Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS7304C
Superseding AMS 7304B
Issued 7-1-48
Revised 10-15-79

SPRINGS, STEEL
0.85 - 1.05C
Hardened and Tempered after Forming

1. SCOPE:

1.1 Type: This specification covers coiled springs made from cold-drawn, annealed, round, carbon-steel wire.

1.2 Application: Primarily for use in moderate stress applications up to 350°F (175°C)

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 2259 - Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
AMS 2350 - Standards and Test Methods
AMS 2640 - Magnetic Particle Inspection

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

ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

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

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E350, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	0.85	1.05
Manganese	0.25	0.60
Phosphorus	--	0.045
Sulfur	--	0.050

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2259.

3.2 Condition: Hardened and tempered after forming.

3.3 Properties: Springs shall conform to the following requirements; hardness testing shall be performed in accordance with ASTM E18.

3.3.1 Hardness: Finished springs shall have hardness of 64 - 69 HR30N or equivalent, unless otherwise specified.

3.3.2 Decarburization: Springs shall be free from decarburization to the extent that the increase in hardness from the surface to any point below the surface will be not more than two points on the Rockwell Superficial 30-N scale or equivalent.

3.4 Quality: Springs, as received by purchaser, shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and from internal and external imperfections detrimental to their performance.

3.4.1 Springs shall be subjected to magnetic particle inspection in accordance with AMS 2640. Standards for acceptance shall be as agreed upon by purchaser and vendor.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of springs 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 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the springs conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed on the first-article shipment of a spring to a purchaser, when a change in material or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction springs shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be in accordance with the following; a lot shall be all springs of the same part number produced from a single heat of wire, hardened and tempered in a single furnace charge, and presented for vendor's inspection at one time.

4.3.1 Composition: One sample from each heat of wire.

4.3.2 Hardness: Five springs from each lot.

4.3.3 Decarburization: One spring from each lot.

4.3.4 Magnetic Particle Inspection: As specified by purchaser.

4.4 Approval:

4.4.1 Sample springs shall be approved by purchaser before springs for production use are supplied, unless such approval be waived.

4.4.2 Vendor shall use manufacturing procedures, processes, and methods of inspection on production springs which are essentially the same as those used on the approved sample springs. If any change is necessary in manufacturing procedures or processes, vendor shall submit for reapproval of the process a statement of the proposed changes in operations and, when requested, springs produced by the revised procedure. Production springs incorporating the revised operations shall not be shipped prior to receipt of reapproval.

4.5 Reports: The vendor of springs shall furnish with each shipment three copies of a report showing the results of tests for chemical composition of each heat and for hardness and decarburization of each lot. This report shall include the purchase order number, this specification number and its revision letter, contractor or other direct supplier of wire, part number, and quantity.

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

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each spring shall, when size permits, be marked with the wire coil number and part number on one end. Marking shall appear on the chamfer or ground face of the dead coil. If springs are too small to be marked individually, part numbers shall appear on the containers.

5.2 Protective Treatment: Springs shall be protected, during shipment and storage, by coating with a suitable corrosion-preventive compound which is readily removable by washing in hydrocarbon solvents. Springs received by purchaser in a corroded condition will be subject to rejection.

5.3 Packaging:

5.3.1 Springs of different part numbers shall be packaged in separate containers, each marked to show not less than the following information:

SPRINGS, STEEL
AMS 7304C
PART NUMBER_____
PURCHASE ORDER NUMBER_____
QUANTITY_____
MANUFACTURER'S IDENTIFICATION_____