

UNCLASSIFIED

---

---

AD 285 372

*Reproduced  
by the*

ARMED SERVICES TECHNICAL INFORMATION AGENCY  
ARLINGTON HALL STATION  
ARLINGTON 12, VIRGINIA



---

---

UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

REPORT NO. FIDM-2154  
DATE: 14 September 1962

AS AD NO. 285372

285 372

MATERIAL: 7075-T6 ALUMINUM  
MATERIAL: 7075-T6 ALUMINUM

GENERAL DYNAMICS | FORT WORTH

**Best  
Available  
Copy**

## TEST DATA MEMORANDUM

F-TDM NO. 2154  
MODEL B-58  
TEST NO. F-8165

**TEST:** MATERIAL - CHOBERT 3/32 HOLLOW STEEL RIVETS - GALVANIC CORROSION EFFECTS  
WITH 7075 ALUMINUM - INVESTIGATION OF

**OBJECT:** To determine the susceptibility of the inside surface of Chobert rivets to corrosion when such rivets are used to attach FXW020 nutplates to 7075-T6 aluminum alloy.

**TEST SPECIMENS AND PROCEDURE:** Two assemblies were fabricated of 7075-T6 aluminum alloy using six sets of fasteners for each assembly. The fasteners consisted of FXW014-16\* titanium bolts and FXW020-55 aluminum nutplates which were joined to the 7075-T6 aluminum with Chobert type 224/310 steel rivets (cadmium plated) as shown in Figure 1. The 7075-T6 alloy was clad on one side, and the assembly was made such that the bare surfaces of the alloy were together (clad sides out). The two assemblies were identical with the exception that the rivets on one assembly received a wash prime treatment. A similar assembly was fabricated for use as a control. The control assembly contained MS20426-AD3 aluminum rivets instead of the steel rivets.

After fabrication, the specimens were exposed to 200 hour salt spray in accordance with FTMS151, Method 811.\* Photographs were made at 50 hour intervals. After salt spray exposure, the bolts and rivets were torqued using inch/pound torque wrench and the failure values were recorded.

**RESULTS:** Table I lists the torque values required to fail the bolts and rivets after 200 hour salt spray exposure. The operating conditions of the salt spray chamber during the test are given in Table II. Figures 1 thru 4 show specimens after each 50 hour salt spray exposure interval. Figure 5 shows bare aluminum which had been in contact with an aluminum rivet after 200 hours salt spray. Figure 6 is the same except Chobert steel rivets were used.

**DISCUSSION:** Information is needed to determine what effect salt spray exposures have upon the inside surface of Chobert rivets used to attach FXW 020 nutplates to 7075-T6 aluminum alloy.

Table I shows that no appreciable difference was found between the torque values of Chobert rivets with wash prime application and the same type rivets with no wash prime. In production these rivets are required to pass 95 - 110 in./lbs. torque without failure, and bolts are required to pass 190 - 210 in./lbs. without failure. All values in Table I are above those limits. Figure 4 shows that after 200 hours salt spray exposure the two assemblies (one with wash prime and one with no wash prime) are identical in appearance. It may be noted that the assembly with aluminum rivets is comparable to the two assemblies with Chobert rivets. More corrosion was evident on aluminum which had been in contact with the Chobert rivets than on that which had been in contact with aluminum rivets (see Figures 5 and 6). However, since the aluminum area is so much greater than the steel area, corrosion would be minor and the aluminum would soon become passive.

**CONCLUSIONS:** The results of this test show the following:

1. Significant corrosion did not occur in or near Chobert (cadmium plated steel) rivets when joined to FXW020 nutplates and 7075-T6 aluminum alloy and exposed to 200 hour salt spray.
2. The use of wash prime on Chobert rivets is not considered necessary in this application.

The tests described in this report were conducted between 8 December 1958 and 9 January 1959.

\*See notes on page 2.

