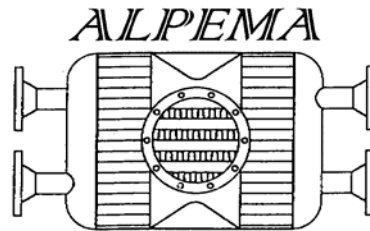


The Standards of the Brazen Aluminium Plate-Fin Heat Exchanger Manufacturers' Association

Second Edition 2000



Revision 1 (25 February 2003)

This revision includes the errata contained in Errata sheet 1 (7 April 2002) together with changes to conform with the European Pressure Vessel Directive.

The following gives the revised sections of the Standards with the changes highlighted. The Appendix repeats the information but with no highlighting so that you can cut and paste the information into your full copy of the Standards.

Corrections and revisions

1. The list of ALPEMA Members given on page (ii), and their contact information, gets out of date rapidly. It is therefore recommended that you go to the Membership page of the ALPEMA web site for the latest information (www.alpema.org/members.htm).
2. The following tables correct errors in the tables of tolerances which go with Figures 2-1, 2-2 and 2-3.

ITEMS	TOLERANCES	ITEMS	TOLERANCES
A, B, C, D, E, F	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm	H, I, J, K	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm
G	± 3°	N, O, P	± 3mm
		Q	± 1mm

Table with Figure 2-1: Important External Dimensions of One Core using the Core Centre Line

ITEMS	TOLERANCES	ITEMS	TOLERANCES
A, B, C, D, E, F	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm	H, I, J, K	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm
G	± 3°	N, O, P	± 3mm
		Q	± 1mm

Table with Figure 2-2: Important External Dimensions of One Core using the Support Base Line

ITEMS	TOLERANCES	ITEMS	TOLERANCES
A, B, C, D, E, F, G	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm	I, J, K	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm
H	± 3mm	L	± 1°; max 5mm at flange periphery
		M	± 1°; max 5mm at bolt circle

Table with Figure 2-3: Important External Dimensions of a Manifolded Assembly of Two Cores: General Flange Details

3 Section 5.3 (**CODES AND CONSTRUCTION**) should be replaced by

The design, construction and testing of brazed aluminium plate-fin heat exchangers are governed by the existing national rules applying to pressure vessels.

The design of a heat exchanger is the result of the mechanical strength analysis of:

- the plate-fin structure under pressure
- the influence of headers on the plate-fin structure
- the header/nozzle assembly

Specific details regarding the design of the individual components are given in Section 5.15.

Brazed aluminium plate-fin heat exchangers are commonly designed under the provisions of the existing codes, typically:

ASME VIII, Div. 1
AD 2000 Regelwerk
 CODAP
 Japanese HPGS Law
 AS 1210
 Raccolta
 Dutch Pressure Vessel Code
 Swedish Pressure Vessel Code

4 Section 5.4 (**TYPICAL MATERIALS OF CONSTRUCTION**) should be replaced by

Typical materials for use on the construction of brazed aluminium plate-fin heat exchangers are:

Core matrix (fins, plates, side bars) **3003 aluminium alloy**
 Headers/nozzles **5083 aluminium alloy**

For a more comprehensive set of materials refer to Chapter 6.

5 Section 5.7.1 (**Metal Temperature Limitations**) should be replaced by

The metal temperature limitations for the typical materials used are those prescribed by the codes.

ALLOY	ASME	AD2000-Merkblätter/VdTUV
3003	-269 / +204°C	-270 / +65°C
5083	-269 / +65°C	-270 / +80°C

Refer to Chapter 6 for further information.

6 Tables 6-1 and 6-2 should be replaced by the following versions

Table 6-1: Typical Materials Used in the Construction of Brazed Aluminium Plate-Fin Heat Exchangers and their Maximum Applicable Design Temperature (Celsius)

