

BRITISH STANDARD 919 : Part 1 : 1960

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SPECIFICATION FOR
**SCREW GAUGE LIMITS
AND TOLERANCES**

**Part 1. Gauges for Screw Threads
of Unified Form**

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BRITISH STANDARDS INSTITUTION
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The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 9000, fully indexed and with a note of the contents of each, will be found in the BSI Catalogue. The BSI Catalogue may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:

B.S. 1044. Recommended designs for plug, ring and gap gauges.

B.S. 1580. Unified screw threads.

B.S. 2517. Definitions for use in mechanical engineering.

B.S. 3382. Electroplated coatings on threaded components.

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CO-OPERATING ORGANIZATIONS

The Mechanical Engineering Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

*Admiralty	Institute of Marine Engineers
Air Ministry	Institute of Petroleum
Associated Offices' Technical Committee	Institution of Civil Engineers
Association of Consulting Engineers (Incorporated)	Institution of Gas Engineers
British Chemical Plant Manufacturers' Association	Institution of Heating and Ventilating Engineers
British Compressed Air Society	Institution of Mechanical Engineers
*British Electrical and Allied Manufacturers' Association	Institution of Mechanical Engineers (Automobile Division)
British Engineers' Association	Institution of Production Engineers
British Gear Manufacturers' Association	Locomotive and Allied Manufacturers' Association of Great Britain
British Internal Combustion Engine Manufacturers' Association	Machine Tool Trades Association
British Iron and Steel Federation	Ministry of Labour (Factory Inspectorate)
British Railways, The British Transport Commission	Ministry of Power
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*D.S.I.R.—National Engineering Laboratory	Ministry of Works
Electricity Council, The Generating Board and the Area Boards in England and Wales	National Coal Board
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Gas Council	Radio Industry Council
High Commission of India	War Office

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this standard:

British Bolt, Nut, Screw and Rivet Federation	Screw Thread Tool Manufacturers' Association
Gauge and Tool-Makers' Association	Society of British Aircraft Constructors
Ministry of Aviation	Society of Motor Manufacturers and Traders

The following B.S.I. references relate to the work on this standard:
Committee reference MEE/57. Draft for comment CZ(MEE) 2154.

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BRITISH STANDARD SPECIFICATION FOR SCREW GAUGE LIMITS AND TOLERANCES

Part 1. Gauges for Screw Threads of Unified Form

FOREWORD

The limits of tolerance specified in the 1952 edition of B.S. 919 were intended to apply to gauges and setting plugs for all standard forms of screw threads with the exception of Acme, buttress and round threads. At that time it was not considered necessary to make any distinction between the tolerances for Unified thread gauges and those for, say, Whitworth-form thread gauges.

Experience has shown, however, that gauging Unified threads often presents problems which do not occur with other threads. It has accordingly been felt that consideration of the requirements for Unified thread gauges might reasonably be separated from those for other thread gauges, and that B.S. 919 might be reissued in several Parts, each dealing with gauges for a different type of thread.

The most important factor which influenced the British Standards Committee responsible for the present standard was the desirability of reconciling differences between British and American practices in gauging Unified threads. This is a matter of considerable importance when the question of interchangeability between products made in the U.K. and U.S. arises.

The Committee also had in mind the position of countries other than the U.K. and U.S. who have adopted or are about to adopt the Unified thread system. Of these, several Commonwealth countries have already encountered difficulties due to the differences in British and American gauging practice and have strongly urged the need for establishing a common gauging system. Further, it has now been agreed that Unified threads shall form the subject of an ISO Recommendation for an international inch-series of screw threads. It is, therefore, clearly desirable that the inch-using countries should be able to offer an agreed system of gauging for consideration by the continental countries when discussing the further development of this Recommendation.

With circumstances such as these in mind, the Committee have had many discussions both among themselves and with representatives of the American and Canadian

Committees on the steps to be taken to achieve unification of their thread-gauging standards. Compromise proposals put forward at one stage were not accepted by the American Committee who pointed out that threaded products made in accordance with their gauging system had proved satisfactory in service over a number of years. It was also realized that the expectation of continuing to use this system had influenced the U.S. when the tolerances to be assigned to Unified threads were originally decided upon.

The magnitude of the tolerances specified in the present standard for GO and NOT GO screw plug gauges and for adjustable screw ring gauges and their associated setting plugs is fully in accordance with the American Standard ASA.B1.2 (1952), except for the pitch tolerances of the gauges which are somewhat smaller.

In addition, the present standard makes provision for solid screw ring gauges, for thread calliper gauges and their associated setting plugs, and for check plugs for GO and NOT GO ring gauges. It also provides for alternative types of NOT GO effective diameter plug gauges, the differences between which are fully explained.