WITNESS:

DATE: 30 January 1959

BY

CHECKED

APPROVED

J. L. Cozart  
E. W. Feltus  
J. E. H.  
K. E. Donner

TABLE I  
RESULTS OF TORQUE TESTS ON ALUMINUM ASSEMBLIES

TYPE RIVETS IN EACH ASSEMBLY	REQUIRED TORQUE TO FAIL			REQUIRED TORQUE TO SHEAR		
	1st NTPL*	2nd NTPL	3rd NTPL	4th NTPL	5th NTPL	6th NTPL
	BOLTS (IN/LBS)			RIVETS (IN/LBS)		
Chobert Type 224/310 Steel Rivets Plated with Cadmium (No wash prime)	260	300	**	170	160	150
Chobert Type 224/310 Steel Rivets Plated with Cadmium (Wash prime)	200	200	200	140	140	140
MS 20426-AD3 Aluminum Rivets	190	200	200			

\*NTPL - Nutplate  
 \*\*No Reading - (Missed exact reading at failure, but was in excess of 200 in./lbs.)

Notes for page 1:  
 FXW-020 nutplates were special GD/FW nutplates of 7075-T6 aluminum alloy.  
 FXW-014 bolts were special GD/FW bolts made from 4A1-4V Titanium alloy.  
 Salt spray was 20%.

# CONVAIR

A Division of General Dynamics Corporation  
FORT WORTH

Test No. F-8165  
N. O. 575-17-306  
Engineer J. L. Cozart  
Prepared by J. L. Cozart

TABLE II  
SALT SPRAY DATA AND RESULTS  
Cabinet No. 2

PAGE 3  
REPORT NO. FDM-2154  
MODEL B-58  
DATE 30 January 1955

TEMPERATURE OF BOX °F	AIR GAUGE PRESSURE Psi	TEMPERATURE OF HUMIDIFIER °F	SPECIFIC GRAVITY OF SALT SOLUTION	SPECIFIC GRAVITY OF FOG SOLUTION	ML. FOG/HR. COLLECTED IN 10 CM FUNNEL	PH OF SALT SOLUTION	PH OF FOG SOLUTION	INTERRUPTIONS			
								DATE	TIME OPENED	TIME CLOSED	REASONS
MAXIMUM 97°	12	110°	1.157	1.153	1.2	7.1	7.1				
MINIMUM 92°	12	100°	1.148	1.146	0.6	6.5	6.5				
<p>I. DESCRIPTION OF SPECIMENS AND/OR PARTS</p> <p>Size: 10" x 2" x 0.250" (complete assembly)</p> <p>Alloy and Condition: 7075-T6 aluminum, titanium bolts, rivets - steel with cadmium plate and aluminum</p> <p>Edges Sealed With: None</p> <p>Pre-Exposure Cleaning: MEK wipe</p>											
<p>II. No. of Specimens: 3</p>											
<p>III. Reason for Test or Use of Part: Check corrosion resistance of rivets</p>											
<p>IV. Exposure Time: 200 hours</p> <p>Date and Time in Chamber: 1-3-58 1-6-58 1-8-58 1-10-58</p> <p>Date and Time out of Chamber: 1-5-58 1-8-58 1-10-58 1-12-58</p>											
<p>V. Method of Specimen Support: Specimens flat on non-corrosive plexiglass rack.</p>											
<p>VI. Results and Remarks: (See Report)</p>											

