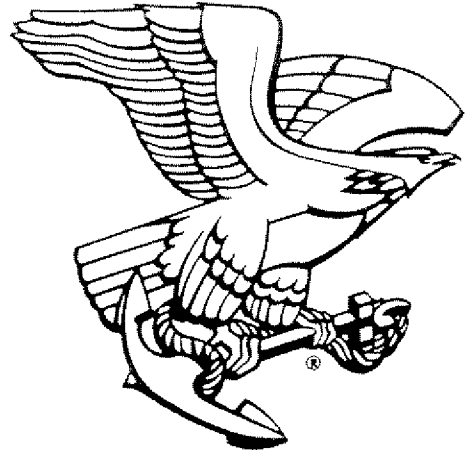




Rules
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Aluminum Vessels

1975

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Rules for Building and Classing Aluminum Vessels

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Notice No. 5

At the meeting of the Technical Committee held 9 November 1995 the following changes were approved and become effective 9 May 1996 unless another date is given.

SECTION 35 MATERIALS FOR HULL CONSTRUCTION

35.1 General

A new subsection 35.1.1c introduced to allow acceptance of materials on basis of the Bureaus Quality Assurance program, in lieu of witnessing actual material tests. Present 35.1.1c and 35.1.1d are renumbered as 35.1.1d and e respectively. Para. 35.1.1b is editorially revised to reflect the new para. 35.1.1c.

35.1.1 Test and Inspection

a General - no change

b Witnessed Tests Except as permitted by 35.1.1c, all tests are to be conducted in the presence of the Surveyor at the place of manufacture prior to shipping.

c Certification on the Basis of the ABS Quality Assurance Program for Rolled and Extruded Products (1996) Upon application, consideration will be given to the acceptance of plates, shapes, and bars without witnessing of mechanical tests by the Surveyor, on the basis of compliance with the Bureaus Quality Assurance Program.

d Rejection of Previously Accepted Material - no change

e Calibrated Testing Machines - no change



Table 35.3 Mechanical Property Limits of Non-Heat Treatable Sheet and Plate Aluminum Alloys⁶ (1996)

Mechanical test specimens are taken as detailed in 35.9.3

The temper H117 has been deleted from Table 35.3 since it is no longer used. The maximum values of ultimate tensile strength and minimum yield strength have been deleted in accordance with ASTM B209 standard. Allowance is also given by new Note 6 for use of the latest ASTM B209 standard upon application

Alloy and Temper	Thickness ¹		Ultimate Tensile Strength kgf/mm ² (ksi)		Minimum Yield Strength 0.2% Offset kgf/mm ² (ksi)		Minimum Elongation ² in 50 mm (2 in.)
	millimeters	(inches)	minimum	maximum	minimum	maximum	percent
5052-O	3.0-6.4	(0.114-0.249)	17.6 (25.0)	21.8 (31.0)	6.7 (9.5)		20
	6.6-75.0	(0.250-3.000)	17.6 (25.0)	21.8 (31.0)	6.7 (9.5)		18
5052-H32	3.0-6.5	(0.114-0.249)	21.8 (31.0)	26.7 (38.0)	16.2 (23.0)		9
	6.6-12.5	(0.250-0.499)	21.8 (31.0)	26.7 (38.0)	16.2 (23.0)		11
	12.6-51.0	(0.500-2.000)	21.8 (31.0)	26.7 (38.0)	16.2 (23.0)		12
5052-H34	3.0-6.5	(0.114-0.249)	23.9 (34.0)	28.8 (41.0)	18.3 (26.0)		7
	6.6-25.0	(0.250-1.000)	23.9 (34.0)	28.8 (41.0)	18.3 (26.0)		10
5052-H112	6.5-12.5	(0.250-0.499)	19.7 (28.0)		11.2 (16.0)		7
	12.6-51.0	(0.500-2.000)	17.6 (25.0)		6.7 (9.5)		12
	51.1-75.0	(2.001-3.000)	17.6 (25.0)		6.7 (9.5)		16
5083-O	1.3-38.0	(0.051-1.500)	28.1 (40.0)	35.9 (51.0)	12.7 (18.0)	20.4 (29.0)	16
	38.1-76.5	(1.501-3.000)	27.4 (39.0)	35.2 (50.0)	12.0 (17.0)	20.4 (29.0)	16
5083-H112	6.5-38.0	(0.250-1.500)	28.1 (40.0)		12.7 (18.0)		12
	38.1-76.5	(1.501-3.000)	27.4 (39.0)		12.0 (17.0)		12
5083-H1163	4.5-38.0	(0.063-1.500)	30.9 (44.0)		21.8 (31.0)		12

Alloy and Temper	Thickness ¹		Ultimate Tensile Strength kgf/mm ² (ksi)		Minimum Yield Strength 0.2% Offset kgf/mm ² (ksi)		Minimum Elongation ¹ in 50 mm (2 in.)
	millimeters	(inches)	minimum	maximum	minimum	maximum	percent
5083-H323	38.1-76.5	(1.501-3.000)	28.8 (41.0)		20.4 (29.0)		12
	1.5-3.0	(0.051-0.125)	31.6 (45.0)	38.0 (54.0)	23.9 (34.0)	30.9 (44.0)	8
	3.1-6.5	(0.126-0.249)	31.6 (45.0)	38.0 (54.0)	23.9 (34.0)	30.9 (44.0)	10
5083-H343	1.5-3.0	(0.051-0.125)	35.2 (50.0)	41.5 (59.0)	27.4 (39.0)	34.4 (49.0)	6
	3.1-6.5	(0.126-0.249)	35.2 (50.0)	41.5 (59.0)	27.4 (39.0)	34.4 (49.0)	8
5086-O	1.5-6.5	(0.051-0.249)	24.6 (35.0)	30.9 (44.0)	9.8 (14.0)		18
	6.5-51.0	(0.250-2.000)	24.6 (35.0)	30.9 (44.0)	9.8 (14.0)		16
5086-H112	4.5-12.5	(0.188-0.499)	25.3 (36.0)		12.7 (18.0)		8
	12.6-25.5	(0.500-1.000)	24.6 (35.0)		11.2 (16.0)		10
	25.6-51.0	(1.001-2.000)	24.6 (35.0)		9.8 (14.0)		14
	51.1-76.5	(2.001-3.000)	23.9 (34.0)		9.8 (14.0)		14
5086-H1163	1.5-6.5	(0.063-0.249)	28.1 (40.0)		19.7 (28.0)		8
	6.6-51.0	(0.250-2.000)	28.1 (40.0)		19.7 (28.0)		10
5454-O	3.0-76.5	(0.114-3.000)	21.8 (31.0)	28.8 (41.0)	8.4 (12.0)		18
5454-H324,5	1.5-6.5	(0.051-0.249)	25.3 (36.0)	30.9 (44.0)	18.3 (26.0)		8
	6.6-51.0	(0.250-2.000)	25.3 (36.0)	30.9 (44.0)	18.3 (26.0)		12
5454-H344,5	4.0-6.5	(0.162-0.249)	27.4 (39.0)	33.0 (47.0)	20.4 (29.0)		7
	6.6-25.5	(0.250-1.000)	27.4 (39.0)	33.0 (47.0)	20.4 (29.0)		10
5454-H1125	6.5-12.5	(0.250-0.499)	22.5 (32.0)		12.7 (18.0)		8
	12.6-51.0	(0.500-2.000)	21.8 (31.0)		8.4 (12.0)		11
	51.1-76.5	(2.001-3.000)	21.8 (31.0)		8.4 (12.0)		15
5456-O	1.5-38.0	(0.051-1.500)	29.5 (42.0)	37.3 (53.0)	13.4 (19.0)	21.1 (30.0)	16
	38.1-76.5	(1.501-3.000)	28.8 (41.0)	36.6 (52.0)	12.7 (18.0)	21.1 (30.0)	16
5456-H112	6.5-38.0	(0.250-1.500)	29.5 (42.0)		13.4 (19.0)		12

Alloy and Temper	Thickness ¹		Ultimate Tensile Strength kgf/mm ² (ksi)		Minimum Yield Strength 0.2% Offset kgf/mm ² (ksi)		Minimum Elongation ² in 50 mm (2 in.)
	millimeters	(inches)	minimum	maximum	minimum	maximum	percent
5456-H1163	38.1-76.5	(1.501-3.000)	28.8 (41.0)		12.7 (18.0)		12
	4.5-15.5	(0.063-0.624)	32.3 (46.0)		23.2 (33.0)		12
	15.6-32.0	(0.625-1.250)	32.3 (46.0)		23.2 (33.0)		12
	32.1-38.0	(1.251-1.500)	30.9 (44.0)		21.8 (31.0)		12
5456-H323	38.1-76.5	(1.501-3.000)	28.8 (41.0)		20.4 (29.0)		12
	1.5-3.0	(0.051-0.125)	33.7 (48.0)	40.8 (58.0)	25.3 (36.0)	32.3 (46.0)	6
	3.1-6.5	(0.126-0.249)	33.7 (48.0)	40.8 (58.0)	25.3 (36.0)	32.3 (46.0)	8
5456-H343	1.5-3.0	(0.051-0.125)	37.3 (53.0)	44.3 (63.0)	28.8 (41.0)	35.9 (51.0)	6
	3.1-6.5	(0.126-0.249)	37.3 (53.0)	44.3 (63.0)	28.8 (41.0)	35.9 (51.0)	8

Notes

- 1 Type of test specimen used depends on thickness of material: see 35.9.3.
- 2 or 4x specimen diameter
- 3 5083, 5086 and 5456 in the H116 temper are to be capable of passing an appropriate test for resistance to exfoliation corrosion. The Aluminum Association Tentative Exfoliation Test for Aluminum Magnesium Alloys for Boat and Ship Hull Construction is considered to be an appropriate method. Other tests will be specially considered.

