

AERONAUTICAL MATERIAL SPECIFICATION

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Revised

BOLTS AND SCREWS, STEEL, CORROSION RESISTANT Roll Threaded

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. **APPLICATION:** High quality bolts and screws requiring corrosion resistance for use up to 700 F.

3. **COMPOSITION:**

		Check Analysis	
		Under Min	or Over Max
Carbon	0.08 - 0.15	0.01	0.01
Manganese	2.00 max	—	0.04
Silicon	1.00 max	—	0.05
Phosphorus	0.040 max	—	0.005
Sulfur	0.030 max	—	0.005
Chromium	17.00 - 19.00	0.20	0.20
Nickel	7.00 - 10.00	0.10	0.10

4. **FABRICATION:** Heads may be formed by cold upsetting or machining. When heads are machined, AMS 5637 steel shall be used. Threads shall be formed by rolling.

5. **TECHNICAL REQUIREMENTS:**

5.1 **Flow Lines:** Flow lines of upset heads shall conform to the general arrangement shown in Figure 1. The intersection of the longitudinal axis of the part and the approximate transverse axis of the flow lines shall be not less than H/3 in. from the bearing surface.

5.1.1 **Examination for Internal Defects:** Visual examination of a longitudinal section of a head and 1/4 in. or more of the shank, after etching for approximately 30 minutes in a solution of 1 volume of sulfuric acid (sp gr 1.84) and 3 volumes of water at 160-180 F, shall reveal no cracks, laps, or porosity.

5.2 **Machining:** The metal removed from the bearing surface of the head of upset-head parts shall be as little as practicable to obtain a clean, smooth surface.

5.3 **Threads:**

5.3.1 **Threads** shall be produced on the finished blanks by a single rolling. Flow lines at threads shall be continuous, shall follow the general thread contour, and shall be of a maximum density at root of thread (see Figure 2).

Section 1.1 of the SAE Technical Board rules provides that: "All technical reports, including standards, are advisory only. Their use in industry or trade is entirely voluntary. There is no agreement to adhere to any standard or recommended practice, and no commitment to conform to or be guided by any technical report, in formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 5.3.2 Threads shall have no multiple or single laps at the root or on the sides (see Figures 3, 4, and 5), except that slight laps are permissible at the crest, on the non-pressure side inside the pitch diameter, and on the sides outside the pitch diameter (see Figures 6, 7, and 8). Slight deviation from thread contour is permissible at the crest of the thread as shown in Figure 9; the incomplete thread at each end of the thread may also deviate slightly from contour.
- 5.4 Parts, after thread rolling, shall be heated at $700\text{ F} \pm 10$ for 3 hr, except that parts made from AMS 5637 steel need not be so heated.
- 5.5 Cleaning: Parts, after finishing, shall be degreased and then immersed for not less than 20 minutes in a solution of 1 volume of nitric acid (sp gr 1.42) and 9 volumes of water at room temperature.
- 5.6 Tensile Strength: Sample parts shall be capable of meeting the following when based on the area at the root of the thread.
- 5.6.1 Proof Load: A load of 100,000 psi shall be applied between the thread and head for not less than 1 minute. After removing the load the length shall not be increased more than 0.0001 in.
- 5.6.2 Ultimate: A load shall be applied between the thread and head until failure. The load shall be not less than 125,000 psi, the fracture shall be in the thread with a reduction of area not less than 20%.
6. QUALITY: Parts shall be uniform in quality and condition, clean, sound, smooth, and free from burrs and foreign materials and from internal and external defects detrimental to their performance.
7. REJECTIONS: Parts not conforming to this specification or to authorized modifications will be subject to rejection. Unless otherwise stipulated, rejected parts will be returned to vendor at vendor's expense, unless purchaser receives, within three weeks of notification of rejection, other instructions for disposition.

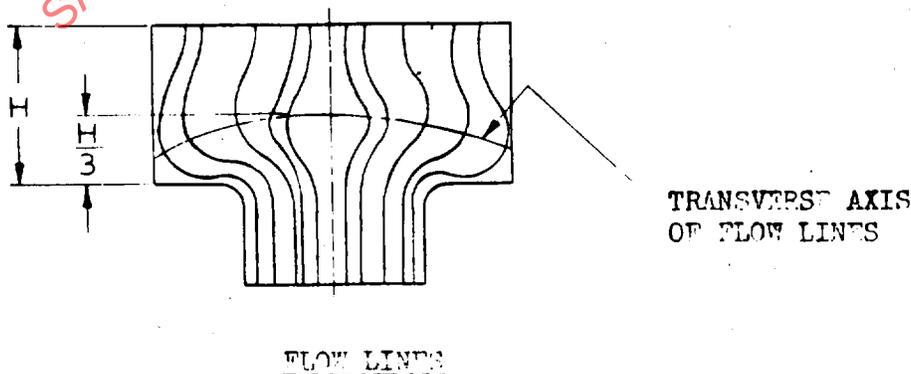


FIGURE 1

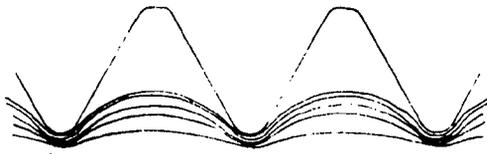


FIGURE 2
ROLLING LAYERS
ROLLED THREAD

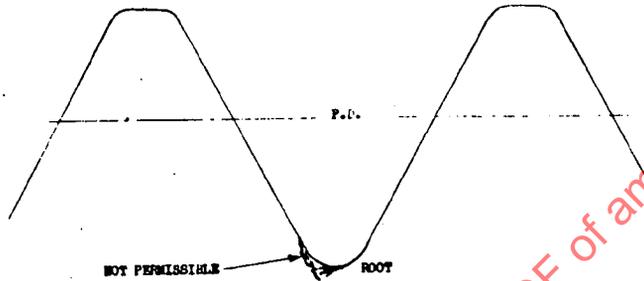


FIGURE 3
ROLLED THREAD

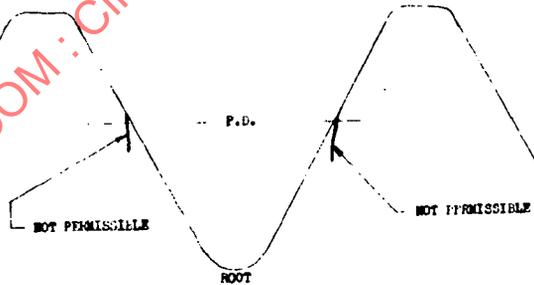


FIGURE 4
ROLLED THREAD

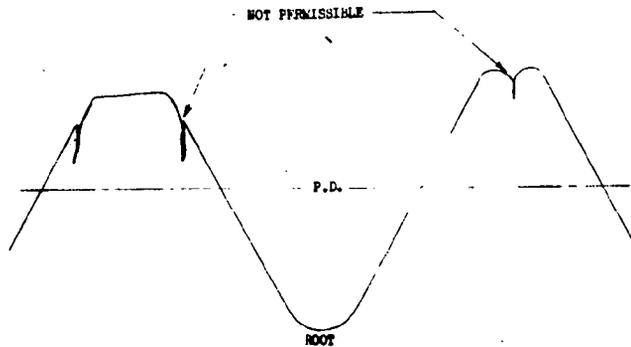


FIGURE 5
ROLLED THREAD

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