning glass container finishes in metric system, nor standard BS 1918-1do not contain stipulations about designation of screw threads. We propose a method of designation in accordance with general structures of designation

<sup>55</sup> The standards ASME D2911-2010 and BS 5789 do not prescribe a designation for these screw threads. We propose the method of designation ilustrated, in accordance with general general structures of designation

<sup>56</sup> Designation in accordance with general structures of designation stipulated by standard ASME D2911-2010

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## APPENDIX 1

## USA SCREW THREAD

Table A1.1. Screw Threads and Symbol in accordance with standards

Symbol 1	Designation (explanations) 2	Standard 3
ACME (Acme)	ACME screw threads (trapezoidal whit profile angle 29°)	ANSI B 1.5-1977 (R 2014)
Am. Nat. form	Special scerw thread having only the pofile and major diameter (for external screw thred) or minor diameter (for internal screw thread) in accordance with the standard of American national screw threads	Handbook H28 (1957) (obsolete)
AMO	American standard microscope objective screw threads with profile angle 55°	ASA B 1.11-1958 (R 2016) ASTM E 210-63 (R 2010)
ANPT	Aeronautical national form taper pipe screw thread	SAE AS 71051-2015
BA	Screw thread B.S.A. (British Science Association) with profile angle 47°30'	BS 93:-1919 (obsolete) Handbook H 28 (1944) (obsolete)
BS Buttress thread ____	British screw thread BUTTRESS Symbol used together with supplementary symbols: - (standard form) (may be omitted) for profile angles 45° and 7°; - (special form) for profile angles 52° and 0°.	BS 1657-1950 Handbook H 28 (1957) (obsolete)
BSMO	British screw thread for microscope objective with profile angle 55°	BS 3569-1956 (obsolete) Handbook H 28 (1957) (obsolete)
BSF	British screw thread Whitworth standard, fine - pitch series	BS 84-1940 (obsolete) Handbook H 28 (1944) ) (obsolete)
BSF -T	British screw thread Whitworth fine - pitch series treuncated	1949 Supplement of Handbook H 28 (1944) (obsolete)
BSP	British screw thread for pipes, (generic symbol)	Handbook H 28 (1944) (obsolete)
BSPP-T	British screw thread for pipes (parallel) truncated	1949 Supplement of Handbook H 28 -1949 (obsolete)
BSW-T	British screw thread Whitworth coarse - pitch series treuncated	1949 Supplement of Handbook H 28 (1944) (obsolete)
DS	ACME screw thread (trapezoidal) modified at 60°, stub, with two starts	MIL-STD-1373-1971 (R2002)
DRYSEL -__	Screw thread for dryseal pipes Symbol used together with supplementary symbols: -NPSF-dryseal American standard fuel internal straight pipe screw threads; -NPSI-dryseal American standard intermediate internal straight pipe screw threads; -NPTF-dryseal American standard taper pipe screw threads; -PTF-SPL, SHORT (short) -short dryseal SAE short taper pipe screw threads.	SAE J476A-2013
DRYSEL-__	Screw thread for dryseal pipes Symbol used together with supplementary symbols: -F-PTF-dryseal fine taper pipe screw thread series; -NPSF-dryseal American standard fuel internal straight pipe screw threads; -NPSI-dryseal American standard intermediate internal straight pipe screw threads; -NPTF-dryseal American standard taper pipe screw threads; -PTF-SAE, SHORT-short dryseal SAE taper pipe screw threads; -PTF-SPL, SHORT-short dryseal taper pipe screw threads; -PTF-SPL, EXTRA SHORT-extrashort dryseal SAE taper pipe screw threads, special; -SPL-PTF-dryseal special taper pipe screw threads.	(MIL-STD-9A-1960) (obsolete)
E	Knuckle rolled screw thread for screwed shells of electric sockets and lamp bases (Edison) (in some works the symbol and the nominal value of the size of screw thread are replaced by the conventional designation of screwed shells and lamp bases size, respectively midget, miniature, mini-candelabria, intermediate, medium and mogul)	ANSI C 81.61-2017 ANSI C 81.62-2017
F-PTF	Dryseal fine taper pipe screw thread series	ANSI/ASME B 1.20.3-1976 (R 2018)
L..__	Screw thread for finishes of plastic containers, trapezoidal, with profile angle 30° rounded, used from plastic or metallic caps Symbol used together with supplementary symbols representing threaded finishes model formed from letters SP and three figures	ASME D 2911-2010 PBI 2-1968 (R 1978) (AU-124) FED-STD-H28/19-1978
M	Metric screw threads-M profile with basic ISO 68 profile (without compulsory rounded root)	ANSI/ASME B 1. 13 M-2005 (R 2018)
M..__	Screw thread for finishes of plastic containers, buttress, with profile angles 45° and 10° rounded, used from plastic caps Symbol used together with supplementary symbols representing threaded finishes model formed from letters SP and three figures	ASME D2911-2010 PBI 2-1968 (R 1978) (AU-124) FED-STD-H28/19-1978
MJ	Metric screw threads-MJ profile with rounded root (r=0,1501-0,18042p, p-pitch)	ANSI/ASME B 1.21M-1997 (R 2018)

