International Standard 8488

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Cycles — Screw threads used to assemble head fittings on bicycle forks

Cycles — Filetages utilisés pour l'assemblage des «accessoires» de direction sur les fourches de bicyclettes

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Cycles — Screw threads used to assemble head fittings on bicycle forks

0 Introduction

Inch screw threads of BSC (British Standard Cycle) thread profile are used extensively throughout the world for various applications on bicycle components, and have been standardized in national standards. The purpose of this document is to provide an International Standard for the particular screw thread used to assemble the head race and locknut on bicycle forks; it is based on the use of the ISO basic thread profile and complies as far as is practicable with existing International Standards for general purpose screw threads.

The change to an ISO system of screw threads will inevitably take a long time to complete in view of the millions of bicycles now in use which employ BSC thread profile inch screw threads and for which replacement spare parts will be required. For this reason, in order to minimize changes in production methods during the changeover to the International Standard, and also to secure satisfactory interchangeability with the BSC screw threads now used, the ISO screw thread in this International Standard has the same pitch as that of the 1.000 in × 24 t.p.i. BSC screw thread it is intended to replace.

An M25,522 × 1,058 (1.005 in × 24 t.p.i.) screw thread of ISO basic profile has been adopted in this International Standard. The basic pitch diameter of this thread is identical to the 1.000 in × 24 t.p.i. BSC thread, but, due to the smaller crest truncation of the ISO profile (see figure 1), interference may occur at the major diameter when an ISO fork thread made towards its upper limit is assembled with a BSC race/locknut thread made towards its lower limit on major diameter. The possibility of interference occurring in this manner is considered to be unlikely in practice because of the effect of the manufacturing tolerances (−ve on the fork and +ve on the fittings) and the usual practice of using high-crested screwing taps. However, a practical investigation has been carried out and has confirmed that there is little possibility of any interference arising in practice.

NOTE — In addition to the 1.000 in × 24 t.p.i. BSC thread referred to above, it should particularly be noted that there exists in the cycle trade other widely used threads:

—	French	25 mm × 1,0 mm	(0.984 in × 25.4 t.p.i.)
—	Italian	25,4 mm × 1,058 mm	(1 in × 24 t.p.i.)
—	UK	25,4 mm × 0,977 mm	(1 in × 26 t.p.i.)
—	USA	25,4 mm × 1,058 mm	(1 in × 24 t.p.i.)

The French and UK threads are clearly not interchangeable with the BSC thread due to outside diameter and t.p.i. respectively. The Italian thread is also not compatible due to the Italian flank angle of 55° compared to the BSC angle of 60°.

As referred to in the second paragraph above, this ISO system of screw threads is intended to replace the 1.000 in × 24 t.p.i. BSC threading, but the continued usage of the other non-compatible threadings is not in harmony with the objects of ISO worldwide standardization, and wherever and as soon as possible, it is strongly recommended that all new products change over to the new ISO threads detailed herein.

It should also be noted that where the design size of the fork column tube is already 25,4 mm (1.000 in) nominal, the thread cutting of this new ISO thread will increase the truncation and facilitate assembly.

Attention should be paid to ISO 6692 for the proposals on thread identification marking.

1 Scope and field of application

This International Standard specifies details of the screw threads used to assemble head races and locknuts, i.e. fittings, on bicycle fork steering columns.

The basic thread profile is that of ISO 68; the tolerance grades and tolerance positions are in accordance with ISO 965/1; the gauging system is that specified in ISO 1502.

Threads to this International Standard are interchangeable with the corresponding BSC (British Standard Cycle) thread.

2 References

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

ISO 965/1, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data.*

ISO 1502, *ISO general purpose metric screw threads — Gauging.*

ISO 6692, *Cycles — Marking of cycle components.*

3 Basic ISO thread profile and basic sizes

3.1 Basic profile

The basic profile is that given in ISO 68 and is shown in figure 1. It is the theoretical profile associated with the basic sizes of the major, pitch and minor diameters of the screw thread.

3.2 Basic sizes

The basic major diameter, and the basic pitch and minor diameters determined from the basic profile, are given in table 1.

4 Limits and tolerances

4.1 Fundamental deviations and maximum material limits

The fundamental deviations are applied to the basic diameters and establish the maximum material limits.

For the fork thread the fundamental (upper) deviations are negative and correspond to tolerance position "g" on the major, pitch and minor diameters.

For the fittings thread the fundamental (lower) deviations are zero and correspond to tolerance position "H" on the major, pitch and minor diameters.

4.2 Tolerance grades, tolerances and limits of size

The application of tolerances to the maximum material limits, negative tolerances for the fork thread, and positive tolerances for the fittings thread, determines the minimum material limits of size.

The tolerances and limits of size are given in tables 2 and 3 respectively for the fork and the fittings. The tolerances are grade 6 in accordance with ISO 965/1.

The fundamental deviations and tolerance zones are shown in figure 2.

5 Designation

Screw threads made to this International Standard are designated by:

a) the nominal diameter of the thread in inch units;

b) the pitch of the thread in t.p.i.;

c) the tolerance classes of the fittings and fork respectively.

Example: **1,005 — 24 6H/6g**

6 Gauging system

The gauging system is that laid down in ISO 1502 to which reference should be made for details of the thread profiles of the screw gauges and the method of application of the gauges.

ISO 1502 gives formulae for the calculation of the gauge limits. These formulae have been used to calculate the gauge limits for the fittings and fork in this International Standard, and these limits are given in tables 4 to 7. It should be noted that the pitch diameter limits given in tables 4 to 6 relate to the simple pitch diameter, and separate tolerances are given in ISO 1502 for the pitch and flank angles of these gauges.

