Designation: B928/B928M – 13

StandardSpecification for High Magnesium Aluminum-Alloy Sheet and Plate for Marine Service and Similar Environments[1]

This standard is issued under the fixed designation B928/B928M; 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.

1. Scope*

1.1 This specification covers high magnesium marine application aluminum-alloy (Note 1), in those alloy-tempers shown in Table 2 [Table 3] and Table 4 [Table 5], for flat sheet, coiled sheet, and plate, in the mill finish condition that are intended for marine hull construction and other marine applications where frequent or constant direct contact with seawater is expected and for similar environments (Note 2).

NOTE 1—Throughout this specification use of the term *alloy* in the general sense includes aluminum as well as aluminum alloy.

NOTE 2—There are other aluminum alloy-temper products that may be suitable for use in marine and similar environments, but which may not require the corrosion resistance testing specified by B928/B928M. See Specification B209 or B209M for other aluminum sheet and plate alloy-temper products.

1.2 Alloy and temper designations are in accordance with ANSI H35.1/H35.1(M). The equivalent Unified Numbering System alloy designations are those of Table 1 preceded by A9, for example, A95083 for 5083 in accordance with Practice E527.

1.3 The values stated in either SI units (Table 3 and Table 5) or inch-pound units (Table 2 and Table 4) 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 each other. Combining values from the two systems may result in non-conformance with the standard.

1.4 For acceptance criteria for inclusion of new aluminum and aluminum alloys in this specification, see Annex A2.

1.5 *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 material purchase, unless otherwise noted, form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*[2]

B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate

B209M Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)

B557 Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products

B557M Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products (Metric)

B660 Practices for Packaging/Packing of Aluminum and Magnesium Products

B666/B666M Practice for Identification Marking of Aluminum and Magnesium Products

B881 Terminology Relating to Aluminum- and Magnesium-Alloy Products

B985 Practice for Sampling Aluminum Ingots, Billets, Castings and Finished or Semi-Finished Wrought Aluminum Products for Compositional Analysis

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E34 Test Methods for Chemical Analysis of Aluminum and Aluminum-Base Alloys

E50 Practices for Apparatus, Reagents, and Safety Considerations for Chemical Analysis of Metals, Ores, and Related Materials

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

E607 Test Method for Atomic Emission Spectrometric Analysis Aluminum Alloys by the Point to Plane Technique Nitrogen Atmosphere (Withdrawn 2011)[3]

E716 Practices for Sampling and Sample Preparation of

[1] This specification is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.03 on Aluminum Alloy Wrought Products.

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[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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

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

Aluminum and Aluminum Alloys for Determination of Chemical Composition by Spectrochemical Analysis
E1251 Test Method for Analysis of Aluminum and Aluminum Alloys by Spark Atomic Emission Spectrometry
G66 Test Method for Visual Assessment of Exfoliation Corrosion Susceptibility of 5XXX Series Aluminum Alloys (ASSET Test)
G67 Test Method for Determining the Susceptibility to Intergranular Corrosion of 5XXX Series Aluminum Alloys by Mass Loss After Exposure to Nitric Acid (NAMLT Test)

2.3 *ANSI Standards:*[4]
H35.1/H35.1(M) Alloy and Temper Designation Systems for Aluminum
H35.2 Dimensional Tolerances for Aluminum Mill Products
H35.2(M) Dimensional Tolerances for Aluminum Mill Products

2.4 *Other Standards*
CEN EN 14242 Aluminum and aluminum alloys. Chemical analysis. Inductively coupled plasma optical emission spectral analysis[5]

3. Terminology

3.1 *Definitions*—Refer to Terminology B881 for definitions of product terms used in this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *exfoliation*—corrosion that proceeds laterally from the sites of initiation along planes parallel to the original rolling surface, generally at grain boundaries, forming corrosion products that force metal away from the body of the material, giving rise to a layered appearance.

3.2.2 *high magnesium aluminum alloys*—in the general sense, includes those 5xxx alloys containing 3% or more nominal magnesium.

