LAND SEA AIR SPACE

AEROSPACE STANDARD

Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AS3062

Issued 3-15-70
Revised

BOLTS, SCREWS AND STUDS, SCREW THREAD REQUIREMENTS

1. PURPOSE: To establish thread requirements for bolts, screws and studs where the threads are produced by rolling.

2. TECHNICAL REQUIREMENTS: Threads shall be as specified on the drawing. Special features of the thread shall meet the requirements specified herein.

2.1 STUD END THREADS (UN or UNJ Thread Forms):

2.1.1 Limits and Tolerances: Pitch diameter limits of the full threads on the stud end shall be as specified on the drawing. Where no tolerance class is specified on the drawing, tolerances for lead and half angle of the stud end threads shall be as specified in Table I.

TABLE I LEAD & HALF ANGLE DEVIATIONS

Threads Per Inch	Lead Deviation Inch (See Note 1)	Half-Angle Deviation Deg	Min
32	.0003	0	37
28	.0003	0	35
24	.0003	0	33
20	.0004	0	30
18	.0004	0	31
16	.0005	0	29
14	.0005	0	29
13	.0005	0	28
12	.0006	0	28
11	.0006	0	26
10	.0007	0	26
9	.0007	0	25
8	.0008	0	25

NOTE 1. Lead deviation between any 2 threads not farther apart than the length of stud end thread including the lead thread.

2.1.1.1 Taper: The pitch diameter of all full threads on the stud end, Figure 1, shall not taper more than 0.0005 in. per in. and, if tapered, the smaller diameter shall be at the entering end of the stud. Taper variations shall fall within pitch diameter limits specified on the drawing.

2.1.1.2 Out-of-Roundness: Out-of-roundness of the pitch diameter of the stud end full threads shall not exceed 0.0005 in. full indicator reading. Roundness variations shall fall within pitch diameter limits specified on the drawing.

2.1.2 Lead Threads: Where lead threads are required as illustrated in Figure 1, the pitch diameter of the lead threads on the stud end shall originate from the stud pitch diameter and continue, decreasing for a distance B specified in Table II (See Figure 2).

TABLE II LENGTH OF REDUCED PD THREADS

Threads Per Inch	B, Inch, Max
32	0.09
28	0.11
24	0.13
20	0.15
18	0.17
16	0.19
14	0.21
13	0.23
12	0.25
11	0.27
10	0.30
9	0.33
8	0.38

