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# International Standard



# 3670

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Blanks for plug gauges and handles (taper lock and trilock) and ring gauges — Design and general dimensions

*Ébauches de calibres-tampons (à assemblage conique et à trois tenons d'assemblage) et de calibres-bagues — Conception et dimensions*

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[ISO 3670:1979](#)

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## FOREWORD

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3670 was developed by Technical Committee ISO/TC 3, *Limits and fits*, and was circulated to the member bodies in February 1975.

It has been approved by the member bodies of the following countries :

Australia	India	Portugal
Belgium	Italy	Romania
Bulgaria	Japan	South Africa, Rep. of
Finland	Mexico	Sweden
France	Netherlands	Turkey
Germany, F. R.	New Zealand	United Kingdom
Hungary	Poland	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Czechoslovakia  
Switzerland  
USSR

# Blanks for plug gauges and handles (taper lock and trilock) and ring gauges — Design and general dimensions

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the characteristics of blanks and handles for plain and screw plug gauges of taper lock and trilock design and blanks for plain and screw ring gauges.

The types of gauges are described and illustrated and recommended blank and handle sizes are given in the tables. Those features of design necessary to ensure interchangeability are specified in some detail and general information on other features is included for guidance in the manufacture of these gauges.

It should be noted that the dimensions in the tables apply to the blanks for gauging members when completed but before they are finished to final gauge size.

Although this International Standard deals with blanks for taper lock and trilock plug gauges, it is recognized that solid gauges may sometimes be required, and their use is not precluded.

NOTE — Blanks for other types of gauges and handles, for example collet-type plug gauges, alternatives to trilock gauges and, possibly, shorter series of blanks and calliper gauges will be dealt with in future supplements to this International Standard.

## 2 REFERENCES

ISO 68, *ISO general purpose screw threads — Basic profile.*

ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts.*

ISO 965/2, *ISO general purpose metric screw threads — Tolerances — Limits of sizes for commercial bolt and nut threads — Medium quality.*

## 3 TAPER LOCK PLUG GAUGES (DIAMETERS FROM 1 UP TO AND INCLUDING 50 mm)

### 3.1 General

The taper lock design is particularly suitable for the smaller sizes of plug gauges. This type of gauge is economical to produce and maintain. General details of construction are illustrated in figures 1 and 2.

It is a feature of the taper lock system that the gauging members are locked firmly in the handles by engagement of the taper shanks in the taper holes and, when properly made and assembled, they have the rigidity of solid gauges.

Dimensions and tolerances for the mating parts of gauging members and handles have been chosen to ensure full interchangeability of these parts wherever manufactured.

A drift slot or hole is provided near one end of the handle to enable the gauging member to be removed when replacement is necessary. In the case of double-ended gauges, the second member is removed by running a rod through the hollow handle.

Details of gauges for use in the manufacture and testing of taper lock shanks and the taper bore of handles are given in the annex.

### 3.2 Handles

It is recommended that, for general applications for plain cylindrical gauging members, the handles be made from light alloy or other suitable material. For some special applications it may be necessary to use mild steel.

The tapers shall be made to fit the appropriate size of taper plug gauge shown in the annex. The end face of the handle shall lie between the end face of the taper plug gauge and the step face when the plug is firmly assembled in the taper of the handle.

All handles shall be so made at both ends that they are suitable for double-ended limit gauges but may be used for single-ended gauges where necessary.

It is customary to insert the GO member in the end of the handle with the drift hole or slot.

In sizes up to and including 6 mm (handles Nos. 1 and 2), a groove is provided near one end of the handle to indicate the NOT GO end, as the length of the GO member in this range is often insufficient to distinguish it clearly from the NOT GO member.

The general dimensions of the handles shall be in accordance with table 1 and 3.2.2.



