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Ground thread taps for ISO metric threads of tolerances 4H to 8H and 4G to 6G coarse and fine pitches — Manufacturing tolerances on the threaded portion

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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 2857 was drawn up by Technical Committee ISO/TC 29, *Small tools*, and circulated to the Member Bodies in August 1972.

It has been approved by the Member Bodies of the following countries :

Austria	India	Romania
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Chile	Israel	Switzerland
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The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

Japan
Sweden

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Ground thread taps for ISO metric threads of tolerances 4H to 8H and 4G to 6G coarse and fine pitches — Manufacturing tolerances on the threaded portion

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the manufacturing tolerances on the threaded portion of taps for producing the ISO metric threads of tolerance classes 4H to 8H and 4G to 6G as defined in ISO/R 965/I to III (excluding, consequently, classes 7G and 8G considered as usually produced with ground thread taps).

It is valid for the short taps specified in ISO/R 529 as well as for any other kind of ground thread taps with the same diameters and pitches.

The internal threads produced with those taps are conventionally designated by the simplified denomination of "nut" in agreement with the word used in ISO/R 965 for the general designation of all internal threads.

Annexes A and B give, for all threads with coarse and fine pitches, the manufacturing tolerances on the threaded portion of taps for the following classes of nuts :

4H and 5H — 6H — 7H and 8H

and

4G and 5G — 6G

2 REFERENCES

ISO/R 529, *Short machine taps and hand taps.*

ISO/R 724, *ISO general purpose metric screw threads — Basic dimensions.*

ISO/R 965/I, *ISO general purpose metric screw threads — Tolerances — Principles and basic data.*

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

ISO/R 965/III, *ISO general purpose metric screw threads — Tolerances — Deviations for constructional threads.*