MJB __	Metric buttress screw thread with profile angles 45° and 7° with compulsory rounded root, aeronautical use Symbol used possibly also with supplementary suffix: -C for screw thread used to push.	SAE MA 1696B-2019
MJS	Metric screw threads MJ profile with rounded root, special series of combinations diameter-pitch (r=0,1501-0,18042p, p-pitch)	ANSI/ASME B 1.21M-1997 (R2018)
NA	ACME screw threads (trapezoidal whit profile angle 29°)	Handbook H 28 (1944) (obsolete)
NC	National American coarse series screw thread	ASA B 1.1-1960 (obsolete) FED-STD-H-28-1987 (partially, obsolete) ANSI B 18.6.3-1972 (R 1991) (partially)
NC-5 __	National American screw thread class 5 interference fit Symbol used with supplementary suffixes For external threads -HF-for ferrous material external threads for driving in hard ferrous material with hardness greater than 160 HB; -HFM-for nickel-copper (monel), nickel-copper-aluminum (K-monel) and hard ferrous material external threads for driving in hard ferrous materials with hardness greater than 160 HB; -CSF-for ferrous material external threads for driving in copper alloy and soft ferrous materials with hardness 160 HB or less; -ONF-for ferrous material external threads for driving in non-ferrous materials other than copper; -HFK- for nickel-copper-aluminum (K-monel) external threads for driving in hard ferrous material with hardness greater than 160 HB; -CSFK-for nickel-copper-aluminum (K-monel) external threads driving in copper alloy and soft ferrous materials with hardness 160 HB or less; -ONFK- for nickel-copper-aluminum (K-monel) external threads driving in non-ferrous materials other than coppers; -HFS-special modified class 5 for ferrous material external threads for driving in hard ferrous material with hardness greater than 160 HB; -CSFS-special modified class 5 for ferrous material external threads for driving in copper alloy and soft ferrous materials with hardness 160 HB or less; -ONFS-special modified class 5 for ferrous material external threads for driving in non-ferrous materials other than coppers; For internal threads: -IF-for all ferrous materials internal threads; -INF-for all non-ferrous material internal threads; -IFM- for nickel-copper (monel), nickel-copper-aluminum (K-monel) and hard ferrous material internal threads; -IFS- special modified class 5 for ferrous material internal threads; -INFS- special modified class 5 for non-ferrous material internal threads.	ANSI/ASME B 1.12M-1987 (R 2018)
NC-7	Screw thread for high strength bolting, coarse series	ASA B 1.4-1945 (obsolete)
NC-__5	National American screw thread class 5 interference fit, coarse series, for hard steel external thread for driving in hard materials such as cast iron, steel, and bronze (implicit symbolization) Symbol used with supplementary suffixes defined implicitly in 1950 Supplement to Handbook H28 (1944): – tentative (TENTATIVE) – [variant initially defined in Report of the National Screw Commission (1928)]; – alternate (alternative, ALTERNATE) – [variant initially defined in Handbook H 28 (1942)].	Report of the National Screw Thread Commission (1928) (obsolete) Handbook H 28 (1942) (obsolete) 1950 Supplement to Handbook H28 (1944) (obsolete) ANSI B 1.12M-1981 (R 2003)
NEF	National American extra fine series screw thread	ASA B 1.1-1960 (obsolete) FED-STD-H-28-1987 (partially, obsolete) ANSI B 18.6.3-1972 (R 1991) (partially)
NF	National American fine series screw thread	ASA B 1.1-1960 (obsolete) FED-STD-H-28-1987 (partially, obsolete) ANSI B 18.6.3-1972 (R 1991) (partially)
NF-__5*	National American screw thread class 5 interference fit, fine series, for hard steel external thread for driving in hard materials such as cast iron, steel, and bronze (implicit symbolization) Symbol used with supplementary suffixes defined implicitly in 1949 Supplement to Handbook H28 (1944): – tentative (TENTATIVE) – [variant initially defined in the Report of the National Screw Commission (1928)]; – alternate (alternative, ALTERNATE) – [variant initially defined in in Handbook H 28 (1942)].	Report of the National Screw Thread Commission (1928) (obsolete) Handbook H 28 (1942) (obsolete) 1950 Supplement to Handbook H28 (1944) (obsolete)
NGO	National gas outlet screw threads	ANSI/CGA V-1-03-2013 ANSI B 57.1-1977 (obsolete)
NGO (Cl)	National gas outlet screw threads for gas containers for chlorine	ASA B 57.1=1950 (obsolete)
NGS	National (American) screw thread for gas containers, straight	ANSI/CGA V-1-03-2013 ANSI B 57.1-1977 (obsolete)
NGT	National (American) screw thread for gas containers taper	ANSI/CGA V-1-03-2013 ANSI B 57.1-1977 (obsolete)