3.2.2 Dimensions for taper lock handles Nos. 1 to 7

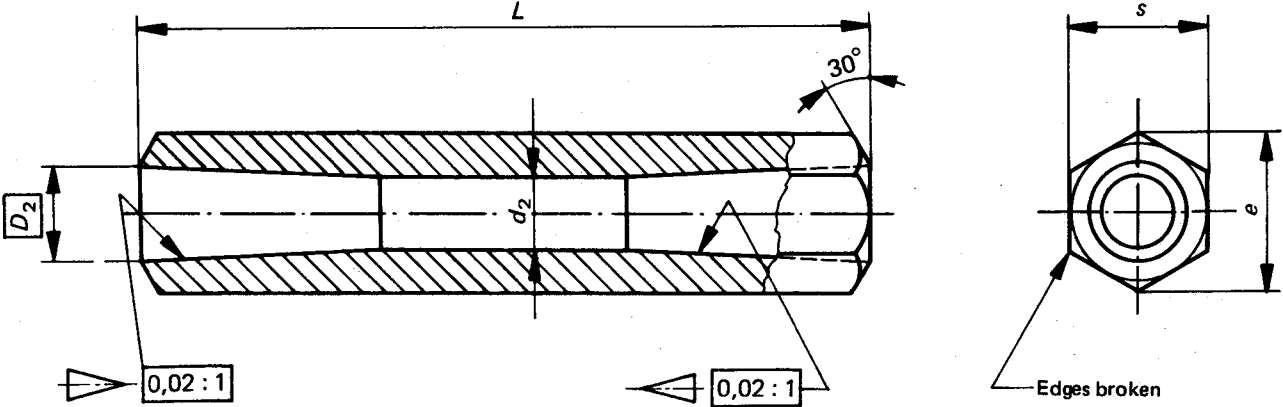


FIGURE 3 – Hexagonal type

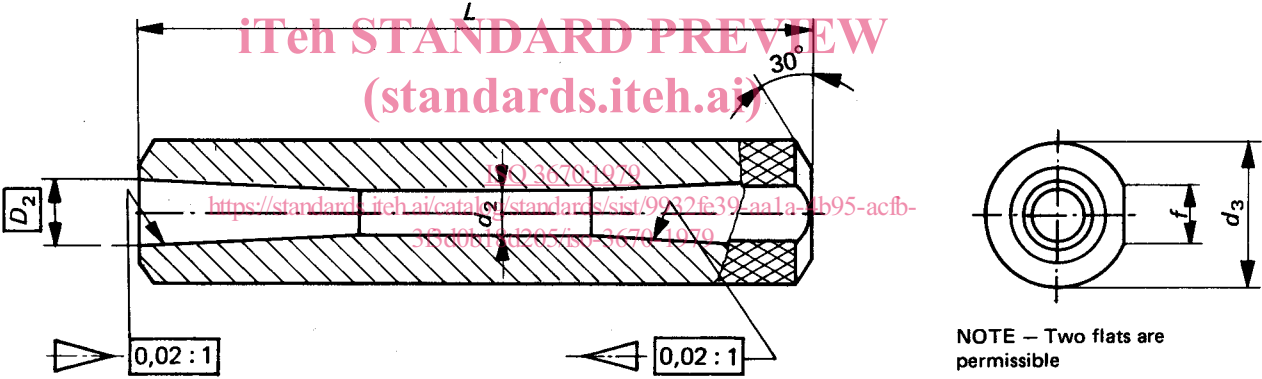


FIGURE 4 – Knurled type

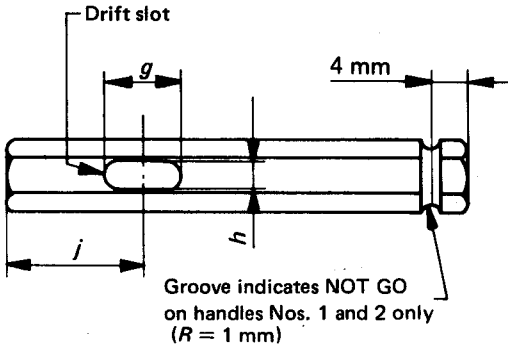


FIGURE 5 – Handles Nos. 1 to 4

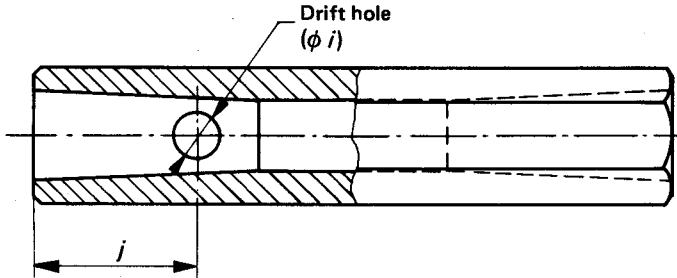


FIGURE 6 – Handles Nos. 5 to 7

**3.3 Taper lock plain cylindrical plug gauging members**

Gauging members shall be made of good quality steel and machined to the general dimensions specified in table 2, with a finishing allowance where necessary.

The dimensions and tolerances shown below apply to gauging members that have been hardened and finished on the taper shanks, but left oversize on the gauging diameter for subsequent completion to the required size. The amount of excess material left to allow for finishing to size is at the discretion of the gauge manufacturer.

Gauging members up to and including 3 mm diameter may be provided with a ground 60° external centre at each end as shown in figure 7. The centre point may be removed from the shank end after the gauging member has been finished to size but it is not necessary to remove the point