ERRATA

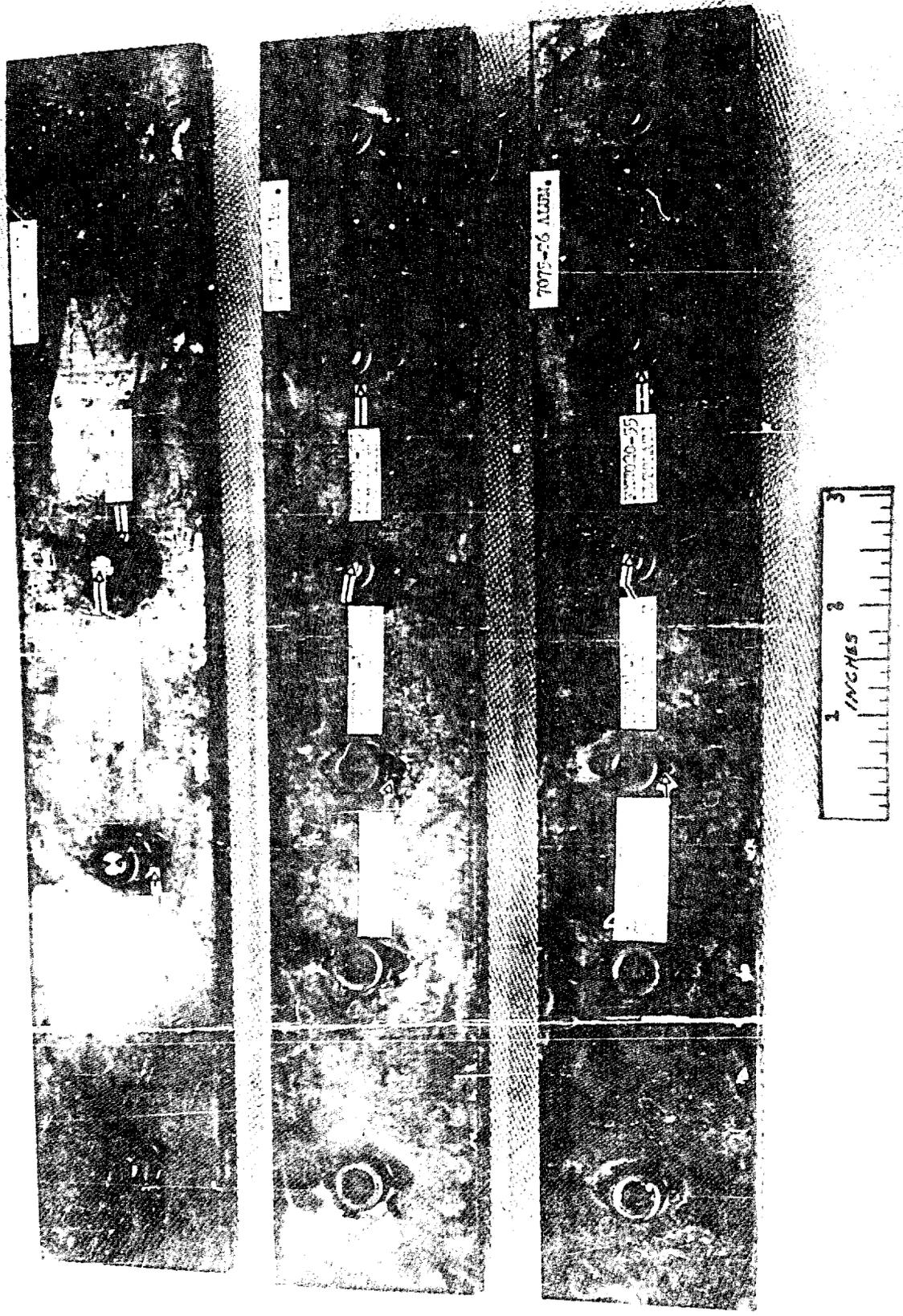
ERRATA

ERRATA

ERRATA