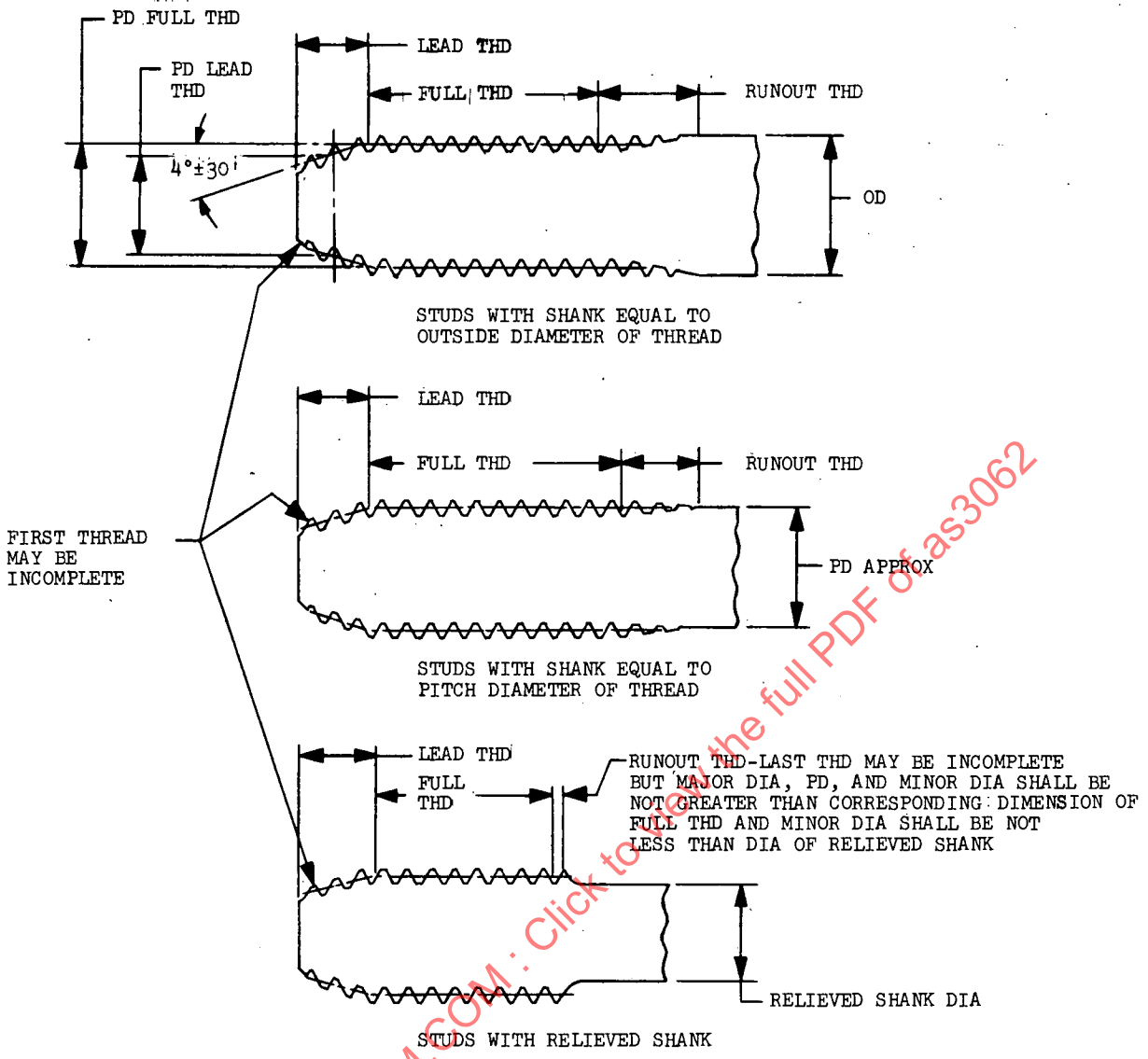
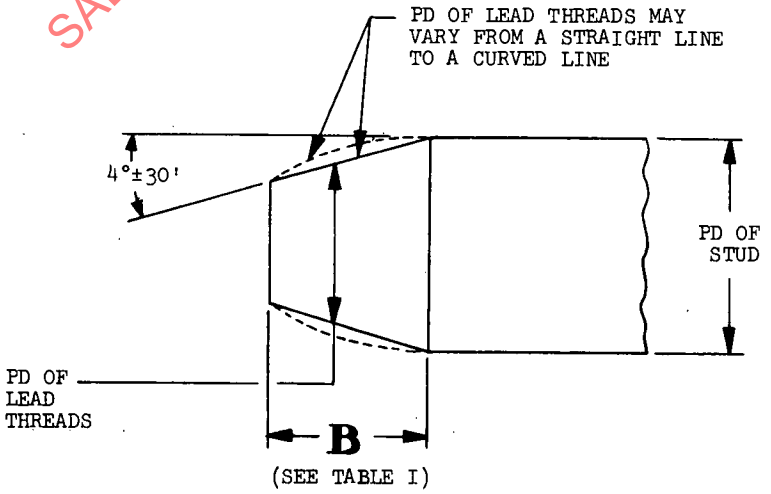


FIGURE 1
STUD END
FOR ILLUSTRATIVE PURPOSES ONLY



(SEE TABLE I)

FIGURE 2

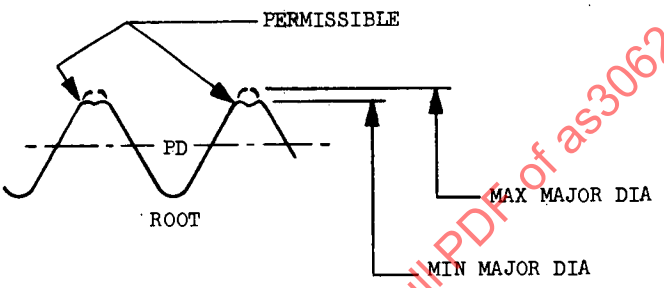
FOR ILLUSTRATIVE PURPOSES ONLY

2.1.2.1 The minimum lead thread length on the stud end is controlled by the number of threads that the stud will enter a lead thread ring gage or gage of equivalent accuracy made to the maximum pitch diameter of the lead threads specified on the drawing; the number of such threads shall be not less than 1 nor more than 2.