at the gauging end unless the gauge is to be used for checking blind holes.

Gauging members of all other sizes shall have an internal centre, well finished and of suitable size, at each end. On sizes above 14 mm nominal diameter, a small protection recess is desirable.

NOT GO gauging members may be relieved to enable them to check ovality if specified by the purchaser.

The taper shank shall have a good finish and be made to fit the taper ring gauge applicable to its size as specified in the annex. The small end face of the taper shank shall lie between the end face of the ring gauge and the step face. In the case of gauging members with external centres, the junction of the centre angle and the shank shall lie between the small end face of the ring gauge and the step face.

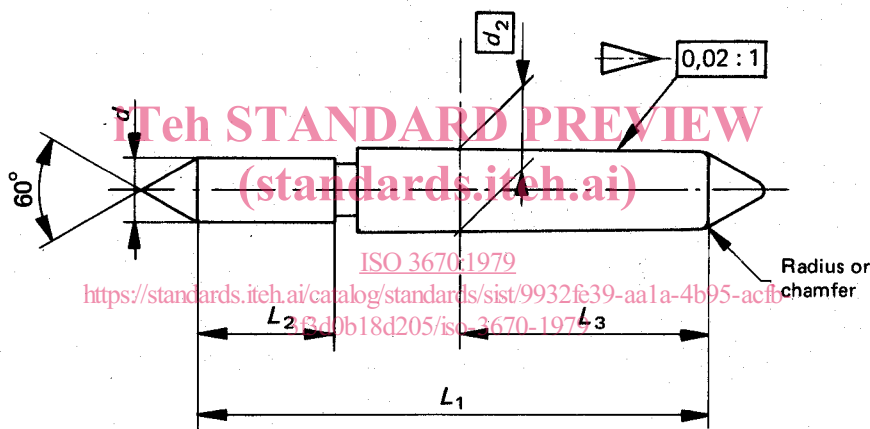


FIGURE 7 — Go and NOT GO gauging members :  
from 1 mm up to and including 3 mm diameter

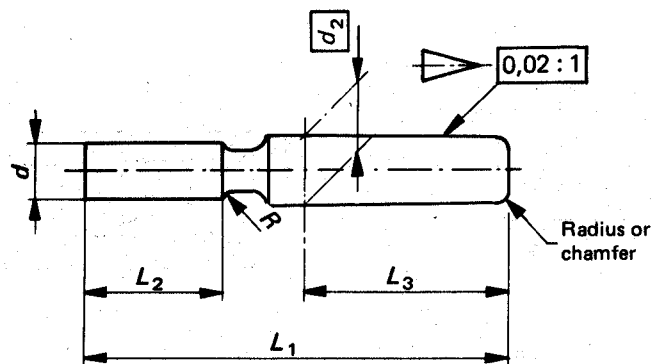


FIGURE 8 — GO and NOT GO gauging members :  
above 3 mm up to and including 6 mm diameter