- 4 For the corresponding H2 temper, limits for maximum ultimate tensile strength and minimum yield strength do not apply.
- 5 5454 is recommended for service applications where exposed to temperatures exceeding 65C (150F).
- 6 Use of the latest ASTM B209 specification will be considered upon application.



In Table 35.2, the composition requirements of *magnesium* is revised to comply with ASTM B26-86 and B108-87.

TABLE 35.2 Chemical Composition Limits of Cast Aluminum Alloys

ASTM American Society for Testing and Materials
AA Aluminum Association

Limits are in percent maximum unless stated otherwise.

<i>Alloy</i>		<i>Silicon</i>	<i>Iron</i>	<i>Copper</i>	<i>Manganese</i>	<i>Magnesium</i>	
<i>ASTM</i>	<i>AA</i>						
SG70A	356.0	6.5-7.5	0.6 ¹	0.25	0.35 ¹	0.20-0.45	(The remainder of Table 35.2 is unchanged)
SG70B	A356.0	6.5-7.5	0.20	0.20	0.10	0.25-0.45	
	357.0	6.5-7.5	0.15	0.05	0.03	0.45-0.6	

Note
¹If the iron content exceeds 0.45%, manganese content shall not be less than one half of the iron

Table 35.3 is revised to comply with ASTM B209-86.

TABLE 35.3 Mechanical Property Limits of Non-Heat Treatable Sheet and Plate Aluminum Alloys

Mechanical test specimens are taken as detailed in 35.9.3

<i>Alloy and Temper</i>	<i>Thickness¹</i>		<i>Ultimate Tensile Strength</i>		<i>Minimum Yield Strength 0.2% Offset</i>		<i>Minimum Elongation²</i>
			<i>kg/mm² (ksi)</i>		<i>kg/mm² (ksi)</i>		<i>in 50 mm (2 in.)</i>
	<i>millimeters</i>	<i>(inches)</i>	<i>minimum</i>	<i>maximum</i>	<i>minimum</i>	<i>maximum</i>	<i>percent</i>
5052-0	3.0-6.5	(0.114-0.249)	17.6 (25.0)	21.8 (31.0)	6.7 (9.5)		20
	6.6-75.0	(0.250-3.000)	17.6 (25.0)	21.8 (31.0)	6.7 (9.5)		18
5052-H32	3.0-6.5	(0.114-0.249)	21.8 (31.0)	26.7 (38.0)	16.2 (23.0)		9
	6.6-12.5	(0.250-0.499)	21.8 (31.0)	26.7 (38.0)	16.2 (23.0)		11
	12.6-51.0	(0.500-2.000)	21.8 (31.0)	26.7 (38.0)	16.2 (23.0)		12
5052-H34	3.0-6.5	(0.114-0.249)	23.9 (34.0)	28.8 (41.0)	18.3 (26.0)		7
	6.6-25.0	(0.250-1.000)	23.9 (34.0)	28.8 (41.0)	18.3 (26.0)		10
5052-H112	6.5-12.5	(0.250-0.499)	19.7 (28.0)		11.2 (16.0)		7
	12.6-51.0	(0.500-2.000)	17.6 (25.0)		6.7 (9.5)		12
	51.1-75.0	(2.001-3.000)	17.6 (25.0)		6.7 (9.5)		16
5083-0	1.3-38.0	(0.051-1.500)	28.1 (40.0)	35.9 (51.0)	12.7 (18.0)	20.4 (29.0)	16
	38.1-76.5	(1.501-3.000)	27.4 (39.0)	35.2 (50.0)	12.9 (17.0)	20.4 (29.0)	16

5083-H112	6.5-38.0	(0.250-1.500)	28.1 (40.0)		12.7 (18.0)	12
	38.1-76.5	(1.501-3.000)	27.4 (39.0)		12.0 (17.0)	12
5083-H116 ^{3,6}	4.5-12.5	(0.063-0.499)	30.9 (44.0)		21.8 (31.0)	10
	12.6-38.0	(0.500-1.500)	30.9 (44.0)		21.8 (31.0)	12
	38.1-76.5	(1.501-3.000)	28.8 (41.0)		20.4 (29.0)	12
5086-0	1.5-6.5	(0.051-0.249)	24.6 (35.0)	30.9 (44.0)	9.8 (14.0)	18
	6.6-51.0	(0.250-2.000)	24.6 (35.0)	30.9 (44.0)	9.8 (14.0)	16
5086-H112	4.5-12.5	(0.188-0.499)	25.3 (36.0)		12.7 (18.0)	8
	12.6-25.5	(0.500-1.000)	24.6 (35.0)		11.2 (16.0)	10
	25.6-51.0	(1.001-2.000)	24.6 (35.0)		9.8 (14.0)	14
	51.1-76.5	(2.001-3.000)	23.9 (34.0)		9.8 (14.0)	14
5086-H116 ^{3,6}	1.5-6.5	(0.063-0.249)	28.1 (40.0)		19.7 (28.0)	8
	6.6-51.0	(0.250-2.000)	28.1 (40.0)		19.7 (28.0)	10
5454-0	3.0-76.5	(0.114-3.000)	21.8 (31.0)	28.8 (41.0)	8.4 (12.0)	18
5454-H32 ^{4,5}	1.5-6.5	(0.051-0.249)	25.3 (36.0)	30.9 (44.0)	18.3 (26.0)	8
	6.6-51.0	(0.250-2.000)	25.3 (36.0)	30.9 (44.0)	18.3 (26.0)	12
5454-H34 ^{4,5}	4.0-6.5	(0.162-0.249)	27.4 (39.0)	33.0 (47.0)	20.4 (29.0)	7
	6.6-25.5	(0.250-1.000)	27.4 (39.0)	33.0 (47.0)	20.4 (29.0)	10
5454-H112 ⁵	6.5-12.5	(0.250-0.499)	22.5 (32.0)		12.7 (18.0)	8
	12.6-51.0	(0.500-2.000)	21.8 (31.0)		8.4 (12.0)	11
	51.1-76.5	(2.001-3.000)	21.8 (31.0)		8.4 (12.0)	15
5456-0	1.5-38.0	(0.051-1.500)	29.5 (42.0)	37.3 (53.0)	13.4 (19.0) 21.1 (30.0)	16
	38.1-76.5	(1.501-3.000)	28.8 (41.0)	36.6 (52.0)	12.7 (18.0) 21.1 (30.0)	16
5456-H112	6.5-38.0	(0.250-1.500)	29.5 (42.0)		13.4 (19.0)	12
	38.1-76.5	(1.501-3.000)	28.8 (41.0)		12.7 (18.0)	12
5456-H116 ^{3,6}	1.5-12.5	(0.063-0.499)	32.3 (46.0)		23.2 (33.0)	10
	12.6-32.0	(0.500-1.250)	32.3 (46.0)		23.2 (33.0)	12
	32.1-38.0	(1.251-1.500)	30.9 (44.0)		21.8 (31.0)	12
	38.1-76.5	(1.501-3.000)	28.8 (41.0)		20.4 (29.0)	12

Notes

¹Type of test specimen used depends on thickness of material; see 35.9.3.

²Or 4x specimen diameter.

³5083, 5086 and 5456 in the H116 temper are to be capable of passing an appropriate test for resistance to exfoliation corrosion. The "Aluminum Association Tentative Exfoliation Test for Aluminum-Magnesium Alloys for Boat and Ship Hull Construction" is considered to be an appropriate method. Other tests will be specially considered.

⁴For the corresponding H2 temper, limits for maximum ultimate tensile strength and minimum yield strength do not apply.

⁵5454 is recommended for service applications where exposed to temperatures exceeding 65C (150F).

⁶The H116 temper designation now also applies to products previously designated H117.

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Notice No. 4

At the meeting of the Technical Committee held 11 November 1992 the following changes were approved and become effective on 11 May 1993 unless another date is given.

Rule Changes

Table 35.3 is revised to show a wider tensile strength range for the indicated alloys in line with commercial practice.

Section 35 Materials for Hull Construction

Table 35.3 Mechanical Property Limits of Non-Heat-Treatable Sheet and Plate Aluminum Alloys

Alloy and Temper	Thickness		Ultimate Tensile Strength kg/mm ² (ksi)	
	Millimeters	(Inches)	Minimum	Maximum
5086-H116 and H1173	1.5-6.5	(0.063-0.249)	28.1(40.0)	35.9(51.0)
	6.6-51.0	(0.250-2.000)	28.1(40.0)	35.9(51.0)

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Notice No. 3

At the meeting of the Technical Committee held 13 November 1991 the following changes were approved and become effective on 13 May 1992 unless another date is given.