3 BASIC DATA

3.1 Thread profile of nuts : see figure 1.

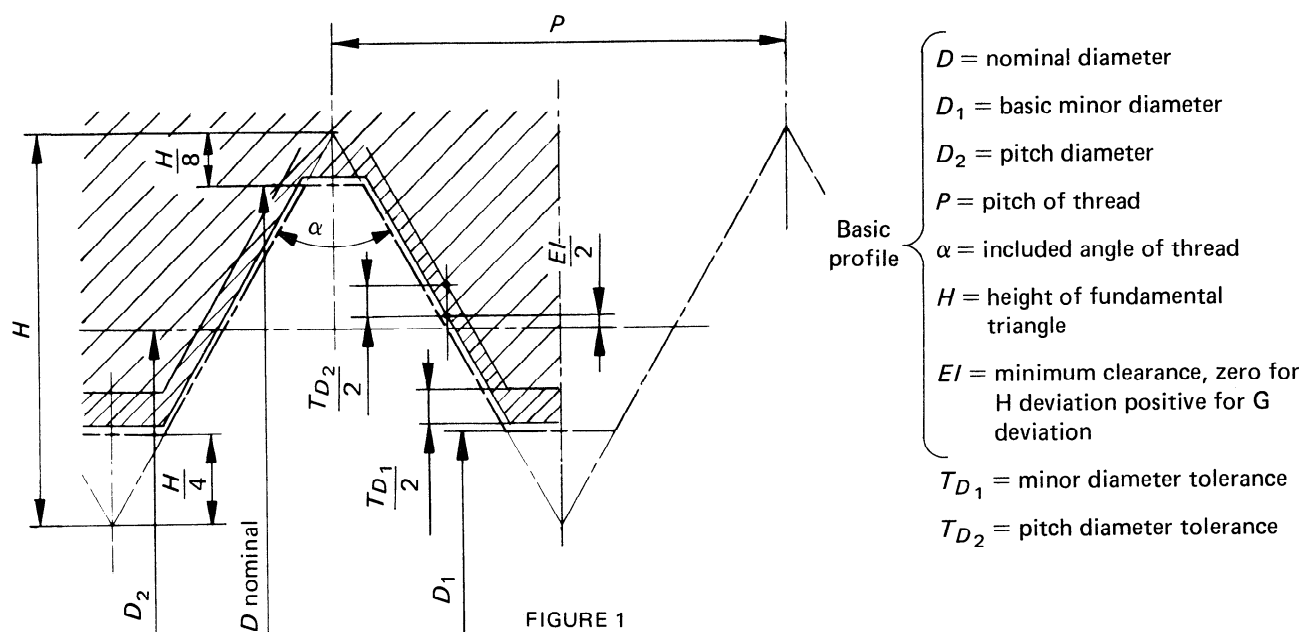


FIGURE 1

3.2 Thread profile of tap : see figure 2.

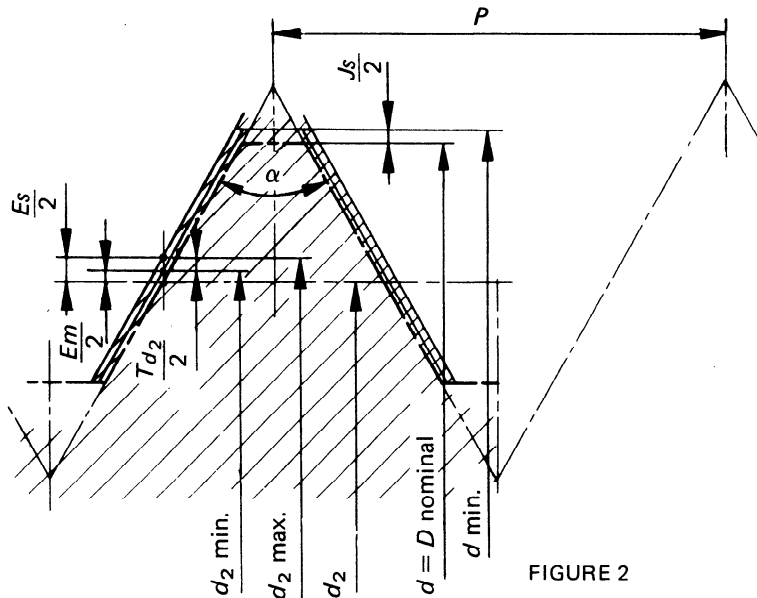


FIGURE 2

- $d = D$ = nominal diameter
- $d \text{ min.}$ = permissible minimum major diameter
- Js = minimum clearance on major diameter
- $d_2 = D_2$ = pitch diameter
- $d_2 \text{ min.}$ = minimum pitch diameter
- $d_2 \text{ max.}$ = maximum pitch diameter
- Es = upper deviation of pitch diameter
- Em = lower deviation of pitch diameter
- T_{d_2} = tolerance on pitch diameter

3.3 Tolerance classes of taps

For the production of nut classes of the following classes :

4H – 5H – 6H – 7H – 8H with zero minimum clearance,

4G – 5G – 6G with positive minimum clearance,

three tolerance classes have been accepted :

Class 1 – Class 2 – Class 3

The tolerances of these three classes are determined as indicated hereafter, in terms of a tolerance unit t , the value of which is equal to the pitch tolerance value T_{D_2} , grade 5 of the nut (extrapolated up to pitch 0,2 mm) :

$$t = T_{D_2} \text{ grade 5 of the nut.}$$

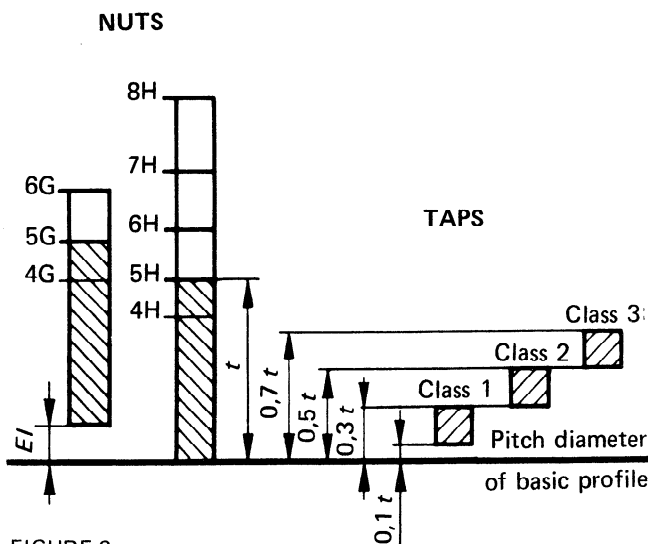


FIGURE 3

3.3.1 Tolerance on pitch diameter

The value for the tap pitch diameter tolerance T_{d_2} is the same for all three classes 1, 2 and 3 : it is equal to 20 % of t .

