ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
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SPECIAL TOLERANCES FOR REAMERS

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SPECIAL TOLERANCES FOR REAMERS

1. SCOPE

This ISO Recommendation deals with special tolerances to be applied to the diameter of the cutting portion of the hand and machine reamers covered by ISO Recommendation R 236, *Hand Reamers and Long Fluted Machine Reamers, Morse Taper Shank*, and ISO Recommendation R 521, *Machine Chucking Reamers with Parallel Shanks or Morse Taper Shanks* when a grade of accuracy other than the standard stock grade (with m6 tolerance) provided for in these ISO Recommendations is required.

2. DETERMINATION OF TOLERANCES

Unless otherwise specified in the order, reamers are made to the tolerance m6 (standard stock grade) and it is impossible to infer in advance what tolerances can be guaranteed on the holes produced with these tools.

The actual diameter of a hole produced by a given reamer depends in practice on very many factors. These factors include:

(a)   the type of material to be cut and the amount of material to be removed;

(b)   the cutting angle of the reamer;

(c)   the condition of the reamer at the time of use;

(d)   the method of mounting and operation;

(e)   the lubrication.

These different factors should be taken into account when determining the special tolerances to be called for on a reamer for the production of a hole *with a given tolerance*.   It is thus impossible to establish, for this type of application, standard "special" tolerances likely to give guaranteed results under all conditions.

In order to obtain uniformity, however, it is recommended that the method shown below for determining the limits of tolerance on the reamer in relation to those of the hole to be produced should be adopted for special grade reamers wherever possible.

2.1   Rule for determining the limits of tolerances on reamers

For a given hole with IT tolerance:

— the high limit of the diameter of the reamer is equal to the maximum diameter of the hole, minus 0.15 IT.

The value 0.15 IT should be rounded upwards to a whole multiple of 0.001 mm (or 0.0001 in).

— the low limit of the diameter of the reamer is equal to its maximum diameter, minus 0.35 IT.

The value 0.35 IT should be rounded upwards to a whole multiple of 0.001 mm (or 0.0001 in).

Tolerances
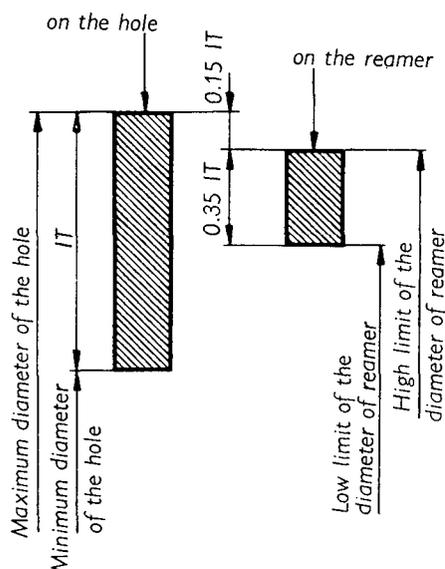
NOTE. — For inch size reamers, the IT values are obtained by direct conversion from the metric IT values.

2.2 General remark

It is always possible to make reamers with greater precision than that provided for by this ISO Recommendation, while remaining within the limits specified above.

2.3 Examples

2.3.1 *For a 12 H7 hole in millimetres*

IT7 = 0.018 mm

Hole sizes: max. 12.018 mm, min. 12.000 mm

The high limit of the diameter of the reamer is 0.15 IT below the maximum diameter of the hole:

0.15 × 0.018 mm = 0.0027 mm which is rounded to 0.003 mm

High limit of the diameter of the reamer = 12.018 mm − 0.003 mm = **12.015 mm**

The low limit of the diameter of the reamer is 0.35 IT below the high limit of the diameter of the reamer:

0.35 × 0.018 mm = 0.0063 mm which is rounded to 0.007 mm

Low limit of the diameter of the reamer = 12.015 mm − 0.007 mm = **12.008 mm**

2.3.2 *For a 0.5 H7 hole in inches*

IT7 = 0.0007 in (direct conversion of 0.018 mm)

Hole sizes: max. 0.5007 in, min. 0.5000 in

The high limit of the diameter of the reamer is 0.15 IT below the maximum diameter of the hole:

0.15 × 0.0007 in = 0.0001 0 in, which is rounded to 0.0001 in

High limit of the diameter of the reamer = 0.5007 in − 0.0001 in = **0.5006 in**

The low limit of the diameter of the reamer is 0.35 IT below the high limit of the diameter of the reamer:

0.35 × 0.0007 in = 0.0002 4 in which is rounded to 0.0003 in

Low limit of the diameter of the reamer = 0.5006 in − 0.0003 in = **0.5003 in**