Rule Changes

Subsection 36.1.5 and 36.1.7 are revised/deleted to eliminate the "Year of Grace" survey and to provide for a five (5) year Special Periodical Survey interval in line with the "Rules for Building and Classing Steel Vessels, 1992".

Section 36 Surveys After Construction

36.1 Conditions for Surveys After Construction

36.1.5 Special Periodical Surveys

A Special Periodical Survey is to be completed within five years after the date of build or after the crediting date of the previous Special Periodical Survey. The interval between Special Periodical Surveys may be reduced by the Committee. If a Special Periodical Survey is not completed at one time, it will be credited as of the completion date of the survey but no later than five years from date of build or from the date recorded for the previous Special Periodical Survey. If the Special Periodical Survey is completed prematurely but within three months prior to the due date, the Special Periodical Survey will be credited to agree with the effective due date. Special consideration may be given to Special Periodical Survey requirements in the case of vessels of unusual design, in layup or in unusual circumstances. The Committee reserves the right to authorize extensions of Rule required Special Periodical Surveys under extreme circumstances.

Special Periodical Survey may be commenced at the fourth annual survey and be continued with a view to completion by the due date. In connection with the preparation for the Special Periodical Survey, thickness gaugings as required for the forthcoming Special Periodical Surveys are to be taken to the extent accessible and practical in connection with the fourth annual survey.

Where the Special Periodical Survey is commenced prior to the fourth annual survey the entire survey is normally to be completed within 12 months if such work is to be credited to the Special Periodical Survey.

36.1.7 (No text)

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Notice No. 2

**At the meeting of the Technical Committee held 14 November 1990
the following changes were approved and become effective 14 May
1991 unless another date is given.**

Rule Change:

Section 32 Machinery Components

A new subsection 32.2 added to provide requirements for the use of non-metallic flexible couplings to isolate stuffing boxes from the aluminum hull structure.

32.2 Tailshaft Stuffing Box

Suitable mechanical sealing arrangements are to be provided to prevent the possibility of seawater from finding its way inboard. Non-metallic flexible couplings will be considered for vessels 45.7m (150 ft) and under. Where the stuffing boxes are attached to the shaft tube by means of a non-metallic flexible coupling, such couplings are to be of at least four-ply synthetic reinforced rubber tube securely attached by means of rigid, bolted clamps. Such clamps are to be constructed of corrosion resistant metal. These hoses are to be subject to inspection during annual survey.

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Notice No. 1-A

At the meeting of the Technical Committee held 8 November 1988 the following changes were approved and become effective 8 May 1989 unless another date is given.

Rule Change

In Table 30.1, the yield strength for the annealed alloy 5083 is revised to be in line with ASTM B209/209M.

TABLE 30.1
Minimum Mechanical Properties for Butt-Welded Aluminum Alloys

The adoption of test values higher than given in the table will be subject to special consideration. Filler wires are those recommended in Table 30.3. Values shown are for welds in plate thicknesses up to 38 mm (1.5 in.) unless otherwise noted.

<i>Alloy</i>	<i>Ultimate Tensile Strength (U_{at})</i>	<i>Yield Strength (Y_{at})³</i>
	<i>kg/mm²(psi)</i>	<i>kg/mm²(psi)</i>
5083 ¹	28.1(40000)	12.7(18000)
5086 ¹	24.6(35000)	9.85(14000)
5454 ¹	21.8(31000)	8.45(12000)
5456 ¹	29.5(42000)	13.4(19000)
6061-T-6 ²	16.9(24000)	10.60(15000)

Notes

¹ All tempers

² Values when welded with 4043, 5183, 5356 or 5556 filler wire.

³ Yield strength is not required for weld procedure qualification. Values shown apply to the yield strength (Y_{at}) values of 2.19.

In Table 30.2, the composition of *silicon* and *iron* for the indicated alloys is revised to comply with AWS A5.3-80 and A5.10-80. The column *Silicon and Iron* is deleted.

TABLE 30.2
Aluminum Alloy Filler Metal Composition

Composition in percent maximum, unless shown as range or specified.

<i>Alloy</i>	<i>Silicon</i>	<i>Iron</i>	<i>Copper</i>	(The remainder of Table 30.2 is unchanged)
4043	4.5-6.0	0.80	0.30	
5183	0.40	0.40	0.10	
5356	0.25	0.40	0.10	
5554	0.25	0.40	0.10	
5556	0.25	0.40	0.10	

*The maximum Beryllium content of all filler wires is to be 0.0008%.

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Notice No. 1

Notice is hereby given that the Technical Committee approved the following revisions to these Rules. These changes became effective 14 May 1979, 1 October 1979, 13 May 1980, 11 May 1981, 17 May 1982, 8 May 1983, and 10 May 1988.

The Technical Committee approved changes to Section 1 and 45.1.10 of the "Rules for Building and Classing Steel Vessels" which became effective on 1 October 1979. These changes are applicable to other ABS Rules including "Rules for Building and Classing Aluminum Vessels (1975)." New subsections have been added to Section 1 to outline the responsibilities of the Bureau. Existing subsections have been renumbered and some have also been editorially revised as appropriate.

The revised Section 1 which follows replaces existing Section 1 and subsections 31.1, 31.3, 31.7, 31.9, 31.11, 31.13, 31.15, 36.1.1, 36.1.2, 36.1.3 and 36.1.11 in the 1975 edition of the "Rules for Building and Classing Aluminum Vessels" as indicated below.

<i>Delete</i> Subsection	<i>Replaced with</i> Subsection of Revised Section 1
31.1	1.11.7
31.3	1.11.8
31.5	1.13.3
31.7	1.8
31.9	1.11.9
31.11	1.11.10
31.13	1.16
31.15	1.23
36.1.1	1.17.2
36.1.2	1.17.1
36.1.3	1.17.2
36.1.11	1.17.3

Rule Changes

Note: Section 1 is reproduced below in its revised format as originally adopted for the 1992 edition of the ABS Rules for Building and Classing Steel Vessels.

SECTION 1 SCOPE AND CONDITIONS OF CLASSIFICATION

1.1 Classification

1.1.1 Process (1 Jan. 96)

The Classification process consists of a) the development of Rules, Guides, standards and other criteria for the design and construction of marine vessels and structures, for materials, equipment and machinery, b) the review of design and survey during and after construction to verify compliance with such Rules, Guides, standards or other criteria, c) the assignment and registration of class when such compliance has been verified and d) the issuance of a renewable Classification certificate, with annual endorsements, valid for five years.

The Rules and standards are developed by Bureau staff and passed upon by committees made up of naval architects, marine engineers, shipbuilders, engine builders, steel makers and by other technical, operating and scientific personnel associated with the worldwide maritime industry. Theoretical research and development, established engineering disciplines, as well as satisfactory service experience are utilized in their development and promulgation. The Bureau and its committees can act only upon such theoretical and practical considerations in developing Rules and standards.

For classification, vessels are to comply with both the hull and the machinery requirements of the Rules.

1.1.2 Certificates and Reports (1 Jan. 96)

a Plan review and surveys during and after construction are conducted by the Bureau to verify to itself and its committees that a vessel, structure, item of material, equipment or machinery is in compliance with the Rules, Guides, standards or other criteria of the Bureau and to the satisfaction of the attending Surveyor. All reports and certificates are issued solely for the use of the Bureau, its committees, its clients and other authorized entities.

b The Bureau will release information from reports and certificates to the Port State to assist in rectification of deficiencies during port state control intervention. Such information includes text of conditions of classification, survey due dates, and certificate expiration dates. The owner will be advised of any request and/or release of information.

c The Bureau will release certain information to the vessel's hull underwriters and P&I clubs for underwriting purposes. Such information includes text of overdue conditions of classification, survey due dates, and certificate expiration dates. The owners will be advised of any request and/or release of information. In the case of overdue conditions of classification, the owners will be given the opportunity to verify the accuracy of the information prior to release.



1.1.3 Representations as to Classification

Classification is a representation by the Bureau as to the structural and mechanical fitness for a particular use or service in accordance with its Rules and standards. The Rules of American Bureau of Shipping are not meant as a substitute for the independent judgement of professional designers, naval architects, marine engineers, owners, operators, masters and crew nor as a substitute for the quality control procedures of shipbuilders, engine builders, steel makers, suppliers, manufacturers and sellers of marine vessels, materials, machinery or equipment. The Bureau, being a technical society, can only act through Surveyors or others who are believed by it to be skilled and competent.

The Bureau represents solely to the vessel Owner or client of the Bureau that when assigning class it will use due diligence in the development of Rules, Guides and standards, and in using normally applied testing standards, procedures and techniques as called for by the Rules, Guides, standards or other criteria of the Bureau for the purpose of assigning and maintaining class. The Bureau further represents to the vessel Owner or other client of the Bureau that its certificates and reports evidence compliance only with one or more of the Rules, Guides, standards or other criteria of the Bureau in accordance with the terms of such certificate or report. Under no circumstances whatsoever are these representations to be deemed to relate to any third party.