3.2.3 *intergranular corrosion*—corrosion that preferentially occurs at, or adjacent to, the grain boundaries of a metal or alloy.

3.2.4 *lot*—an inspection lot shall consist of an identifiable quantity of material of the same mill form, alloy, temper, cast or melt lot, and thickness, subjected to inspection at one time.

3.2.5 *sensitization*—the development of a continuous or nearly continuous grain boundary precipitate in 5xxx alloy-temper material, that causes the material to be susceptible to intergranular forms of corrosion.

3.2.6 *stress-corrosion cracking*—a cracking process that requires the simultaneous action of a corrodent, and sustained tensile stress. (This excludes corrosion-reduced sections, which fail by fast fracture. It also excludes intercrystalline or transcrystalline corrosion which can disintegrate an alloy without either applied or residual stress.)

4. Ordering Information

4.1 Orders for material to this specification shall include the following information:

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

4.1.2 Quantity in pieces or pounds [kilograms],

4.1.3 Alloy (see 7.1 and Table 1),

4.1.4 Temper (see 8.1 and Table 2 and Table 4 [Table 3 and Table 5]),

4.1.5 For sheet, whether flat or coiled, and

4.1.6 Dimensions (thickness, width, and length or coil size).

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

4.2.1 Whether inspection or witness of inspection and tests by the purchaser's representative is required prior to material shipment (see 12.1),

4.2.2 Whether Practices B660 applies and, if so, the levels of preservation, packaging, and packing required (see 16.3),

4.2.3 Whether certification is required (see Section 14),

[4] Available from Aluminum Association, Inc., 1525 Wilson Blvd., Suite 600, Arlington, VA 22209, http://www.aluminum.org.

[5] Available from European Committee for Standardization (CEN), Avenue Marnix 17, B-1000 Brussels, http://www.cenorm.be.

TABLE 1 Chemical Composition Limits[A,B,C,H]

Alloy	Silicon	Iron	Copper	Manganese	Magnesium	Chromium	Zinc	Titanium	Other Elements[D]		Aluminum
									Each	Total[E]	
5059	0.45	0.50	0.25	0.6 to 1.2	5.0 to 6.0	0.25	0.40 to 0.9	0.20	0.05[F]	0.15	remainder
5083	0.40	0.40	0.10	0.40 to 1.0	4.0 to 4.9	0.05 to 0.25	0.25	0.15	0.05	0.15	remainder
5086	0.40	0.50	0.10	0.20 to 0.7	3.5 to 4.5	0.05 to 0.25	0.25	0.15	0.05	0.15	remainder
5383	0.25	0.25	0.20	0.7 to 1.0	4.0 to 5.2	0.25	0.40	0.15	0.05[G]	0.15	remainder
5456	0.25	0.40	0.10	0.50 to 1.0	4.7 to 5.5	0.05 to 0.20	0.25	0.20	0.05	0.15	remainder

[A] Limits are in weight percent maximum unless shown as a range or stated otherwise.
[B] Analysis shall be made for the elements for which limits are shown in this table.
[C] For purposes of determining conformance to these limits, an observed value or a calculated value attained from analysis shall be rounded to the nearest unit in the last right-hand place of figures used in expressing the specified limit, in accordance with the rounding-off method of Practice E29.
[D] Others include listed elements for which no specific limit is shown, as well as unlisted metallic elements, but doesn't include elements shown with composition limits in the footnotes. The producer may analyze samples for trace elements not specified in the specification. However, such analysis is not required and may not cover all metallic Others elements. Should any analysis by the producer or the purchaser establish that an Others element exceeds the limit of Each or that the aggregate of several Others elements exceeds the limit of Total, the material shall be considered nonconforming.
[E] Other Elements—Total shall be the sum of unspecified metallic elements 0.010 % or more, rounded to the second decimal before determining the sum.
[F] 0.05 to 0.25 Zr.
[G] 0.20 Zr max.
[H] In case of a discrepancy in the values listed in Table 1 with those listed in the *International Alloy Designations and Chemical Composition Limits for Wrought Aluminum and Wrought Aluminum Alloys* (known as the "Teal Sheets"), the composition limits registered with the Aluminum Association and published in the "Teal Sheets" shall be considered the controlling composition. The "Teal Sheets" are available at http://www.aluminum.org/tealsheets.

