SCREWS

STRAIGHTNESS LIMITS FOR MACHINE, TAPPING AND THREAD ROLLING SCREWS

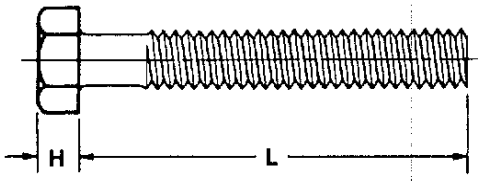
IFI 138 1987

1. Scope.

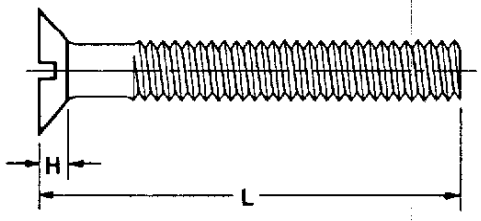
This standard establishes out-of-straightness limits for machine, tapping, and thread rolling screws. Included are screws fully threaded or with thread lengths of at least 4D and screw lengths to and including 12 inches (D equals nominal screw diameter). For screws with longer lengths and/or with shorter thread lengths, straightness limits shall be as agreed upon between manufacturer and purchaser. Also included is a referee gaging procedure for determining conformance of products to specified out-of-straightness limits.

2. Gaged Length.

Gaged length is the length of a screw subject to measurement for straightness. Gaged length for screws with flat bearing surface type heads (e.g. pan, fillister, hex, hex washer, etc.) shall be their nominal length, L. Gaged length for screws with conical bearing surface type heads (e.g. flat countersunk, oval countersunk, etc.) shall be their nominal length, L, minus their specified maximum head height, H.



Gaged Length = L



Gaged Length = L – H

3. Out-of-Straightness Limits.

Screws shall not exceed the out-of-straightness limits specified in Table 1.

Table 1 Out-of-Straightness Limits for Machine, Tapping and Thread Rolling Screws

Gaged Length of Screw (Inches)	Maximum Out-of-Straightness Limit (Inches)	
	Non Heat Treated Machine Screws	Heat Treated Machine Screws, Tapping Screws, Thread Rolling Screws
1	0.004	0.006
2	0.008	0.012
3	0.012	0.018
4	0.016	0.024
5	0.025	0.030
6	0.030	0.036
7	0.035	0.042
8	0.040	0.048
9	0.054	0.072
10	0.060	0.080
11	0.066	0.088
12	0.072	0.096
See Note 1, 4	2	3

NOTES:

1. Gaged length of screws is defined in Paragraph 2.
2. Based on 0.004 in. per in. of gaged length for screw nominal lengths to 4 in., 0.005 in. per in. of gaged length for screw nominal lengths over 4 in. to 8 in., and 0.006 in. per in. of gaged length for screw nominal lengths over 8 in. to and including 12 in.
3. Based on 0.006 in. per in. of gaged length for screw nominal lengths to 8 in., and 0.008 in. per in. of gaged length for screw nominal lengths over 8 in. to and including 12 in.
4. For intermediate gaged lengths compute the maximum allowable out-of-straightness limit using the actual gaged length of the screw and the applicable limit as defined in either Note 2 or 3.

4. Referee Gaging Technique.

The conformance of screws to shank straightness shall be checked by use of a typical gage shown in Fig. 1.

The allowable total out-of-straightness shall be calculated by multiplying the out-of-straightness limit as given in Table 1 by the gaged length of the screw. The allowable out-of-straightness thus derived shall be added to the measured ac-

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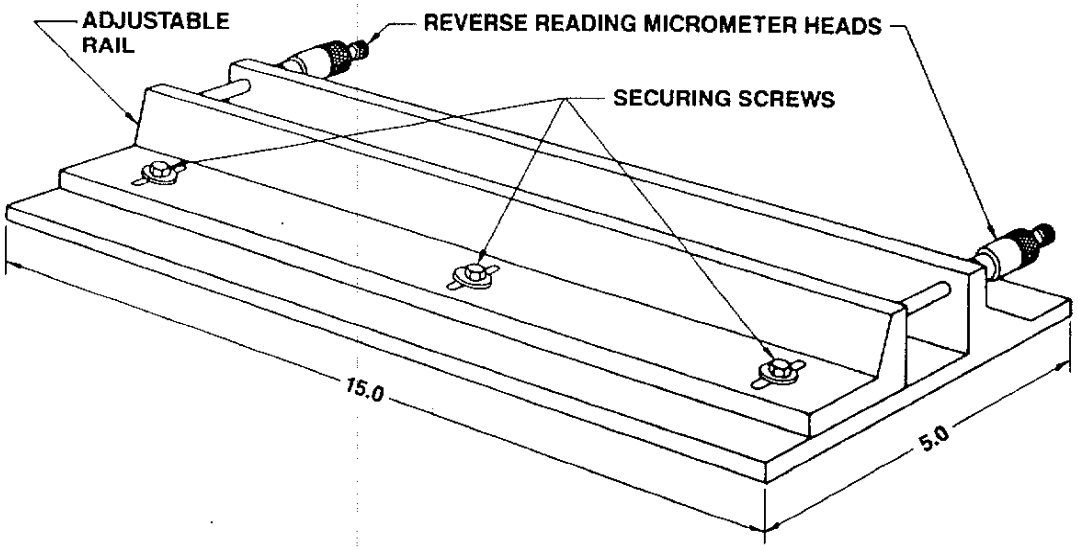

FIG. 1 STRAIGHTNESS GAGE

tual major diameter of the thread of the screw being inspected. The adjustable rail of the gage shall be adjusted to provide a parallel space between the rails equal to this distance by obtaining common readings on both micrometer heads. The adjustable rail shall then be locked in place by tightening securing screws.

The screw shall be inserted between the rails, excluding any permitted length of fillet or shoulder under the head. The screw shall be rotated 360 degrees by hand. Any interference occurring between the screw and the gage sufficient to prevent rotation shall indicate excessive out-of-straightness.