Society of Automotive Engineers, Inc.
400 Commonwealth Drive, Warrendale, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 7205E

Superseding AMS 7205D

Issued 11-1-52
Revised 10-15-79

SPRING PINS, TUBULAR
Carbon Steel

1. SCOPE:

1.1 Type: This specification covers tabular-shaped pins, fabricated from carbon steel, having a full-length longitudinal slot to permit flexure when inserted into a hole.

1.2 Application: Primarily to provide a pin with sufficient flexure to remain tight against the surface of a hole into which it has been inserted, after adjusting itself to the hole tolerances.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2370 - Quality Assurance Sampling of Carbon and Low-Alloy Steels, Wrought Products Except Forgings and Forging Stock
AMS 5120 - Steel Strip, 0. 68 - 0.80C (SAE 1074)
AMS 5121 - Steel Strip, 0. 90 - 1.04C (SAE 1095)

2.1.2 SAE Standards and Recommended Practices:

J496 - Spring Type Straight Pins

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B117 - Salt Spray (Fog) Testing
ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be steel strip conforming to AMS 5120 or AMS 5121.

3.2 Condition: Austempered, zinc phosphate treated, and oiled.

3.3 Properties: Pins shall conform to the following requirements:

3.3.1 Shear Strength: Shall be as specified in Table I, determined in accordance with SAE J496

TABLE I

Nominal Pin Diameter Inch	Hole Diameter Inch	Double Sheer Strength lb, min
0.062	0.062 - 0.065	425
0.078	0.078 - 0.081	650
0.094	0.094 - 0.097	1,000
0.125	0.109 - 0.112	1,840
0.141	0.125 - 0.129	2,200
0.156	0.156 - 0.160	2,880
0.188	0.187 - 0.192	4,140
0.219	0.219 - 0.224	5,640
0.250	0.250 - 0.256	7,360
0.312	0.312 - 0.318	11,500
0.375	0.437 - 0.445	16,580
0.438	0.437 - 0.445	20,000
0.500	0.500 - 0.510	25,800

TABLE I (SI)

Nominal Pin Diameter Millimetres	Hole Diameter Millimetres	Double Sheer Strength kN, min
1.59	1.57 - 1.65	1.89
1.98	1.98 - 2.06	2.89
2.38	2.39 - 2.46	4.45
2.78	2.77 - 2.84	6.27
3.18	3.18 - 2.84	8.18
3.57	3.57 - 3.68	9.79
3.97	3.96 - 4.06	12.81
4.76	4.75 - 4.88	18.41
5.56	5.56 - 5.69	25.09
6.35	6.35 - 6.50	31.74
7.94	7.92 - 8.08	51.60
9.52	9.52 - 9.70	73.75
11.11	11.10 - 11.30	88.96
12.70	12.70 - 12.95	114.76

3.3.2 Hardness: Shall be 83 - 87 HR15N or equivalent, determined in accordance with ASTM E18 on a prepared flat surface on the pin OD.

3.3.3 Microstracture: Shall be bainite, determined by microscopic examination of a polished and etched specimen.

3.3.4 Ductility: Pins shall withstand, without cracking, squeezing in a vise until the gap closes. Pins which have been tested for shear strength shall show a ductile shear with no longitudinal cracks longer than 0.250 in. (6.35 mm) or one-third the total length of the pin, whichever is less.

3.3.5 Insertion: Pins shall withstand being inserted in the minimum hole size shown on the drawing without the sides of the gap touching. The hole in the ring gage used for this test shall have a basic diameter equal to the minimum hole shown on the drawing and a tolerance of ±0.0003 in. (±0.008 mm).

3.3.6 Corrosion Resistance: Pins shall withstand, without showing definite rusting, exposure for 72 hr to salt spray test conducted in accordance with ASTM B117.

3.4 Quality: Pins, as received by purchaser, shall be sound, clean, smooth, and free from foreign Ø materials and from internal and external imperfections detrimental to their performance.

3.5 Tolerances:

3.5.1 Minimum Average Diameter: Shall be as shown on the drawing, determined by averaging three measurements made at the angular locations, with respect to the slot, shown on the drawing. Measurements shall be made at midlength of pins 1 in. (25 mm) or less in length and at least 1/2 in. (12.5 mm) from the end of pins over 1 in. (25 mm) in length. Minimum diameter shall be as shown on the drawing, determined by means of a "no-go" ring gage having a length of hole not greater than 0.125 in. (3.2 mm).

3.5.2 Maximum Diameter: Shall be not greater than shown on the drawing, determined by means of a "go" ring gage having length of hole not greater than 0.125 in. (3.18 mm).

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

3.5.3.1 The maximum ID of the gage shall be equal to the maximum diameter shown on the drawing of the pin plus the straightness tolerance of Table II. The length of the gages shall depend on the straightness tolerance and shall be as follows:

TABLE II

Nominal Pin Length Inches	Straightness Tolerance Inch	Length of Cage Inches
Up to 1.000, incl	0.007	0.995 - 1.005
Over 1.000 to 2.000, incl	0.010	1.995 - 2.005
Over 2.000	0.013	2.995 - 3.005

TABLE II (SI)

Nominal Pin Length Millimetres	Straightness Tolerance Inch	Length of Cage Inches
Up to 25.40, incl	0.18	25.28 - 25.52
Over 25.40 to 50.80, incl	0.25	50.68 - 50.92
Over 50.80	0.33	76.08 - 76.32

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of pins shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the pins conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for material (3.1), shear Ø strength (3.3.1), hardness (3.3.2), microstructure (3.3.3), ductility (3.3.4), and tolerances (3.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for insertion (3.3.5) and corrosion Ø resistance (3.3.6) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be as follows; a lot shall be all pins of the same nominal dimensions, except length, produced from the same size stock of the same composition, heat treated as a batch or sequentially heat treated in a continuous furnace in not more than eight consecutive hours:

4.3.1 Acceptance Tests:

4.3.1.1 Material: In accordance with AMS 2370.

4.3.1.2 Shear Strength and Ductility: Three specimens from each lot.

4.3.1.3 Hardness: Five specimens from each lot.

4.3.1.4 Microstructure: One specimen from each lot.

4.3.2 Periodic Tests: As agreed upon by purchaser and vendor.

4.4 Reports: The vendor of pins shall furnish with each shipment three copies of a report showing the results of tests for material, shear strength, hardness, and ductility of each lot and stating that the pins conform to the other technical requirements of this specification. This report shall include the purchase order number, this specification number and its revision letter, part number, and quantity.

4.5 Resampling and Retesting: If any pin or specimen used in the above tests fails to meet the specified requirements, disposition of the pins may be based on the results of testing three additional pins or specimens for each original nonconforming specimen. Failure of any retest pin or specimen to meet the specified requirements shall be cause for rejection of the pins represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification and Packaging:

5.1.1 Pins of each different part number shall be packaged in separate containers.

5.1.2 Each container shall be marked to show not less than the following information:

SPRING PINS, TUBULAR, CARBON STEEL
AMS 7205E
PART NUMBER_____
PURCHASE ORDER NUMBER_____
QUANTITY_____
MANUFACTURER'S IDENTIFICATION_____

5.1.3 Ø Containers of pins shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the pins to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.1.4 Ø For direct U. S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1 and 5.1.3 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGEMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Pins not conforming to this specification or to authorized modifications will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: The phi (Ø) symbol is used to indicate technical changes from the previous issue of this specification.