NGT (CI) __	National (American) screw thread for gas containers, taper, for chlorine Symbol used together with supplementary symbols: - 1, 2, 3, 4, 5 representing conventionally the oversize of the screw length expressed by the number of turns that the ring gauge has to carry to certify the correctness of the thread.	ANSI/CGA V-1-03-2013 ANSI B 57.1-1977 (obsolete)
NH __	American standard hose coupling screw threads of full form Symbol possibly used together with supplementary symbol: -SPL in case of use for hoses used in the navy.	ANSI/ASME B 1.20.7-1991 (R2018) ANSI B 2.4-1969 (obsolete) NFPA Standard No 1963-2009
NHR	American standard hose coupling screw threads for garden hose applications	ANSI/ASME B 1.20.7-1991 (R2018) ANSI B 2.4-1969 (obsolete)
NM	National American miniature screw thread series	Handbook H 28 (1957) (obsolete)
NPS	American standard pipe screw threads, straight, internal. (Currently the symbol is only used for marking threading tools)	Progress report of the National Screw Thread Commission (1921) (obsolete) (ASME B 24.9)
NPSC	American Standard Straight pipe threads in pipe couplings	ANSI/ASME B 1.20.3-1976 (R2018)
NPSF	Dryseal American standard fuel internal straight pipe screw threads	ANSI B 1.20.3-1976 (R2003)
NPSG	American standard screw thread for lubricators with cup	Handbook H 28 (1942) (obsolete) (SAE J471-1961)
NPSH	American standard straight hose coupling screw threads for joining to American standard taper pipe screw threads ordinarily made with straight internal and external loose-fitting threads.	ANSI/ASME B 1.20.7-1991 (R2018)
NPSI	Dryseal American standard intermediate internal straight pipe screw threads	ANSI/ASME B 1.20.3-1976 (R2018)
NPSL	American standard straight pipe screw threads for loose-fitting mechanical joints with locknuts	ANSI/ASME B 1.20.1-2013 (R2018)
NPSM	American standard straight pipe screw threads for free-fitting mechanical joints for fixture	ANSI/ASME B 1.20.1-2013 (R2018)
NPT	American standard taper pipe screw threads for general use	ANSI/ASME B 1.20.1-2013 (R2018)
NPT-Spec-__	American standard taper pipe screw for gas containers for chlorine Symbol used together with supplementary symbols: -No. <n> (<n>=1, 2, 3, 4 where 2, 3, 4 representing conventionally the oversize of the screw length expressed by the number of turns that the ring gauge has to carry to certify the correctness of the thread).	Handbook H-28 (1944) (obsolete)
NPTF-__	Dryseal American standard taper pipe screw threads Symbol used with supplementary suffixes: -1 for thread without controlled crest and root truncation; -2 for thread with controlled crest and root truncation.	ANSI/ASME B 1.20.3-1976 (R2018)
NPTR	Railing joint taper pipe thread	ANSI/ASME B 1.20.1-2013 (R2018)
NR	National American screw thread with rounded root ( $r=0,108n$ , n-t.p.i)	SAE AS 82C-2018
NR	National American screw thread with rounded root ( $r=0,108n-0,144n$ , n-t.p.i)	[MIL-B-7838A-1952] (obsolete) (Handbook H-28(1969)) (obsolete)
NS	National American screw thread with special diameters, t.p.i and lengths of engagement	ASA B 1.1-1960 (obsolete) FED-STD-H-28-1987 (partially, obsolete) ANSI B 18.6.3-1972 (R 1991) (partially)
NSC	National American screw thread for electrical conduits straight based on NPT thread	NEMA Publication FB1-1977 (obsolete)
NSC -SHORT	National American screw thread for electrical conduits straight based on NPT thread with modified length	NEMA Publication FB1-1977 (obsolete)
NTC	National American screw thread for electrical conduits based on NPT thread	ANSI/NEMA FB 1-2007 (R 2010)
NTC -SHORT	National American screw thread for electrical conduits straight based on NPT thread with modified length	NEMA Publication FB1-1977 (obsolete)
NTCM	National American screw thread for electrical conduits tapered based on NPT screw thread with increased engagement length	ANSI/NEMA FB 1-2007 (R 2010)
P __	Screw thread for finishes of plastic containers, buttress, with profile angles 50° and 10° rounded, used from plastic caps Symbol used together with supplementary symbols representing threaded finishes model formed from letters SP and three figures??	[ASME D 2911-2010] PBI 2-1968 (R 1978) (AU-124) FED-STD-H28/19-1978
PTF-SAE, SHORT	Short dryseal SAE taper pipe screw threads,	ANSI/ASME B 1.20.3-1976 (R 2018)
PTF-SPL (Special) , SHORT	Short dryseal taper pipe screw threads	ANSI/ASME B 1.20.3-1976 (R2018)
PTF-SPL, EXTRA SHORT	Extrashort dryseal SAE taper pipe screw threads, special	ANSI/ASME B 1.20.3-1976 (R2018)
Rd	Knuckle screw thread for NBC protective mask and filter canister	STANAG 4155-1981
RMS (probably wrong symbol)	American screw thread for surveying instruments mounting	(Handbook H 28-1957) (obsolete)
R.S.M. for .. in. sheet	British rolled sheet metal screw thread and associated screw threads in moulded plastic and die-cast materials for general purposes, knuckle Numerical value is thickness of the metal for which the thread form is required	BS 2038:1953 (obsolete) (FED-STD H28/19-1988) (obsolete)
S	ISO metric miniature screw thread	[(63)] BS 4827:1972
S	Screw thread for canteen of mask drinking system, buttress with profile angles 50° and 10°	STANAG 4475-2007
SAE LT	Screw thread for lubrication fittings, type UN, tapered, external	SAE J 534-2015