Following American practice, only one class of gauge is specified for Unified threads; the standard does not include the Reference class of gauge provided for in the 1952 edition.

The tables in this standard contain only the limits of tolerance for the various types of gauges, but it is the intention of the Committee to publish further tables which will give the limits of size of these gauges for the full range of standard threads in the Unified system.

It is emphasized that the provisions of this standard relate solely to gauges for Unified threads. It is recognized that a transition period will necessarily ensue during which existing gauges will continue to be used. Requirements for gauges for Whitworth and other forms of thread will shortly be reviewed as a separate consideration, and will be published in separate Parts of B.S. 919 as mentioned above.

SPECIFICATION

SCOPE

1. This standard relates to screw gauges and to setting and check plugs for screw ring and calliper gauges for use in the checking of products with Unified threads.

Provision is made for the following types of gauges:

a. Screw gauges.

- (i) GO and NOT GO screw plug gauges—solid,
- (ii) GO and NOT GO screw ring gauges—solid,
- (iii) GO and NOT GO screw ring gauges—adjustable,
- (iv) GO and NOT GO screw calliper gauges—adjustable.

b. Setting plugs. Setting plugs for GO and NOT GO adjustable ring gauges and for GO and NOT GO calliper gauges:

- (i) double length,
- (ii) single length.

c. Check gauges. GO and NOT GO screw check plugs for solid screw ring gauges.

d. Plain gauges. GO and NOT GO plug gauges and GO and NOT GO calliper gauges for the crest diameters of product threads.

The standard comprises five main sections as follows:

- Section One. Notes on the inspection of product threads.
- Section Two. Notes on the use of various types of gauges.
- Section Three. Inspection of product threads by direct measurement.
- Section Four. Gauge tolerance tables.
- Section Five. General requirements.

Appendices are also included as follows:

- Appendix A. Conventional illustration of tolerance zones.
- Appendix B. Effective diameter equivalent of pitch and angle errors.
- Appendix C. A recommended system of gauges for coated screw threads.
- Appendix D. Notes on the setting to size of adjustable screw ring gauges.
- Appendix E. Examples illustrating the method of determining the diametral limits of size of gauges and setting plugs.
- Appendix F. Comparison between the designations of British and American gauges.

NOMENCLATURE

- 2. For definitions of terms, reference should be made to B.S. 2517, 'Definitions for use in mechanical engineering'.

SECTION ONE : NOTES ON THE INSPECTION OF PRODUCT THREADS

METHODS OF INSPECTION

3. The object of any system of inspecting screw threads of Unified form is to check compliance with the requirements laid down for them in B.S. 1580*.

There are two ways of verifying that product threads comply with this standard, (1) by the use of limit gauges; (2) by direct measurement of the thread elements. Both methods are considered later.

METHOD OF SPECIFYING THE PRODUCT THREAD

4. **a. Permissible deviations in diameter.** In B.S. 1580* maximum and minimum limits are tabulated for the major, effective and minor diameters of three classes of Unified threads, with the single exception of the major diameter of internal threads for which only the minimum limit is stated.

It may be noted that the permissible size variations may exist not only between separate screw threads of a given class, but also in any individual screw thread. For example, it is stated that the diameters of a $\frac{1}{2}$ -20 UNF bolt to Class 2A are permitted to vary in size as follows:

	Maximum size (uncoated) in	Minimum size (uncoated) in	Tolerance in
Major diameter	0.4987	0.4906	0.0081
Effective diameter	0.4662	0.4619	0.0043
Minor diameter	0.4374	0.4295	0.0079

* B.S. 1580, 'Unified screw threads'.

b. Permissible deviations in flank angle and pitch. No specific tolerances are given in B.S. 1580 for the permissible deviations in the pitch or the flank angles of the bolt thread. It is stated, however, that whilst the actual simple effective diameter of the thread should be not less than the minimum size specified for that element, viz. 0.4619 in, the sum of the simple effective diameter and the effective diameter equivalent of the errors present in the pitch and flank angles of the bolt should not be greater than the maximum size specified, viz. 0.4662 in.

In other words, the minimum limit for the effective diameter of the bolt relates to its *simple* effective diameter, whilst the maximum limit refers to its *virtual* effective diameter.†

It will be appreciated that a bolt with simple effective diameter on *maximum* size or a nut with simple effective diameter on *minimum* size could be permitted no deviations at all in flank angles or pitch. A bolt or nut with simple effective diameter lying somewhere between the permissible limits of size may have limited deviations in angle and pitch, the amounts depending upon the difference between the actual simple effective diameter and the maximum limit of size in the case of a bolt, and the minimum limit of size in the case of a nut.

