AEROSPACE STANDARD

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Superseding AS4983

Spring Pins, Tubular, Coiled Corrosion Resistant Nickel Base Alloy Procurement Specification For

FSC 5315

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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1. SCOPE:

1.1 Type:

This procurement specification covers tubular-shaped, coiled spring pins made of a corrosion resistant nickel base alloy of the type identified under the Unified Numbering System as UNS N07718.

1.2 Application:

Primarily to provide a spring pin constructed to resist reduction in pin diameter by means of spring action.

1.3 Dimensions and Tolerances:

Unless otherwise specified herein, dimensions and tolerances are in inches.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this specification 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.

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

AMS 5597 Sheet, Strip, and Plate, Alloy, 52.5Ni 19Cr 3.0Mo 5.1(Cb+Ta) 0.90Ti 0.50Al 18Fe, Consumable Electrode or Vacuum Induction Melted, 1950 °F (1065 °C) Solution Heat Treated

2.1.2 U.S. Government Publications: Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

QQ-P-35 Passivation Treatments for Corrosion Resistant Steel

2.1.3 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 3951 Commercial Packaging Practice
ASTM E 18 Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E 92 Vickers Hardness of Metallic Materials
ASTM E 140 Standard Hardness Conversion

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

ANSI/ASME B46.1 Surface Texture (Surface Roughness, Waviness, and Lay)

2.1.5 ASME Publications: Available from ASME, 345 East 47th Street, New York, NY 10017.

ASME B18.8.2 Taper Pins, Dowel Pins, Straight Pins, Grooved Pins, and Spring Pins (Inch Series)

2.2 Definitions:

DEFECTIVE: A unit of product which contains one or more defects.

PRODUCTION INSPECTION LOT: Shall be all finished parts 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:

° - degree, angular
°F - degree, Fahrenheit
lbf - pound-force

3. TECHNICAL REQUIREMENTS:

3.1 Material:

3.1.1 Chemical Composition: Shall conform to AMS 5597.

3.1.2 Condition: Strip, annealed

3.2 Design:

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

3.2.1 Design and Dimension: Shall be in accordance with the part drawing.

3.2.2 Surface Roughness: Surface roughness of finished parts shall conform to the requirements as specified on the part drawing, determined in accordance with ANSI/ASME B46.1. Minor tool marks during forming shall not be cause for rejection.

3.2.3 Swage: Pins shall be swaged at both ends as specified on the part drawing. Shape optional.

3.2.4 Diameter: A or B are acceptable diameter measurement. In instances of conflict, method B takes precedence.

a. Maximum Diameter: Shall not be greater than that shown on the part drawing, determined by means of a GO ring gage having a length of hole not greater of .125 in and a maximum diameter as shown on the drawing within a tolerance of -.0001 (Z Gage).

b. Minimum/Maximum Diameter: The outer diameter of a coiled pin is to be measured with a micrometer at a location 15° back from the seam area and at a location 90° from the seam area. All diameter measurements between these two locations must fall within the minimum and maximum diameter specifications.

3.2.5 Straightness: Shall be such that pins will pass freely through the appropriate ring gage constructed to meet the following requirements:

3.2.5.1 The maximum hole diameter of the gage shall be equal to the maximum pin diameter plus the pin straightness tolerance, within a tolerance of minus .0001 in. The length of the gage hole and the straightness tolerance shall be as specified in Table 1 for the applicable pin length.

TABLE 1 - Pin Straightness Tolerance and Gage Length

Nominal Pin Length	Pin Straightness Tolerance	Length of Gage Hole
Up to 1.00 incl	.007	.995 - 1.005
Over 1.00 to 2.00 incl	.010	1.995 - 2.005
Over 2.00	.013	2.995 - 3.005

3.3 Fabrication:

Coiled pins shall be formed to meet the design requirements as specified in 3.2 and heat treated to meet the properties as specified in 3.4.