1.1.4 Scope of Classification

Nothing contained in any certificate or report is to be deemed to relieve any designer, builder, Owner, manufacturer, seller, supplier, repairer, operator, other entity or person of any warranty express or implied. Any certificate or report evidences compliance only with one or more of the Rules, Guides, standards or other criteria of American Bureau of Shipping and is issued solely for the use of the Bureau, its committees, its clients or other authorized entities. Nothing contained in any certificate, report, plan or document review or approval is to be deemed to be in any way a representation or statement beyond those contained in 1.1.3. The validity, applicability and interpretation of any certificate, report, plan or document review or approval are governed by the Rules and standards of American Bureau of Shipping who shall remain the sole judge thereof. The Bureau is not responsible for the consequences arising from the use by other parties of the Rules, Guides, standards or other criteria of the American Bureau of Shipping, without review, plan approval and survey by the Bureau.

The term approved shall be interpreted to mean that the plans, reports or documents have been reviewed for compliance with one or more of the Rules, Guides, standards, or other criteria of the Bureau. The Rules are published on the understanding that responsibility for stability and trim, for reasonable handling and loading, as well as for avoidance of distributions of weight which are likely to set up abnormally severe stresses in vessels does not rest upon the Committee.

1.1.5 Suspension of Representations as to Classification *(1 Jan. 96) - deleted*

1.1.6 Termination of Classification *(1 Jan. 96) - deleted*

1.2 Suspension and Cancellation of Class *(1 Jan. '96)*

1.2.1 Termination of Classification

The continuance of the Classification of any vessel is conditional upon the Rule requirements for periodical, damage and other surveys being duly carried out. The Committee reserves the right to reconsider, withhold, suspend, or cancel the class of any vessel or any part of the machinery for noncompliance with the Rules, for defects reported by the Surveyors which have not been rectified in accordance with their recommendations, or for nonpayment of fees which are due on account of Classification, Statutory and Cargo Gear Surveys, Suspension or cancellation of class may take effect immediately or after a specified period of time.

1.2.2 Notice of Surveys

It is the responsibility of the owner to ensure that all surveys necessary for the maintenance of class are carried out at the proper time. The Bureau will give proper notice to an owner of upcoming surveys. This may be done by means of a letter, a quarterly vessel status or other communication. The non-receipt of such notice, however, does not absolve the owner from his responsibility to comply with survey requirements for maintenance of class.

1.2.3 Special Notations

If the survey requirements related to maintenance of special notations are not carried out as required, the suspension or cancellation may be limited to those special notations only.

1.2.4 Suspension of Class Includes:

a Class is suspended for any use, operation, loading condition or other application of any vessel for which it has not been approved and which affects or may affect classification or the structural integrity, quality or fitness for a particular use or service.

b If the periodical surveys required for maintenance of class are not carried out by the due date and no Rule allowed extension has been granted, class will be suspended.

c If recommendations issued by the Surveyor are not carried out within their due dates, class will be suspended.

d Class is suspended for any damage, failure, deterioration or repair that has not been completed as recommended.

e If proposed repairs as referred to in 1/3.1.1 of the Rules for Building and Classing Steel Vessels have not been submitted to the Bureau and agreed upon prior to commencement, class may be suspended.

1.2.5 Cancellation of Class

a If the circumstances leading to suspension of class are not corrected within the time specified, the vessel's class will be canceled.

b A vessel's class is canceled immediately when a vessel proceeds to sea without having completed recommendations which were required to be dealt with before leaving port.

1.3 Classification Symbols

1.3.1 Unrestricted Service

Vessels of aluminum alloys which have been built to the satisfaction of the Surveyors to the Bureau to the full requirements of these Rules, or to their equivalent, where approved by the Committee for unrestricted ocean service at the

assigned freeboards, will be classed and distinguished in the Record by the symbols A1 indicating compliance with the hull requirements of the Rules and for self-propelled vessels AMS indicating compliance with the machinery requirements of the Rules.

1.3.2 Special Rules

Vessels of aluminum alloys which have been built to the satisfaction of the Surveyors to the Bureau to the requirements as contained in these Rules for special types of vessels and which are approved by the Committee for unrestricted ocean service at the assigned freeboards, will be classed and distinguished in the Record by the symbols A1 followed by the appropriate notation, such as Oil Carrier, Ore Carrier, Bulk Carrier, Passenger Vessel, Vehicle Carrier, Container Carrier, Towing Vessel, Refrigerated Cargo Carrier.

1.3.3 Special Purpose Vessels

Vessels of aluminum alloys, of special design, intended primarily for ferry service, for dredging, for fishing, etc., which have been built to the satisfaction of the Surveyors to the Bureau to arrangements and scantlings approved for the particular purpose, where approved by the Committee for unrestricted ocean service at the assigned freeboards, will be classed and distinguished in the Record by the symbols A1 followed by a designation of the trade for which special modifications to these Rules have been approved.

1.3.4 Geographical Limitations

Vessels of aluminum alloys which have been built to the satisfaction of the Surveyors to the Bureau to special modified requirements for a limited service, where approved by the Committee for that particular service, will be classed and distinguished in the Record by the symbols and notations as described in 1.3.1, 1.3.2, and 1.3.3 above, but the symbols and notations will either be followed by or have included in them the appropriate service limitation.

1.3.5 Vessels Not Built under Survey

Vessels of aluminum alloys which have not been built under survey to this Bureau, but which are submitted for classification, will be subjected to a special classification survey. Where found satisfactory and thereafter approved by the Committee, they will be classed and distinguished in the Record by the symbols and special notations as described in 1.3.1 to 1.3.4 above, but the mark signifying the survey during construction will be omitted.

1.3.6 Equipment Symbol

The symbol placed after the symbols of classification, thus: A will signify that the equipment of anchors and chain cables of these vessel is in compliance with the requirements of these Rules, or with requirements corresponding to the service limitation noted in the vessel's classification, which have been specially approved for the particular service.

1.3.7 AMS Symbols

Machinery and boilers which have been constructed and installed to the satisfaction of the Surveyors to the Bureau to the full requirements of the Rules, when found satisfactory after trial and approved by the Committee, will be classed and distinguished in the Record by the symbols AMS.

1.3.8 AMS Symbols

Machinery and boilers which have not been constructed and installed under survey to this Bureau, but which are submitted for classification, will be subjected to a special classification survey. Where found satisfactory and thereafter approved by the Committee, they will be classed and distinguished in the Record by the symbols AMS.

1/1.3.9 Centralized or Automatic Control Systems

Where, in addition to the individual unit controls, it is proposed to provide remote, centralized, or automatic control systems for propulsion units, essential auxiliaries, or for cargo handling, relevant data is to be submitted to permit the assessment of the effect of such systems on the safety of the ship. All controls necessary for the safe operation of the vessel are to be proved to the Surveyor's satisfaction. The automatic and remote-control systems are to be in accordance with the applicable requirements of Section 4/11 of the Rules for Building and Classing Steel Vessels.

1.3.10 Dynamic Loading Approach

Vessels which have been built to plans reviewed in accordance with an acceptable procedure and criteria for calculating and evaluating the behavior of hull structures under dynamic loading conditions, in addition to full compliance with other requirements of the Rules, will be classed and distinguished in the Record by the symbols DLA placed after the appropriate hull classification notation. See also 3/2.3.3 of the Rules for Building and Classing Steel Vessels. The application of the dynamic loading approach will be optional.

1.5 Rules For Classification

1.5.1 Application of Rules

These Rules apply to vessels 30.5 m (100 ft) to 152.5 m (500 ft) in length which are constructed of aluminum alloys. Vessels less than 30.5 m (100 ft) or exceeding 152.5 m (500 ft) in length will be specially considered. These rules, except where specifically mentioned otherwise, apply to vessels intended for unrestricted ocean service..

These requirements are applicable to those features that are permanent in nature and can be verified by plan review, calculation, physical survey or other appropriate means. Any statement in the Rules regarding other features is to be considered as a guidance to the designer, builder, owner, et al.

1.5.2 Alternatives

a General The Committee is at all times ready to consider alternative arrangements and scantlings which can be shown, through either satisfactory service experience or a systematic analysis based on sound engineering principles, to meet the overall safety and strength standards of the Rules.

b National Regulations The Committee will consider special arrangements or details of hull, equipment or machinery which can be shown to comply with standards recognized in the country in which the vessel is registered or built, provided they are not less effective.

c Other Rules The Committee will consider hull, equipment or machinery built to the satisfaction of the Surveyors of the Bureau in accordance with the plans that have been approved to the Rules of another recognized classification society with verification of compliance by the Bureau. A notation will be entered in the Record

indicating that classification has incorporated the provisions of this subparagraph. Submission of plans is to be in accordance with 1.9.