It will be seen, therefore, that, whilst the product standard (B.S. 1580) quotes no specific tolerances for

† For further explanatory information reference should be made to 'Notes on Applied Science No. 1—Gauging and Measuring Screw Threads', published by H.M.S.O.

deviations of flank angles and pitch of a product thread, the permissible deviations of these elements of the thread are intended to be controlled by the amount of tolerance quoted for the effective diameter.

CONVENTIONAL THREAD GAUGING PRACTICE AND ITS LIMITATIONS

5. The usual way of verifying that threads comply with the product standard, and especially when large quantities of the product are involved, is by the use of limit gauges. The following gauges are normally used:

- (i) Maximum metal limit gauges known as GO gauges.
- (ii) Minimum metal limit gauges known as NOT GO gauges.

a. GO gauges. The forms of GO screw plug gauges and of GO screw ring and calliper gauges are shown in Fig. 1.

From Fig. 1*a* it will be seen that the GO screw plug gauge will ensure that the major and effective diameters of the internal product thread are not below the minimum sizes specified for them. The gauge does not ensure that the minor diameter is not too small since, for practical reasons, the root of the plug gauge must be cleared. The minor diameter is examined separately by means of a GO plain plug gauge made to the minimum minor diameter of the internal thread.

It will be appreciated that the above mentioned gauge does not take account of any eccentricity which may be present between the crest and flank diameters of the internal product thread and which might affect assembly. A test for eccentricity of these diameters can be made, if required, by using a GO screw plug gauge provided with a pilot GO plain plug, the diameter of which should be made to the minimum minor diameter of the internal thread.

From the form of the GO ring or calliper gauge shown in Fig. 1*b* it will be noted that this gauge will ensure (1) that the effective diameter of the external product thread is not above the maximum size specified for it, and (2) that the external thread will assemble with an internal thread having a minimum minor diameter. The gauge does not ensure that the major diameter of the external thread is not too large, since for practical reasons the root of the ring gauge must be cleared. The major diameter is examined separately by means of a GO plain calliper gauge made to the maximum major diameter of the external thread.

Here again it will be appreciated that eccentricity between the crest and flank diameters of the thread will not be detected by the GO gauge. The amount of any eccentricity present can be most readily determined by means of optical projection.

Since their purpose is to ensure, as far as possible, assembly of mating threads, the GO screw gauges should be made at least to a length corresponding to the length of engagement of the product threads.

NOTE. When, for reasons of economy standard gauge blanks are used in manufacturing the gauges, the length of the gauge may sometimes be less than the length of engagement of the product threads. In such cases suitable precautions must be taken when using the gauges.

b. NOT GO gauges. NOT GO gauges for crest diameters are plain plugs for internal threads, and plain calliper

gauges for external threads, made to the *minimum metal* limit for the product thread.

The NOT GO gauge for checking the *minimum metal* limit on effective diameter is not so simple and its design needs careful consideration. A NOT GO effective diameter gauge is a threaded gauge intended for verifying that the thickness of the product threads is not less than half the basic pitch at a diameter equal to the minimum metal limit specified for the effective diameter of the product thread. Fig. 2*a* indicates the profile of a gauge which, theoretically, would serve that purpose. It is realized at once that such a gauge would not only be difficult to measure but would also wear very quickly in use. The gauge is made practicable, however, by providing it with limited lengths of flank, as shown in Fig. 2*b*. The longer one makes these flanks, the less critical does the gauge become in controlling the *simple* effective diameter of the product thread when the flank angles are in error or when other malformations exist.

The forms of NOT GO effective diameter gauges covered by this standard are as shown in Fig. 5. Fig. 5*a* shows a short flank (or low addendum) gauge having an addendum of $H/8$, while Fig. 5*b* shows a long flank (or high addendum) gauge with an addendum of $H/4$. The low addendum gauge is the type which has been in use in the United Kingdom for many years and its present form is closely similar to that shown in B.S. 919 : 1952. The high addendum gauge is the type used in the U.S.A. where it is known as the HI plug gauge.

When considering which type of gauge to use, it should be borne in mind that a long flank NOT GO effective diameter gauge is less searching than a short flank gauge in detecting thin threads when angle errors are present, or when other malformations of the thread exist such as those due to tearing. Some guidance in the selection of gauges is given under the heading, 'Acceptability of threads', in B.S. 1580, 'Unified screw threads'.

