~~Designation:B618–06~~ Designation: B 618/B 618M – 07

Standard Specification for Aluminum-Alloy Investment Castings[1]

This standard is issued under the fixed designation B 618/B 618M; 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 specification covers aluminum-alloy investment castings designated as shown in Table 1.

1.2 This specification is not intended for aluminum-alloy investment castings used in aerospace applications.

1.3 Alloy and temper designations are in accordance with ANSI H35.1/H35.1 (M). The equivalent Unified Numbering System alloy designations are in accordance with Practice E 527.

~~1.4For acceptance criteria for inclusion of new aluminum and aluminum alloys and their properties in this specification, see~~

1.4 Unless the order specifies the "M" specification designation, the material shall be furnished to the inch-pound units.

1.5 For acceptance criteria for inclusion of new aluminum and aluminum alloys and their properties in this specification, see Annex A1 and Annex A2.

~~1.5*Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units which are provided for information only and are not considered standard.~~

~~1.6~~

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

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 The following documents of the issue in effect on the date of purchase form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:* [2]

B 179 Specification for Aluminum Alloys in Ingot and Molten Forms for Castings from All Casting Processes

B 275 Practice for Codification of Certain Nonferrous Metals and Alloys, Cast and Wrought

B 557 Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products

B 557M Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products [Metric]

B 660 Practices for Packaging/Packing of Aluminum and Magnesium Products

B 881 Terminology Relating to Aluminum- and Magnesium-Alloy Products

B 917/B 917M Practice for Heat Treatment of Aluminum-Alloy Castings from All Processes

D 3951 Practice for Commercial Packaging

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E 34 Test Methods for Chemical Analysis of Aluminum and Aluminum-Base Alloys

E 88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition

E 94 Guide for Radiographic Examination

E 155 Reference Radiographs for Inspection of Aluminum and Magnesium Castings

E 165 Test Method for Liquid Penetrant Examination

E 527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

[1] This specification is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.01 on Aluminum Alloy Ingots and Castings.

Current edition approved ~~Sept.~~Oct. 1, ~~2006.~~2007. Published ~~September 2006.~~November 2007. Originally approved in 1977. Last previous edition approved in ~~2003~~2006 as B 618 – 0~~3~~6.

[2] 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* 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.**

TABLE 1 Chemical Composition Requirements

NOTE 1—When single units are shown, these indicate the maximum amounts permitted.
NOTE 2—Analysis shall be made for the elements for which limits are shown in this table.
NOTE 3—The following applies to all specified limits in this table: For purposes of acceptance and rejection, an observed value or a calculated value obtained from analysis should be rounded off to the nearest unit in the last right-hand place of figures used in expressing the specified limit (Practice E 29).

