

**Undercuts for Straight Screw Threads - Metric**

**RATIONALE**

MA1508 has been reaffirmed to comply with the SAE five-year review policy.

**1. SCOPE:**

**1.1 Purpose:**

This SAE Aerospace Standard (MA) provides recommended dimensional data for screw thread undercuts for straight "MJ" metric screw threads in accordance with MA1370.

**1.2 Application:**

The thread undercut data included in this document are primarily designed to provide a clearance for threading tool runout either where the thread is in a blind hole or where the thread is close to an adjacent shoulder. These thread undercuts are not recommended for bolts, screws, or studs which are required to be necked; e.g., reduced shank contiguous to the thread, to improve their tensile, impact, and cyclic load performance.

**2. APPLICABLE DOCUMENTS:**

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

**2.1 SAE Publications:**

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

MA1370      Screw Threads - MJ Profile, Metric

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2012 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

**TO PLACE A DOCUMENT ORDER:**    Tel: 877-606-7323 (inside USA and Canada)  
Tel: +1 724-776-4970 (outside USA)  
Fax: 724-776-0790  
Email: CustomerService@sae.org  
**SAE WEB ADDRESS:**                    http://www.sae.org

**SAE values your input. To provide feedback  
on this Technical Report, please visit  
<http://www.sae.org/technical/standards/MA1508>**

## 2.2 ISO Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO/R286      System of Limits and Fits

## 3. DIMENSIONS:

### 3.1 External Threads:

Table 1 and Figure 1 provides data for external screw thread undercuts. The basic width (A) of the undercut is based on  $1.6 \times P$ , where  $P$  = Pitch rounded to nearest 0.1 mm. Tolerance applied is H14<sup>1</sup>.

The undercut diameter ( $\phi G$ ) is equal to nominal thread size (T) less value shown in column 3, Table 1; recommended tolerance is h12<sup>1</sup>.

Example: Required  $\phi G$  for T = MJ6 x 1 - 4h6h

$$\phi G_{\max} = 6.0 - 1.5 = 4.5$$

$$\text{Tolerance } h12 = 0.12$$

$$\text{Therefore } \phi G = 4.38 - 4.50$$

### 3.2 Internal Threads:

Table 2 and Figure 2 provides data for internal screw thread undercuts. The basic width (A) of the undercut is based on  $1.6 \times P$  for nominal thread sizes (T) less than 20 mm; for nominal thread sizes equal to or greater than 20 mm the basic width is based on  $2.5 \times P$ . Basic widths (A) in columns 2 and 3 have been rounded to nearest 0.1 mm. The specific value for "A" selected from Table 2 will therefore depend on thread pitch and size. When an increase in "A" is desired either to provide additional tool clearance, save weight, or accommodate tolerance accumulations, the value for "A" should be increased by multiples of  $1.5 \times P$ . Tolerance applied is H14<sup>1</sup>.

The undercut diameter ( $\phi H$ ) is equal to nominal thread size (T) plus value shown in column 4, Table 2; recommended tolerance is H13<sup>1</sup>. The value in column 4 is based on  $0.25 \times P$ , except the minimum value is 0.3 mm.

Example: Required  $\phi H$  for T = MJ6 x 1 - 4H5H

$$\phi H_{\min} = 6.0 + 0.3 = 6.3$$

$$\text{Tolerance } H13 = 0.22$$

$$\text{Therefore } \phi H = 6.3 - 6.52$$

### 3.3 Fillet Radii:

The values for the fillet radii (R) in the undercut for both external and internal threads shall be selected from the appropriate table and will depend on the thread pitch.

<sup>1</sup> Selected from ISO/R286 - System of Limits and Fits.

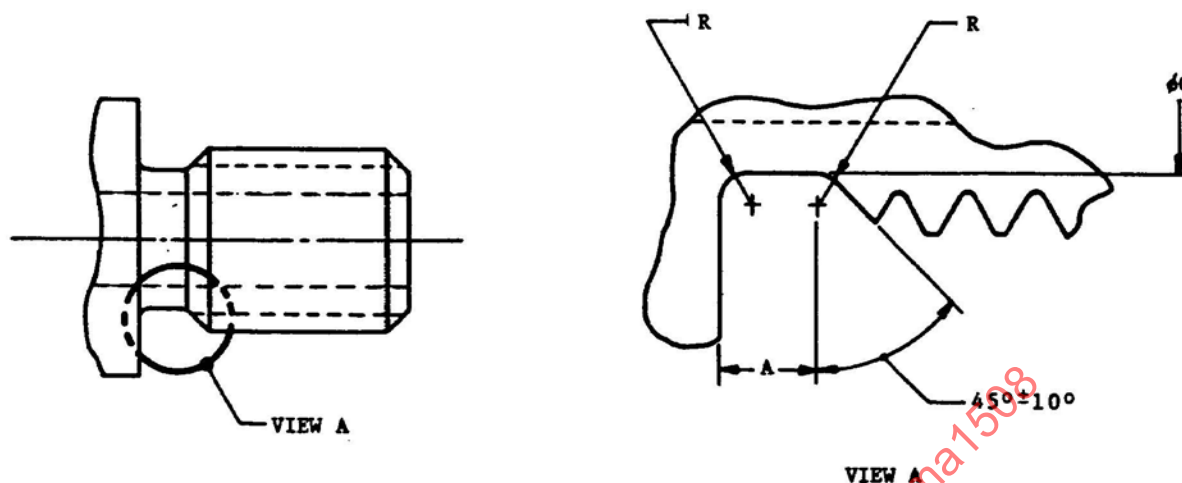


FIGURE 1 - External Thread

TABLE 1 - External Threads  
Dimensions in Millimeters

Thread Pitch P 1	A Undercut Width Tol. H14 2	Undercut Diameter $\phi G = T$ Less Values Below See Note 3	Fillet Radii R 4
0.5	0.80-1.05	0.8	0.2-0.6
0.6	1.00-1.25	0.9	0.2-0.6
0.7	1.10-1.35	1.0	0.2-0.6
0.75	1.20-1.45	1.1	0.4-0.8
0.8	1.30-1.55	1.2	0.4-0.8
1	1.60-1.85	1.5	0.4-0.8
1.25	2.00-2.25	1.9	1.1-1.5
1.5	2.40-2.65	2.2	1.1-1.5
1.75	2.80-3.05	2.6	1.1-1.5
2	3.20-3.50	3.0	2.1-2.5
2.5	4.00-4.30	3.8	2.1-2.5
3	4.80-5.10	4.5	2.1-2.5

NOTE: (a) See 3.1 for recommended tolerance.  
(b) T = Nominal thread size