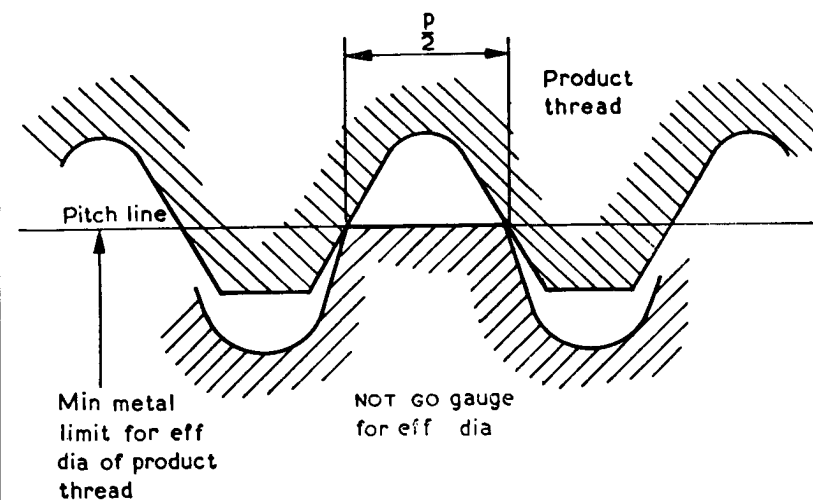
NOTE. For the time being it is recommended that the American type high addendum NOT GO effective diameter screw plug gauge should be used for checking the numbered sizes of internal threads.

c. Limitations of thread gauging practice. It must be borne in mind that conventional limit gauging is not sufficient in itself to ensure that product threads are completely satisfactory. For example, the form and finish of the roots of external threads are not controlled precisely by the gauges laid down in this standard and yet they are features which may have a large effect upon the strength of the thread. For complete satisfaction one must be able to rely upon the accuracy of the tools and the methods used in the production of the thread. The maintenance, by use of optical projection, of good profiles on the threading tools, as a basis for obtaining good profiles on the product threads, is of particular importance if conventional gauging is to be really effective in inspecting screw threads.

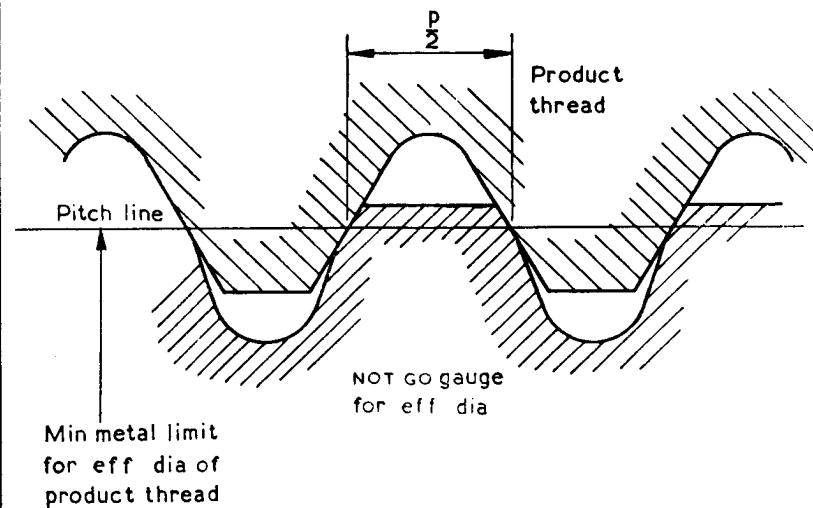
GAUGE TOLERANCES AND GAUGE TOLERANCE ZONES

6. Ideally, GO gauges should be of perfect form, made in a non-wearing material, and be equal to the maximum metal size of the product. Such gauges would, theoretically, reject no work made within the product limits. Since small inaccuracies in size and form of gauges are inevitable in the manufacture, tolerances are specified which are