TABLE 2 Longitudinal Mechanical Property Limits, Inch-Pound Units[A,B]

Temper	Specified Thickness, in.	Tensile Strength, ksi		Yield Strength (0.2 % offset), ksi		Elongation in 2 in. or 4× Diameter, min, %
		min	max	min	max	
			Alloy 5059			
H116	0.078 to 0.249	54.0	64.0	39.0	...	10
	0.250 to 0.787	54.0	64.0	39.0	...	10
	0.788 to 1.575	52.0	64.0	38.0	...	10
H321	0.078 to 0.249	54.0	64.0	39.0	...	10
	0.250 to 0.787	54.0	64.0	39.0	...	10
	0.788 to 1.575	52.0	64.0	38.0	...	10
			Alloy 5083			
H116	0.063 to 0.499	44.0	56.0	31.0	. . .	10
	0.500 to 1.250	44.0	56.0	31.0	. . .	12
	1.251 to 1.500	44.0	56.0	31.0	. . .	12
	1.501 to 3.000	41.0	56.0	29.0	. . .	12
H321	0.125 to 0.187	44.0	56.0	31.0	. . .	10
	0.188 to 1.500	44.0	56.0	31.0	. . .	12
	1.501 to 3.000	41.0	56.0	29.0	. . .	12
H128[C]	*0.157 to 0.315*	*44.0*	*56.0*	*31.0*	. . .	*10*
			Alloy 5086			
H116	0.063 to 0.249	40.0	52.0	28.0	. . .	8
	0.250 to 0.499	40.0	52.0	28.0	. . .	10
	0.500 to 1.250	40.0	52.0	28.0	. . .	10
	1.251 to 2.000	40.0	52.0	28.0	. . .	10
H321[C]	*0.063 to 0.249*	*40.0*	*52.0*	*28.0*	. . .	*8*
	0.250 to 0.320	*40.0*	*52.0*	*28.0*	. . .	*9*
			Alloy 5383			
H116	0.118 to 0.500	48.0	*58.0*[C]	33.0	...	10
	0.501 to 2.000	48.0	*58.0*[C]	33.0	...	10
H321	0.118 to 0.500	48.0	58.0	33.0	...	10
	0.501 to 2.000	48.0	58.0	33.0	...	10
			Alloy 5456			
H116	0.063 to 0.499	46.0	59.0	33.0	. . .	10
	0.500 to 1.250	46.0	56.0	33.0	. . .	12
	1.251 to 1.500	44.0	56.0	31.0	. . .	12
	1.501 to 3.000	41.0	54.0	29.0	. . .	12
	3.001 to 4.000	40.0	54.0	25.0	. . .	12
H321	0.100 to 0.187	48.0	59.0	34.0	. . .	10
	0.188 to 0.499	46.0	59.0	33.0		12
	0.500 to 1.500	44.0	56.0	31.0		12
	1.501 to 3.000	41.0	54.0	29.0		12

[A] To determine conformance to this specification, each value for tensile strength and for yield strength shall be rounded to the nearest 0.1 ksi and each value for elongation to the nearest 0.5 %, both in accordance with the rounding method of Practice E29.
[B] The basis for establishment of mechanical property limits is shown in Annex A1.
[C] *Tentative — properties subject to revision.*

4.2.4 Whether G66 and G67 testing is the required lot release method for the H116 and H321 tempers (see 9.5),

4.2.5 Whether the G66 and G67 test results are to be included in the certification (see Section 14), and

4.2.6 Whether tensile testing should be in the longitudinal or long transverse direction (see 8.5).

5. Responsibility for Quality Assurance

5.1 *Responsibility for Inspection and Tests*—Unless otherwise specified in the contract or purchase order, the producer is responsible for the performance of all inspection and test requirements specified herein. Producers may use their own or any other suitable facilities for the performance of the inspection and test requirements specified herein, unless disapproved by the purchaser in the order or at the time of contract signing. 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 ensure that material conforms to prescribed requirements.