1.5.3 Novel Features

Vessels of aluminum alloys which contain novel features of design in respect of the hull, machinery, or equipment to which the provisions of these Rules are not directly applicable may be classed, when approved by the Committee, on the basis that these Rules insofar as applicable have been complied with and that special consideration has been given to the novel features based on the best information available at the time.

1.5.4 Effective Date of Rule Change

a Six Month Rule Changes to the Rules are to become effective six months from the date on which The Technical Committee approves them. However, the Bureau may bring into force individual changes before that date if necessary or appropriate. Particular attention is directed to recent changes to Part 1, Section 1 of the Rules for Building and Classing Steel Vessels which are to apply to these Rules where applicable.

b Implementation of Rule Changes In general, until the effective date, plan approval for designs will follow prior practice unless review under the latest Rules is specifically requested by the party signatory to the application for classification. If one or more vessels are to be constructed from plans previously approved, no retroactive application of the subsequent Rule changes will be required except as may be necessary or appropriate for all contemplated construction.

1.7 Other Regulations

1.7.1 General

While these Rules cover the requirements for the classification of new vessels, the attention of Owners, designers, and builders is directed to the regulations of international, governmental, canal, and other authorities dealing with those requirements in addition to or over and above the classification requirements.

1.7.2 International Conventions or Codes

Where authorized by the Administration of a country signatory thereto and upon request of the Owners of a classed vessel or one intended to be classed, the Bureau will survey a new or existing vessel for compliance with the provisions of International Conventions and Codes including the following, and certify thereto in the manner prescribed in the Convention or Code.

International Convention on Load Lines, 1966.

International Convention for the Safety of Life at Sea, 1974, as amended.

International Convention on Tonnage Measurement of Ships, 1969.

International Convention for the Prevention of Pollution from Ships, 1973/78, as amended.

International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk.

International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.

1.7.3 Governmental Regulations

Where authorized by a government agency and upon request of the owners of a

classed vessel or one intended to be classed, the Bureau will survey and certify a new or existing vessel for compliance with particular regulations of that government on their behalf.

1.8 IACS Audit

The International Association of Classification Societies (IACS) conducts audits of processes followed by all its member societies to assess the degree of compliance with the IACS Quality System Certification Scheme requirements. For this purpose, auditors from IACS may accompany ABS personnel at any stage of the classification or statutory work which may necessitate the auditors having access to the vessel or access to the premises of the manufacturer or shipbuilder.

In such instances, prior authorization for the auditor's access will be sought by the local ABS office.

1.9 Submission of Plans

1.9.1 Hull Plans

Plans showing the scantlings, arrangements, and details of the principal parts of the hull structure of each vessel to be built under survey are to be submitted and approved before the work of construction is commenced. These plans are to indicate clearly the scantlings and details of welding, and they are to include such particulars as the design draft and design speed. Where provision is to be made for any special type of cargo or for any exceptional conditions of loading, whether in ballast or with cargo, particulars of the weights to be carried and of their distribution are also to be given. In general the following plans are to be submitted for review or reference. See also 3/2.1.1.d.

- Vessel Specifications
- General Arrangement
- Midship section
- Scantling profile and decks
- Bottom construction, floors, girders, etc.
- Framing plan
- Inner bottom plating
- Shell expansion
- Deck plans
- Pillars and girders
- Watertight and deep-tank bulkheads
- Miscellaneous nontight bulkheads which are used as structural supports
- Shaft tunnels
- Machinery casings, boiler, engine and main auxiliary foundations
- Bow framing
- Stem
- Stern framing
- Stern frame and rudder
- Shaft struts
- Spectacle frames and bossing details
- Superstructures and deckhouses, and their closing arrangements
- Hatches and hatch-closing arrangements
- Ventilation system on weather decks

Anchor handling arrangements
Lines and body plan
Capacity plan

Plans should generally be submitted in triplicate, one copy to be returned to those making the submission, one copy for the use of the Surveyor where the vessel is being built, and one copy to be retained in the ABS Technical office for record. Additional copies may be required where the required attendance of the Surveyor is anticipated at more than one location

1.9.2 Machinery Plans

Plans showing the proposed arrangements of engine, thrust and boiler foundations, including holding-down bolts; also such plans of the machinery installation as are enumerated in the following sections of the machinery requirements are to be submitted and approved before proceeding with the work. It is desired that the sizes, dimensions, welding and other details, make and size of standard approved appliances be shown on the plans as clearly and fully as possible. All welded construction is to meet the requirements of Section 30. Plans are to be submitted in quadruplicate where construction is to be carried out at a plant other than that of the shipbuilder. All plan submissions originating from manufacturers are understood to be made with the cognizance of the shipbuilder. A fee may be charged for the review of plans for which there is no contract of classification.

1.9.3 Additional Plans

Where certification under 1.7.2 or 1.7.3 is requested, submission of additional plans and calculations may be required.

1.9.4 Machinery Equations

The equations for rotating parts of the machinery in the following sections are based upon strength considerations only and their application does not relieve the manufacturer from responsibility for the presence of dangerous vibrations in the installation at speeds within the operating range.

1.11 Conditions for Surveys After Construction

1.11.1 Damage, Failure and Repair (1 Jan. '96)

a Examination and Repair Damage, failure, deterioration or repair to hull, machinery or equipment, which affects or may affect classification, is to be submitted by the Owners or their representatives for examination by a Surveyor at first opportunity. All repairs found necessary by the Surveyor are to be carried out to the Surveyors satisfaction.

b Repairs Where repairs to hull, machinery or equipment, which affect or may affect classification, are planned in advance to be carried out, a complete repair procedure including the extent of proposed repair and the need for Surveyor's attendance is to be submitted to and agreed upon by the Bureau reasonably in advance. Failure to notify the Bureau, in advance of the repairs, may result in suspension of the vessels classification until such time as the repair is redone or evidence submitted to satisfy the Surveyor that the repair was properly carried out.

Note: The above applies also to repairs during voyage.

The above is not intended to include maintenance and overhaul to hull, machinery and equipment in accordance with the recommended manufacturer's procedure and established marine practice and which does not require Bureau approval; however,

any repair as a result of such maintenance and overhauls which affects or may affect classification is to be noted in the ship's log and submitted to the Surveyor as required by 1/1.11.1a.

c Representation Nothing contained in this section or in a rule or regulation of any government or other administration, or the issuance of any report or certificate pursuant to this section or such a rule or regulation, is to be deemed to enlarge upon the representations expressed in 1.1.1 through 1.1.4 hereof and the issuance and use of any such reports or certificates are to be governed in all respects by 1.1.1 through 1.1.4 hereof.

1.11.2 Notification and Availability for Survey (1 Jan. '96)

The Surveyors are to have access to classed vessels at all reasonable times. For the purpose of Surveyor Monitoring, monitoring Surveyors shall also have access to classed vessels at all reasonable times. Such access may include attendance at the same time as the assigned Surveyor or during a subsequent visit without the assigned Surveyor. The Owners or their representatives are to notify the Surveyors on all occasions when a vessel can be examined in dry dock or on a slipway.

The Surveyors are to undertake all surveys on classed vessels upon request, with adequate notification, of the Owners or their representatives and are to report thereon to the Committee. Should the Surveyors find occasion during any survey, to recommend repairs or further examination, notification is to be given immediately to the Owners or their representatives in order that appropriate action may be taken. The Surveyors are to avail themselves for every convenient opportunity for carrying out periodical surveys in conjunction with surveys of damages and repairs in order to avoid duplication of work.

1.11.3 Attendance at Port State Request (1 Jan. '96)

It is recognized that Port State authorities legally may have access to a vessel. In cooperation with Port States, ABS Surveyors will attend on board a classed vessel when so requested by a Port State, and upon concurrence by the vessel's master will carry out a survey in order to facilitate the rectification of reported deficiencies or other discrepancies that affect or may affect classification. ABS Surveyors will also cooperate with Port States by providing inspectors with background information, if requested. Such information includes text of conditions of class, survey due dates, and certificate expiration dates.

Where appropriate, the vessel's flag state will be notified of such attendance and survey.

1.13 Fees

Fees in accordance with normal ABS practice will be charged for all services rendered by the Bureau. Expenses incurred by the Bureau in connection with these services will be charged in addition to the fees. Fees and expenses will be billed to the party requesting that particular service.

1.15 Disagreement

1.15.1 Rules

Any disagreement regarding either the proper interpretation of the Rules, or translation of these Rules from the English language edition, is to be referred to the Bureau for resolution.



Documents

Document Sharing Hub

1.15.2 Surveyors

In case of disagreement between the Owners or builders and the Surveyors regarding the material, workmanship, extent of repairs, or application of the Rules relating to any vessel classed or proposed to be classed by this Bureau, an appeal may be made in writing to the Committee, who will order a special survey to be held. Should the opinion of the Surveyor be confirmed, the expense of this special survey is to be paid by the party appealing.

1/1.17 Limitation of Liability

The combined liability of American Bureau of Shipping, its committees, officers, employees, agents or subcontractors for any loss, claim, or damage arising from its negligent performance or nonperformance of any of its services or from breach of any implied or express warranty of workmanlike performance in connection with those services, or from any other reason, to any person, corporation, partnership, business entity, sovereign, country or nation, will be limited to the greater of a) \$100,000 or b) an amount equal to ten times the sum actually paid for the services alleged to be deficient.