The position of the tolerance of the tap with respect to the basic pitch diameter results from the lower deviation Em , the values of which are (see figure 3) :

for tap class 1 : + 0,1 t

for tap class 2 : + 0,3 t

for tap class 3 : + 0,5 t

3.3.2 Choice of tolerance class of the tap with respect to the class of thread to be produced

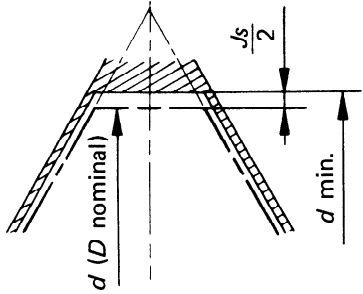
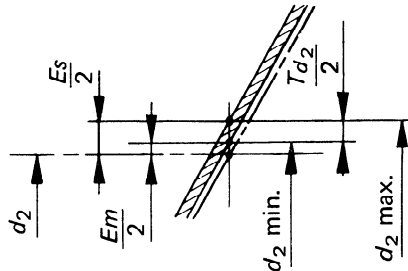
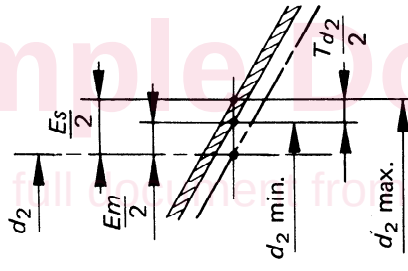
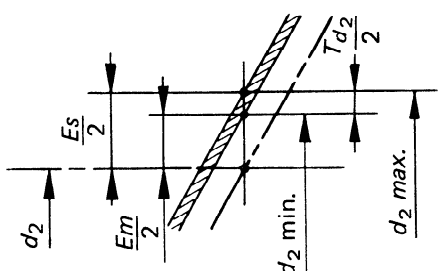
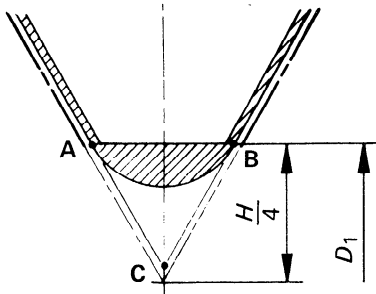
Unless otherwise specified, the taps of classes 1 to 3 will generally be used for the manufacture of nuts of the following classes :

- Class 1 : for nuts of classes 4H and 5H
- Class 2 : for nuts of classes 6H and also 4G and 5G
- Class 3 : for nuts of classes 7H – 8H and also 6G

This correspondance has, however, only an indicative nature, since the accuracy of tapping can vary as a function of a series of factors such as : the material to be tapped, the condition of the machine tool, the tapping attachment, the tapping speed, the lubricant, etc.

Users are therefore recommended to select in each case the most suitable class of tap for the manufacture of the required class of nut.

3.4 Calculation of tap thread dimensions of classes 1, 2 and 3

Class of tap	Minimum tolerance on tap major diameter $d = D$ of tap
all	 $d = D$ nominal diameter of tap $J_s = 0,4 t^*$ $d \text{ min.} = D + J_s$
1	Tolerance on tap pitch diameter d_2  $Em = 0,1 t^*$ $Es = 0,3 t^*$ $d_2 \text{ min.} = d_2^{**} + Em$ $d_2 \text{ max.} = d_2^{**} + Es$
2	 $Em = 0,3 t^*$ $Es = 0,5 t^*$ $d_2 \text{ min.} = d_2^{**} + Em$ $d_2 \text{ max.} = d_2^{**} + Es$
3	 $Em = 0,5 t^*$ $Es = 0,7 t^*$ $d_2 \text{ min.} = d_2^{**} + Em$ $d_2 \text{ max.} = d_2^{**} + Es$
all	Tolerance on tap minor diameter  No tolerance is specified on this diameter. The thread root is generally, but not mandatorily, with a rounded form and the profile of the radius blending with the flanks of the thread should lie, in principle, under the line AB which corresponds with the internal diameter D_1 of the basic ISO profile.

* t = tolerance unit = TD_2 pitch tolerance, grade 5 of the nut.
The values are given in ISO/R 965/I, section 9.

** The d_2 values correspond to the values of the pitch diameter D_2 of the nut in conformity with ISO/R 724.