6. General Quality

6.1 Unless otherwise specified, the material shall be supplied in the mill finish, shall be uniform as defined by the requirements of this specification and shall be commercially sound. Any requirement not so covered is subject to negotiation between producer and purchaser.

6.2 Each coil, sheet and plate shall be examined to determine conformance to this specification with respect to general quality and identification marking. On approval of the purchaser, however, the producer may use a system of statistical quality control for such examinations.

7. Chemical Composition

7.1 *Limits*—The sheet and plate shall conform to the chemical composition limits specified in Table 1. Conformance shall be determined by the producer, by taking samples in accordance with E716 when the ingots are poured and analyzing those samples in accordance with E607, E1251, E34 or

TABLE 3 Longitudinal Mechanical Property Limits [SI Units][A,B]

Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, %[C]	
	over	through	min	max	min	max	in 50 mm	in 5× Diameter
				Alloy 5059				
H116	1.99	6.30	370	440	270	...	10	...
	6.30	12.50	370	440	270	...	10	...
	12.50	20.00	370	440	270	...	...	10
	20.00	40.00	360	440	260	...	...	10
H321	1.99	6.30	370	440	270	...	10	...
	6.30	12.50	370	440	270	...	10	...
	12.50	20.00	370	440	270	...	...	10
	20.00	40.00	360	440	260	...	...	10
				Alloy 5083				
H116	1.60	12.50	305	385	215	. . .	10	. . .
	12.50	30.00	305	385	215	. . .	. . .	10
	30.00	40.00	305	385	215	. . .	. . .	10
	40.00	80.00	285	385	200	. . .	. . .	10
H321	3.20	5.00	305	385	215	. . .	10	. . .
	5.00	12.50	305	385	215	. . .	12	. . .
	12.50	40.00	305	385	215	. . .	. . .	10
	40.00	80.00	285	385	200	. . .	. . .	10
H128[D]	*4.00*	*8.00*	*305*	*385*	*215*		*10*	
				Alloy 5086				
H116	1.60	6.30	275	360	195	. . .	8	. . .
	6.30	12.50	275	360	195	. . .	10	. . .
	12.50	30.00	275	360	195	. . .	. . .	9
	30.00	50.00	275	360	195	. . .	. . .	9
H321[D]	*1.60*	*6.30*	*275*	*355*	*195*	. . .	*8*	. . .
	6.30	*8.00*	*275*	*355*	*195*	. . .	*9*	. . .
				Alloy 5383				
H116	3.00	12.50	330	*400[D]*	230	...	10	...
	12.50	50.00	330	*400[D]*	230	...	...	10
H321	3.00	12.50	330	400	230	...	10	...
	12.50	50.00	330	400	230	...	...	10
				Alloy 5456				
H116	1.60	12.50	315	405	230	. . .	10	. . .
	12.50	30.00	315	385	230	. . .	. . .	10
	30.00	40.00	305	385	215	. . .	. . .	10
	40.00	80.00	285	370	200	. . .	. . .	10
	80.00	110.00	275	370	170	. . .	. . .	10
H321	2.50	4.00	330	405	235	. . .	10	. . .
	4.00	12.50	315	405	230		12	. . .
	12.50	40.00	305	385	215		. . .	10
	40.00	80.00	285	370	200		. . .	10

[A] To determine conformance to this specification, each value for tensile strength and for yield strength shall be rounded to the nearest 1 MPa and each value for elongation to the nearest 0.5 %, both in accordance with the rounding method of Practice E29.
[B] The basis for establishment of mechanical property limits is shown in Annex A1.
[C] Elongations in 50 mm apply for thicknesses up through 12.50 mm and in 5× diameter for thicknesses over 12.50 mm.
[D] *Tentative — properties subject to revision.*

TABLE 4 Long Transverse Mechanical Property Limits, Inch-Pound Units[A,B]