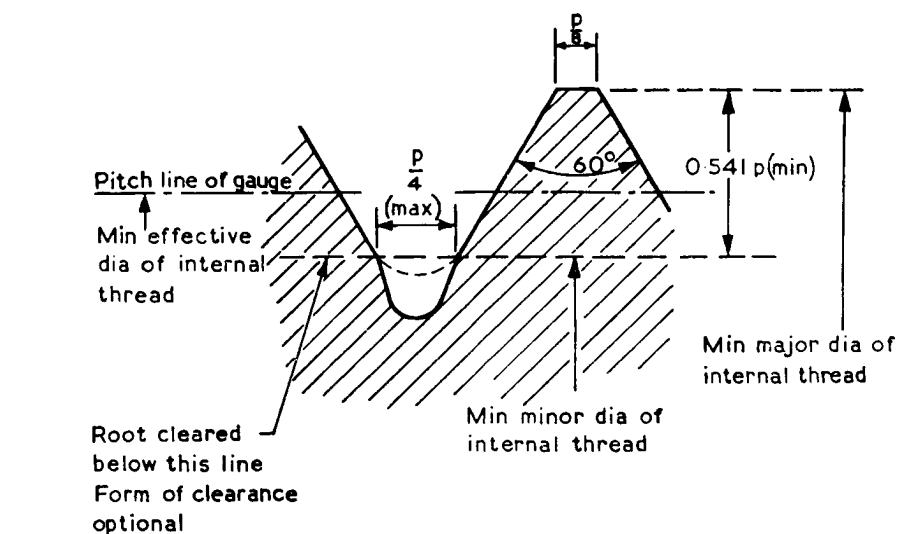
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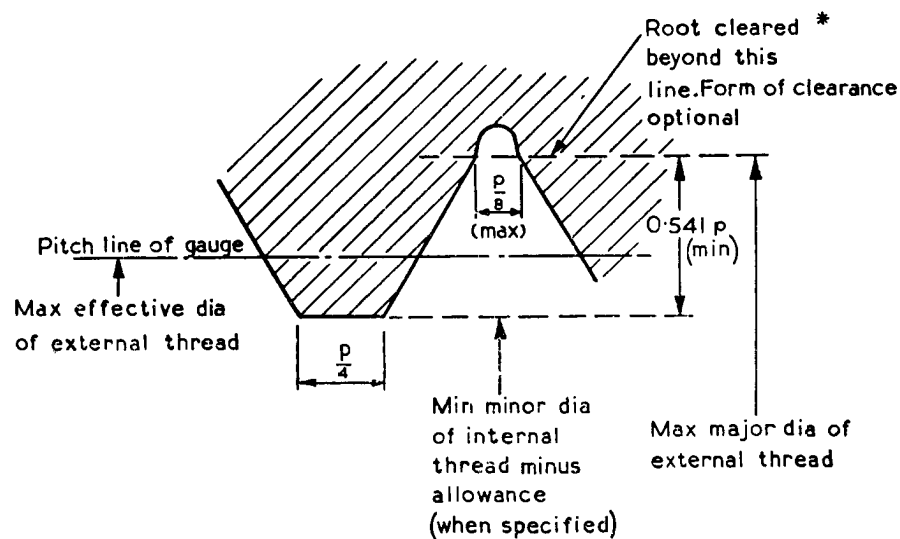
a. Theoretical form for NOT GO gauge



b. Practical form for NOT GO gauge



a. GO plug gauge



* For adjustable gauges the clearance must be sufficient to permit subsequent adjustment of the gauge.

