

MIL-STD-645B(MR)  
NOTICE 1  
17 February 1984

MILITARY STANDARD

DIP BRAZING OF ALUMINUM ALLOYS

TO ALL HOLDERS OF MIL-STD-645B(MR)

1. THE FOLLOWING PAGES OF MIL-STD-645B(MR) HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
7	23 November 1981	(REPRINTED WITHOUT CHANGE)	23 November 1981
8	17 February 1984	8	23 November 1981

2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

3. Holders of MIL-STD-645B(MR) will verify that page changes and additions indicated above have been entered. This notice will be retained as a check sheet. This issuance, together with the appended pages, is a separate publication. Each notice is to be retained by stocking points until the Military Standard is completely revised or canceled.

Custodian:  
Army - MR

Preparing activity:  
Army - MR

Review activities:  
Army - AR, CR, ER, MI

(Project No. THJM-A222)

User activity:  
Army - ME, AV

AREA THJM

## 5. POST-BRAZING PROCEDURE

### 5.1 General.

5.1.1 Cooling rate. Assemblies shall be cooled in air to approximately 400°F (204°C) in such a manner and rate, as determined by qualification pilot run, so that no cracks occur and internal stresses and distortion are minimized. When heat treatment is used in conjunction with brazing, cooling and quenching procedures shall be developed accordingly.

5.1.2 Flux removal. Immediately after brazing and cooling, flux shall be removed by a method which is not injurious to the surface finish, and which will not remove parent metal and filler metal to below drawing tolerances. A suitable test, such as the absence of a typical chloride precipitate in a 5 percent aqueous solution of silver nitrate on the cleaned and rinsed part, shall be used to determine that the flux has been adequately removed.

5.1.3 Quality of joint. Quality of joint shall be Grade A or Grade B or as specified on the drawing.

5.1.3.1 Contour. The contour of an outside fillet joint shall be of a uniform radius with a minimum amount of excess braze or flash over the adjacent surfaces.

5.1.3.2 In process corrections. Brazements containing Grade A joints may be rebrazed once to correct braze defects. After cleaning, add stop-off material and filler metal if needed, then preheat and rebraze in accordance with an approved Brazing Procedure Record. If a satisfactory braze is not achieved on completion of the rebraze cycle, the brazement shall be rejected. Brazements containing Grade B joints are allowed two rebraze cycles using the same rebrazing procedure as specified for Grade A brazements. If a satisfactory braze is not achieved on completion of the second rebraze cycle, the brazement shall be rejected.

## 6. DEFECTS

### 6.1 External defects. For Grade A and B joints.

6.1.1 External porosity (pinholes). This defect is the result of gases being expelled. It appears as a small, round, smooth-surfaced pocket on the surface of the filler metal. The maximum diameter permissible is 0.050 inch (1.27 mm) with a depth of not more than 10 percent of the braze depth. The total number of pinholes of maximum diameter permitted shall be one per linear inch (25.4 mm) of braze metal, or one per joint when the braze length is less than one linear inch (25.4 mm). There shall be no voids in the joint overlap area that are connected with surface porosity.

6.1.1.1 Concentrated surface porosity. An area of concentrated porosity, the largest dimension of which is 50 percent of the braze fillet width, is acceptable provided that the sum of diameters of the pinholes in the area does not exceed 0.050 inch (1.27 mm). No more than one such area of maximum size or two more with a total equivalent diameter shall occur per linear inch (25.4 mm) of braze fillet.

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6.1.1.2 Linear surface porosity. Linear surface porosity is defined as any surface porosity where the majority of the porosity is lined up in straight lines. Linear porosity is acceptable providing its length does not exceed 3/16 inch (4.76 mm) and the sum of the diameters of the pinholes in this length does not exceed 0.050 inch (1.27 mm). Linear porosity shall be acceptable provided that no more than one such defect occurs per linear inch (25.4 mm) of braze or one per joint where the braze circumference or length is less than one linear inch (25.4 mm).

6.1.2 Blisters. This surface condition, resulting from the overheating of the base metal, shall be cause for rejection.

6.1.3 Residual flux. No residual flux shall be permitted on the surface of a brazed assembly.

6.1.4 Excess braze metal. Brazing filler metal in excess of that required for the joint is acceptable providing the excess filler metal does not interfere with the function of the completed assembly or substantially detract from appearance.

6.1.5 Unmelted filler metal. Except where specifically permitted by applicable drawings or specifications, the presence of unmelted filler metal in a joint shall be cause for rejection of the assembly.

6.1.6 Undercutting. Melting or erosion of the base metal, adjacent to the brazed joint, is undesirable and shall be controlled by limiting this to a maximum of 5 percent of the stock thickness, and 15 percent cumulative, of the braze length or as specified on the drawings.

6.1.7 Penetration. Filler metal shall appear at all edges of a joint indicating proper flow through the joint. Lack of penetration shall be cause for rejection of the part.

6.2 Internal defects. For Grade A joints only.

6.2.1 Total aggregate area. The unbrazed area including trapped flux, scattered porosity, and voids shall not exceed 20 percent of the faying surface of the respective joint in any one inch (25.4 mm) of joint length.

6.2.2 Maximum extent of a single defect. No single unbrazed area shall exceed 20 percent of the overlap distance of the joint.

## 7 TEST METHODS

7.1 Inspection and test. Inspection and test procedure shall be in accordance with the requirements of MIL-I-6870 and as specified herein.

7.1.1 Visual examination. Brazed joints shall be visually examined to determine the quality of joint as specified in 5.1.3.1, 6.1 and 6.2. Fluorescent or dye penetrant MIL-I-6866 procedures may be used as inspection aids. All indicated flaws shall be checked visually under ten power magnification, maximum.