AEROSPACE
MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York, N.Y. 10017

AMS 6546

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Revised

STEEL SHEET, STRIP, AND PLATE
0.48Cr - 8.0Ni - 4.0Co - 0.48Mo - 0.09V (0.24 - 0.30C)
Premium Quality, Consumable Electrode Melted, Annealed

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. APPLICATION: Primarily for heat treated parts, such as pressure vessels, requiring through hardening to high strength levels, and where such parts may require welding.

3. COMPOSITION:

	min	max
Carbon	0.24	0.30
Manganese	0.10	0.35
Silicon	--	0.10
Phosphorus	--	0.010
Sulfur	--	0.010
Chromium	0.35	0.60
Nickel	7.00	9.00
Cobalt	3.50	4.50
Molybdenum	0.35	0.60
Vanadium	0.06	0.12

3.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2259, paragraph titled "Low Alloy Steels"; check analysis limits for cobalt shall be 0.05 under min or over maximum.

4. CONDITION: Unless otherwise specified, material shall be supplied in the following condition:

4.1 Sheet and Strip: Cold finished, bright or atmosphere annealed, pickled if necessary, and oiled; or hot rolled, annealed, pickled, and oiled having hardness not higher than Rockwell C 30 or equivalent.

4.2 Plate: Hot rolled, annealed, pickled, and oiled having hardness not higher than Rockwell C 25 or equivalent.

4.3 When normalized and tempered material is specified, hardness shall be not higher than Rockwell C 30 or equivalent.

5. TECHNICAL REQUIREMENTS: When ASTM methods are specified for determining conformance to the following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.

5.1 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible, determined, unless otherwise specified, in accordance with ASTM E112, McQuaid-Ehn test.

5.2 Decarburization: Unless otherwise agreed upon by purchaser and vendor, product shall be free from complete decarburization. Partial decarburization shall not exceed the following when measured microscopically:

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Nominal Thickness Inches	Depth of Decarburization Inch	
	Product Width, Inches	
	Up to 48, incl	Over 48
Up to 0.040, incl	0.001	0.002
Over 0.040 to 0.065, incl	0.001	0.003
Over 0.065 to 0.090, incl	0.002	0.004
Over 0.090 to 0.125, incl	0.003	0.005
Over 0.125 to 0.250, incl	0.006	0.006
Over 0.250 to 0.375, incl	0.010	0.012
Over 0.375 to 0.500, incl	0.015	0.015
Over 0.500 to 1.000, incl	0.025	0.025
Over 1.000 to 2.000, incl	0.035	0.035
Over 2.000 to 3.000, incl	0.045	0.045
Over 3.000 to 4.000, incl	0.050	0.050

5.3 Inclusion Rating: Unless otherwise specified, the inclusion rating, determined in accordance with ASTM E45, Method D, using not less than 9 specimens per heat or lot selected parallel to the direction of rolling and representing the worst area of inclusions in the inspection sample, shall be as specified below. The method of selection of specimens shall be such that suitable rating of the heat or lot of steel being qualified is assured. Two-thirds of all specimens shall not exceed the following limits, except that the length of any inclusion shall be not greater than 0.015 inch.

Type	Inclusion Rating			
	A	B	C	D
Thin	1.5	1.5	1.5	2.0
Heavy	1.0	1.0	1.0	1.5

5.4 Properties After Heat Treatment: Material heat treated as in 5.4.1, except that annealing (5.4.1.1) is optional, shall conform to the requirements of 5.4.2 and 5.4.3.

5.4.1 Heat Treatment:

5.4.1.1 Annealing: Heat to 1125 F ± 25 (607.2 C ± 14), hold at heat for 48 hr, and cool in air to room temperature.

5.4.1.2 Normalizing: Heat to a temperature within the range of 1600 - 1700 F (871.1 - 926.7 C), hold at the selected temperature within ± 25 F (±14 C) for 1 hr per inch of section thickness, and cool in air to room temperature.

5.4.1.3 Hardening: Heat to a temperature within the range of 1525 - 1575 F (829.4 - 857.2 C), hold at the selected temperature within ± 15 F (±8.3 C) for 1 hr per inch of section thickness but at least 1 hr, and then from that temperature quench sections up to 4 in. in thickness into room-temperature oil or water.

5.4.1.4 Tempering: Heat to 1000 F ± 10 (537.8 C ± 5.6), hold at heat for 2 hr, and cool suitably to approximately 125 F (52 C), and then reheat and recool using the same time and temperature.

5.4.2 Tensile Properties:

Tensile Strength, psi	185,000 min
Yield Strength at 0.2% Offset or at 0.0159 in. in 2 in. Extension Under Load (E = 29,500,000), psi	175,000 min
Elongation, % in 2 in.	13 min
Reduction of Area (Round Specimens), %	50 min