Alloy		Composition, %															
ANSI[A]	UNS	~~Aluminum~~	Silicon	Iron	Copper	Manganese	Magnesium	Chromium	Nickel	Zinc	~~Tin~~	Titanium	Tin		Other[B] Elements		Aluminu
															Each	Total[C]	
~~201.0~~	~~A02010~~	~~remainder~~	0.10	0.15	4.0–5.2	0.20–0.50	0.15–0.55	...	...	...	...	0.15–0.35	0.05[D]	0.05	0.10		
201.0	A02010	remainder	0.10	0.15	4.0–5.2	0.20–0.50	0.15–0.55	...	...	...	0.15–0.35	...	[D]	0.05	0.10	remainder	
~~204.0~~	~~A02040~~	~~remainder~~	0.20	0.35	4.2–5.0	0.10	0.15–0.35	...	0.05	0.10		0.05	0.15–0.30	0.05	0.15		
204.0	A02040	remainder	0.20	0.35	4.2–5.0	0.10	0.15–0.35	...	0.05	0.10	0.15–0.30	0.05		0.05	0.15	remainder	
~~242.0~~	~~A02420~~	~~remainder~~	0.7	1.0	3.5–4.5	0.35	1.2–1.8	0.25	1.7–2.3	0.35		...	0.25	0.05	0.15		
242.0	A02420	remainder	0.7	1.0	3.5–4.5	0.35	1.2–1.8	0.25	1.7–2.3	0.35	0.25	...		0.05	0.15	remainder	
~~295.0~~	~~A02950~~	~~remainder~~	0.7–1.5	1.0	4.0–5.0	0.35	0.03	...	...	0.35		...	0.25	0.05	0.15		
295.0	A02950	remainder	0.7–1.5	1.0	4.0–5.0	0.35	0.03	...	...	0.35	0.25	...		0.05	0.15	remainder	
~~319.0~~	~~A03190~~	~~remainder~~	5.5–6.5	1.0	3.0–4.0	0.50	0.10	...	0.35	1.0		...	0.25	...	0.50		
319.0	A03190	remainder	5.5–6.5	1.0	3.0–4.0	0.50	0.10	...	0.35	1.0	0.25	...		...	0.50	remainder	
~~328.0~~	~~A03280~~	~~remainder~~	7.5–8.5	1.0	1.0–2.0	0.20–0.6	0.20–0.6	0.35	0.25	1.5		...	0.25	...	0.50		
328.0	A03280	remainder	7.5–8.5	1.0	1.0–2.0	0.20–0.6	0.20–0.6	0.35	0.25	1.5	0.25	...		...	0.50	remainder	
~~355.0~~	~~A03550~~	~~remainder~~	4.5–5.5	0.6[E]	1.0–1.5	0.50[E]	0.40–0.6	0.25	...	0.35		...	0.25	0.05	0.15		
355.0	A03550	remainder	4.5–5.5	0.6[E]	1.0–1.5	0.50[E]	0.40–0.6	0.25	...	0.35	0.25	...		0.05	0.15	remainder	
~~C355.0~~	~~A33550~~	~~remainder~~	4.5–5.5	0.20	1.0–1.5	0.10	0.40–0.6	...	...	0.10		...	0.20	0.05	0.15		
C355.0	A33550	remainder	4.5–5.5	0.20	1.0–1.5	0.10	0.40–0.6	...	...	0.10	0.20	...		0.05	0.15	remainder	
~~356.0~~	~~A03560~~	~~remainder~~	6.5–7.5	0.6[E]	0.25	0.35[E]	0.20–0.45	...	...	0.35		...	0.25	0.05	0.15		
356.0	A03560	remainder	6.5–7.5	0.6[E]	0.25	0.35[E]	0.20–0.45	...	...	0.35	0.25	...		0.05	0.15	remainder	
~~A356.0~~	~~A13560~~	~~remainder~~	6.5–7.6	0.20	0.20	0.10	0.25–0.45	...	...	0.10		...	0.20	0.05	0.15		
A356.0	A13560	remainder	6.5–7.6	0.20	0.20	0.10	0.25–0.45	...	...	0.10	0.20	...		0.05	0.15	remainder	
~~443.0~~	~~A04430~~	~~remainder~~	4.5–6.0	0.8	0.6	0.50	0.05	0.25	...	0.50		...	0.25	...	0.35		
443.0	A04430	remainder	4.5–6.0	0.8	0.6	0.50	0.05	0.25	...	0.50	0.25	...		...	0.35	remainder	
~~B443.0~~	~~A24430~~	~~remainder~~	4.5–6.0	0.8	0.15	0.35	0.05	...	...	0.35		...	0.25	0.05	0.15		
B443.0	A24430	remainder	4.5–6.0	0.8	0.15	0.35	0.05	...	...	0.35	0.25	...		0.05	0.15	remainder	
~~514.0~~	~~A05140~~	~~remainder~~	0.35	0.50	0.15	0.35	3.5–4.5	...	...	0.15		...	0.25	0.05	0.15		
514.0	A05140	remainder	0.35	0.50	0.15	0.35	3.5–4.5	...	...	0.15	0.25	...		0.05	0.15	remainder	
~~520.0~~	~~A05200~~	~~remainder~~	0.25	0.30	0.25	0.15	9.5–10.6	...	...	0.15		...	0.25	0.05	0.15		
520.0	A05200	remain-	0.25	0.30	0.25	0.15	9.5–10.6	...	...	0.15	0.25	...		0.05	0.15	remainder	

E 607 Test Method for Atomic Emission Spectrometric Analysis Aluminum Alloys by the Point to Plane Technique Nitrogen Atmosphere
E 716 Practices for Sampling Aluminum and Aluminum Alloys for Spectrochemical Analysis
E 1251 Test Method for Analysis of Aluminum and Aluminum Alloys by Atomic Emission Spectrometry
IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System

2.3 *ANSI Standard:*[3]

H35.1/H35.1 (M) - 2006 American National Standard Alloy and Temper Designation Systems for Aluminum