SB (obsolete)	Screw thread for stove bolts according the standards of manufacturers	(ASME B 24.9-2008)
SGT	Special gas taper screw threads for gas cylinder valves, tapered, tapering 1:8 ( $1\frac{1}{2}$ i.p.f.)	ANSI/CGA V-1-03-2013 ANSI B 57.1-1977 (obsolete)
Spec 3	Screw thread for cable drilling tools, tapered, tapering 1:4 (3 i.p.f.)	API Specification 3-1988 (obsolete)
Spec 7-2 ____	<p>Screw thread for rotary drilling equipment, tapered different taperings depending on reference diameter</p> <p>Symbol used together with supplementary prefixes:</p> <ul style="list-style-type: none"> <li>— NC - connection type Numbered Connection style;</li> <li>— REG (Reg) - connection type Regular style;</li> <li>— FH - connection type Full Hole style;</li> <li>— SH - connection type Slim Hole style;</li> <li>— IF - connection type Internal Flush style;</li> <li>— OH – connection type American Open Hole;</li> <li>— OH LW - connection type Open-Hole Light Weight style;</li> <li>— OH SW - connection type Open-Hole Standard Weight style;</li> <li>— PAC - connection type PAC (Philip A. Cornell) style;</li> <li>— H 90 - connection type Hughes H-90 style ;</li> <li>— SL H90 connection type Slime Line Hughes H-90 style;</li> <li>— GOST Z- connection type 3 (Z) in accordance with ГОСТ (GOST) 28487:1990.</li> </ul> <p>Obsolete symbols:</p> <ul style="list-style-type: none"> <li>— XH - connection type eXtra Hole;</li> <li>— DSL - connection type Double Strim Line;</li> <li>— EF - connection type External Flush;</li> <li>— WO - connection type Wide Open.</li> </ul>	<p>API specification 7-1-2006 (R 2019)</p> <p>API specification 7-2-2017</p>
SPECIAL FORM	Screw thread with shape different from standardized form where there is no standard for defining it	1963 supplement to the Handbook H28 (1957) (obsolete)
SPECIAL FORM, 10° thread	Modified square screw thread (trapezoidal whit profile angle 10°)	FED-STD H28/19-1975 (obsolete)
SPECIAL FORM, 60° thread	ACME screw thread (trapezoidal) whit profile angle 60°, stub	FED-STD H28/19-1975 (obsolete)
SPL-PTF	Dryseal special taper pipe screw threads	ANSI/ASME B 1.20.3-1976 (R2001)
SPL 10° FORM	10° modified square screw thread (trapezoidal whit profile angle 10°)	FED-STD H28/19A-1988
SPL 60° FORM	ACME screw thread (trapezoidal) whit profile angle 60°, stub	FED-STD H28/19A-1988
SPL 60 deg Form	Special shape screw thread whit deviation from standard UN profile (for example with other roots shape)	(ANSI/ASME B 1.1-2003)
STUB ACME (Stub Acme) ____	<p>Stub ACME screw thread (trapezoidal whit profile angle 29°) Symbol used possibly also whit supplementary suffixes in case of modified shape:</p> <ul style="list-style-type: none"> <li>-M1-for Form 1 (with low screw thread height);</li> <li>-M2 for Form 2 (with increased screw thread height).</li> </ul>	ANSI/ASME B 1.8-1988 (R2016)
TS	ACME screw thread (trapezoidal) modified at 60°, stub, with three starts	[MIL-DTL-39888M-2015]
TWC	American truncated Whitworth form screw thread coarse-pitch series	ASA B 1.6-1944 (obsolete) Handbook H 28 (1944) (obsolete)
TWF	American truncated Whitworth form screw thread fine -pitch series	ASA B 1.6-1944 (obsolete)* Handbook H 28 (1944) (obsolete)
TWPP	American truncated Whitworth form screw thread for pipes parallel	ASA B 1.6-1944 (obsolete) Handbook H 28 (1944) (obsolete)
TWS	American truncated Whitworth form screw thread special series of combinations diameter-pitch	ASA B 1.6-1944 (obsolete) Handbook H 28 (1944) (obsolete)
UNC	Unified inch screw thread coarse pitch series	ANSI/ASME B 1.1-2003 (R 2018)
UNEF	Unified inch screw thread extra-fine pitch series	ANSI/ASME B 1.1-2003 (R 2018)
UNF	Unified inch screw thread fine coarse pitch series	ANSI/ASME B 1.1-2003 (R 2018)
UNJC	Unified inch screw thread, coarse pitch series, with rounded root ( $r=0, 15011n-0,18042n$ , n-t.p.i.)	ASME B 1.15-1995 (R2003)
UNJEF	Unified inch screw thread, extra-fine pitch series, with rounded root ( $r=0,15011n-0,18042n$ , n-t.p.i.)	ASME B 1.15-1995 (R2003)
UNJF	Unified inch screw thread, fine pitch series, with rounded root ( $r=0,15011n-0,18042n$ , n-t.p.i.)	ASME B 1.15-1995 (R2003)
UNJS	Unified inch screw thread, special series of combinations diameter-pitch and engagements lengths, with rounded root ( $r=0,15011n-0,18042n$ , n-t.p.i.)	ASME B 1.15-1995 (R2003)
UNK	Unified inch screw thread exterior whit controlled root radius ( $r=0,10829n-0,14434n$ , n-t.p.i.), external, dimensionally identical to the UNR but having tolerated dimension of minor diameter and additional measurement requirements (root radius and minor diameter)	ANSI B 1.14 (draft) [MIL-B-7838B-1962] (obsolete) ([48])
UNM	Unified miniature screw thread series	ANSI/ANSI B 1.10M-2004 (R2014)
UNO	Knuckle screw thread type Edison used to medium screwed lampholder	ANSI C 81.69-2017
UNRC	Unified inch screw thread, coarse pitch series, with rounded root ( $r=0,108n-0,144n$ , n-t.p.i.)	ANSI/ASME B 1.1-2003 (R 2018)
UNREF	Unified inch screw thread, extra-fine pitch series, with rounded root ( $r=0,108n-0,144n$ , n-t.p.i.)	ANSI/ASME B 1.1-2003 (R 2018)