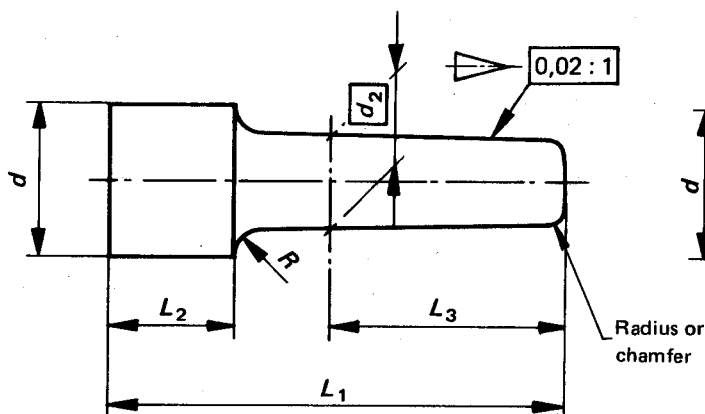


FIGURE 9 – GO and NOT GO gauging members : above 6 mm up to and including 50 mm diameter

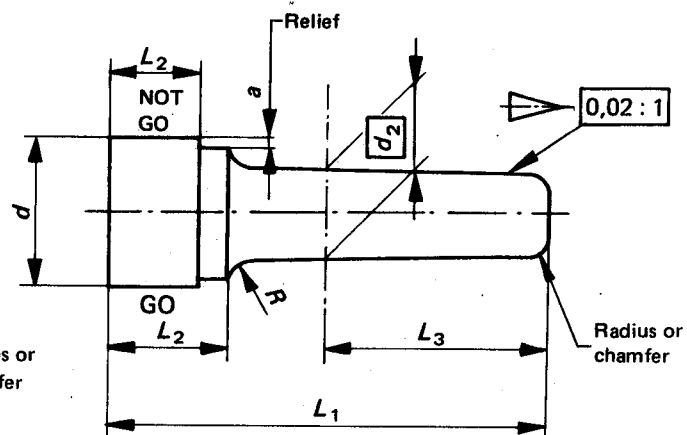


FIGURE 10 – Alternative for NOT GO gauge made from GO blank : above 6 mm up to and including 50 mm diameter

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TABLE 2 – General dimensions for taper lock plain cylindrical plug gauging members

Dimensions in millimetres

Nominal diameter <i>d</i>		ISO 3670-1979				<i>R</i>	<i>d</i> <sub>2</sub> basic	<i>a</i>	Handle No.	
		$L_1$ $\begin{matrix} + 0,3 \\ 0 \end{matrix}$		$L_2$ $\begin{matrix} 0 \\ - 0,3 \end{matrix}$						$L_3$ $\begin{matrix} + 1 \\ 0 \end{matrix}$
above	up to (incl.)	GO	NOT GO	GO	NOT GO					
1*	3	22	20	6,5	4,5	10	—	2,5	0,1	1
3	6	26	24	8	6	12	1	4	0,2	2
6	10	32	29	10	7	15	1,6	5,5	0,5	3
10	14	40	36	12	8	20	2	7	0,5	4
14	18	46	42	14	10	22	2,5	9	1	5
18	24	52	48	16	12	24	2,5	12	1	6
24	30	54	50	18	14	24	2,5	12	1	6
30	40	60	55	20	15	25	4	16	1,5	7
40	50	68	61	25	18	25	4	16	1,5	7

\* Included

3.4 Taper lock screw plug gauging members

The dimension and tolerances shown below apply to gauging members that have been finished on the taper shank but left oversize on the gauging diameter for subsequent finishing to the required size. The amount of excess material left to allow for finishing to size is at the discretion of the gauge manufacturer.