The limitation of liability may be increased up to an amount twenty-five times that sum paid for services upon receipt of Client's written request at or before the time of performance of services and upon payment by Client of an additional fee of \$10.00 for every \$1,000.00 increase in the limitation.

1.18 Trial

A final under-way trial is to be made of all machinery, including the steering gear, anchor windlass and ground tackle. All automatic controls, including trips which may affect the vessels propulsion system, are to be tested underway or alongside the pier, to the satisfaction of the Surveyor.

SECTION 36 SURVEYS AFTER CONSTRUCTION (1 January 1996)

The entire Section 36, Surveys after Construction, is deleted and replaced by the following as all surveys are to be in accordance with the applicable requirements of Steel Vessel Rules, unless otherwise specified. Special Surveys intervals for machinery and electrical equipment are extended to five years to coincide with SS for hull. Drydocking Survey intervals are changed to 2 and 5 years. Also, the anchor chain renewal requirements have been deleted.

36.1 Surveys

Unless otherwise specified hereafter, surveys after construction are to be in accordance with the applicable parts and survey requirements of Part 1, Section 3, Surveys after Construction of the ABS Rules for Building and Classing Steel Vessels.

36.2 Special Materials

Welding is not to be performed on aluminum alloys of the hull structure nor repairs or renewals commenced on such plating or adjacent to such plating without thorough and careful reference to the recommendations contained in Section 30 of these Rules. Substitution of aluminum alloys differing from those originally installed is not to be undertaken without approval.

36.3 Annual Surveys - Hull

36.3.1 Parts to be Examined

At each Annual Survey between Special Surveys the following parts , in addition to those applicable requirements of the Steel Vessel Rules, are to be examined, placed in good condition and reported upon:

All parts liable to rapid deterioration, particularly areas adjacent to dissimilar metals which are in close proximity.

36.4 Special Periodical Surveys - Hull

36.4.1 All Special Periodical Surveys

In addition to the applicable requirements for Special Periodical Surveys of the Steel Vessel Rules, particular attention is to be given to insulation material in joints of shell connections between dissimilar metals, which is to be found or made effective as necessary.

SECTION 1

Scope and Conditions of Classification

1.1 Classification

The Classification process consists of a) the development of Rules, Guides, standards and other criteria for the design and construction of marine vessels and structures, for materials, equipment and machinery, b) the review of design and survey during and after construction to verify compliance with such Rules, Guides, standards or other criteria and c) the assignment and registration of class when such compliance has been verified.

The Rules and standards are developed by Bureau staff and passed upon by committees made up of naval architects, marine engineers, shipbuilders, engine builders, aluminum alloy producers and by other technical, operating and scientific personnel associated with the worldwide maritime industry. Theoretical research and development, established engineering disciplines, as well as satisfactory service experience are utilized in their development and promulgation. The Bureau and its committees can act only upon such theoretical and practical considerations in developing Rules and standards.

For classification, vessels are to comply with both the hull and the machinery requirements of these Rules.

1.2 Certificates and Reports

Plan review and surveys during and after construction are conducted by the Bureau to verify to itself and its committees that a vessel, structure, item of material, equipment or machinery is in compliance with the Rules, Guides, standards or other criteria of the Bureau and to the satisfaction of the attending surveyor. All reports and certificates are issued solely for the use of the Bureau, its committees, its clients and other authorized entities.

1.3 Representations as to Classification

Classification is a representation by the Bureau as to the structural and mechanical fitness for a particular use or service in accordance with its Rules and standards. The Rules of American Bureau of Shipping are not meant as a substitute for the independent judgment of professional designers, naval architects and marine engineers nor as a substitute for the quality control procedures of shipbuilders, engine builders, aluminum alloy producers, suppliers, manufacturers and sellers of marine vessels, materials, machinery or equipment. The Bureau, being a technical society, can only act through Surveyors or others who are believed by it to be skilled and competent.

The Bureau represents solely to the vessel Owner or client of the Bureau that when assigning class it will use due diligence in the development of Rules, Guides and standards, and in using normally applied testing standards, procedures and techniques as called for by the Rules, Guides, standards or other criteria of the Bureau for the purpose of assigning and maintaining class. The Bureau further represents to the vessel Owner or other client of the Bureau that its certificates and reports evidence compliance only with one or more of the Rules, Guides, standards or other criteria of the Bureau in accordance with the terms of such certificate or report. Under no circumstances whatsoever are these representations to be deemed to relate to any third party.

1.4 Responsibility and Liability

Nothing contained in any certificate or report is to be deemed to relieve any designer, builder, Owner, manufacturer, seller, supplier, repairer, operator, other entity or person of any warranty express or implied. Any certificate or report evidences compliance only with one or more of the Rules, Guides, standards or other criteria of American Bureau of Shipping and is issued solely for the use of the Bureau, its committees, its clients or other authorized entities. Nothing contained in any certificate, report, plan or document review or approval is to be deemed to be in any way a representation or statement beyond those contained in subsection 1.3 above. The validity, applicability and interpretation of any certificate, report, plan or document review or approval are governed by the Rules and standards of American Bureau of Shipping who shall remain the sole judge thereof.

1.5 Suspension of Representations as to Classification

In the event of any damage or casualty to hull, machinery or equipment which affects or may affect classification, or the structural integrity, quality or fitness for a particular use or service of a vessel, structure, item of material, equipments or machinery, all representations as to classification are to be considered suspended unless notification of such damage or casualty is given at first opportunity and survey and repairs are thereafter undertaken as required in Section 36 of these Rules. Any use, operation, loading condition, or other application of any vessel, structure, item of material, equipment or machinery for which it has not been approved and which affects or may affect classification or the structural integrity, quality or fitness for a particular use or service is to cause all representations as to classification to be suspended until such time as the condition shall be remedied.

1.6 Application

These Rules apply to vessels 30.5 m (100 ft) to 152.5 m (500 ft) in length which are constructed of aluminum alloys. Vessels less than 30.5 m (100 ft) or exceeding 152.5 m (500 ft) in length will be specially considered. These rules, except where specifically mentioned otherwise, apply to vessels intended for unrestricted ocean service.

1.7 Interpretation

Any disagreement regarding either the proper interpretation of these Rules, or translation of these Rules from the English language edition, is to be referred to the Bureau for resolution.

1.8 Alternatives

The Committee is at all times ready to consider alternative arrangements and scantlings which can be shown, through either satisfactory service experience or a systematic analysis based on sound engineering principles, to meet the overall safety and strength standards of these Rules. See Appendix H of the Rules for Building and Classing Steel Vessels for available structural and machinery analyses. The Committee will consider special arrangements or details of hull, equipment or machinery which can be shown to comply with standards recognized in the country in which the vessel is registered or built, provided they are not less effective.

1.9 Novel Features

Vessels of aluminum alloys which contain novel features of design in respect of the hull, machinery, or equipment to which the provisions of these Rules are not directly applicable may be classed, when approved by the Committee, on the basis that these Rules insofar as applicable have been complied with and that special consideration has been given to the novel features based on the best information available at the time.

1.10 Effective Date of Rule Change

1.10.1 Six Month Rule

Changes to these Rules are to become effective six months from the date on which The Technical Committee approves them. However, the Bureau may bring into force individual changes before that date if necessary or appropriate. Particular attention is directed to recent changes to Section 1 of the “Rules for Building and Classing Steel Vessels” which are to apply to these Rules where applicable.

1.10.2 Implementation of Rule Changes

In general, until the effective date, plan approval for designs will follow prior practice unless review under the latest Rules is specifically requested by the party signatory to the application for classification. If one or more vessels are to be constructed from plans previously approved, no retroactive application of the subsequent Rule changes will be required except as may be necessary or appropriate for all contemplated construction.

1.11 Classification Symbols

1.11.1 Unrestricted Service

Vessels of aluminum alloys which have been built to the satisfaction of the Surveyors to the Bureau to the full requirements of these Rules, or to their equivalent, where approved by the Committee for unrestricted ocean service at the assigned freeboards, will be classed and distinguished in the Record by the symbols ⌘AI indicating compliance with the hull requirements of the Rules and for self-propelled vessels ⌘AMS indicating compliance with the machinery requirements of these Rules.

1.11.2 Special Rules

Vessels of aluminum alloys which have been built to the satisfaction of the Surveyors to the Bureau to the requirements as contained in these Rules for special types of vessels and

which are approved by the Committee for unrestricted ocean service at the assigned freeboards, will be classed and distinguished in the Record by the symbols ⌘A1 followed by the appropriate notation, such as Oil Carrier, Ore Carrier, Bulk Carrier.

1.11.3 Special Purpose Vessels

Vessels of aluminum alloys, of special design, intended primarily for ferry service, for dredging, for fishing, etc., which have been built to the satisfaction of the Surveyors to the Bureau to arrangements and scantlings approved for the particular purpose, where approved by the Committee for unrestricted ocean service at the assigned freeboards, will be classed and distinguished in the Record by the symbols ⌘A1 followed by a designation of the trade for which special modifications to these Rules have been approved.

