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Sample Identification: ASTM G31 Immersion Testing of Copper Alloys

Purchase Order#: Credit Card **Project Number**: P13-0402

Objective: We were requested to expose four (4) copper alloys to a solution of SDS+RTD at 30°C ± 2°C for a period of 72 hours in accordance with (IAW) ASTM G31. The solution was reported to have been in its most concentrated form for its application. The copper alloys are as follows:

Metal	UNS Number
90-10 Copper-Nickel	C70600
70-30 Copper-Nickel	C71500
*90-10 CuNi welded with 70-30 CuNi	C70600/71500
Bronze	C92200

Results: All alloys exposed to SRS+RTD for 72 hours at 30°C ± 2°C had corrosion rates less than the maximum permissible limits stated in MIL-STD-3026 , Section 5.2.2.

Alloy	Corrosion rate(mils/year)	Maximum Permissible Corrosion Rate
CDA706	5.4	8
CDA706/CDA715	4.9	8
CDA715	6.5	14
CDA922	6.9	7

Procedures and Data: Each test coupon was cleaned with acetone and thoroughly dried to ensure the sample was clean and contaminant free. Each coupon was then weighed to the nearest 0.0001g on an analytical balance. Glass rods were place at the bottom of the vessels to ensure that the sample coupons did not rest directly on the vessel bottom. The SRS+RTD solution was brought up to the requested 30°C ± 2°C. The sample coupons were not put into the solution until the desired temperature had been reached. Once 30°C had been achieved, the samples were submerged and placed in a manner that prevented them from contact with other coupons. Per the requirements of ASTM G31, the system was then closed using glass condensers. Upon the completion of the exposure period, the coupons were removed, rinsed with de-ionized water, acetone rinsed, dried with filtered, compressed air and placed in a desiccator for a period of 2 hours. The coupons were then re-weighed to determine a mass loss value to be used in the calculation of the corrosion rate.

Procedures and Data (continued):

Volume of Test Solution	Approximately 1200mL/ alloy
Temperature of Test solution	30°C ± 2°C
Aeration/Agitation	None
Type of Vessel	Flask sealed with high vacuum grease and condenser
Duration of Test	72 hours
Chemical Name	SRS+RTD
Specimen Form/Surface Area	1.3cm x 7.1cm metal coupon, 18.5 cm^2
Specimen Form/Surface Area	2.5cm x 5 cm metal coupon, 25cm^2
Surface treatment	Acetone rinse prior to collection of initial mass value

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The above tests were performed using one or more of the following specifications: ASTM A48, A247, A262, A370, B117, B328, B368, B748, E2 (SM 11-22), E3, E8, E9, E10, E18, E21, E23, E34, E45, E92, E112, E212, E290, E340, E350, E352, E353, E381, E384, E404, E407, E415, E562, E663, E766, E883, E986, E1019, E1024, E1077, E1086, E1251, E1508, G053, G154, ASME IX, AWS D1.1, MIL-S-867A, NAVSEA S9074-AQ-GIB-010/248, SAE J81, EN 10002 Part 1, EN 10045 Parts 1 & 2, EN 10204 Section 3.1.C, and Anderson Laboratories' Quality Manual Revision K dated 10/12/09. This report shall not be reproduced except in full, without the written approval of Anderson Laboratories, Inc. Results reported apply only to the sample submitted