

ASME B1.20.5-1991

(REVISION OF ANSI B1.20.5-1978)

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**GAGING FOR
DRYSEAL PIPE
THREADS
(INCH)**

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers

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The American Society of
Mechanical Engineers

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FOREWORD

(This Foreword is not part of ASME B1.20.5-1991.)

In 1973, the American National Standards Committee B2, which had formerly been responsible for pipe thread standards, was absorbed by ANSI Standards Committee B1 and reorganized as subcommittee 20. A complete rewrite of the B2.2-1968 Standard on Dryseal Pipe Threads was completed with the publication of ANSI B1.20.3-1976 for product threads and the ANSI B1.20.5-1978 Standard for Gaging.

The product thread standard ANSI B1.20.3 establishes two classes of dryseal pipe threads: Class 1 and Class 2. The classes differ only in inspection requirements. With Class 1 threads, inspection of root and crest truncation is not specified. Class 2 threads are identical to Class 1 threads except that inspection of root and crest truncation is required. This gaging standard includes 6-step crest and root check gages, which, within their limitations, should be helpful in establishing the degree of conformance of product threads.

When 6-step crest or root check gages are to be used, it is necessary to classify the product thread size into a size range (minimum, basic, or maximum) as shown in Fig. 1. The use of 3-step L1 thread gages for NPTF threads requires estimating the one third of a turn, plus or minus, from the basic notch on the gage to classify the thread as basic. Use of this same one third turn estimation is required to determine minimum and maximum ranges. This Standard includes 4-step taper thread gages to eliminate the need for estimating the one third turn deviation from basic necessary with 3-step or basic step gages. 3-step taper thread gages are included in Appendix A for those who may prefer to use them.

Crest and root check gages for NPTF threads are also covered in this Standard. Prior to the publication of ANSI B1.20.5-1978 many gage manufacturers had calculated diameters for and made such gages based on methods used for ANPT (MIL-P-7105) 6-step gages, which were calculated to the extremes of the minimum and maximum zones, where most product threads should never be, and which, further, is not the same logic used in calculating the pair of basic steps. The NPTF 6-step gages tabulated herein are based on the mid-point of each range as determined by the L_1 plug gage (minimum, basic, or maximum) for calculation of the truncation limits where most of the product threads should be (see Fig. 2).

It should be noted that all references to the turns of engagement method for inspection of product threads have been withdrawn from this Standard. Results obtained by that method were found to quite often disagree with those obtained by the step limit method described here within. Also, inconsistencies in the end threads on the product and gages do not provide for a constant disengagement point between the two. This does not however preclude the use of this method in any way as an acceptable means of inspecting taper pipe threads. When this method is chosen, customer and vendor should agree on gaging procedures and minimum/maximum acceptance limits on the turns of engagement. Information on this method can be found in Appendix D for reference.

The gaging data in this Standard supersedes that given in ANSI B1.20.5-1978. The proposed standard was submitted by Standards Committee B1 to the Secretariat and the American National Standards Institute. It was approved and formally designated as an American National Standard on January 22, 1991.

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Standardization and Unification of Screw Threads

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GAGING FOR DRYSEAL PIPE THREADS (INCH)

1 GAGING

1.1 Scope

The scope of this Standard is to provide information regarding practical dryseal thread inspection methods and commonly used gages for production evaluation purposes. All dimensions are in inches unless otherwise specified.

1.1.1 Federal Government Use. When this Standard is approved by the Department of Defense and the Federal agencies and is incorporated into FED-STD-H28/8, Screw-Thread Standards for Federal Services, Section 8, the use of this Standard by the Federal Government is subject to all the requirements and limitations of FED-STD-H28/8.

1.2 How Dryseal Works

The principle of dryseal threads is based on crest and root contact at handtight engagement at both major and minor diameters. Conformance to L_1 , L_2 , and L_3 functional size gages alone will not assure that the threads will be drysealed to ANSI B1.20.3 design specifications. In addition to functional size, the dryseal crest and root truncations must be held on both external and internal threaded products in order to be dryseal. This applies to both straight and taper dryseal threads.

1.3 Limitations

Industry has developed gaging practices over many years which have resulted in the common use of L_1 , L_2 , L_3 , and plain taper plug and ring gages to evaluate dryseal pipe threads. These are functional gages intended to aid the manufacturer in the control of threading operations. It must be recognized that conformance to a functional gage or series of gages is not conclusive evidence of conformance to the design requirements of ANSI B1.20.3. For critical applications more extensive inspection and testing, not covered in this Standard, may be required in order to insure an acceptable seal.

1.3.1 These gaging practices used with proper tool configuration control, sound manufacturing and part support practices, and visual inspection have provided pipe threads that sealed acceptably for many producers of pipe threads.

1.3.2 These gages and gaging practices are intended to evaluate unused pipe threads. Once a thread joint is made up wrench tight, metal is deformed by design and may not be found acceptable using these described gages and methods. It is the user's responsibility to determine if the used thread will perform satisfactorily in its intended application.

1.4 Product Thread Designations

Dryseal pipe threads are designated by specifying in sequence the nominal size, threads per inch, thread symbol, and class where required.

EXAMPLES:

1/8-27 NPTF-1
1/8-27 NPTF-2
1/8-27 PTF-SAE SHORT
1/8-27 NPSF
1/8-27 NPSI

Each of the letters in the symbols has a definite significance as follows:

N = National (American) Standard
P = Pipe
T = Taper
S = Straight
F = Fuel and Oil
I = Intermediate

For further information see ANSI B1.20.3.

1.4.1 Reference Documents. The latest issues of the following documents form a part of this Standard to the extent specified herein.

ANSI/ASME B1.7
Nomenclature, Definitions and Letter Symbols for Screw Threads
ANSI B1.20.3
Dryseal Pipe Threads
ANSI B47.1
Gage Blanks