Temper	Specified Thickness, in.	Tensile Strength, ksi		Yield Strength (0.2 % offset), ksi		Elongation in 2 in. or ×4 Diameter, min, %
		min	max	min	max	
		Alloy 5083				
H116	0.118 to 0.249	44.0	. . .	31.0	. . .	10
	0.250 to 0.499	44.0	. . .	31.0	. . .	10
H321	0.118 to 0.236	44.0	55.0	31.0	. . .	10
H128[C]	*0.157 to 0.315*	*44.0*	*56.0*	*31.0*	. . .	*10*
		Alloy 5086				
H321[C]	*0.250 to 0.320*	*40.0*	*52.0*	*28.0*	. . .	*10*

[A] To determine conformance to this specification, each value for tensile strength and for yield strength shall be rounded to the nearest 0.1 ksi and each value for elongation to the nearest 0.5 %, both in accordance with the rounding method of Practice E29.
[B] The basis for establishment of mechanical property limits is shown in Annex A1.
[C] *Tentative — properties subject to revision.*

TABLE 5 Long Transverse Mechanical Property Limits [SI Units][A,B]

Temper	Specified Thickness, mm		Tensile Strength, MPa		Yield Strength (0.2 % offset), MPa		Elongation, min, %[C]	
	over	through	min	max	min	max	in 50 mm	in 5x Diameter
			Alloy 5083					
H116	3.00	6.00	305	. . .	215	. . .	10	. . .
	6.00	12.50	305	. . .	215	. . .	10	. . .
H321	3.00	6.00	305	380	215	. . .	10	. . .
H128[D]	*4.00*	*8.00*	*305*	*385*	*215*	. . .	*10*	. . .
			Alloy 5086					
H321[D]	*6.00*	*8.00*	*275*	*355*	*195*	. . .	*10*	. . .

[A] To determine conformance to this specification, each value for tensile strength shall be rounded to the nearest 1 MPa and each value for elongation to the nearest 0.5 %, both in accordance with the rounding method of Practice E29.
[B] The basis for establishment of mechanical property limits is shown in Annex A1.
[C] Elongations in 50 mm apply for thicknesses up through 12.50 mm and in 5× diameter for thicknesses over 12.50 mm.
[D] *Tentative — properties subject to revision.*

EN 14242. At least one sample shall be taken for each group of ingots poured simultaneously from the same source of molten metal. If the producer has determined the chemical composition during pouring of the ingots, they shall not be required to sample and analyze the finished product.

7.2 If it becomes necessary to analyze the finished or semifinished product for conformance to chemical composition limits, the methods of sampling and methods of analysis shall be as provided in the following:

7.2.1 *Methods of Sampling*—Samples for chemical analysis shall be taken in accordance with Practice B985.

7.2.2 *Methods of Analysis*—Analysis shall be performed in accordance with Test Method E607, Test Method E1251, Test Methods E34, or CEN EN 14242 (ICP method).

8. Tensile Properties of Material as Supplied

8.1 *Limits*—The sheet and plate shall conform to the requirements for tensile properties as specified in Table 2 [Table 3] or Table 4 [Table 5]. Table 2 [Table 3] includes specification limits for tensile properties in the longitudinal direction. Table 4 [Table 5] includes specification limits for tensile properties in the long transverse direction.

8.1.1 Tensile property limits for sizes not covered in Table 2 or Table 4 [Table 3 or Table 5] shall be as agreed upon between the producer and purchaser and shall be so specified in the contract or purchase order.

8.2 *Number of Samples*—One sample shall be taken from each end of each parent coil, or parent plate, but no more than one sample per 2000 lb [1000 kg] of sheet or 4000 lb [2000 kg] of plate, or part thereof, in a lot shall be required. Other procedures for selecting samples may be employed if agreed upon between the producer and purchaser.

8.3 *Test Specimens*—Geometry of test specimens and the location in the product from which they are taken shall be as specified in Test Methods B557 or B557M, with the exception that the test direction will be as specified in 8.5.