3.3.1 Passivation: Finished pins after heat treatment shall be cleaned and passivated in accordance with QQ-P-35.

3.4 Properties:

3.4.1 Hardness: Shall be within the range specified in part drawing, determined in accordance with ASTM E 18 or ASTM E 92, as applicable. The pin shall be cut or ground in half along the longitudinal axis and the hardness readings taken on the inside surface of the outer half coil. The Vickers hardness test specimen must be properly mounted to avoid false readings due to pin flexibility.

3.4.2 Shear Strength: Shall be as specified in Table 2, determined in accordance with ASME B 18.8.2. Testing shall be conducted at room temperature.

TABLE 2 - Shear Strength

Nominal Pin Diameter (Inch)	Double Shear Strength (lbf, minimum) Standard Duty	Double Shear Strength (lbf, minimum) Heavy Duty
.062	360	460
.078	580	730
.094	770	1060
.125	1500	1870

3.4.3 Ductility: Pins which have been tested for shear strength shall show a ductility shear with no longitudinal cracks longer than .250 in or one-third the total length of the pin, whichever is less.

3.5 Quality:

Pins as received by purchaser, shall be sound, smooth, and free from foreign materials and from imperfections detrimental to usage of the pins.

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 that the parts conform to the requirements of this specification.

4.2 Responsibility for Compliance:

The manufacturer's system for parts production shall 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 satisfy the requirements of this specification.

4.4 Acceptance Tests:

Tests to determine conformance to requirements for material (3.1), design, dimension and tolerances (3.2), hardness (3.4.1), shear strength (3.4.2), and ductility (3.4.3) are classified as acceptance tests and shall be performed on each production inspection lot. A summary of acceptance tests is specified in Table 3.

TABLE 3 - Summary of Acceptance Tests

TABLE 3A - Nondestructive Tests

Characteristic	Requirement Paragraph	Sample Size	Test Method
Material	3.1	AMS 5597	Per 3.1.1
Design and Dimension	3.2.1	Tables 4 and 5	Conventional measuring methods
Surface Roughness	3.2.2	Tables 4 and 5	Per ANSI/ASME B46.1
Swage	3.2.3	Tables 4 and 5	Conventional measuring methods
Diameter	3.2.4	Tables 4 and 5	Per 3.2.4 a or b
Straightness	3.2.5	Tables 4 and 5	Ring gage

TABLE 3B - Destructive Tests

Characteristic	Requirement Paragraph	Sample Size	Test Method
Hardness	3.4.1	Table 6	Per ASTM E 18 or ASTM E 92
Shear Strength	3.4.2	Table 6	Per ASME B18.8.2
Ductility	3.4.3	Table 6	—

4.5 Sampling Acceptance Tests:

4.5.1 Material: In accordance with AMS 5597.

4.5.2 Nondestructive Tests - Visual and Dimensional: A random sample of parts shall be taken from each production inspection lot, the size of the sample to be as specified in Table 4. The classification of dimensional characteristics shall be as specified in Table 5. All dimensional characteristics are considered defective when out of tolerance.

TABLE 4 - Sampling Data (Nondestructive Tests, Visual and Dimensional Characteristics For Classes Major and Minor)

Production Inspection Lot	Major Sample Size	Minor Sample Size
25 & under	5	3
26 to 50	8	5
51 to 90	13	8
91 to 150	20	13
151 to 280	32	20
281 to 500	50	32
501 to 1200	80	50
1201 to 3200	125	80
3201 to 10 000	200	125
10 001 to 35 000	315	200
35 001 to 150 000	500	315
150 001 to 500 000	800	500

TABLE 5 - Classification of Dimensional Characteristics

Class	Characteristic
Major	
101	Minimum diameter
102	Diameter
103	Straightness
104	Length
Minor	
201	Swage or end chamfer
202	Edges and corners broken
203	Other dimensional characteristics