Gauging members up to and including 3 mm<sup>1)</sup> diameter may be provided with a ground 60° external centre at each end as shown in figure 11. The centre point may be removed from the shank end after the threads have been finished but it is not necessary to remove the point at the gauging end unless the gauge is to be used for checking blind holes.

Gauging members of all sizes greater than 3 mm shall have an internal centre, well finished and of suitable size, at each end. On sizes above 14 mm nominal diameter, a small protection recess is desirable.

The taper shank shall have a good ground finish and be made to fit the taper ring gauge applicable to its size as specified in the annex. The small end face of the taper shank shall lie between the small end of the ring gauge and the step face.

In the case of gauging members with external centres, the junction of the centre angle and the shank shall lie between the small end face of the ring gauge and the step face.

The lengths of the blanks shown in table 3 are suitable for GO gauges of the pitches shown. If a blank is used for a finer pitch, the rear end of the blank may be relieved as shown in figure 14 if the number of threads is excessive.

Incomplete threads shall be removed from each end of all gauges.

Blanks for NOT GO gauges shall be selected from the short or medium series so that there are not less than four completed threads. The blank may be relieved as shown in figure 14 if necessary.

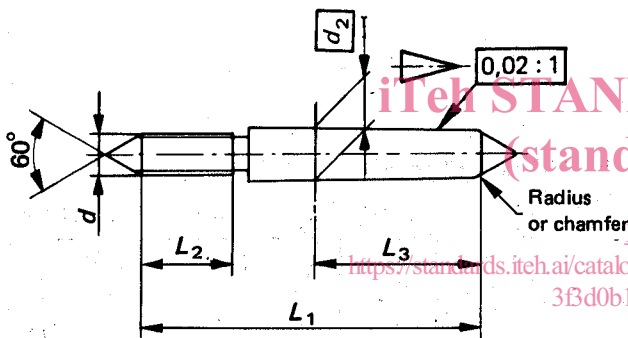


FIGURE 11 – GO and NOT GO gauging members : from 1 mm up to and including 3 mm diameter

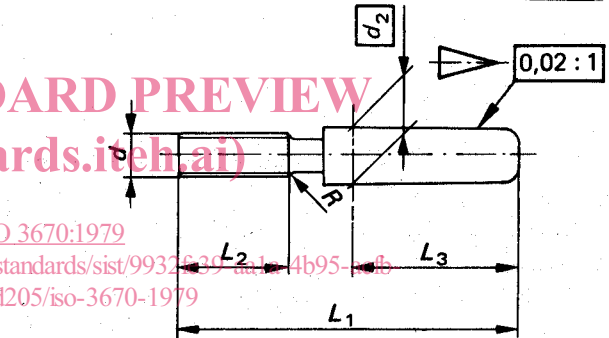


FIGURE 12 – GO and NOT GO gauging members : above 3 mm up to and including 6 mm diameter