UNRS	Unified inch screw thread, special series of combinations diameter-pitch and engagements lengths, with rounded root ( $r=0,108n-0,144n$ , n.t.p.i.)	ANSI/ASME B 1.1-2003 (R 2018)
UNS	Unified inch screw thread, special series of combinations diameter-pitch and engagements lengths (development of threads proposed by ABMA)	ANSI/ASME B 1.1-2003 (R 2018)
Unified Form SPL (UNIFIED FORM SPL)	Special screw thread having UN standard profile and tolerances different from standard (exception situations when differences from standard are at pitch diameter for different lengths engagement, at major diameter for special crest or at minor diameter for different roots or at all diameters for adaptation for coating or plating)	(ANSI B 1.1-2003)
V	Screw thread at 60° with truncated crest and root. Usual shape „V” are usually flattened in accordance with demands of users.(sharp shape used in USA to 1909)	(ANSI/ASME B 24.9-2016)
60° STUB	Stub ACME screw thread (trapezoidal) whit profile angle 60°	(MIL-STD-9A-1960) (obsolete) [ASA B 1.3-1941] (obsolete)
<n> N	National American series screw thread with constant t.p.i. ( $n=t.p.i.=8, 12, 16$ )	ASA B 1.1-1960 (obsolete) FED-STD-H-28-1987 (partially, obsolete) ANSI B 18.6.3-1972 (R 1991) (partially)
<n> UN	Unified inch screw thread seria seria cu with constant t.p.i ( $n=t.p.i.=4, 6, 8, 12, 16, 20, 28, 32$ )	ANSI/ASME B 1.1-2003 (R 2018)
<n> UNJ	Unified inch screw thread, series with constant t.p.i, with rounded root ( $n=t.p.i.=4, 6, 8, 12, 16, 20, 28, 32$ ) ( $r=0,150118n-0,18042$ )	ASME B 1.15-1995 (R2003)
<n> UNR	Unified inch screw thread, series with constant t.p.i, with rounded root ( $n=t.p.i.=4, 6, 8, 12, 16, 20, 28, 32$ ) ( $r=0,108n-0,144n$ )	ANS/ASME B 1.1-2003 (R 2018)
8N-7	Screw thread for high strength bolting, series with constant t.p.i. 8 in <sup>-1</sup>	ASA B 1.4-1945 (obsolete)
27 UNS	Unified inch screw thread. 27 in <sup>-1</sup> t.p.i. series for use on thin wall tubing	(MIL-STD-9A-1960) (obsolete)
.. AMMT (AMT, MT)	Screw thread for rotary drilling equipment, connection type American Mining Macaroni Tubing, tapered, tapering 1:4 (3 i.p.f.) The size of the connection is historical drill pipe size	(API specification 7-1-2002) [[28]]
.. Spec 5B __	Screw threads for casing, tubing and line pipe for petroleum industries buttress whit profile angles 10° și 3° tapered whit different tapering in accordance with reference diameter, triangular tapered with semi angle of tape 1°47' and trapezoidal with profile angle 60° tapered whit different tapering in accordance with reference dimensions Symbol used whit supplementary suffixes: -CSG—screw thread for casing pipes, round, short; -LCSG—screw rhread for casing pipes, round. Long; -BCSG (BUTTRESS CSG)-screw thread for casing pipes, buttress; -XCSG-screw tread for casing pipesr, extreme line; -LP (LINE PIPE)—screw thread for line pipes; -TBG—screw thread for not upset tubing pipes, integral joint; -UP TBG (EU, EUE, EUT)—screw thread for exrternal upset tubing pipes.	API Specification 5B-2017
.. - __ HELICAL COIL INSERT THD	Special screw thread for spiral wire inserts for internal screw thread UN system Symbol used whit supplementary suffixes: -complete designation (reference diameter, t.p.i., precision) of UN screw thread for what is used.	NASM 33537-2009 MS-33537E-1994 (obsolete)
.. __-STI thread	Special screw thread for spiral wire inserts for internal screw thread UN system Symbol used whit supplementary suffixes: -complete designation (reference diameter, t.p.i., precision) of UN screw thread for what is used.	ANSI/ASME B 18.29.1-2010 (R2017)
.. __-STI thread	Special screw thread for spiral wire inserts for internal screw thread M system Symbol used whit supplementary suffixes: -complete designation (reference diameter, pitch., precision) of M screw thread for what is used.	ANSI/ASME B 18.29.2M-2005
..2A-PIN	Screw thread for sucker rods, external UNRS 0.1 pitch ( $t.p.i.=10$ in <sup>-1</sup> ) serie	API Specification 11B-1998
..2B-BOX	Screw thread for sucker rods, internal UNS 0.1 pitch ( $t.p.i.=10$ in <sup>-1</sup> ) series and root radius $r=0,1 p$ (p-pitch)	API Specification 11B-1998
__-BUTT (Butt)	American buttress screw thread (with profile angles 45° and 7°) Symbol used possibly also whit supplementary prefix: -PUSH for screw thread used to push.	ANS/ASME B 1.9-1973 (R2017)
__ Thread Forming	Screw thread for for lubrication fittings, self tapping , triangular with profile angle 90° tapered, angle of inclination of generatrix 5° with the profile perpendicular to the generatrix, Symbol used whit supplementary suffixes: -Pipe Special for dimension $1/8-27$ ; -Special Taper for dimension $1/4-28$ .	SAE J 534-2015
__N-BUTT	American national buttress (with profile angles 45° and 7°) screw thread Symbol used with supplementary prefixes: - (← for thread used to push; - ←( for thread used to pull.	ASA B 1.9-1953 (obsolete)
--	Screw thread for lag screw, inch system	ANSI B 18.2.1-1996
--	Screw thread for lag screw, metric system	ANSI/ASME B 18.2.3.8.M 1991 (R 1991)*
--	Screw thread for screw for wood	ANSI B 18.6.1-1981 (R 1997)
--	Screw thread for self tapping screw, inch system	ANSI B 18.6.4-1981 (R1991)
--	Screw thread for self tapping screw, metric system	ANSI B 18.6.5M-1986

