



Designation: ~~A 204/A 204M-93 (Reapproved 1999)~~ Designation: A 204/A 204M – 03 (Reapproved 2007)

Standard Specification for Pressure Vessel Plates, Alloy Steel, Molybdenum¹

This standard is issued under the fixed designation A 204/A 204M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification² covers molybdenum-alloy steel plates, intended particularly for welded boilers and other pressure vessels.

1.2 Plates under this specification ~~is~~ are available in three grades having different strength levels as follows:

Grade	Tensile Strength, ksi [MPa]
A	65–85 [450–585]
B	70–90 [485–620]
C	75–95 [515–655]

1.3 The maximum thickness of plates is limited only by the capacity of the composition to meet the specified mechanical property requirements; however, current practice normally limits the maximum thickness of plates furnished under this specification as follows:

Grade	Maximum Thickness, in. [mm]
A	6 [150]
B	6 [150]
C	4 [100]

1.4 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with this specification.

2. Referenced Documents

2.1 *ASTM Standards:*³

A 20/A 20M Specification for General Requirements for Steel Plates for Pressure Vessels

A 435/A 435M Specification for Straight-Beam Ultrasonic Examination of Steel Plates

<http://www.astm.org/standards/A577/A577M> Specification for Ultrasonic Angle-Beam Examination of Steel Plates [9c27c6/astm-a204-a204m-032007](http://www.astm.org/standards/A578/A578M)

A 578/A 578M Specification for Straight-Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications³
Specification for Straight-Beam Ultrasonic Examination of Rolled Steel Plates for Special Applications

3. General Requirements and Ordering Information

~~3.1 Material supplied to this material specification shall conform to Specification A20/A20M. These requirements outline the testing and retesting methods and procedures, permissible variations in dimensions and mass, quality and repair of defects, marking, loading, etc.~~

~~3.2 Specification A20/A20M also establishes the rules for the ordering information that should be complied with when purchasing material to this specification.~~

~~3.3 In addition to the basic requirements of this specification, certain supplementary requirements are available when additional control, testing, or examination is required to meet end use requirements. These include:~~

~~3.3.1 Vacuum treatment;~~

~~3.3.2 Additional or special tension testing;~~

¹ This specification is under the jurisdiction of ASTM Committee A-01 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.11 on Steel Plates for Boilers and Pressure Vessels.

Current edition approved June 15, 1993; Nov. 1, 2007. Published August 1993; March 2008. Originally published as A204-37 T, approved in 1937. Last previous edition approved in 2003 as A204/A 204M – 903.

² For ASME Boiler and Pressure Vessel Code applications, see related Specification SA-204/SA 204M in Section II of that Code.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards*, Vol. 01.04, volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard.

3.3.3 Impact testing, and

3.3.4 Nondestructive examination.

3.4 The purchaser is referred to the listed supplementary requirements in this specification and to the detailed requirements in Specification A20/A20M.

3.5 If the requirements of this specification are in conflict with the requirements of Specification A20/A20M, the requirements of this specification shall prevail. **General Requirements and Ordering Information**

3.1 Plates supplied to this product specification shall conform to Specification A 20/A 20M, which outlines the testing and retesting methods and procedures, permissible variations in dimensions and mass, quality and repair of defects, marking, loading, etc.

3.2 Specification A 20/A 20M also establishes the rules for ordering information that should be complied with when purchasing plates to this specification.

3.3 In addition to the basic requirements of this specification, certain supplementary requirements are available where additional control, testing, or examination is required to meet end use requirements.

3.4 The purchaser is referred to the listed supplementary requirements in this specification and to the detailed requirements in Specification A 20/A 20M.

3.5 Coils are excluded from qualification to this specification until they are processed into finished plates. Plates produced from coil means plates that have been cut to individual lengths from coil. The processor directly controls, or is responsible for, the operations involved in the processing of coils into finished plates. Such operations include decoiling, leveling, cutting to length, testing, inspection, conditioning, heat treatment (if applicable), packaging, marking, loading for shipment, and certification.

NOTE 1—For plates produced from coil and furnished without heat treatment or with stress relieving only, three test results are reported for each qualifying coil. Additional requirements regarding plates from coil are described in Specification A 20/A 20M.

TABLE 1 Chemical Requirements

Element	Composition, %		
	Grade A	Grade B	Grade C
Carbon, max: ^A			
Up to 1 in. [25 mm]	0.18	0.20	0.23
incl. in thickness			
Over 1 in. to 2 in. [50 mm]	0.21	0.23	0.26
incl. in thickness			
Over 2 in. to 4 in. [100 mm]	0.23	0.25	0.28
incl. in thickness			
Over 4 in. [100 mm]	0.25	0.27	0.28
in thickness			
Manganese, max:			
Heat analysis	0.90	0.90	0.90
Product analysis	0.98	0.98	0.98
Phosphorous, max ^A	0.035	0.035	0.035
Sulfur, max ^A	0.035	0.035	0.035
Silicon:			
Heat analysis	0.15–0.40	0.15–0.40	0.15–0.40
Product analysis	0.13–0.45	0.13–0.45	0.13–0.45
Molybdenum:			
Heat analysis	0.45–0.60	0.45–0.60	0.45–0.60
Product analysis	0.41–0.64	0.41–0.64	0.41–0.64

^A Applies to both heat and product analyses.

TABLE 2 Tensile Requirements

	Grade A		Grade B		Grade C	
	ksi	[MPa]	ksi	[MPa]	ksi	[MPa]
Tensile strength	65–85	[450–585]	70–90	[485–620]	75–95	[515–655]
Yield strength, min ^A	37	[255]	40	[275]	43	[295]
Elongation in 8 in. [200 mm], min, % ^B		19		17		16
Elongation in 2 in. [50 mm], min, % ^B		23		21		20

^A Determined by either the 0.2 % offset method or the 0.5 % extension-under-load method.

^B See Specification A 20/A 20M for elongation adjustment.

3.6 If the requirements of this specification are in conflict with the requirements of Specification A 20/A 20M, the requirements of this specification shall prevail.

4. Manufacture—Materials and Manufacture

4.1 *Steelmaking Practice*—The steel shall be killed.