1.11.4 Geographical Limitations

Vessels of aluminum alloys which have been built to the satisfaction of the Surveyors to the Bureau to special modified requirements for a limited service, where approved by the Committee for that particular service, will be classed and distinguished in the Record by the symbols and notations as described in 1.11.1, 1.11.2, and 1.11.3 above, but the symbols and notations will either be followed by or have included in them the appropriate service limitation.

1.11.5 Vessels Not Built under Survey

Vessels of aluminum alloys which have not been built under survey to this Bureau, but which are submitted for classification, will be subjected to a special classification survey. Where found satisfactory and thereafter approved by the Committee, they will be classed and distinguished in the Record by the symbols and special notations as described in 1.11.1 to 1.11.4 above, but the mark ⌘ signifying the survey during construction will be omitted.

1.11.6 Equipment Symbol

The symbol Ⓔ placed after the symbols of classification, thus ⌘A1Ⓔ will signify that the equipment of anchors and chain cables of the vessel is in compliance with the requirements of these Rules, or with requirements corresponding to the service limitation noted in the vessel's classification, which have been specially approved for the particular service.

1.11.7 ⚡AMS Symbols

Machinery and boilers which have been constructed and installed to the satisfaction of the Surveyors to the Bureau to the full requirements of the Rules, when found satisfactory after trial and approved by the Committee, will be classed and distinguished in the Record by the symbols ⚡AMS.

1.11.8 AMS Symbols

Machinery and boilers which have not been constructed and installed under survey to this Bureau, but which are submitted for classification, will be subjected to a special classification survey. Where found satisfactory and thereafter approved by the Committee, they will be classed and distinguished in the Record by the symbols AMS.

1.11.9 Centralized or Automatic Control Systems

Where, in addition to the individual unit controls, it is proposed to provide remote, centralized, or automatic control systems for propulsion units, essential auxiliaries, or for cargo handling, relevant data is to be submitted to permit the assessment of the effect of such systems on the safety of the ship. All controls necessary for the safe operation of the vessel are to be proved to the Surveyor's satisfaction. The automatic and remote-control systems are to be in accordance with the applicable requirements of Section 41 or Appendix D of the Rules for Building and Classing Steel Vessels.

1.11.10 Unmanned Propulsion-machinery Spaces

When propulsion-machinery spaces are not intended to be manned continuously, these spaces are to be fitted with alarm systems to warn of the presence of fire and rise of water level in the machinery-space bilges. See 39.1.4 and 39.71 of the Rules for Building and Classing Steel Vessels for fire-detection and alarm systems. Automatic and remote-control systems are to be in accordance with the requirements of Section 41 or Appendix D as applicable of the Rules for Building and Classing Steel Vessels.

1.12 Plan Review

The term "approved" shall be interpreted to mean that the plans, reports or documents have been reviewed for compliance with one or more of the Rules, Guides, standards, or other criteria of the Bureau. Nothing contained in any letter, report, plan or document review or approval is to be determined to be in any way a representation or statement beyond that con-

tained in subsection 1.3 above. The validity, application, applicability, and interpretation of any letter, report, plan or document review or approval are governed by the Rules, Guides, standards, or other criteria of the American Bureau of Shipping who shall remain the sole judge thereof.

1.13 Submission of Plans

1.13.1 Hull Plans

Plans showing the scantlings, arrangements, and details of the principal parts of the hull structure of each vessel to be built under survey are to be submitted and approved before the work of construction is commenced. These plans are to indicate clearly the scantlings and details of welding, and they are to include such particulars as the design draft and intended design speed. Where provision is to be made for any special type of cargo or for any exceptional conditions of loading, whether in ballast or with cargo, particulars of the weights to be carried and of their distribution are also to be given. In general these plans should include the following.

- Midship section
- Scantling profile and decks
- Bottom construction, floors, girders, etc.
- Framing plan
- Inner bottom plating
- Shell expansion
- Deck plans
- Pillars and girders
- Watertight and deep-tank bulkheads
- Miscellaneous nontight bulkheads which are used as structural supports
- Shaft tunnels
- Machinery casings, boiler, engine and main auxiliary foundations
- Bow framing
- Stem
- Stern framing
- Stern frame and rudder
- Shaft struts
- Spectacle frames and bossing details
- Superstructures and deckhouses, and their closing arrangements
- Hatches and hatch-closing arrangements
- Ventilation system on weather decks
- Anchor handling arrangements

Plans should generally be submitted in triplicate, one copy to be returned to those making the submission, one copy for the use of the Surveyor where the vessel is being built, and one copy to be retained in the Headquarters office for record.

1.13.2 Loading Conditions

These Rules are published on the understanding that responsibility for stability and trim, for reasonable handling and loading, as well as for avoidance of distributions of weight which are likely to set up abnormally severe stresses in vessels does not rest upon the Committee. Where it is desired to provide for exceptional conditions of loading, full particulars are to be given in connection with the submission of plans as outlined in 1.13.1.

1.13.3 Machinery Plans

Plans showing the proposed arrangements of engine, thrust and boiler foundations, including holding-down bolts; also such plans of the machinery installation as are enumerated in the following sections of the machinery requirements are to be submitted and approved before proceeding with the work. It is desired that the sizes, dimensions, welding and other details, make and size of standard approved appliances be shown on the plans as clearly and fully as possible. All welded construction is to meet the requirements of Section 30. Plans are to be submitted in quadruplicate where construction is to be carried out at a plant other than that of the shipbuilder. All plan submissions originating from manufacturers are understood to be made with the cognizance of the shipbuilder. A fee may be charged for the review of plans for which there is no contract of classification.

1.13.4 Machinery Equations

The equations for rotating parts of the machinery in the following sections are based upon strength considerations only and their application does not relieve the manufacturer from responsibility for the presence of dangerous vibrations in the installation at speeds within the operating range.

1.15 Fees for Plan Approval

Fees, proportional to the work involved, may be charged for the consideration of new structural designs of a special character which are submitted for approval. Fees may also be charged for the consideration of plans in cases where the vessel to which they relate is not constructed under the Bureau's survey.

1.16 Trial

A final under-way trial is to be made of all machinery, including the steering gear, anchor windlass and ground tackle. All automatic controls, including trips which may affect the vessel's propulsion system, are to be tested underway or alongside the pier, to the satisfaction of the Surveyor.

1.17 Conditions for Surveys after Construction

1.17.1 Damage

Damage to hull, machinery or equipment, which affects or may affect classification, is to be submitted by the Owners or their representatives for examination by the Surveyor at first opportunity. All repairs found necessary by the Surveyor are to be carried out to his satisfaction. Nothing contained in this section or in a rule or regulation of any government or other administration, or the issuance of any report or certificate pursuant to this section or such a rule or regulation, is to be deemed to enlarge upon the representations expressed in subsections 1.1 through 1.5 hereof and the issuance and use of any such reports or certificates are to in all respects be governed by subsections 1.1 through 1.5 hereof.

1.17.2 Notification and Availability for Survey

The Surveyors are to have access to classed vessels at all reasonable times. The Owners or their representatives are to notify the Surveyors on all occasions when a vessel can be examined in dry dock or on a slipway.

The Surveyors are to undertake all surveys on classed vessels upon request, with adequate notification, of the Owners or their representatives and are to report thereon to the Committee. Should the Surveyors find occasion during any survey to recommend repairs or further examination, notification is to be given immediately to the Owners or their representatives in order that appropriate action may be taken. The Surveyors are to avail themselves for every convenient opportunity for carrying out periodical surveys in conjunction with surveys of damages and repairs in order to avoid duplication of work.

1.17.3 Alterations

No alterations which affect or may affect classification or the assignment of load lines are to be made to the hull or machinery of a classed vessel unless plans of the proposed alterations are submitted and approved by the ABS Technical Office before the work of alterations is commenced and such work, when approved, is carried out to the satisfaction of the Surveyor.

Nothing contained in this section or in a rule or regulation of any government or other administration, or the issuance of any report or certificate pursuant to this section or such a rule or regulation, is to be deemed to enlarge upon the representations expressed in subsections 1.1 through 1.5 hereof and the issuance and use of any such reports or certificates are to in all respects be governed by subsections 1.1 through 1.5 hereof.

1.19 Fees for Surveys

Fees will be charged for all surveys and for testing material in accordance with established scales. When the attendance of a Surveyor is required to suit the convenience of the Owners, or their representatives, outside of normal working hours, an extra fee will be charged. Traveling expenses incurred by the Surveyor in connection with these services will be charged in addition to the fees.

1.21 Governmental and Other Regulations

While these Rules cover the requirements for the classification of new vessels, the attention of Owners, designers, and builders is directed to the regulations of governmental, canal, and other authorities dealing with such matters as pollution control, emergency power supply, navigation aids, bilge pumping arrangements, piping details, fire protection, and details in passenger vessels, such as the arrangement and extent of double bottoms, watertight bulkheads, fire-retarding bulkheads, the types of admissibility of watertight doors, etc.

