AEROSPACE MATERIAL SPECIFICATION

AMS5553™	REV. J

Issued 1965-02
Reaffirmed 2006-10
Revised 2022-10

Superseding AMS5553H

Nickel, Sheet and Strip
Low (0.02 Max) Carbon
Annealed
(Composition similar to UNS N02201)

RATIONALE

AMS5553J is the result of a Five-Year Review and update of the specification. The revision includes additional information on exclusions (1.1, 3.6, 8.5), updates to composition reports (3.1.1), and control of strain rate in tensile tests (3.3.1.1).

1. SCOPE

1.1 Form

This specification covers nickel in the form of sheet and strip 0.001 to 0.250 inch (0.03 to 0.65 mm), inclusive, in nominal thickness.

1.2 Application

These products have been used typically for parts requiring excellent corrosion resistance, and/or strong magnetic properties, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2262 Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Sheet, Strip, and Plate

AMS2269 Chemical Check Analysis Limits, Nickel, Nickel Alloys, and Cobalt Alloys

AMS2371 Quality Assurance Sampling and Testing, Corrosion- and Heat-Resistant Steels and Alloys, Wrought Products and Forging Stock

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS5553J/

AMS2807 Identification, Carbon and Low-Alloy Steels, Corrosion- and Heat-Resistant Steels and Alloys Sheet, Strip, Plate, and Aircraft Tubing

AS4194 Sheet and Strip Surface Finish Nomenclature

AS7766 Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A480/A480M Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

ASTM E8/E8M Tension Testing of Metallic Materials

ASTM E18 Rockwell Hardness of Metallic Materials

ASTM E140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

ASTM E384 Microindentation Hardness of Materials

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by spectrochemical methods, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Nickel	99.0	--
Carbon	--	0.02
Manganese	--	0.35
Silicon	--	0.35
Sulfur	--	0.010
Cobalt	--	1.00
Iron	--	0.40
Copper	--	0.25

3.1.1 Producer may test for any element not listed in Table 1 and include this analysis in the report of 4.4. Reporting of any element not listed in the composition table is not a basis for rejection unless limits of acceptability are specified by the purchaser.

3.1.2 Check Analysis

Composition variations shall meet the applicable requirements of AMS2269.

3.2 Condition

Cold rolled, annealed, and, unless annealing is performed in an atmosphere yielding a bright finish, descaled having a surface appearance in accordance with ASTM A480/A480M, AS4194, and 3.2.1.1 or 3.2.1.2, as applicable.

3.2.1 Sheet

No. 2D finish.

3.2.2 Strip

No. 1 strip finish.

3.3 Properties

The product shall conform to the following requirements:

3.3.1 Tensile Properties

Shall be as shown in Table 2, determined in accordance with ASTM E8/E8M.

3.3.1.1 Unless otherwise specified, the strain rate shall be set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ±0.002 in/in/min (0.002 mm/mm/min) through 0.2% offset yield strain. The strain rate after yield may be increased to any value up to 0.5 in/in/min (or 0.5 mm/mm/min) or equivalent crosshead speed as a function of gage length. The requirement for compliance becomes effective for material produced 1 year after the publication date of this document.

Table 2A - Tensile properties, inch/pound units

Nominal Thickness Inches	Tensile Strength ksi, Min	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %, Min
0.001 to 0.010, excl	45.0	--	--
0.010 to 0.015, incl	50	30.0, max	30
Over 0.015 to 0.049, incl	50	12.0, min	30
Over 0.049 to 0.109, incl	50	12.0, min	35
Over 0.109 to 0.250, incl	50	12.0, min	40

Table 2B - Tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa, Min	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %, Min
0.03 to 0.25, excl	310	--	--
0.25 to 0.38, incl	345	207, max	30
Over 0.38 to 1.24, incl	345	83, min	30
Over 1.24 to 2.77, incl	345	83, min	35
Over 2.77 to 6.35, incl	345	83, min	40

3.3.1.2 Mechanical property requirements for product outside of the range covered by 1.1 shall be agreed upon between purchaser and producer and reported in 4.4.1.

3.3.2 Hardness

Shall be not higher than 66 HRB, or equivalent (see 8.2), determined in accordance with ASTM E18; for thin gages where superficial hardness testing is impractical, microhardness testing in accordance with ASTM E384 may be used. Product shall not be rejected on the basis of hardness if the tensile properties of 3.3.1 are acceptable, determined on product taken from the same sample as that with nonconforming hardness or from another sample with similar nonconforming hardness.

3.4 Quality

The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.5 Tolerances

Shall conform to all applicable requirements of AMS2262.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for producer's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing

Shall be in accordance with AMS2371.

4.4 Reports

The producer of the product shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile properties and hardness of each lot and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS5553J, size, and quantity.

4.4.1 When material produced to this specification is beyond the sizes allowed in the scope of tables, or other exceptions are taken to the technical requirements listed in Section 3 (see 5.1.1), the report shall contain a statement “This material is certified as AMS5553J(EXC) because of the following exceptions:” and the specific exceptions shall be listed.

4.5 Resampling and Retesting

Shall be in accordance with AMS2371.