b. GO ring or calliper gauge

Fig. 1. Thread forms of GO gauges

Fig. 2. Thread forms of NOT GO gauges

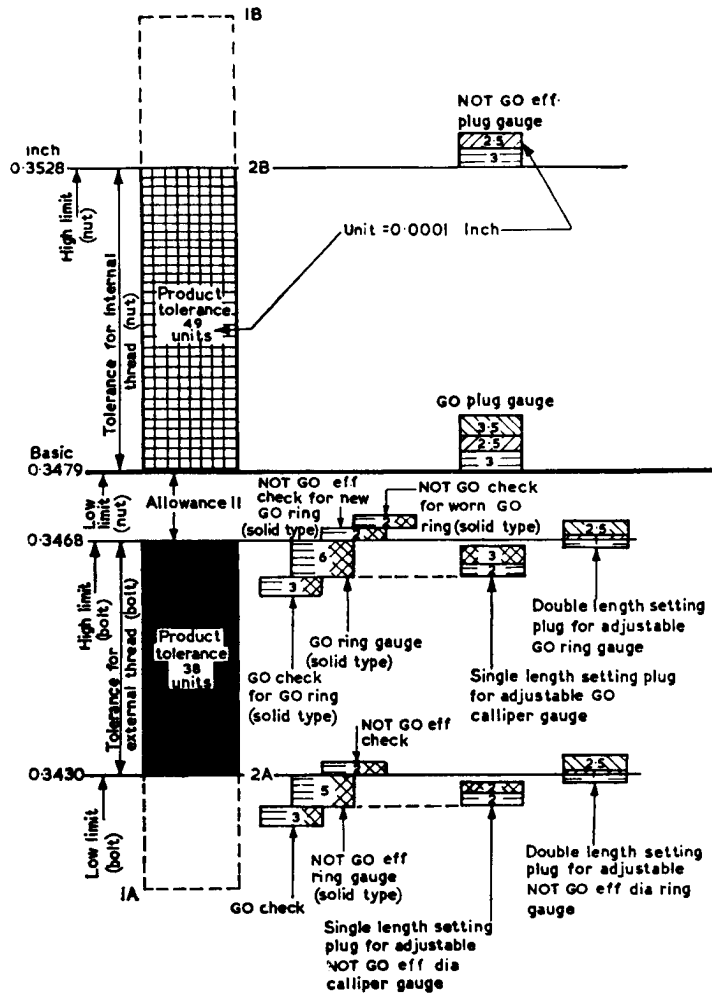


Fig. 3a. $\frac{3}{8}$ -24 UNF-2A and 2B threads

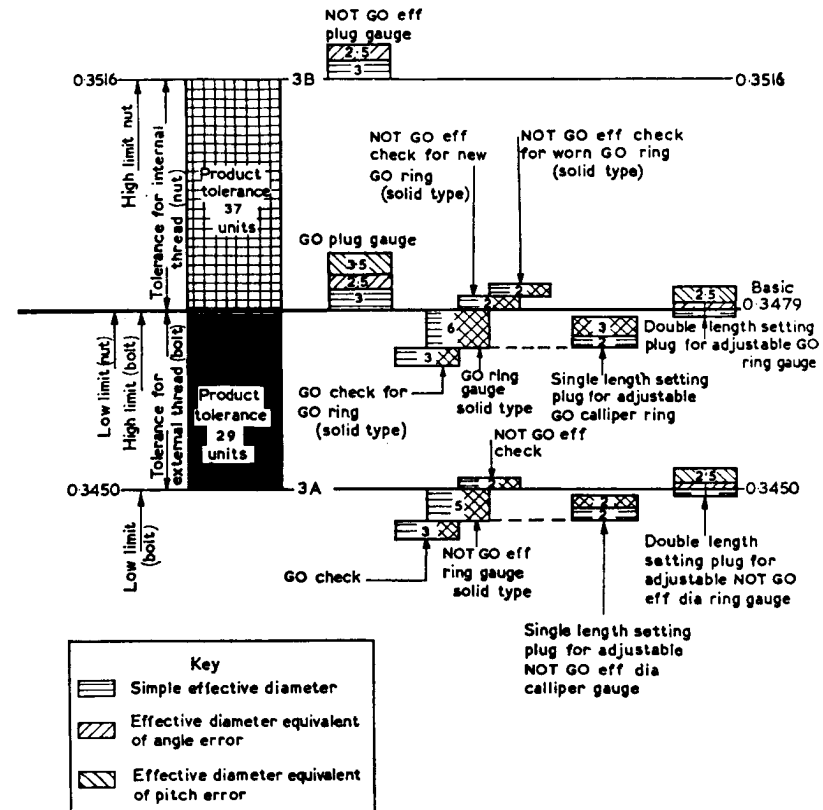


Fig. 3b. $\frac{3}{8}$ -24 UNF-3A and 3B threads

Fig. 3. Effective diameter tolerance zone charts

designed to control these inaccuracies to a degree which is both practical and economical.

Tables of tolerances graded in accordance with diameter and pitch are given in this standard. In laying down these gauge tolerances attention also has to be paid to the product tolerance and care taken that the gauge tolerance does not unduly absorb, or add to, the product tolerance. A ratio of one-tenth, as a maximum, is generally adopted in the case of *plain* limit gauges, but it is not possible to lay down a hard and fast relationship between gauge tolerance and product tolerance in the case of screw gauges.

Reference has been made above to the absorption of product tolerance by the gauge tolerance. This will depend upon the position of the gauge tolerance zone in relation to the product tolerance zone. It will be helpful at this point to refer to the tolerance zone chart, Fig. 3, which illustrates the relative dispositions of gauge and product tolerance zones. To the left of the chart are set out, diagrammatically and to scale, the effective diameter tolerance zones of the gauges for a 3/8-24 UNF-2B nut (taken as an example), and for a 3/8-24 UNF-2A bolt, in relation to the tolerance zones for the product threads. To the right of the chart the tolerance zones for Class 3

threads of the same nominal size are similarly displayed. (The conventional method of showing tolerance zones, which has been adopted in the chart, is explained in Appendix A.) In order to put into effect the principle now generally adopted for British Standards on gauging practice, 'that no work be accepted whose size is outside the limits specified on the drawing', the tolerance zones for the GO gauges are placed inside the product limits. The tolerance zones for NOT GO gauges are, however, placed outside the product limits. In theory these gauges do not enter or are not entered by the product and in practice are only permitted the limited amount of entry necessary to cater for slightly bell mouthed or tapered threads so that there is little danger of NOT GO gauges accepting work outside the limits.

NOTE. The tolerance zones for NOT GO (HI plug and LO ring) gauges, normally used in the U.S.A. for product acceptance, are placed inside the product limits. In American practice threads are acceptable as being within the minimum metal limits if, when using plug and ring threaded gauges, the HI gauge does not enter or the LO gauge is not entered. Threads are also acceptable if all complete threads can enter in the LO gauge or be entered by the HI gauge, provided that a definite drag fit results from metal to metal contact on or before the third turn of entry.

