SAE Aerospace
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AEROSPACE STANDARD

SAE AS7245 | REV. A

Issued 1993-01
Revised 2007-02
Reaffirmed 2012-11

Superseding AMS7245

Inserts, Screw Thread, Helical Coil 19Cr-9.2Ni, Corrosion Resistant Steel, Procurement Specification For

FSC 5340

RATIONALE

AS7245A has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Type

This specification covers closely-wound helical coil, screw thread inserts made of a corrosion resistant steel formed wire with a chemical composition in accordance with Table 1 and identified under the Unified Numbering System as UNS S30200 or UNS S30400 that can be formed by an insert manufacturer to achieve the requirements of this procurement specification. The inner surface of the insert coil, after assembly into a screw thread tapped hole, provides internal threads of standard 60° Unified form.

1.2 Application

Primarily to provide hard, wear-resistant internal screw threads in light alloys or nonmetals, to provide the parent tapped material increased shear strength by installing an insert of sufficient length to develop the full load of the bolt, and for salvaging worn or damaged internal threads.

2. REFERENCES

2.1 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.

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2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS 2248 Chemical Check Analysis Limits, Wrought Heat and Corrosion Resistant Steels and Alloys

AMS 2371 Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products and Forging Stock

2.1.2 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/.

MIL-STD-2073-1 DoD Materiel, Procedures for Development and Application of Packaging Requirements

2.1.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E 8 Tension Testing of Metallic Materials

ASTM E 290 Semi-Guided Bend Test for Ductility of Metallic Materials

ASTM E 353 Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.1.4 ASME Publications

Available from ASME, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900, Tel: 973-882-1170, www.asme.org.

ANSI Y14.5M-1982 Dimensioning and Tolerancing

2.2 Definitions

DEFECTIVE: Is a unit of product that has one or more defects.

PRODUCTION INSPECTION LOT: Shall be all finished inserts of the same part number, made from a single heat of alloy, heat treated at the same time to the same specified condition, produced as one continuous run, and submitted for vendor's inspection at the same time.

2.3 Unit Symbols

% - percent (1% = 1/100)

ksi - kips (1000 pounds) per square inch

° - degree, angular

3. TECHNICAL REQUIREMENTS

3.1 Material

3.1.1 Chemical Composition

Shall conform to the percentages by weight specified in Table 1, determined by wet chemical methods in accordance with ASTM E 353, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - MATERIAL COMPOSITION

Element	% By Weight min	% By Weight max
Carbon	---	0.15
Manganese	---	2.00
Silicon	---	1.00
Phosphorus	---	0.045
Sulfur	---	0.035
Chromium	17.00	20.00
Nickel	8.00	10.50
Molybdenum	---	0.75
Copper	---	0.75
Iron	Remainder	

3.1.1.1 Check Analysis

Composition variation shall meet the requirements of AMS 2248.

3.1.2 Condition

Wire cold drawn and formed by rolling to achieve the properties as in 3.1.3, and to conform to the cross-section as specified on the insert drawing.

3.1.3 Properties

3.1.3.1 Ultimate Tensile Strength

Formed wire, before coiling into parts, shall have an ultimate tensile strength not lower than 150 ksi, determined in accordance with ASTM E 8.

3.1.3.2 Bending

Formed wire from which inserts are coiled shall withstand, without cracking, bending at room temperature through an angle of 180° around a diameter equal to twice the cross-sectional dimension of the formed wire in the plane of the bend, determined in accordance with ASTM E 290.

3.2 Design

Finished (completely manufactured) parts shall conform to the following requirements:

3.2.1 Dimensions

The dimensions of finished parts, after all processing, shall conform to the part drawing.

3.2.2 Tang location and approximate shape shall be as shown in Figure 1 and Table 2. The tang removal notch shall be located as shown on the part drawing and shall be of such depth that the part may be installed without failure of the tang and that the tang may be removed, after assembly, without affecting the function of the installed insert.

3.3 Fabrication

3.3.1 Inserts shall be coiled from cold drawn and shaped wire as in 3.1.

3.3.2 Spacing

Inserts shall stretch with approximately equal spacing between turns when extended axially beyond their elastic limit.