2.1.2.2 Any variation in lead shall be in the same relative direction on the lead thread of the stud end as on the full thread of the stud end.

2.2 Bolts, Screws and Stud Threads:

2.2.1 Crest Deviations: Slight deviations from thread contour on bolts, screws and stud threads are permissible at the crest of the thread within the major diameter limits as shown in Figure 3 and at the incomplete thread at each end of the threaded section. The general "break edge" note on drawings does not apply to the crest of the thread; sharp edges (without burrs and feather edges) at this location are permissible. Any operation to remove burrs from the thread should not break the edge more than 0.003 in. radius.

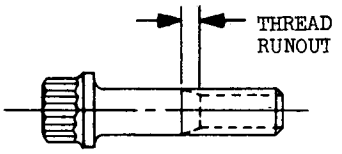


ROLLED THREAD
FIGURE 3

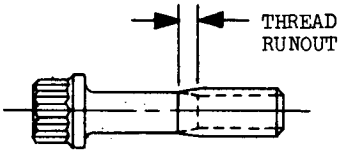
2.2.2 Locking Holes: Parts having holes for locking devices are permitted to have slight ovalization of the hole and the countersink and slight flattening of the crest of the thread at the countersink, provided the diameter of the hole is within specified tolerances.

2.2.3 Incomplete Lead Threads: Except for lead threads on the stud end thread as in 2.1.2, the incomplete lead threads on the end of bolts, screws, and nut thread end of studs shall extend no greater than 2 times the pitch from the end, including chamfer as determined in 3.2.3.1. The thread elements of the incomplete lead threads may be under the specified thread limits and the length of chamfer shall be as specified on the drawing.

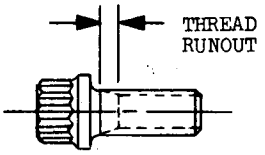
2.2.4 Thread Runout: Thread runout is that portion of the threaded part between the end of the full thread and the beginning of the unthreaded shank or, if there is no unthreaded shank, the head to shank fillet radius (See Figures 4A, 4B, 4C, and 4D). For full shank parts, thread runout shall comprise the incomplete threads and a portion of the blank diameter from which the thread is rolled (See Figures 5A and 5B). For PD shank parts having shank diameter equivalent to the blank diameter from which the thread is rolled, thread runout shall comprise the incomplete threads only (See Figure 5C). The end of the full thread is that point on the root of the thread nearest to the shank or head up to which the thread conforms to the thread specification as determined in 3.2.3.2. Incomplete thread shall not enter head to shank fillet.