--	Screw thread for shutter cable tip socket connection triangular, tapered, tape angle 14°	ANSI IT 3.107 1995*
--	Screw thread for finishes of plastic containers, buttress, with profile angles 40° and 10° rounded, used from plastic caps	ASME D2911-2010
--	Screw threads for high temperature bolting	MS SP-29-1943 (obsolete)
--	Screw thread straight, used for plug of the vent and flange of bung of containers for explosive and dangerous materials	FED-STD-H28/7A-1984 Appendix B
--	Screw thread for spark plugs, other than aircraft used (metric screw thread whit dimensions in inch)	MSS 39097C-1979 (obsolete)
--	Screw thread rope type for drills, rodes. couplings, bits, and shanks for drifter drills, for mining use, knucle	MS 90496A-1973 (obsolete)
--	Screw thread for finishes of glass containers, trapezoidal with profile angle 30° rounded	BS 1918-1:1978 (FED-STD-H28/19-1978)
--	Screw thread for finishes of plastic containers buttress with profile angles 10° și 45° rounded	BS 5789:1979 (FED-STD-H28/19-1978)
--	Screw thread for finishes of plastic containers buttress with profile angles 10° și 45° rounded	BS 5789:1979 (FED-STD-H28/19-1978)
--	Screw thread for glass containers, trapezoidal with profile angle 23° și 24° rounded and buttress with profile angles 15°, 19°, 30° and 34° in various combinations, rounded	drawings GPI (FED-STD-H28/19-1978)
--	Screw threads for fire hose coupling, having various reference diameters and t.p.i.in according to the city of use	--