CODES	ASME		European Standard (EN)		JAPANESE INDUSTRIAL ST'D (JIS)	
	Alloy No.	Max. Applicable Design Temperature ^{*1}	Alloy No.	Max. Applicable Design Temperature ^{*2}	Alloy No.	Max. Applicable Design Temperature ^{*3}
Heat Transfer Fin	SB-209 3003 3004	204°C 204°C	AW-3003	65°C	H4000 A3003P A3004P	200°C 200°C
Distributor Fin	SB-209 3003 3004	204°C 204°C	AW-3003	65°C	H4000 A3003P A3004P	200°C 200°C
Side Bar	SB-221 3003	204°C	AW-3003	65°C	H4100 A3003S	200°C
Centre Bar	SB-221 3003	204°C	AW-3003	65°C	H4100 A3003S	200°C
Parting Sheet ^{*4}	SB-209 3003	204°C	AW-3003	65°C	H4000 A3003P	200°C
Cap Sheet ^{*4}	SB-209 3003	204°C	AW-3003	65°C	H4000 A3003P	200°C
Header	SB-209, 221 & 241 3003 5052 5083 5454 6061	204°C 204°C 65°C 204°C 204°C	AW-5754 AW-5083	150°C 80°C	H4000 A3003P A5052P A5083P A5454P A6061P	200°C 200°C 65°C 200°C 200°C
Nozzle	SB-209, 221 & 241 3003 5052 5083 5086 5454 6061 SB-221 & SB-241 6063	204°C 204°C 65°C 65°C 204°C 204°C 204°C	AW-5754 AW-5083	150°C 80°C	H4080 & H4000 A3003TID&TE A3003P A5052TID&TE A5052P A5083TID&TE A5083P - A5086P A5454TE A5454P A6061 TD&TE A6061P A6063TID&TE	200°C 200°C 65°C 65°C 200°C 200°C 200°C
Flange	SB-247 5083 6061	65°C 204°C	AW-5083 AW-5754	80°C 150°C	H4140 A5083FD A6061FD	65°C 200°C
Support	SB-209 & 221 5052 5083 6061 6063	204°C 65°C 204°C 204°C	AW-5754 AW-5083 AC-AISI7Mg	150°C 80°C 130°C	H4000 A5052P A5083P A6061P	200°C 65°C 200°C

Remarks *1 : Maximum applicable temperature is as per ASME Sec. VIII, Div.1, where the official unit is British (degree F).

*2 : Maximum applicable temperature is as per AD2000-Merkblätter/Vd-TÜV, where the official unit is Metric (degree C).

*3 : Maximum applicable temperature is as per Japanese High Pressure Gas Safety Law, where the official unit is Metric (degree C).

*4 : They may be clad

Table 6-2: Typical Materials Used in the Construction of Brazed Aluminium Plate-Fin Heat Exchangers and their Maximum Applicable Design Temperature (Fahrenheit)

CODES	ASME		European Standard (EN)		JAPANESE INDUSTRIAL ST'D (JIS)	
	Alloy No.	Max. Applicable Design Temperature *1	Alloy No.	Max. Applicable Design Temperature *2	Alloy No.	Max. Applicable Design Temperature *3
Heat Transfer Fin	SB-209 3003 3004	400°F 400°F	AW-3003	150°F	H4000 A3003P A3004P	392°F 392°F
Distributor Fin	SB-209 3003 3004	400°F 400°F	AW-3003	150°F	H4000 A3003P A3004P	392°F 392°F
Side Bar	SB-221 3003	400°F	AW-3003	150°F	H4100 A3003S	392°F
Centre Bar	SB-221 3003	400°F	AW-3003	150°F	H4100 A3003S	392°F
Parting Sheet *4	SB-209 3003	400°F	AW-3003	150°F	H4000 A3003P	392°F
Cap Sheet *4	SB-209 3003	400°F	AW-3003	150°F	H4000 A3003P	392°F
Header	SB-209, 221 & 241 3003 5052 5083 5454 6061	400°F 400°F 150°F 400°F 400°F	AW-5754 AW-5083	302°F 176°F	H4000 A3003P A5052P A5083P A5454T A6061P	392°F 392°F 150°F 392°F 392°F
Nozzle	SB-209, 221 & 241 3003 5052 5083 5086 5454 6061 SB-221 & SB-241 6063	400°F 400°F 150°F 150°F 400°F 400°F 400°F	AW-5754 AW-5083	302°F 176°F	H4080 & H4000 A3003TID&TE A3003P A5052TID&TE A5052P A5083TID&TE A5083P - A5086P A5454TE A5454P A6061 TD&TE A6061P A6063TD&TE	392°F 392°F 150°F 150°F 392°F 392°F 392°F
Flange	SB-247 5083 6061	150°F 400°F	AW-5083 AW-5754	176°F 302°F	H4140 A5083FD A6061FD	150°F 392°F
Support	SB-209 & 221 5052 5083 6061 6063	400°F 150°F 400°F 400°F	AW-5754 AW-5083 AC Al Si7Mg	302°F 176°F 266°F	H4000 A5052P A5083P A6061P	392°F 150°F 392°F

- Remarks *1 : Maximum applicable temperature is as per ASME Sec. VIII, Div.1, where the official unit is British (degree F).
*2 : Maximum applicable temperature is as per AD2000-Merkblätter/Vd-TÜV, where the official unit is Metric (degree C).
*3 : Maximum applicable temperature is as per Japanese High Pressure Gas Safety Law, where the official unit is Metric (degree C).
*4 : They may be clad

END

ALPEMA
Braze Aluminium Plate-fin Heat Exchanger Manufacturers' Association

info@alpema.org
www.alpema.org

Appendix

This repeats the information in the main body of this document but without the highlighting so you are able to cut and paste the information into your full copy of the Standards.