SECTION TWO : NOTES ON THE USE OF VARIOUS TYPES OF GAUGES

GO AND NOT GO SCREW GAUGES

7. The purpose of GO and NOT GO screw gauges and the positions of their tolerance zones have been referred to in Section One.

The product should accept, or be accepted by, a GO gauge over the whole length of engagement.

Since the tolerance zones for the NOT GO gauges are placed just *outside* the product tolerance zones the NOT GO screw plug gauge should, ideally, not enter the work, nor should the NOT GO screw ring gauge be entered by the external thread. Since internal work is nearly always slightly bell mouthed and external work often slightly tapered at the point, it is permissible at the discretion of the inspector to allow entry in both cases, provided that, on withdrawal, disengagement takes place within two full turns of thread.

The length of thread on NOT GO effective diameter calliper gauges should not exceed three pitches for satisfactory functioning. The length of thread on other types of NOT GO gauges need not be so restricted. (See B.S. 1044 for design of gauge blanks.)

SETTING PLUGS

8. Threaded setting plugs serve to control the size of adjustable screw ring and adjustable screw calliper gauges. They should be made as accurately as possible on form and pitch in order to secure consistency in the gauging of external product threads.

a. Setting plugs for adjustable ring gauges. The type of setting plug used with adjustable ring gauges has a length approximately equal to twice the length of the ring gauge to be controlled. The effective diameter remains constant throughout, but over half the length of the plug for a

GO gauge the major diameter is made equal to the maximum major diameter of the product and over the other half to the minimum major diameter of the product. By first fitting the ring gauge to the full flank portion of the setting plug and then examining its fit on the truncated portion, it is possible to detect an error in thread form of the GO ring gauge. This test is particularly necessary when the gauge is reset after wear. See also Appendix D.

By using the 'double-length' setting plug for the adjustable NOT GO ring gauge in similar fashion, it is possible to verify that the latter is both large enough on major diameter and set correctly to size on effective diameter.

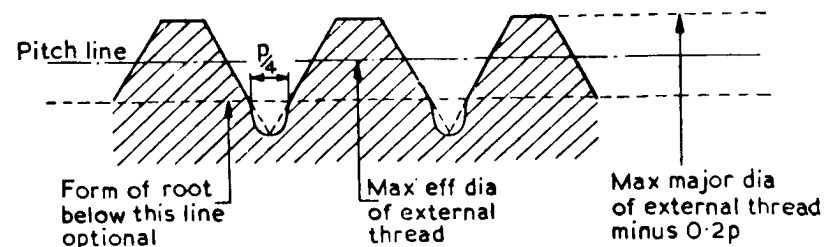
The thread forms of setting plugs for adjustable ring gauges are shown in Fig. 4.

b. Setting plugs for adjustable calliper gauges. The type of setting plug used with adjustable calliper gauges has a length approximately equal to that of the gauge and is referred to as a 'single-length' setting plug.

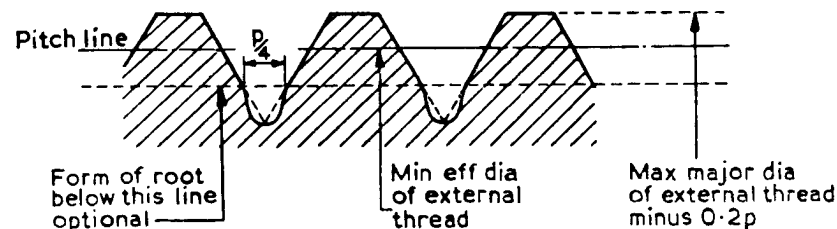
The thread forms of setting plugs for adjustable calliper gauges are shown in Fig. 4.

Since single-length setting plugs provide little help in the detection of an error in thread form caused by wear of the calliper gauge anvils, it is necessary to examine periodically for such error by other means.

For any given product size, setting plugs for calliper gauges are made slightly smaller in effective diameter than the corresponding setting plugs for adjustable ring gauges. This difference in size has been found to be necessary if the results in testing by means of a calliper gauge are to be comparable with those obtained with an adjustable ring gauge. The positions of the tolerance zones for the two types of setting plug, relative to the tolerance zone for the external thread are shown in Fig. 3.



c. Single length setting plug for adjustable GO screw calliper gauge



d. Single length setting plug for adjustable NOT GO screw calliper gauge

* See Note 1, Table 15

Fig. 4. Thread forms of setting plugs

CHECK GAUGES

9. GO and NOT GO screw check gauges are provided for verifying that new solid type ring gauges are within limits. They correspond to the GO and NOT GO screw plug gauges used for testing the product but are made necessarily to much finer tolerances. They serve as an alternative to direct measurement in the testing of ring gauges above, say, $\frac{1}{4}$ inch in diameter. Check gauges are indispensable for sizes smaller than $\frac{1}{4}$ inch in diameter, which is about the limit of size for direct measurement.