These tolerances are:

Pitch tolerance = 0,005 mm

Flank angle tolerance

= ± 15′ for profiles with complete flanks

= ± 16′ for profiles with truncated flanks

Table 1 — Basic dimensions

Nominal diameter of thread in	t.p.i.	Basic sizes, mm		
		Major diameter	Pitch diameter	Minor diameter
1.005	24	25,522	24,836	24,379

Table 2 — Limits and tolerances for screw threads on the fork

t.p.i.	Major diameter, d mm			Pitch diameter, d_2 mm			Minor diameter, d_1 mm
	max.	tol.	min.	max.	tol.	min.	max.
24	25,496	0,180	25,316	24,810	0,125	24,685	24,209
1	2	3	4	5	6	7	8

NOTE — The tolerances given in columns 3 and 6 are those recommended in ISO 965/1 for the nearest metric pitch corresponding to the t.p.i. given in column 1.

Note that the grade 6 pitch diameter tolerance differs from the grade 6 major diameter tolerance.

The limit for the maximum minor diameter corresponds to a truncation of $H/6$.

Table 3 — Limits and tolerances for screw threads on fittings

t.p.i.	Major diameter, D mm		Pitch diameter, D_2 mm			Minor diameter, D_1 mm		
	D_3 min.	D min.	max.	tol.	min.	max.	tol.	min.
24	25,598	25,522	25,006	0,170	24,836	24,615	0,236	24,379
1	2	3	4	5	6	7	8	9

NOTE — The tolerances given in columns 5 and 8 are those recommended in ISO 965/1 for the nearest metric pitch corresponding to the t.p.i. given in column 1.

Note that the grade 6 pitch diameter tolerance differs from the grade 6 minor diameter tolerance.

D_3 min. is the diameter to the radiused root of the fittings thread that just clears the crest of a maximum fork thread, assuming no clearance between the flanks of the assembled threads.

Table 4 — Fork limits of size for GO screw ring and calliper gauges, and associated screw check, wear and setting plugs

Dimensions in millimetres

Type of gauge	Major diameter		Pitch diameter		Minor diameter	
	max.	min.	max.	min.	max.	min.
Solid GO screw ring gauge	—	25,572 2	24,815	24,801	24,379	24,365
Adjustable GO screw ring gauge	—	25,572 2	Set on setting plug		24,367	24,363
GO screw calliper gauge	Cleared		Distance from pitch line to crest is 0,229 2			
GO screw check plug for new solid GO screw ring gauge	25,505	25,487	24,797	24,789	24,056 6	—
NOT GO screw check plug for new solid GO screw ring gauge	25,033 7	25,019 7	24,819 5	24,810 5	24,384 7	—
Wear check plug for solid or adjustable GO screw ring gauge	25,041 7	25,027 7	24,827 5	24,818 5	24,386 7	—
Setting plug for GO screw calliper gauge	25,505	25,487	24,797	24,789	24,056 6	—
Full profile setting plug for adjustable GO screw ring gauge	25,505	25,487	24,808	24,800	24,056 6	—
Truncated profile setting plug for adjustable GO screw ring gauge	25,022 2	25,008 2	24,808	24,800	24,056 6	—

Table 5 — Fork — Limits of size for NOT GO screw ring and calliper gauges, and associated screw check, wear and setting plugs

Dimensions in millimetres

Type of gauge	Major diameter		Pitch diameter		Minor diameter	
	max.	min.	max.	min.	max.	min.
Solid NOT GO screw ring gauge	cleared	24,896 7	24,685	24,671	24,473 3	24,445 3
Adjustable NOT GO screw ring gauge	cleared	24,896 7	Set on setting plug		24,473 3	24,445 3
NOT GO screw calliper gauge	Thread profile sizes as for NOT GO screw ring gauge					
GO screw check plug for new solid NOT GO screw ring gauge	25,380	25,362	24,667	24,659	24,056 6	—
NOT GO screw check plug for new solid NOT GO screw ring gauge	25,380	25,362	24,689 5	24,680 5	24,056 6	—
Wear check plug for solid or adjustable NOT GO screw ring gauge	25,385	25,367	24,694 5	24,685 5	24,056 6	—
Setting plug for NOT GO screw calliper gauge	25,373	25,355	24,678	24,670	24,056 6	—
Full profile setting plug for adjustable NOT GO screw ring gauge	25,373	25,355	24,678	24,670	24,056 6	—
Truncated profile setting plug for adjustable NOT GO screw ring gauge	25,105 8	25,087 8	24,678	24,670	24,056 6	—

Table 6 — Fittings — Limits of size for GO and NOT GO screw plug gauges

Dimensions in millimetres

Type of gauge	Major diameter		Pitch diameter			Minor diameter
			New gauge		Worn gauge	
	max.	min.	max.	min.	min.	max.
GO screw plug gauge	25,545	25,523	24,853 5	24,842 5	24,830 5	24,226 6
NOT GO screw plug gauge	25,234 2	25,212 2	25,017	25,006	25,000	24,582 6

Table 7 — Fork and fittings — Limits of size for GO and NOT GO plain ring or calliper gauges for fork major diameter, and GO and NOT GO plain plug gauges for fittings minor diameter

Dimensions in millimetres

Type of gauge	GO gauge			NOT GO gauge	
	New gauge		Worn gauge		
	max.	min.		max.	min.
Plain ring or calliper gauge	25,466	25,450	25,496 max.	25,324	25,308
Plain plug gauge	24,425	24,409	24,379 min.	24,623	24,607