Pages 13, 14 and 15. The following tables correct errors in the tables of tolerances which go with Figures 2-1, 2-2 and 2-3.

ITEMS	TOLERANCES	ITEMS	TOLERANCES
A, B, C, D, E, F	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm	H, I, J, K	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm
G	± 3°	N, O, P	± 3mm
		Q	± 1mm

Table with Figure 2-1: Important External Dimensions of One Core using the Core Centre Line

ITEMS	TOLERANCES	ITEMS	TOLERANCES
A, B, C, D, E, F	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm	H, I, J, K	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm
G	± 3°	N, O, P	± 3mm
		Q	± 1mm

Table with Figure 2-2: Important External Dimensions of One Core using the Support Base Line

ITEMS	TOLERANCES	ITEMS	TOLERANCES
A, B, C, D, E, F, G	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm	I, J, K	± 6mm for Dim ≤ 1000mm ± 8mm for 1000mm < Dim ≤ 2000mm ± 10mm for Dim > 2000mm
H	± 3mm	L	± 1°; max 5mm at flange periphery
		M	± 1°; max 5mm at bolt circle

**Table with Figure 2-3: Important External Dimensions of a
Manifolded Assembly of Two Cores: General Flange Details**

Page 35. Section 5.3 (**CODES AND CONSTRUCTION**) should be replaced by

The design, construction and testing of brazed aluminium plate-fin heat exchangers are governed by the existing national rules applying to pressure vessels.

The design of a heat exchanger is the result of the mechanical strength analysis of:

- the plate-fin structure under pressure
- the influence of headers on the plate-fin structure
- the header/nozzle assembly

Specific details regarding the design of the individual components are given in Section 5.15.

Brazed aluminium plate-fin heat exchangers are commonly designed under the provisions of the existing codes, typically:

ASME VIII, Div. 1
AD 2000 Regelwerk
CODAP
Japanese HPGS Law
AS 1210
Raccolta
Dutch Pressure Vessel Code
Swedish Pressure Vessel Code

Page 35. Section 5.4 (**TYPICAL MATERIALS OF CONSTRUCTION**) should be replaced by

Typical materials for use on the construction of brazed aluminium plate-fin heat exchangers are:

Core matrix (fins, plates, side bars)	3003 aluminium alloy
Headers/nozzles	5083 aluminium alloy

For a more comprehensive set of materials refer to Chapter 6.

Page 37. Section 5.7.1 (**Metal Temperature Limitations**) should be replaced by

The metal temperature limitations for the typical materials used are those prescribed by the codes.

ALLOY	ASME	AD2000-Merkblätter/VdTÜV
3003	-269 / +204°C	-270 / +65°C
5083	-269 / +65°C	-270 / +80°C

Refer to Chapter 6 for further information.

Page 43 and 44. Tables 6-1 and 6-2 should be replaced by the following versions

Table 6-1: Typical Materials Used in the Construction of Brazed Aluminium Plate-Fin Heat Exchangers and their Maximum Applicable Design Temperature (Celsius)