2.4 ~~*Military Standard:*~~ *Military Standards:*[4]

MIL-STD-129 Marking for Shipment and Storage
MIL-STD-276 Impregnation of Porous Nonferrous Metal Castings

2.5 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[4]

2.6 *AMS Standard:*~~*AMS 2771Heat Treatment of Aluminum Alloy Castings*~~ [5]

AMS 2771 Heat Treatment of Aluminum Alloy Castings

2.7 *NAVSEA Standard:*[6]

S9074-AR-GIB-010/278 Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels

3. Terminology

3.1 ~~*Definition:*~~ Definitions: Refer to Terminology B 881 for definitions of product terms used in this specification.

3.1.1 *investment casting*—a metal object produced by surrounding (investing) an expendable pattern (usually wax or plastic) with a refractory slurry that sets at room temperature, after which the pattern is removed through the use of heat, and then filling the resulting cavity with molten metal and allowing it to solidify.

4. ~~Ordering Information~~

~~4.1Orders for material under this specification shall include the following information:~~ Ordering Information

4.1 Orders for material under this specification shall include the following information (Sections 1.4 and 1.6):

4.1.1 This specification designation (which includes the number, the year, and the revision letter, if applicable),

~~4.1.2Alloy (Section~~

NOTE 1—For inch-pound application, specify Specification B 618 and for metric application specify Specification B 618M. Do not mix units.

4.1.2 Alloy (Section 7 and Table 1),

4.1.3 Temper (Section ~~10~~12 and Table 2 [Table 3~~),~~]),

4.1.4 Applicable drawing or part number,

4.1.5 The quantity in either pieces or pounds [kilograms].

4.2 Additionally, orders for material to this specification shall include the following information when required by the purchaser:

~~4.2.1Whether castings or test specimens or both may be supplied in the artificially aged—T5 temper for alloys 705.0, 707.0, D712.0, and 713.0 (see 10.2~~

4.2.1 Whether chemical analysis and tensile property reports are required (Table 1, Table 2 [Table 3]),

4.2.2 Whether castings or test specimens or both may be supplied in the artificially aged—T5 temper for alloys 705.0, 707.0, D712.0, and 713.0 (see 12.2),

4.2.~~2~~3 Whether test specimens cut from castings are required in addition to or instead of separately cast specimens (see ~~10.3~~12.3 and ~~11.2~~13.2),

~~4.2.3Whether repairs are permissible (see 17.1),~~

~~4.2.4Whether inspection is required at the producer's works (see~~

4.2.4 Whether heat treatment is to be performed in accordance with AMS 2771 (see 17)

4.2.5 Whether repairs are permissible (see 18.1),

~~4.2.5Whether surface requirements shall be checked against observational standards where such standards are established (see 18.2~~

4.2.6 Whether inspection is required at the producer's works (see 20.1),

~~4.2.6Whether liquid penetrant inspection is required (see 18.4~~

[3] Available from Aluminum Association, Inc., 1525 Wilson Blvd., Suite 600, Arlington, VA 22209, http://www.aluminum.org.
[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.
[4] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.
[5] Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.
[6] Available from Naval Sea Systems Command (NAVSEA), 1333 Isaac Hull Ave., SE, Washington, DC 20376, http://www.navsea.navy.mil.

TABLE 2 Tensile Requirements[A] (Inch-Pound Units)

NOTE 1— For purposes of determining conformance with this specification, each value for tensile strength and yield strength shall be rounded to the nearest 0.1 ksi and each value for elongation shall be rounded to the nearest 0.5 %, both in accordance with the rounding method of Practice E 29.