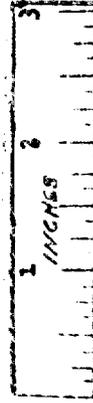
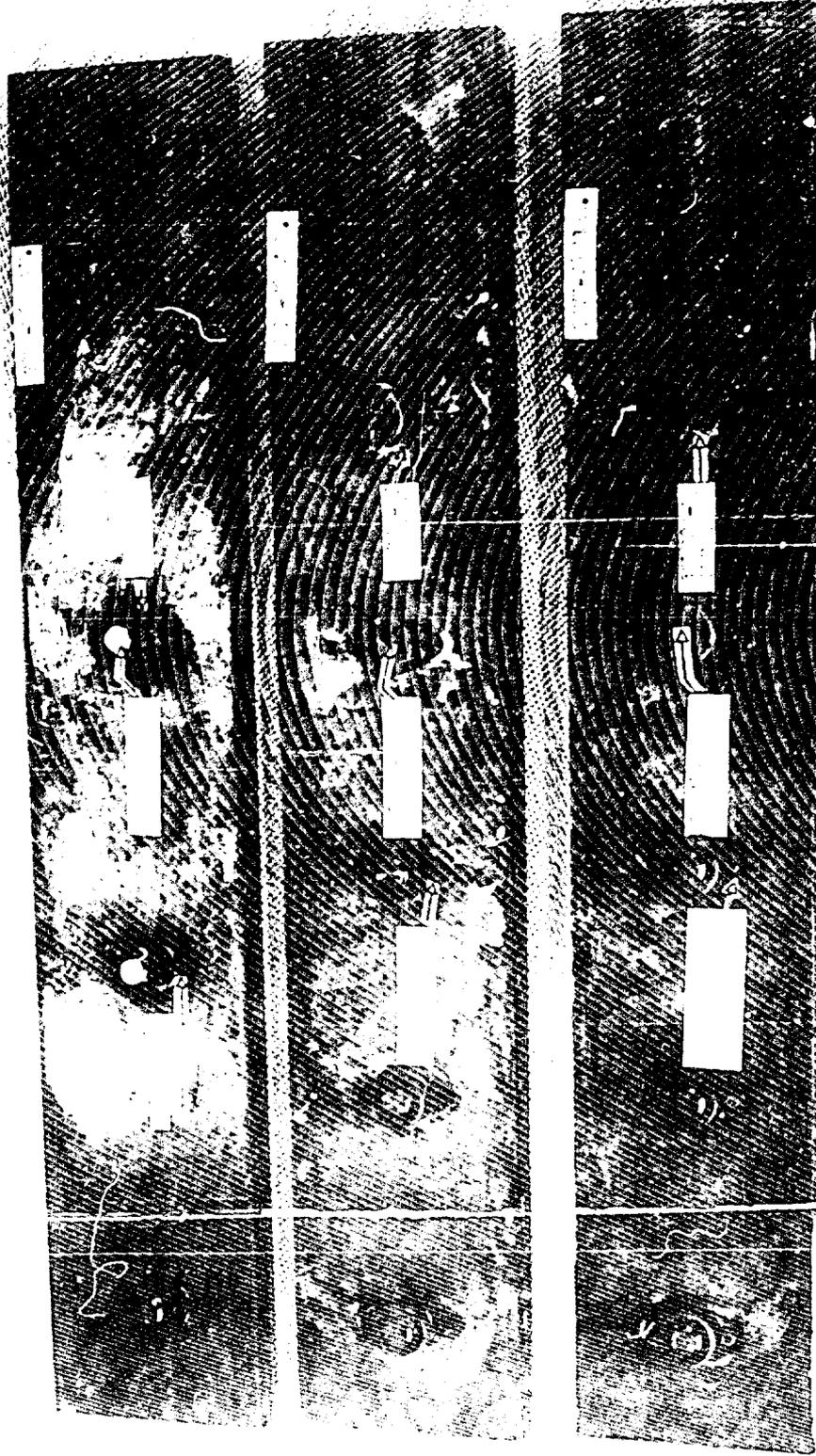
ERRATA