CODES COMPONENTS	ASME		European Standard (EN)		JAPANESE INDUSTRIAL ST'D (JIS)	
	Alloy No.	Max. Applicable Design Temperature ^{*1}	Alloy No.	Max. Applicable Design Temperature ^{*2}	Alloy No.	Max. Applicable Design Temperature ^{*3}
Heat Transfer Fin	SB-209 3003 3004	204°C 204°C	AW-3003	65°C	H4000 A3003P A3004P	200°C 200°C
Distributor Fin	SB-209 3003 3004	204°C 204°C	AW-3003	65°C	H4000 A3003P A3004P	200°C 200°C
Side Bar	SB-221 3003	204°C	AW-3003	65°C	H4100 A3003S	200°C
Centre Bar	SB-221 3003	204°C	AW-3003	65°C	H4100 A3003S	200°C
Parting Sheet ^{*4}	SB-209 3003	204°C	AW-3003	65°C	H4000 A3003P	200°C
Cap Sheet ^{*4}	SB-209 3003	204°C	AW-3003	65°C	H4000 A3003P	200°C
Header	SB-209, 221 & 241 3003 5052 5083 5454 6061	204°C 204°C 65°C 204°C 204°C	AW-5754 AW-5083	150°C 80°C	H4000 A3003P A5052P A5083P A5454P A6061P	200°C 200°C 65°C 200°C 200°C
Nozzle	SB-209, 221 & 241 3003 5052 5083 5086 5454 6061 SB-221 & SB-241 6063	204°C 204°C 65°C 65°C 204°C 204°C 204°C	AW-5754 AW-5083	150°C 80°C	H4080 & H4000 A3003TID&TE A3003P A5052TID&TE A5052P A5083TID&TE A5083P - A5086P A5454TE A5454P A6061 TD&TE A6061P A6063TID&TE	200°C 200°C 65°C 65°C 200°C 200°C 200°C
Flange	SB-247 5083 6061	65°C 204°C	AW-5083 AW-5754	80°C 150°C	H4140 A5083FD A6061FD	65°C 200°C
Support	SB-209 & 221 5052 5083 6061 6063	204°C 65°C 204°C 204°C	AW-5754 AW-5083 AC-AISI7Mg	150°C 80°C 130°C	H4000 A5052P A5083P A6061P	200°C 65°C 200°C

Remarks *1 : Maximum applicable temperature is as per ASME Sec. VIII, Div.1, where the official unit is British (degree F).

*2 : Maximum applicable temperature is as per AD2000-Merkblätter/Vd-TÜV, where the official unit is Metric (degree C).

*3 : Maximum applicable temperature is as per Japanese High Pressure Gas Safety Law, where the official unit is Metric (degree C).

*4 : They may be clad

Table 6-2: Typical Materials Used in the Construction of Brazed Aluminium Plate-Fin Heat Exchangers and their Maximum Applicable Design Temperature (Fahrenheit)

CODES	ASME		European Standard (EN)		JAPANESE INDUSTRIAL ST'D (JIS)	
	Alloy No.	Max. Applicable Design Temperature * ¹	Alloy No.	Max. Applicable Design Temperature * ²	Alloy No.	Max. Applicable Design Temperature * ³
Heat Transfer Fin	SB-209 3003 3004	400°F 400°F	AW-3003	150°F	H4000 A3003P A3004P	392°F 392°F
Distributor Fin	SB-209 3003 3004	400°F 400°F	AW-3003	150°F	H4000 A3003P A3004P	392°F 392°F
Side Bar	SB-221 3003	400°F	AW-3003	150°F	H4100 A3003S	392°F
Centre Bar	SB-221 3003	400°F	AW-3003	150°F	H4100 A3003S	392°F
Parting Sheet * ⁴	SB-209 3003	400°F	AW-3003	150°F	H4000 A3003P	392°F
Cap Sheet * ⁴	SB-209 3003	400°F	AW-3003	150°F	H4000 A3003P	392°F
Header	SB-209, 221 & 241 3003 5052 5083 5454 6061	400°F 400°F 150°F 400°F 400°F	AW-5754 AW-5083	302°F 176°F	H4000 A3003P A5052P A5083P A5454T A6061P	392°F 392°F 150°F 392°F 392°F
Nozzle	SB-209, 221 & 241 3003 5052 5083 5086 5454 6061 SB-221 & SB-241 6063	400°F 400°F 150°F 150°F 400°F 400°F 400°F	AW-5754 AW-5083	302°F 176°F	H4080 & H4000 A3003TID&TE A3003P A5052TID&TE A5052P A5083TID&TE A5083P - A5086P A5454TE A5454P A6061 TD&TE A6061P A6063TD&TE	392°F 392°F 150°F 150°F 392°F 392°F 392°F
Flange	SB-247 5083 6061	150°F 400°F	AW-5083 AW-5754	176°F 302°F	H4140 A5083FD A6061FD	150°F 392°F
Support	SB-209 & 221 5052 5083 6061 6063	400°F 150°F 400°F 400°F	AW-5754 AW-5083 AC Al Si7Mg	302°F 176°F 266°F	H4000 A5052P A5083P A6061P	392°F 150°F 392°F

Remarks *1 : Maximum applicable temperature is as per ASME Sec. VIII, Div.1, where the official unit is British (degree F).

*2 : Maximum applicable temperature is as per AD2000-Merkblätter/Vd-TÜV, where the official unit is Metric (degree C).

*3 : Maximum applicable temperature is as per Japanese High Pressure Gas Safety Law, where the official unit is Metric (degree C).

*4 : They may be clad