Alloy		Temper[B]	Tensile Strength, min, ksi (MPa)[C]	Yield Strength (0.2 % offset) min, ksi (MPa)[C]	Elongation in 2 in. or 4× diameter, min, %	Typical Brinell Hardness,[D] 500 kgf, 10 mm
ANSI[E]	UNS					
201.0	A02010	T6	60.0 (414)	50.0 (345)	5.0	...
		T7	60.0 (414)	50.0 (345)	3.0	...
204.0	A02040	T4	45.0 (310)	28.0 (193)	6.0	...
		T6	30.0 (207)	[F]	[F]	115
242.0	A02420	O[G]	23.0 (159)	[F]	[F]	70
		T61	32.0 (221)	20.0 (138)	[F]	105
295.0	A02950	T4	29.0 (200)	13.0 (90)	6.0	60
		T6	32.0 (221)	20.0 (138)	3.0	75
		T62	36.0 (248)	28.0 (193)	[B]	95
		T7	29.0 (200)	16.0 (110)	3.0	70
319.0	A03190	F	23.0 (159)	13.0 (90)	1.5	70
		T6	31.0 (214)	20.0 (138)	1.5	80
328.0	A03280	F	25.0 (172)	14.0 (97)	1.0	60
		T6	34.0 (234)	21.0 (145)	1.0	80
355.0	A03550	T6	32.0 (221)	20.0 (138)	2.0	80
		T51	25.0 (172)	18.0 (124)	[F]	65
		T71	30.0 (207)	22.0 (152)	[F]	75
C355.0	A33550	T6	36.0 (248)	25.0 (172)	2.5	...
356.0	A03560	F	19.0 (131)	[F]	2.0	55
		T6	30.0 (207)	20.0 (138)	3.0	70
		T7	31.0 (214)	[F]	[F]	75
		T51	23.0 (159)	16.0 (110)	[F]	60
		T71	25.0 (172)	18.0 (124)	3.0	60
A356.0	A13560	T6	34.0 (234)	24.0 (166)	3.5	80
443.0	A04430	F	17.0 (117)	7.0 (48)	3.0	40
B443.0	A24430	F	17.0 (117)	6.0 (41)	3.0	40
514.0	A05140	F	22.0 (152)	9.0 (62)	6.0	50
520.0	A05200	T4	42.0 (290)	22.0 (152)	12.0	75
535.0	A05350	F	35.0 (241)	18.0 (124)	9.0	70
705.0	A07050	T1[H] and T5[I]	30.0 (207)	17.0 (117)[J]	5.0	65
707.0	A07070	T1[H]	33.0 (228)	22.0 (152)[J]	2.0	85
		T7	37.0 (255)	30.0 (207)[J]	1.0	80
710.0[K]	A07100	T1[H]	32.0 (221)	20.0 (138)	2.0	75
712.0[K]	A07120	T1[H] and T5[I]	34.0 (234)	25.0 (172)[J]	4.0	75
713.0	A07130	T1[H] and T5[I]	32.0 (221)	22.0 (152)	3.0	75
771.0	A07710	T5	42.0 (290)	38.0 (262)	1.5	100
		T51	32.0 (221)	27.0 (186)	3.0	85
		T52	36.0 (248)	30.0 (207)	1.5	85
		T6	42.0 (290)	35.0 (241)	5.0	90
		T71	48.0 (331)	45.0 (310)	2.0	120
850.0	A08500	T5	16.0 (110)	[F]	5.0	45
851.0[K]	A08510	T5	17.0 (117)	[F]	3.0	45
852.0[K]	A08520	T5	24.0 (166)	18.0 (124)	[F]	60

[A] If agreed upon by the producer and the purchaser, other mechanical properties may be obtained by other heat treatments such as annealing, aging, or stress relieving.
[B] Refer to ANSI H35.1/H35.1M for description of tempers.
[C] SI units for information only. For explanation of the SI unit "MPa" see Appendix X2.
[D] For information only, not required for acceptance.
[E] ASTM alloy designations are in Practice B 275.
[F] Not required.
[G] Formerly designated 222.0-T2 and 242.0-T21.
[H] Aged 21 days at room temperature.
[I] Artificially aged in accordance with Practice B 917/B 917M.
[J] Yield strength to be determined only when specified in the contract or purchase order.
[K] 710.0 formerly A712.0, 712.0 formerly D712.0, 851.0, formerly A850.0, 852.0 formerly B850.0.

TABLE 2 3 Tensile Requirements[A,B]

NOTE 1— For purposes of determining conformance with this specification, each value for tensile strength and yield strength shall be rounded to the nearest 0.1 ksi and each value for elongation shall be rounded to the nearest 0.5 %, both in accordance with the rounding method of Practice E 29.