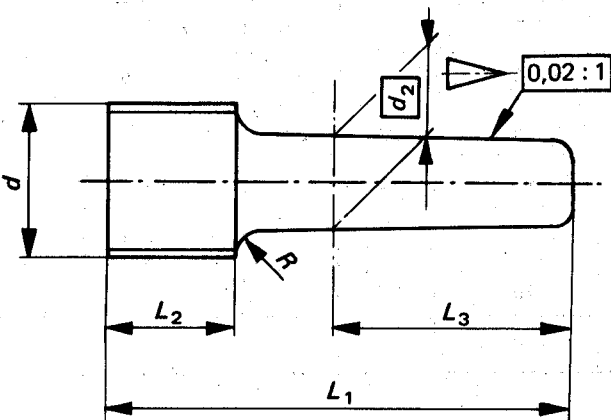
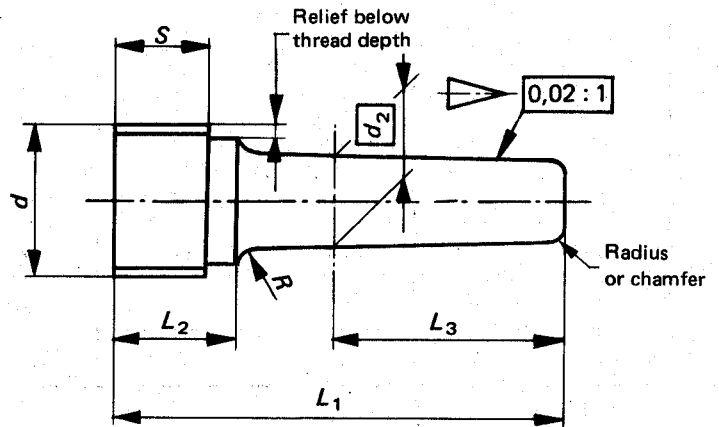


FIGURE 13 – GO and NOT GO gauging members : above 6 mm up to and including 50 mm diameter



S GO = 6 pitches minimum  
S NOT GO = 4 pitches minimum

FIGURE 14 – Alternative for NOT GO or fine pitches : above 6 mm up to and including 50 mm diameter

1) This may be extended to gauges up to 4,0 mm nominal diameter at the discretion of the gauge manufacturer.



TABLE 3 — General dimensions for taper lock screw plug gauging members

Dimensions in millimetres

Nominal diameter $d$	up to (incl.)	Handle No.	$L_3$ +1 0	$R$	$d_2$ basic	Blank $b_0$ (Short series)			Blank $b_1$ (Medium series)			Blank $b_2$ (Long series)			Blank $b_3$ (Extra long series)			
						Pitches for GO gauges	$L_1$ +0,3 0	$L_2$ 0 -0,3	Pitches for GO gauges	$L_1$ +0,3 0	$L_2$ 0 -0,3	Pitches for GO gauges	$L_1$ +0,3 0	$L_2$ 0 -0,3	Pitches for GO gauges	$L_1$ +0,3 0	$L_2$ 0 -0,3	
1*	3	1	10	—	2,5			All	20	4,5								
3	6	2	12	1	4			Up to 0,75	24	6								
6	10	3	15	1,6	5,5			0,75	29	7								
10	14	4	20	2	7			0,75 and 1	36	8								
14	18	5	22	2,5	9			1	42	10								
18	24	6	24	2,5	12			1,5 and 2	52	16								
24	30	6	24	2,5	12			2	54	18								
30	40	7	25	4	16			1,5	60	20								
40	50	7	25	4	16			1,5 to 2	61	18								

\* Included.

**4 TRILOCK PLUG GAUGES (DIAMETERS ABOVE 40 UP TO AND INCLUDING 120 mm)**

**4.1 General**

Trilock gauges extend the interchangeable end system to the larger size and overlap with the taper lock type in the 40 to 50 mm diameter range.

An additional advantage of this type of gauge is that the gauging members can be reversed when the entering end is worn.

The wedge-shape prongs on the handle are engaged with corresponding grooves in the gauging member by a single screw providing a self-centring support with a positive lock and a degree of rigidity equivalent to that of a solid gauge.

Complete dimensions have been established for the mating parts of gauging members and handles, thus ensuring absolute interchangeability of gauging members and handles wherever manufactured.

Double-ended handles may be used for size 8 but the size and weight of gauging members make them unsuitable for size 9.

It is customary to use a single-ended handle for GO or NOT GO gauging members as required and to rely on marking or physical characteristics to identify the NOT GO member. A groove on the NOT GO handle is not considered necessary but may be provided if requested.

**4.2 Trilock handles**

It is recommended that, for general applications for plain cylindrical gauging members, the handles be made from light alloy or other suitable material. For some special applications it may be necessary to use mild steel.