1.23 SOLAS 1974

Where authorized by the Administration of a country signatory to the International Convention for the Safety of Life at Sea 1974, and upon request of the Owners of a classed vessel or one intended to be classed, the Bureau will survey a new or existing vessel for compliance with the provisions of SOLAS 1974 and certify thereto in the manner prescribed in the Convention.

1.25 Responsibility

The Bureau, being a technical society, can act only through Surveyors or others who are believed by it to be skilled and competent. It is understood and agreed by all who avail themselves in any way of the services of the Bureau that neither the Bureau nor any of its Committees and employees will,

under any circumstances whatever, be responsible or liable in any respect for any act or omission, whether negligent or otherwise, of its Surveyors, agents, employees, officers or Committees, nor for any inaccuracy or omission in the Record or any other publication of the Bureau, or in any report, certificate or other document issued by the Bureau, its Surveyors, agents, employees or Committees.

1.27 Disagreement

In case of disagreement between the Owners or builders and the Surveyors regarding the material, workmanship, extent of repairs, or application of these Rules relating to any vessel classed or proposed to be classed by this Bureau, an appeal may be made in writing to the Committee, who will order a special survey to be held. Should the opinion of the Surveyor be confirmed, the expense of this special survey is to be paid by the party appealing.

1.29 Termination of Classification

The continuance of the Classification of any vessel is conditional upon the Rule requirements for periodical, damage and other surveys being duly carried out. The Committee reserves the right to reconsider, withhold, suspend, or cancel the class of any vessel or any part of the machinery for noncompliance with these Rules, for defects reported by the Surveyors which have not been rectified in accordance with their recommendations, or for nonpayment of fees which are due on account of Classification and other surveys.

Approved Rule Changes

The following revisions to the Rules became effective 14 May, 1979.

Table 35.1

The values given below should be inserted in the appropriate column and row of the table, in order to bring them in line with current Aluminum Association Standards. Delete the column "Silicon and Iron"

<i>Alloy</i>	<i>Silicon</i>	<i>Iron</i>
5052	0.25	0.40
5454	0.25	0.40
5456	0.25	0.40

Table 35.3

The following percentage elongation is to be substituted in the appropriate column and row of the table, to bring it in line with current Aluminum Association Standards.

<i>Alloy and Temper</i>	<i>Thickness¹</i>	<i>Minimum Elongation² in 50 mm (2 in.)</i>
	<i>millimeters (inches)</i>	<i>percent</i>
5086-H116 and H117 ³	6.6-51.0 (0.250-2.000)	10

The following revision to the Rules became effective 13 May, 1980.

TABLE 30.1 Minimum Mechanical Properties for Butt-Welded Aluminum Alloys

The adoption of test values higher than given in the table will be subject to special consideration. Filler wires are those recommended in Table 30.3. Values shown are for welds in plate thicknesses up to 38 mm (1.5 in.) unless otherwise noted.

Alloy	Ultimate Tensile Strength (U_{al})	Yield Strength (Y_{al}) ³
	kg/mm ² (psi)	kg/mm ² (psi)
5083 ¹	28.1(40000)	14.8 (21000)
5086 ¹	24.6(35000)	9.85(14000)
5454 ¹	21.8(31000)	8.45(12000)
5456 ¹	29.5(42000)	13.4 (19000)
6061-T-6 ²	16.9(24000)	10.60(15000)

Notes

- 1 All tempers
- 2 Values when welded with 4043, 5183, 5356 or 5556 filler wire.
- 3 Yield strength is not required for weld procedure qualification. Values shown apply to the yield strength (Y_{al}) values of 2.19.

Figure 30.5

Delete definitions t , A , and B , and substitute the following.

Applicable to material	Thickness of specimens	A	B	C	D
All alloys except 6061	t	$6\frac{2}{3}t$	$3\frac{1}{3}t$	$8\frac{2}{3}t$ $+ \frac{1}{8}$	$4\frac{1}{3}t$ $+ \frac{1}{16}$
Alloy 6061	3.2 mm ($\frac{1}{8}$ in.)	51.6 mm ($2\frac{1}{16}$ in.)	26.2 mm ($1\frac{1}{32}$ in.)	59.9 mm ($2\frac{3}{8}$ in.)	30.2 mm ($1\frac{3}{16}$ in.)

In the Figure make the following changes:

Width of mandrel change $6t$ to A
 Radius of mandrel change $3t$ to B
 Radius in base change A to D
 Width of slot change B to C
 Jig base dimensions change $22t$ to 190 mm (7.5 in.)
 and $26t$ to 230 mm (9 in.)

Figure 30.5A

Insert the following general note.

For aluminum alloy bend requirements see Figure 30.5.

In the Figure change Diameter $6t$ to A

The following revision to the Rules became effective 10 May 1988

New paragraph 18.19.3 added with existing 18.19.3 being re-numbered 18.19.4

18.19 Miscellaneous Openings in Freeboard and Superstructure Decks

18.19.3 Escape Openings

The closing appliances of escape openings are to be readily operable from each side.

18.19.4 Companionway Sills

In Position 1 the height above the deck of sills to the doorways in companionways is to be at least 600 mm (23.5 in.). In Position 2 they are to be at least 380 mm (15 in.).

Other Approved Changes

Changes to “Rules for Building and Classing Steel Vessels” or “Rules for Building and Classing Steel Vessels Under 61 Meters (200 feet) in Length” may be generally applied to an Aluminum Vessel of corresponding size in association with the material factor as may be specified for respective application.

Corrigenda

2.19.1 }
2.19.2 } The definition of U_{al} and Y_{al} is to read as follow

U_{al} = minimum ultimate strength of the welded aluminum alloy under consideration in accordance with Table 30.1

Y_{al} = minimum yield strength of the welded aluminum alloy under consideration in accordance with Table 30.1

The minimum yield strength for material factor Q and Q_o is to be at the 0.2% offset, not the 2% offset.

Table

10.1 Various references to the appropriate column in Table 10.1 for certain values of h are missing, and the correct references are as follows:

Forecastle decks (first above freeboard deck)	b
Superstructure decks (second above freeboard deck)	d
Second tier above freeboard deck	e
Third and higher tiers above freeboard deck	f

23.13.4 The words "or for loading in alternate holds" should be deleted from the second definition of the value of c .

28.19 The existing title and text are in error and should read:

28.19 Hawsers and Towlines

Hawsers and towlines are listed in Table 28.2 as a guide but this equipment is not required as a condition for classification.

Table

30.2 For 5356 Alloy, Titanium content is 0.06–0.20.

Figures

30.5,
30.5A In Figures 30.5 and 30.5A, a note should be added indicating that the mandrel radius may be increased up to 8.25 t maximum for alloy 6061.

Table

35.1 For 6061 Alloy, copper content is 0.15–0.40 and Chromium content 0.04–0.35.

Table

35.3 The property limits should read as shown for the following indicated alloys.

TABLE 35.3
Mechanical Property Limits of Non-Heat-Treatable Sheet and Plate Aluminum Alloys

Mechanical test specimens are taken as detailed in 35.9.3.

<i>Alloy and Temper</i>	<i>Thickness¹</i>		<i>Ultimate Tensile Strength kg/mm² (ksi)</i>		<i>Minimum Yield Strength 0.2% Offset kg/mm² (ksi)</i>		<i>Minimum Elongation² in 50 mm (2 in.)</i>
	<i>millimeters</i>	<i>(inches)</i>	<i>minimum</i>	<i>maximum</i>	<i>minimum</i>	<i>maximum</i>	<i>percent</i>
5052-H34				28.8 (41.0) 28.8 (41.0)			
5083-0	1.3–38.0 38.1–76.5						
5083-H112		(0.250–1.500) (1.501–3.000)					

Table

35.4 In the “Thickness” column, replace kg/mm² and ksi by “mm” and “in.”, respectively.

Table

35.5 In the Alloy and temper column, replace 5080–0 with 5083–0.

35.7 The references to the tables should be to Tables 35.4, 35.6, 35.7, and 35.8, not 35.8, 35.10, 35.11, and 35.12.

35.19.2 Paragraph 35.19.2 with subparagraphs a and b should be deleted entirely.



Table**35.8**

Delete "6061-T6" and "over 200(8)" from last line in Table and combine the remainder of the last line with the property limits included for 6061-T6 immediately above as follows:

TABLE 35.8
Mechanical Property Limits for Hand Forgings

<i>Alloy and Temper</i>	<i>Thickness mm (in.)</i>	<i>Axis of Test Specimen</i>	<i>Minimum Tensile Strength kg/mm² (ksi)</i>		<i>Minimum Elongation in 50 mm (2 in.)</i>
			<i>ultimate</i>	<i>yield</i>	<i>percent</i>
6061-T6	over 100 (4) to 200 (8)	Longitudinal	26.0 (37.0)	23.9 (34.0)	8
		Long transverse	26.0 (37.0)	23.9 (34.0)	6
		Short transverse	24.6 (35.0)	22.5 (32.0)	4