Alloy		Temper[B]	Tensile Strength,min, ksi (MPa)[C]	Yield Strength (0.2 % offset) min, ksi (MPa)[C]		Elongation in 2 in. or 4× diameter, min, %	Typical Brinell Hard- ness,[D] 500 kgf, 10 mm
Alloy		Temper[C]	Tensile Strength, min, MPa[D]	Yield Strength (0.2 % offset) min, MPa[C]			Elongation in 5D, min, %	Typical Brinell Hard- ness,[E] 500 kgf, 10 mm
ANSI[E]	UNS							
ANSI[F]	UNS							
201.0	A02010	T6	60.0 (414)	50.0 (345)	5.0	...		
201.0	A02010	T6	415	345	4.0	...		
		T7	60.0 (414)	50.0 (345)	3.0	...		
		T7	415	345	3.0	...		
204.0	A02040	T4	45.0 (310)	28.0 (193)	6.0	...		
204.0	A02040	T4	310	195	5.0	...		
		T6	30.0 (207)	F	F	115		
		T6	205	G	G	115		
242.0	A02420	O[G]	23.0 (159)	F	F	70		
242.0	A02420	O[H]	160	G	G	70		
		T61	32.0 (221)	20.0 (138)	F	105		
		T61	220	140	G	105		
295.0	A02950	T4	29.0 (200)	13.0 (90)	6.0	60		
295.0	A02950	T4	200	90	5.0	60		
		T6	32.0 (221)	20.0 (138)	3.0	75		
		T6	220	140	3.0	75		
		T62	36.0 (248)	28.0 (193)	B	95		
		T62	250	195	G	95		
		T7	29.0 (200)	16.0 (110)	3.0	70		
		T7	200	110	3.0	70		
319.0	A03190	F	23.0 (159)	13.0 (90)	1.5	70		
319.0	A03190	F	160	90	1.5	70		
		T6	31.0 (214)	20.0 (138)	1.5	80		
		T6	215	140	1.5	80		
328.0	A03280	F	25.0 (172)	14.0 (97)	1.0	60		
328.0	A03280	F	170	95	1.0	60		
		T6	34.0 (234)	21.0 (145)	1.0	80		
		T6	235	145	1.0	80		
355.0	A03550	T6	32.0 (221)	20.0 (138)	2.0	80		
355.0	A03550	T6	220	140	2.0	80		
		T51	25.0 (172)	18.0 (124)	F	65		
		T51	170	125	G	65		
		T71	30.0 (207)	22.0 (152)	F	75		
		T71	205	150	G	75		
C355.0	A33550	T6	36.0 (248)	25.0 (172)	2.5	...		
C355.0	A33550	T6	250	170	2.5	...		
356.0	A03560	F	19.0 (131)	F	2.0	55		
356.0	A03560	F	130	G	2.0	55		
		T6	30.0 (207)	20.0 (138)	3.0	70		
		T6	205	140	3.0	70		
		T7	31.0 (214)	F	F	75		
		T7	215	G	G	75		
		T51	23.0 (159)	16.0 (110)	F	60		
		T51	160	110	G	60		
		T71	25.0 (172)	18.0 (124)	3.0	60		
		T71	170	125	3.0	60		
A356.0	A13560	T6	34.0 (234)	24.0 (166)	3.5	80		
A356.0	A13560	T6	235	165	3.5	80		
443.0	A04430	F	17.0 (117)	7.0 (48)	3.0	40		
443.0	A04430	F	115	50	3.0	40		
B443.0	A24430	F	17.0 (117)	6.0 (41)	3.0	40		
B443.0	A24430	F	115	40	3.0	40		
514.0	A05140	F	22.0 (152)	9.0 (62)	6.0	50		
514.0	A05140	F	150	60	5.0	50		
520.0	A05200	T4	42.0 (290)	22.0 (152)	12.0	75		
520.0	A05200	T4	290	150	10.0	75		
535.0	A05350	F	35.0 (241)	18.0 (124)	9.0	70		
535.0	A05350	F	240	125	8.0	70		
705.0	A07050	T1[H] and T5[I]	30.0 (207)	17.0 (117)[J]	5.0	65		
705.0	A07050	T1[I] and T5[J]	205	115[K]	4.0	65		
707.0	A07070	T1[H]	33.0 (228)	22.0 (152)[J]	2.0	85		
707.0	A07070	T1[I]	230	150[K]	2.0	85		
		T7	37.0 (255)	30.0 (207)[J]	1.0	80		
		T7	255	205[K]	1.0	80		
710.0[K]	A07100	T1[H]	32.0 (221)	20.0 (138)	2.0	75		
710.0[L]	A07100	T1[I]	220	140	2.0	75		
712.0[K]	A07120	T1[H] and T5[I]	34.0 (234)	25.0 (172)[J]	4.0	75		
712.0[L]	A07120	T1[I] and T5[J]	235	170[K]	4.0	75		
713.0	A07130	T1[H] and T5[I]	32.0 (221)	22.0 (152)	3.0	75		
713.0	A07130	T1[I] and T5[J]	220	150	3.0	75		