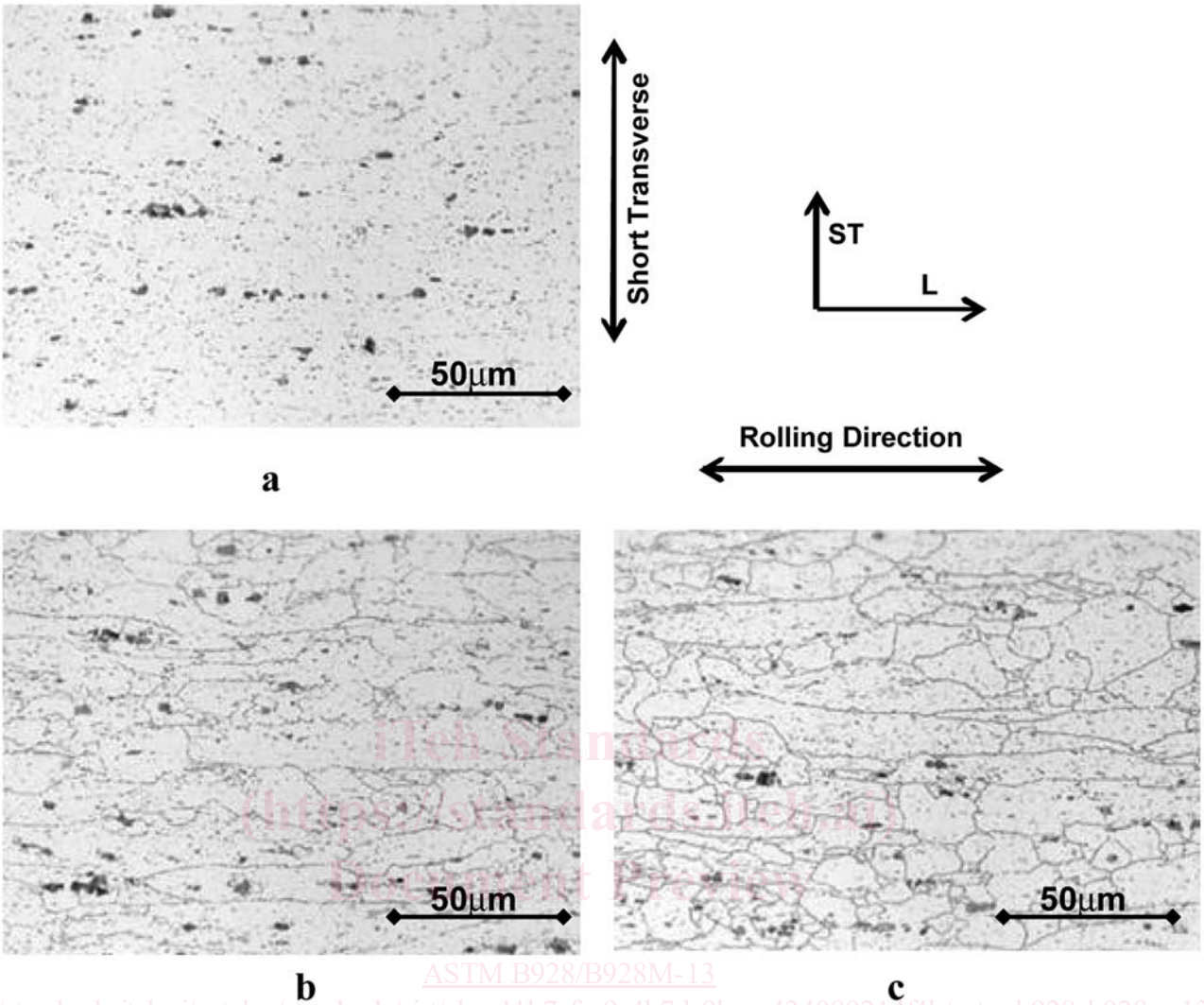
8.4 *Test Methods*—The tension test shall be made in accordance with Test Methods B557 or B557M.