EFFECT OF 106 HOURS  
SALT SPRAY EXPOSURE

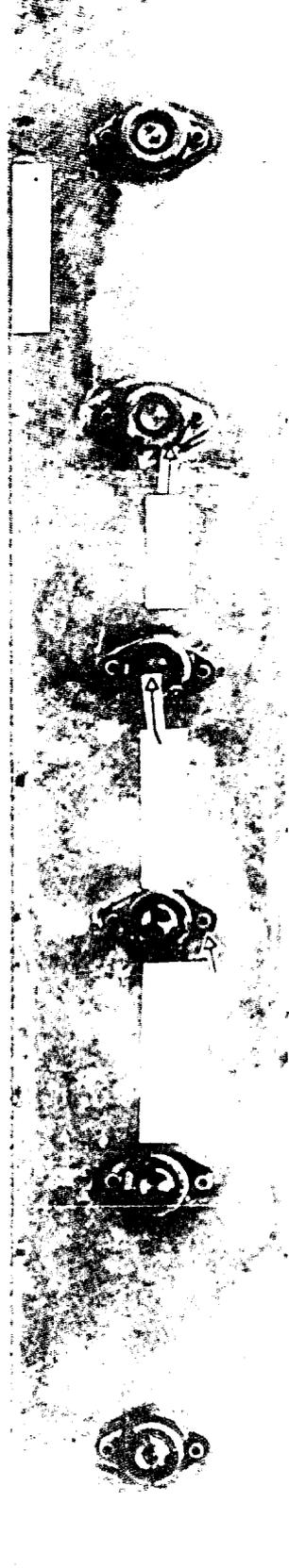
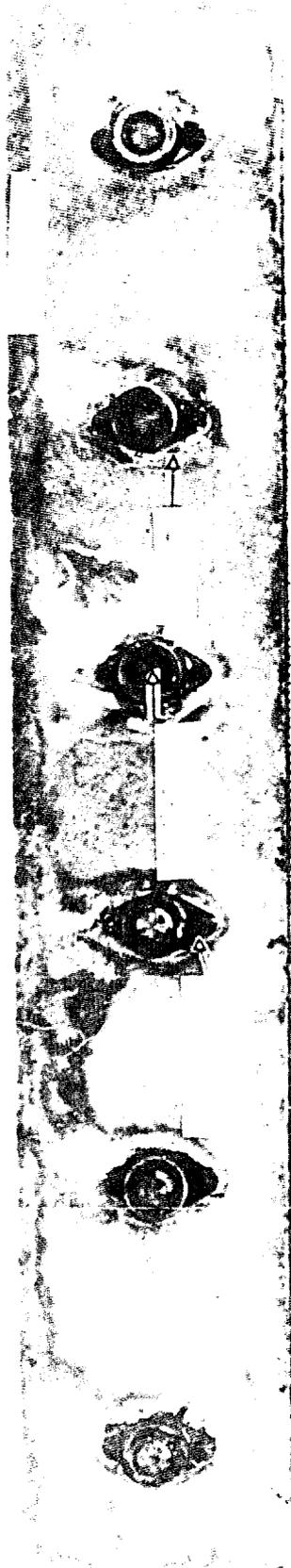
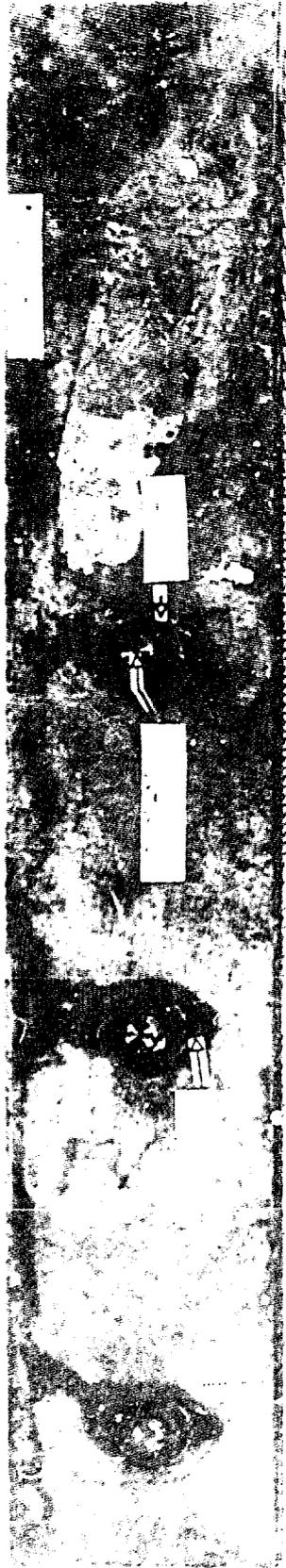


3  
INCHES  
2  
1

EFFECT OF 150 HOURS  
SALT SPRAY EXPOSURE



EFFECT OF 200 HOURS  
SALT SPRAY EXPOSURE



7075 BARRE ALUMINUM IN  
CONTACT WITH ALUMINUM  
RIVET AFTER 200 HRS.  
SALT SPRAY EXPOSURE.  
B-58 F-8165  
CONVAIR FT. WORTH TEXAS