A cross-pin hole is provided in single end handles to enable a loose mild steel bar to be inserted to obtain leverage if a gauge end should become a tight fit in a hole.

The screw threads shall be to 6H tolerances.

The general dimensions of the handles shall be in accordance with table 4 and 4.2.2 and fixing screws shall be as shown in 4.2.3.

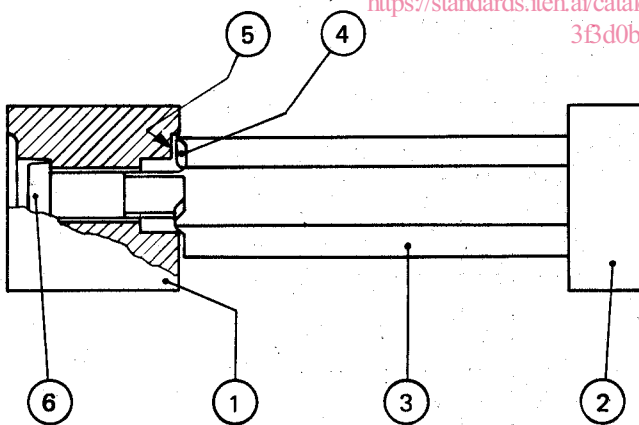
**4.2.1 General arrangement**

See figures 15 and 16.

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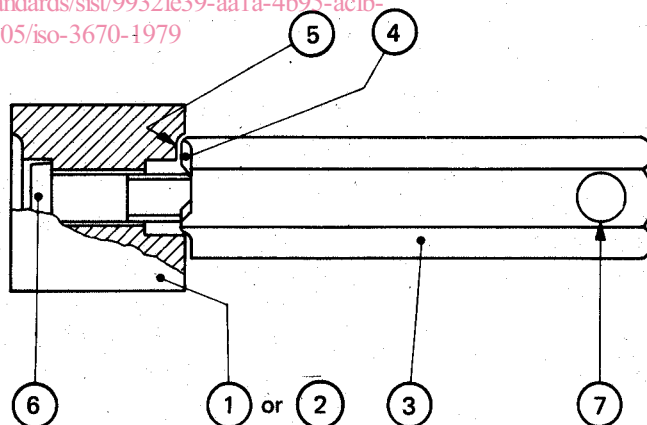
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- 1 GO gauging member
- 2 NOT GO gauging member
- 3 Double-end trilock handle
- 4 Locking prong
- 5 Locking groove
- 6 Fixing screw

FIGURE 15 – Double-end trilock gauge handle (size No. 8 only)



- 1 GO gauging member
- 2 NOT GO gauging member
- 3 Single-end trilock handle
- 4 Locking prong
- 5 Locking groove
- 6 Fixing screw
- 7 Cross-pin hole

FIGURE 16 – Single-end trilock gauge handle (sizes Nos. 8 and 9)