3.4 Workmanship

Inserts shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and imperfections detrimental to the usage of the insert.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of parts shall supply all samples for vendor's test and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure the parts conform to the requirements of this specification.

4.2 Responsibility for Compliance

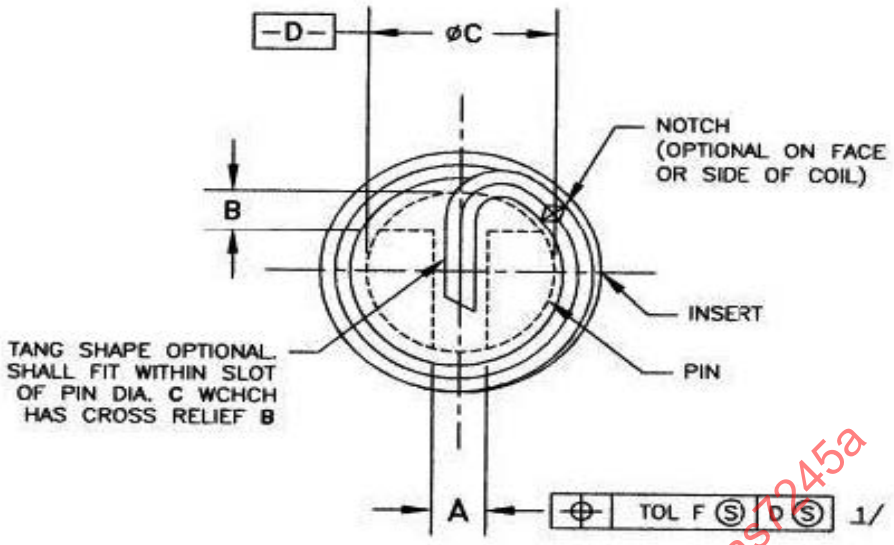
The manufacturer's system for parts production should be based on preventing product defects, rather than detecting the defects at final inspection and then requiring corrective action to be invoked. An effective manufacturing in-process control system shall be established, subject to the approval of the purchaser, and used during production of parts.

4.3 Production Acceptance Tests

The purpose of production acceptance tests is to check, as simply as possible, using a method which is inexpensive and representative of the part usage, with the uncertainty inherent in random sampling, that the parts comprising a production inspection lot conform to the requirements of this specification.

4.4 Classification of Tests

Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and are to be performed on each production inspection lot. A summary of acceptance tests is specified in Table 3.



NOTE 1/: TOL F = 0.004 FOR INSERT SIZES 0.086 TO 0.4375, INCL
= 0.010 FOR INSERT SIZES 0.500 TO 1.000, INCL
= 0.020 FOR INSERT SIZES 1.125 TO 1.500, INCL

NOTE 2: DIMENSIONS IN INCHES. SEE TABLE 2 FOR DIMENSIONS A, B, AND C.