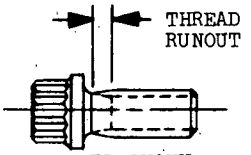
FULL SHANK
FIGURE 4A



PD SHANK
FIGURE 4B



FULL SHANK
THREAD TO HEAD
FIGURE 4C



PD SHANK
THREAD TO HEAD
FIGURE 4D

HEAD SHAPE SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY

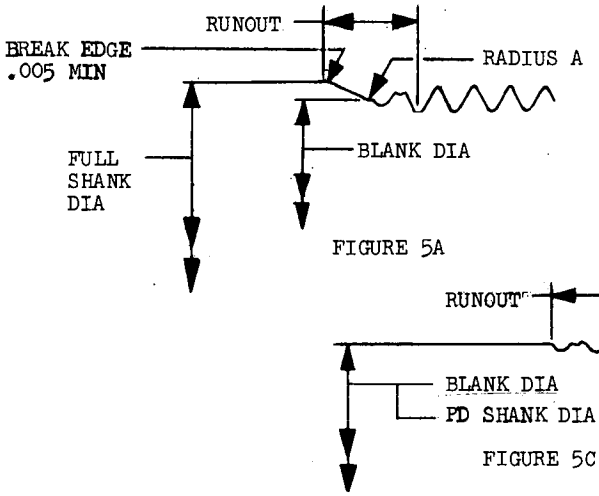


FIGURE 5A

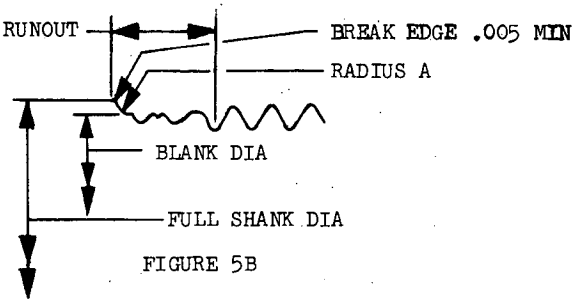


FIGURE 5B

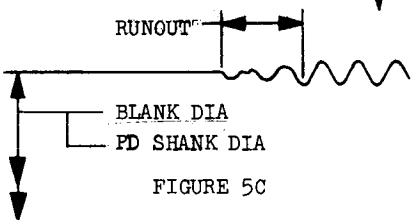


FIGURE 5C

2.2.4.1 Full shank parts shall have a minimum thread runout of one thread and a maximum of two threads. The transition between the blank diameter and the full shank diameter shall consist of a radius "A" and either a taper as in Figure 5A or a shoulder as in Figure 5B. The radius "A" shall be not less than the amount specified below; for parts having only a radius, with no taper, between the runout threads and the full shank diameter, as shown in Figure 5B, the incomplete thread shall not encroach upon radius "A".

Threads Per Inch	Radius "A" Inch
32 and finer	0.005
28 thru 14	0.010
13 thru 10	0.015
9 and 8	0.020

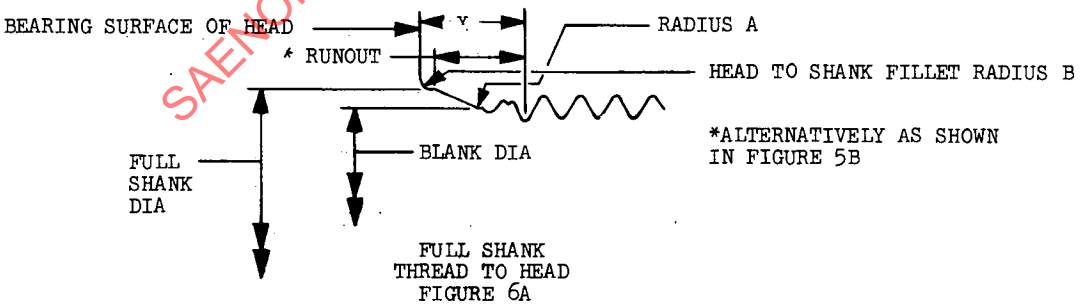
2.2.4.2 PD shank parts, having a shank diameter equivalent to the blank diameter from which the thread is rolled, shall have a minimum thread runout of 0.625 x thread pitch and a maximum of two threads. See Figure 5C.

2.2.4.3 For parts threaded to the head, unless otherwise specified on the drawing, the dimension "X" (See Figures 6A and 6B) between the end of the full thread and the bearing surface shall be as follows:

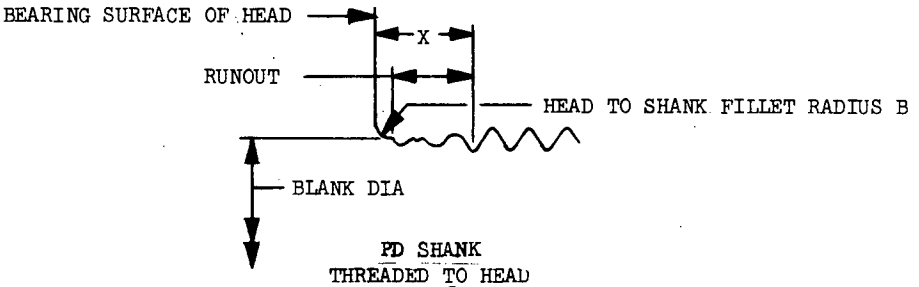
X min (rounded to three decimal places) = 1.5 x thread pitch + B max

X max = X min + 0.020 inch

The runout shall be as defined in 2.2.4.1 for the full shank condition and in 2.2.4.2 for the PD shank condition, but shall not encroach upon the head to shank fillet radius "B".



FULL SHANK THREAD TO HEAD
FIGURE 6A



PD SHANK THREADED TO HEAD
FIGURE 6B