4.2.2 Dimensions of trilock handles Nos. 8 and 9

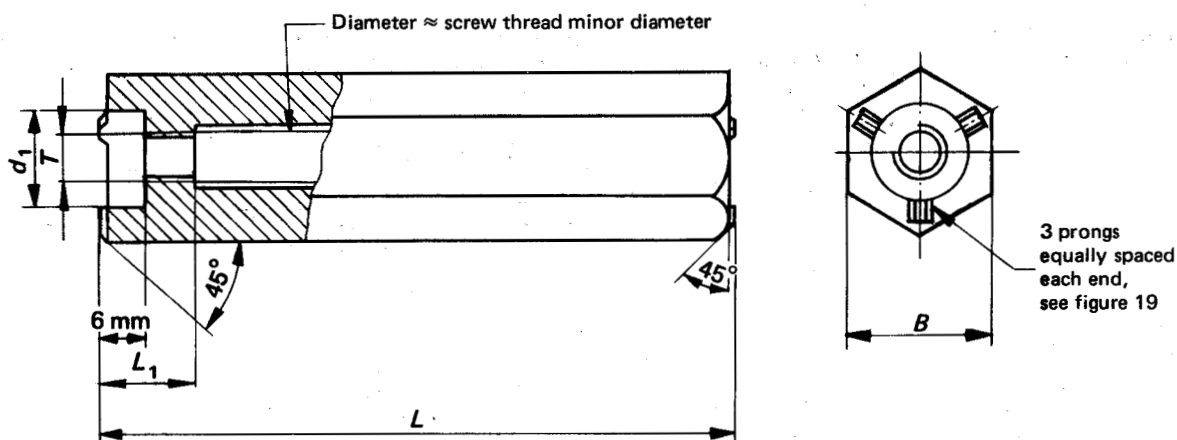


FIGURE 17 – Double-ended handle (size No. 8 only)

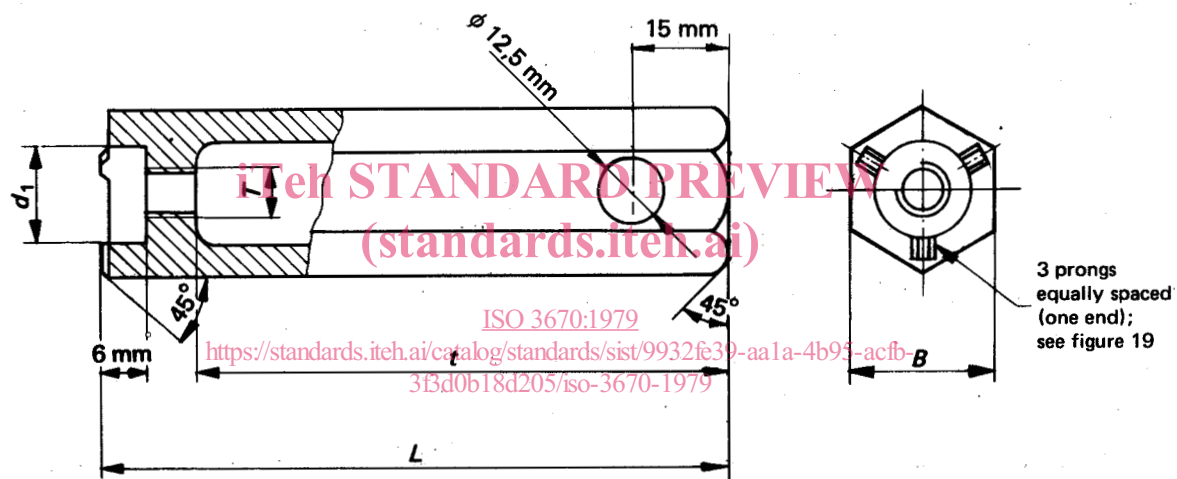


FIGURE 18 – Single-ended handles (sizes 8 and 9)

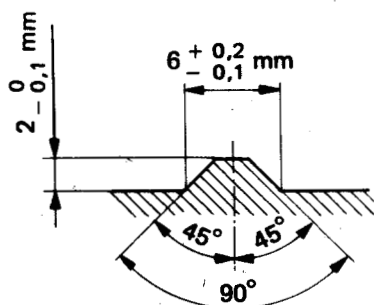


FIGURE 19 – Dimensions of prongs

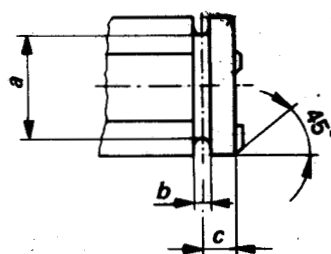


FIGURE 20 – Optional groove for NOT GO handles

TABLE 4 – General dimensions for handles

Dimensions in millimetres

Handle No.	B	L	t	d <sub>1</sub>	a	b	c	Thread T × pitch	L <sub>1</sub>
8	29	125	105	21	28	3	8	M12 × 1,25	31
9	32	150	120	24	31	3	16	M22 × 1,5	36