NOT GO effective diameter checks are also provided for ensuring that solid GO ring gauges are not allowed to remain in service after they have worn by a specific amount.

The disposition of the tolerance zones for check gauges is shown in Fig. 3.

RELATIVE ADVANTAGES AND DISADVANTAGES OF SOLID SCREW RING GAUGES ADJUSTABLE SCREW RING GAUGES AND CALLIPER GAUGES

10. *a. GO gauges.* The primary purpose of a GO screw gauge is to prove that the surface of the product thread falls wholly within the envelope prescribed by the maximum metal limits of size.

The *solid GO screw ring gauge* provides the most reliable practical means of achieving that purpose in the case of an external thread.

One of its disadvantages is the shortness of its life due to wear. Another is that its effective diameter must either be checked for size by direct measurement or by check plug gauges. Sizes below $\frac{1}{4}$ inch in diameter are outside the range of internal measuring machines and must be tested by check gauges. Further, should the gauge be on its lower limit of size, it may reject satisfactory work which is on the high limit of size. Such a possibility is, of course, inevitable with a gauge which reliably fulfils its primary purpose.

The *adjustable GO screw ring gauge*, in theory, gives the same reliable test on the complete surface of the external thread as the solid GO screw ring gauge. The gauge is set to size by means of a threaded setting plug. The simple effective diameter tolerance zone for this plug is placed just inside the product tolerance zone (see Fig. 3) the aim being to set the effective diameter of the ring gauge on the high limit for the external thread. According to the extent to which angle and pitch errors on plug and ring match or oppose each other, so will the simple effective diameter of the ring gauge be set either slightly above or

slightly below the high limit for the external thread. Thus when gauging external threads bordering on the high limit the adjustable ring gauge can only function at a somewhat lower level of certainty than the solid type.

The main advantage of the adjustable gauge is that it can be reset to size after it has worn. This advantage is off-set to some extent by the fact that in the process of adjustment the shape of the gauge is changed, so that it no longer makes contact all round the circumference of the setting plug, or the screw under test. Restoration of shape can, however, be effected by grinding or lapping or both. Notes on the setting of adjustable screw ring gauges are given in Appendix D.

The *adjustable calliper gauge*, like the adjustable ring gauge, has the advantage that it can be set and reset to size by means of a setting plug. It does not, however, envelope the external thread and so, unless applied at a number of positions round the external thread it may accept an oval thread which is partly oversize. Further, whether the gauge is of the fixed anvil type or the floating roller type, it cannot take account either of lobing error or drunkenness of helix in the external thread. At first sight it may be thought that the fixed anvil type would take account of drunkenness of helix but for the larger sizes lateral 'give' in the frame may allow the anvils of the gauge to accommodate themselves to the screw in the pitchwise direction. Some types of calliper gauges are also liable to give different results according to the force of application of the external thread to the anvils or to the method of presentation of the thread to the anvils. See also Clause 8.

Although the calliper gauge is less certain than the ring gauge, either solid or adjustable, of achieving the primary purpose of a GO screw gauge, long practical experience has shown that, with care, it can be used satisfactorily as a maximum metal gauge.

b. NOT GO gauges. In comparing the types of NOT GO effective diameter screw gauges for external threads, one comes to the conclusion that the calliper gauge is the more efficient since its performance is not affected by the existence of a thick or damaged thread at the point of the screw under test. Such a defect can completely prevent the ring gauge from detecting a thread which is, in the main, undersize. The calliper will also detect an oval screw which is partly undersize, and an undersize lobed screw both of which would be undetected by the ring gauge.

In the case of threads on thin tubing it may be desirable to use a NOT GO ring gauge in preference to a calliper.

SECTION THREE : INSPECTION OF PRODUCT THREADS BY DIRECT MEASUREMENT

METHODS OF MEASUREMENT

11. Occasions are likely to occur when threaded components are required in small quantities and the provision of gauges is uneconomical. Recourse would then be made to direct measurement of the diameters, pitch and flank angles of the threads. (Full information on the measuring of screw threads will be found in the N.P.L. Booklet, 'Notes on Applied Science, No. 1', published by H.M.S.O.)

The measurement of the crest diameter of either an external or internal thread presents no difficulty. Measure-

ment of the more important simple effective diameter is not so straightforward. Thread measuring wires are normally used to measure this element on external threads and as they make point contacts with the flanks, they are liable either to ride on the top of a high spot or settle in a cavity, should the flanks be at all irregular. Therefore, it is necessary to inspect the flanks on an optical projector before deciding whether the localized measurement is a fair indication of the actual size of the screw. Supplementary measurements with wires of slightly different