8.5 *Testing Direction*—Tensile testing shall be in the longitudinal direction unless the long transverse direction is specified in the contract or purchase order. Tensile testing direction shall be noted on all documentation.

9. Exfoliation and Intergranular Corrosion Resistance for H116 and H321 Sheet and Plate

9.1 The alloys produced as H116 and H321 tempers shown in Table 2 and Table 4 [Table 3 and Table 5] are manufactured and corrosion tested in the as-produced condition. See Notes 3 and 4.

NOTE 3—*Background Information*—Aluminum-magnesium-alloy products that have a continuous or nearly continuous grain boundary precipitate are susceptible to intergranular forms of corrosion, (that is, IGC, SCC, or exfoliation corrosion). Examples of varying degrees of grain boundary precipitate continuity are shown in Figs. 1 and 2. The term "sensitization" is used to describe the development of this susceptible microstructure. The type of corrosion that occurs in a sensitized 5xxx alloy will depend primarily on the morphology of the grain structure and on the residual and applied stresses that are present. The extent of corrosion that will occur depends on the degree of continuity of the grain boundary precipitation and the corrosiveness of the environment. Both recrystallized and unrecrystallized 5xxx alloys that have been sensitized, are susceptible to intergranular corrosion, and when subjected to sustained tensile stress,



Specimens were prepared as per 9.6.1 (Phosphoric Acid etched). (Photomicrographs are of as-produced material and were not subjected to Test Method G67 testing.) Metallographic examination is conducted ×500 magnification as per 9.6.1.

Figure 1a has discontinuous grain boundary precipitation, typical of a mass-loss of no greater than 100 mg/in.^{2} [15 mg/cm^2] in Test Method G67.

Figure 1b has semi-continuous grain boundary precipitation and would likely fall in the mid-range, greater than 100 mg/in.^{2} [15 mg/cm^2] but less than or equal to 160 mg/in.^{2} [25 mg/cm^2] in Test Method G67.

Figure 1c has a continuous network of grain boundary precipitation, typical of a mass loss greater than 160 mg/in.^{2} [25 mg/cm^2] in Test Method G67.

(**Warning**—These photomicrographs are examples of typical microstructures and due to variations in alloy, temper and process, they may or may not be similar to the microstructure of production sheet or plate. These photographs shall not be used in lieu of producer-established reference photographs for comparison with production material in surveillance or in determining process qualification or lot release.)

FIG. 1 Examples of Microstructures with Varied Degrees of Grain Boundary Beta-phase Continuity, for a *Partially Recrystallized* Grain Structure.

may exhibit intergranular stress corrosion cracking. Unrecrystallized 5xxx alloys that have been sensitized are also susceptible to exfoliation corrosion.

NOTE 4—Alloys 5059, 5083, 5086, 5383, and 5456 should not be used for service, which provides prolonged exposure to temperatures exceeding 150°F [65°C] (whether continuous exposure or discontinuous exposure) because of the risk of sensitization and the resulting susceptibility to exfoliation and other forms of intergranular corrosion and stress corrosion cracking. Cold forming can also increase susceptibility to intergranular corrosion and stress corrosion cracking.

Warning—It is possible to meet the requirements of Test Method G66 (ASSET) and fail the requirements of Test Method G67 (NAMLT). Therefore both tests shall be performed for process qualification (see 9.4), for lot release, that is, in developing producer-established reference photomicrographs (see 9.6), and for surveillance (see 9.8).

9.2 *Exfoliation-Corrosion Resistance*—Sheet and plate in the H116 and H321 tempers listed in Table 2 and Table 4 [Table 3 and Table 5] shall be capable of exhibiting no evidence of exfoliation corrosion and a pitting rating of PB or better when subjected to the test described in Test Method G66 (ASSET).

9.3 *Intergranular-Corrosion Resistance*—Sheet and plate in the H116 and H321 tempers listed in Table 2 and Table 4 [Table 3 and Table 5] shall be capable of exhibiting resistance to intergranular corrosion as indicated by an acceptable mass-loss when tested in accordance with Test Method G67