NOTE 3: DIMENSIONING AND TOLERANCING: ANSI Y14.5M-1982

FIGURE 1 - TANG LOCATING DIMENSIONS

TABLE 2 - TANG LOCATING DIMENSIONS

Thread Size	Dimensions, inch A	Dimensions, inch B	Dimensions, inch øC
0.086 -56	0.024 - 0.026	0.007 - 0.009	0.053 - 0.055
0.099 -48	0.032 - 0.034	0.009 - 0.011	0.064 - 0.066
0.099 -56	0.028 - 0.030	0.008 - 0.010	0.081 - 0.083
0.112 -40	0.034 - 0.036	0.009 - 0.011	0.074 - 0.076
0.112 -48	0.032 - 0.034	0.009 - 0.011	0.073 - 0.075
0.125 -40	0.034 - 0.036	0.014 - 0.016	0.089 - 0.091
0.138 -32	0.044 - 0.046	0.019 - 0.021	0.100 - 0.102
0.138 -40	0.037 - 0.039	0.019 - 0.021	0.103 - 0.105
0.164 -32	0.044 - 0.046	0.019 - 0.021	0.126 - 0.128
0.164 -36	0.040 - 0.042	0.019 - 0.021	0.127 - 0.129
0.190 -24	0.060 - 0.062	0.019 - 0.021	0.141 - 0.143
0.190 -32	0.051 - 0.053	0.019 - 0.021	0.152 - 0.154
0.250 -20	0.072 - 0.074	0.027 - 0.029	0.192 - 0.194
0.250 -28	0.059 - 0.061	0.019 - 0.021	0.207 - 0.209
0.3125-18	0.081 - 0.083	0.033 - 0.035	0.249 - 0.251
0.3125-24	0.069 - 0.071	0.021 - 0.025	0.264 - 0.266
0.375 -16	0.092 - 0.094	0.038 - 0.040	0.301 - 0.303
0.375 -24	0.069 - 0.071	0.023 - 0.025	0.327 - 0.329
0.4375-14	0.111 - 0.113	0.055 - 0.057	0.354 - 0.356
0.4375-20	0.087 - 0.089	0.045 - 0.047	0.379 - 0.381
0.500 -13	0.124 - 0.126	0.075 - 0.077	0.410 - 0.412
0.500 -20	0.089 - 0.091	0.045 - 0.047	0.421 - 0.423
0.5625-12	0.141 - 0.143	0.085 - 0.087	0.467 - 0.469
0.5625-18	0.099 - 0.101	0.065 - 0.067	0.499 - 0.501
0.625 -11	0.155 - 0.157	0.113 - 0.115	0.520 - 0.522
0.625 -18	0.099 - 0.101	0.088 - 0.090	0.562 - 0.564
0.750 -10	0.185 - 0.187	0.116 - 0.118	0.624 - 0.626
0.750 -16	0.108 - 0.110	0.086 - 0.088	0.678 - 0.680
0.875 - 9	0.185 - 0.187	0.155 - 0.157	0.749 - 0.751
0.875 -14	0.124 - 0.126	0.134 - 0.136	0.793 - 0.795
1.000 - 8	0.249 - 0.251	0.155 - 0.157	0.843 - 0.845
1.000 -12	0.129 - 0.131	0.134 - 0.136	0.909 - 0.911
1.000 -14	0.124 - 0.126	0.124 - 0.126	0.918 - 0.920
1.125 - 7	0.247 - 0.249	0.155 - 0.157	0.934 - 0.936
1.125 -12	0.149 - 0.151	0.134 - 0.136	1.034 - 1.036
1.250 - 7	0.252 - 0.254	0.155 - 0.157	1.059 - 1.061
1.250 -12	0.149 - 0.151	0.134 - 0.136	1.159 - 1.161
1.375 - 6	0.249 - 0.251	0.155 - 0.157	1.185 - 1.187
1.375 -12	0.149 - 0.151	0.134 - 0.136	1.284 - 1.286
1.500 - 6	0.249 - 0.251	0.155 - 0.157	1.309 - 1.311
1.500 -12	0.149 - 0.151	0.134 - 0.136	1.409 - 1.411

TABLE 3 - SUMMARY OF ACCEPTANCE TESTS

Characteristic	Req. Para.	Sample Size	Test Method
Nondestructive Tests			
Packaging & Identification	5.1	None	Visual
Dimensions	3.2.1	Table 4	Conventional measuring methods
Tang Location	3.2.2	Table 4	Figure 1 slotted pin
Tang Removal Notch	3.2.2	Table 4	Visual
Workmanship	3.4	Table 4	Visual
Destructive Tests			
Material Composition	3.1.1	4.5.1	ASTM E 353
Ultimate Tensile Strength	3.1.3.1	Table 5	ASTM E 8
Bending	3.1.3.2	Table 5	ASTM E 290
Tang Removal	3.2.2	Table 5	Installed insert and assembled bolt or screw
Spacing	3.3.2	Table 5	Per 3.3.2

4.5 Acceptance Test Sampling

4.5.1 Material

Shall be in accordance with AMS 2371.

4.5.2 Nondestructive Tests - Visual and Dimensional

A random sample shall be selected from each production inspection lot; the size of the sample to be as specified in Table 4. All dimensional characteristics are considered defective when out of tolerance.

4.5.3 Destructive Tests

A random sample shall be selected from each production inspection lot; the size of the sample shall be as specified in Table 5.

4.5.4 Acceptance Quality

Of random samples tested, acceptance quality shall be based on zero defectives.