4.2.7 Whether surface requirements shall be checked against observational standards where such standards are established (see 21.1),

~~4.2.7Whether radiographic inspection is required (see 18.5~~

4.2.8 Whether liquid penetrant inspection is required (see 21.3),

~~4.2.8Whether certification of chemical analysis and tensile properties is required (see 20.1~~

4.2.9 Whether radiographic inspection is required (see 21.4),

~~4.2.9Whether the material shall be packaged or marked, or both, in accordance with Practices B660~~

4.2.10 Whether certification is required (see 23.1),

4.2.11 Whether foundry control is required (11),

4.2.12 Whether the material shall be packaged or marked, or both, in accordance with Practices B 660, MIL-STD-129, D 3951, and Fed. Std. No. 123 (see ~~22.3~~25.3).

5. Responsibility for Quality Assurance

5.1 *Responsibility for Inspection and Tests*—Unless otherwise specified in the contract or purchase order, the producer shall be responsible for the performance of all inspection and test requirements specified herein. Except as otherwise specified in the contract or order, the producer may use his own or any other suitable facilities for the performance of the inspection and test requirements specified herein, unless disapproved by the purchaser. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification where such inspections are deemed necessary to confirm that material conforms to prescribed requirements.

6. Materials and Manufacture

6.1 The responsibility of furnishing castings that can be laid out and machined to the finished dimensions within the permissible variations specified, as shown on the blueprints or drawings, shall rest with the producer, except where pattern equipment is furnished by the purchaser.

6.1.1 Unless otherwise specified, only aluminum alloy conforming to the requirements of Specification B 179 or producer's foundry scrap (identified as being made from alloy conforming to Specification B 179) shall be used in the remelting furnace from which molten metal is taken for pouring directly into castings. Additions of small amounts of modifiers and grain refining elements or alloys are permitted.

6.1.2 Pure materials, recycled materials, and master alloys may be used to make alloys conforming to this specification, provided chemical analysis can be taken and adjusted to conform to Table 1 prior to pouring any castings.

7. Chemical Composition

7.1 The castings shall conform to the chemical composition limits prescribed in Table 1. Conformance shall be determined by the producer by analyzing samples taken at the time the castings are poured, or samples taken from castings or tension test specimens representative of castings. If the producer has determined the chemical composition of the material during the course of manufacture, he shall not be required to sample and analyze the finished product.

8. Sampling for Determination of Chemical Composition

8.1 A sample for the determination of chemical composition shall be taken to represent the following:

8.1.1 Not more than 500 lb ~~(227 kg)~~[227 kg] of clean castings (gates and risers removed) or a single casting poured from one furnace and using only one melt charge.

8.1.2 Castings poured continuously from one furnace for not more than 8 consecutive hours from a single master heat. A master heat is defined as all the metal of a single furnace charge without subsequent additions after chemical composition has been determined.

8.2 Samples for determination of chemical composition shall be taken in accordance with one of the following methods.

8.2.1 *Samples for Chemical Analysis*— Samples for chemical analysis shall be taken by sawing, drilling, or milling the casting or test specimens in such a manner as to be representative of the material in accordance with Practice E 88. The weight of a prepared sample shall be not less than 75 g.

8.2.2 *Samples for Spectrochemical and Other Methods of Analysis*—Sampling for spectrochemical analysis shall be in accordance with Practices E 716. Samples for other methods of analysis shall be suitable for the form of material being analyzed and the type of analytical methods used.

9. Methods of Determination of Chemical Composition

9.1 The determination of chemical composition shall be made in accordance with suitable chemical (Test Methods E 34), or spectrochemical (Test Methods E 607 and E 1251) methods. Other methods may be used only when no published ASTM standard is available. In case of dispute, the methods of analysis shall be agreed upon between the producer and the purchaser.

~~**10.***Tensile Requirements* Tensile Requirements~~

~~10.1The separately cast tension test specimens representing the castings shall meet the mechanical properties prescribed in~~