



ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

ALUMINUM BRAZING SHEET - HEADER STOCK

WSH-M2A139-A

1. SCOPE

The material defined by this specification is an aluminum sheet clad with brazing alloy on both sides.

2. APPLICATION

This material was released originally for fabrication of headers, tanks and baffles for vacuum brazed aluminum heaters.

3. REQUIREMENTS

3.1 STATISTICAL PROCESS

Suppliers must conform to the requirements of Ford Quality System Standard Q-101. A mutually acceptable Control Plan as described therein is required for material/source approval. Appropriate statistical tools must be used to analyze process/product data so that variation in the final product is continuously reduced.

3.2 CHEMICAL COMPOSITION PERCENTAGE (See 5.1)

	Core	Braze Clad
Silicon	0.6 max	9.2 - 10.2
Iron	0.8 max	0.5 max
Copper	0.40 - 0.60	0.10 max
Magnesium	0.10 max	1.25 - 1.75
Manganese	0.8 - 1.3	0.10 max
Bismuth	-	0.05 - 0.15
Chromium	0.05 max	-
Titanium	0.11 - 0.20	-
Zinc	0.10 max	0.10 max
Each Other Element	0.05 max	0.05 max
Total Other Elements	0.15 max	0.15 max
Aluminum	Balance	Balance

3.3 BRAZE CLAD THICKNESS

.091 mm to .137 mm (each side)

Date	Release No.	Release/Revision
1991 02 20	CE00E10109215005	3.3 Revised C. Gray
1990 08 02	RD885100-306	3.3 Revised C. C. Gray
1987 05 19	RD885100-129	Released C.F. Carter

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3.4 MECHANICAL PROPERTIES (Material as Supplied)
(ASTM B 557M)

	0 Temper

Ultimate Tensile Strength	117 - 165 MPa
Yield Strength, min	45 MPa
Elongation, min	20 %

3.5 GRAIN SIZE (Material as Supplied)
(ASTM E 112)

3.5 or finer

3.6 SUPPLIER'S RESPONSIBILITY

All materials supplied to this specification must be equivalent in all characteristics to the material upon which approval was originally granted.

Prior to making any change in the properties, composition, construction, color, processing or labeling of the material originally approved under this specification, whether or not such changes affect the material's ability to meet the specification requirements, the Supplier shall notify Purchasing, Toxicology and the affected Materials Engineering activity of the proposed changes and obtain the written approval of the Materials Engineering activity. Test data, test samples and a new code identification are to be submitted with the request.

Substance restrictions imposed by law, regulations or Ford, apply to the materials addressed by this document. The restrictions are defined in Engineering Material Specification WSS-M99P9999-A1, unless a different suffix (e.g., A2 or A3) is specified on the engineering document for the application.

4. APPROVAL OF MATERIALS

Materials defined by this specification must have prior approval by the responsible Materials Engineering activity. Suppliers desiring approval of their materials shall first obtain an expression of interest from the affected Purchasing, Design and Materials Engineering activity. Upon request, the Supplier shall submit to the affected Materials Engineering activity its own laboratory report to the specification (test results, not nominal values), the material designation and code number, and test specimens for Ford evaluation. Upon approval, the material will be added to the Engineering Material Approved Source List.