Table 2 Symbols Unused in Standards, Existents in Others Sources

Symbol 1	Designation (explanations) 2	Standard 3
AERO*	Patented screw thread for aircraft construction (triangular profile, profile angle 60° at nut made from a soft material and semi-circular profile at screw made from high strength steel) with insertion in the form of helical spring	
ACME __ *	ACME screw thread (trapezoidal whit profile angle 29°), tapered, tapering 3.373 i.p.f Symbol used together with supplementary prefixes: -REG, SL - with significance above	
ANC*	National American coarse series screw thread (British symbol for NC)	
ANF*	National American fine series screw thread (British symbol for NF)	
API SR ..* (API Sucker Rod .. *)	Screw thread for sucker rods (maybe an obsolete designation)	API Specification 11 (old edition)??
API.. __ THD*	Screw thread for rotary drill stem elements (maybe obsolete designation) Symbol used together with supplementary prefixes : - NC ROTARY, REG, REG LH FH, IH with significance above.	API Specification 7 (old edition)??
ASME*	Enlargement of Sellers screw thread, for general use issued by ASME, withdrawn in 1918	(obsolete)
ASTP*	American standard pipe screw thread (alternative designation for NPT thread)	
EG .. __ *	Special screw thread for spiral wire inserts for internal screw thread UN system (German and Czech designation in accordance with the pattern of DIN standard for special thread for spiral wire inserts for internal screw thread M system) Symbol used with supplementary suffixes: -complete designation (reference diameter, t.p.i., precision) of screw thread (UNC, UNF) for what is used.	MIL-S-33537??
FIP*	Female pipe-internal screw thread for iron pipes (alternative designation for NPT screw thread)	
FIPT*	Female pipe-internal screw thread for iron pipes (alternative designation for NPT screw thread)	
FMPT*	Female american standard taper pipes screw threads for general use (alternative designation for NPT screw thread)	
FPT*	Female pipe thread internal screw thread for pipes (alternative designation for internal NPT screw thread)	
GHT*	Garden hose screw thread	
IPS*	Iron pipe standard screw thread for iron pipe (alternative designation for NPT screw thread)	
IPT*	Screw thread for iron pipe (alternative designation for NPT screw thread)	
MIP*	Male iron pipe external screw thread for iron pipe (designation for NPT thread)	
MM*	Metric screw thread-M	
MNP*T	Male American standard taper pipe screw threads for general use (alternative designation for external NPT screw thread)	

MPT*	Male pipe taper-external pipe tape screw thread (designation for NPT screw thread)	
NGTT*	National gas taper screw thread	
NPTC*	American standard taper pipe screw thread for discharge valves for chlorine gas cylinders	
NPTF* or NPT (F)*	Female American standard taper pipe screw threads for general use (alternative designation for internal NPT screw thread)	
NPTG*	American standard taper pipe screw thread for discharge valves for gas cylinders (except chlorine)	
NPTM* or NPT(M)*	Male American standard taper pipe screw threads for general use (alternative designation for external NPT screw thread)	
NST*	National American standard screw thread for fire hoses	NFPA Standard No 1963, old edition??
SAE*	Screw thread for fasteners. coarse and fine developed by SAE from A.L.A.M. screw thread for car screw thread, developed later in NF screw thread	(obsolete)
SIPT*	Straight screw thread for iron pipes	
Sq	Square screw thread	--
TIPT*	Tapered iron pipe screw thread (alternative designation for external NPT screw thread)	
UNIV*	Unified miniature screw thread	
USF*	American form screw thread	(obsolete)
USS*	Screw thread in accordance with US standard	(obsolete)
USST* (USSt*)	US-standard form screw thread	(obsolete)
UST*	Unified screw threads, American, British, Canadian Form	(obsolete)
V sharp*, (VEE*, Vee*)	Screw thread at 60° with crest and root reduced. Usual shape „V” are usually flattened in accordance with demands of users (sharp shape used in USA to 1909)	---
60°*	American screw thread trapezoidal stub with profile angle 60°	ASA B 1.3-1941
..API__*	Screw threads for casing, tubing and line pipe for petroleum industries (maybe an obsolete designation). Symbol used with supplementary suffixes: - CSG, LCSG, BCSG, XCSG, LP, TBG, UP TBG with significance above.	API Standard 5B (old edition)??

Table 1.3: Screw Threads without Symbols, besides National Standards, showed in Miscellaneous Sources

Symbol	Designation (explanations)	Standard
A.L.A.M*	Screw thread Sellers type established the Association of Licensed Automobile Manufacturers, developed later in SAE screw thread	--
Briggs*	Taper pipe screw thread, used as basis for the development of the screw thread NPT	--
Cadillac*	Screw thread USS type with rounded root	--
Dardelet*	Screw thread triangular with profile angle 29° self-locking, designed to resist vibrations and remain tight without auxiliary locking devices	--
Echols*	Screw thread for tapes with increased space for chips and decreased number of cutting edges. Profile is in accordance with profile of manufactured thread	--
Harvey Grip*	Buttress screw thread with profile angles 44° and 1°	--
Loyd & Loyd*	Screw thread type Whitworth	--
Philadelphia Carriage Bolt*	Trapezoidal screw thread with profile angle 3°30'	--
Sellers*	American screw thread used as basis for the development of threads A.L.A.M., ASME, SAE, USS, USST, N	--

Table 1.4: Proposals of Symbols for Some Unsymbolized Screw Threads

Symbol	Designation (explanations)	Standard
1	2	3
Glass Finish Number__	Screw threads for glass containers Symbol completed with supplementary suffixes representing number of glass finish (number of GPI drawing)	GPI drawings FED-STD-H28/19-1978
Glass Containers Finish __	Screw thread for finishes of glass containers Symbol completed with supplementary suffixes representing type of glass finish: -R3, R4, R5, R6	BS 1918-1:1978 (FED-STD-H28/19-1978)
M 40°..__	Screw thread for finishes of plastic containers, buttress, with profile angles 40° and 10° rounded, used from plastic caps Symbol used together with supplementary symbols representing threaded finishes model formed from letters SP and three figures	ASME D2911-2010

Plastic Containers Finish_-No	Screw thread for plastic containers Symbol completes with supplementary suffixes representing type of plastic containers finish: -short neck. medium neck, long neck and -after No, number of finish	BS 5789:1979 (FED-STD-H28/19-1978)
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## NOTES

When is not other specification, the profile of the screw thread is triangular.

Profile angle:

for UN (N), metric and not specified screw thread 60°;  
for Whitworth screw thread 55°.

When is not other specification tapering 1:16 (<sup>3</sup>/<sub>4</sub> i.p.f.).

When is not other specification, at the tapered screw threads, the profile is perpendicular to the axis.

A standard or a work indicated in the bibliography put into parenthesis define only the symbol not the respective screw thread. A standard or a work indicated in the bibliography put into brackets provides only partial data about the screw thread without indicating the symbol or designation

Data about designation symbols:

\* (asterisk) wrote near the symbol of a screw thread indicate what this symbol was not met in the designation of screw thread and may be only a form of identification of screw thread in varied works;  
-- (two dashes) indicate the lack of the symbol or of the standard;  
.. (two periods) indicate what in the symbol these must be replaced with numerical values (usually reference diameter of the screw thread);  
(two space) indicate the lack of information about symbol of the screw thread or of the standard for definition;  
\_\_ (two underscores) indicate what in the symbol must be replaced with the prefix or with the suffix;  
?? (two question marks) indicate uncertain or contradictory information, which were not checked on the source, included for the lack of source.

Standards symbols:

- American Standards
  - API – Publication issued by American Petroleum Institute
  - ANSI - Standards issued by American National Standards Institute
  - ASA - Standards issued by American Standards Association (obsolete, now ANSI)
  - ASME - Publications issued by American Society of Mechanical Engineers
  - ASTM - Publications of American Society for Testing and Materials
  - CGA - Publication issued by Compressed Gas Association
  - FED-STD - Federal standards issued by Federal Supply Service valid for federal agencies
  - GPI – Publications issued by Glass Packaging Institute
  - MIL-B, MIL-S – Military Specifications issued by Department of Defence
  - MIL-DTL – Military Detail Specification issued by Department of Defence
  - MIL-STD – Military Standards issued by Department of Defence
  - MS - Military Standards issued by Department of Defence
  - MSS – Publications issued by Manufacturers Standardization Society of the Valve and Fittings Industry
  - NASM – National Aerospace Standards inch based issued by Aerospace Industries Association
  - NEMA – Standards issued by Association of Electrical Equipment and Medical Imaging Manufacturers
  - NFPA – Publications issued by National Fire Protection Association
  - PBI- Publication issued issued by Plastic Bottle Institute
  - SAE – Publication issued by Society of Automotive Engineers
  - STANAG – Standardization Agreement issued by North Atlantic Treaty Organization (NATO)
  - USAS – United States of America Standards issued by United States of America Standards Institute (obsolete, now ANSI)
- Foreign Standards

- BS – British Standard - Standards issued by British Standard Institute UK

ГОСТ (GOST) - ru-Государственный стандарт (Gosudarstvenyi standart) en-State Standard - Standards issued by the Russian standardization organization (and former Soviet standardization organization).