



A QUAKER HOUGHTON COMPANY

Certificate of Conformance
SIFCO Process Solution

The solution identified below has been tested under controlled conditions and found to meet SIFCO Applied Surface Concepts specifications and Quality Assurance standards. This product does not contain, nor has it been contaminated with metallic mercury or mercury compounds. SIFCO ASC, LLC is a mercury free facility. This product is free from all foreign materials that could result in foreign object damage to the equipment or process.

Capability of Meeting Specifications

When properly selected and applied, this solution will meet LGPS1102. This solution meets the requirements for: MIL-STD-865E, AMS2451/4E, ASTM B117-19, ASTM F519-18, BAC5854M, DPS9.89P & PS 13113F.

Product Code	5070
Product Description	Cadmium LHE®
Batch Number	5070-2301100
Test Requirement	Actual Value
Specimen Type	1a1 Notch Bars per ASTM F519 Lot # 79H Sensitivity Pass Date: 08/23/2022 Notched Specimens per BAC5144 Lot # 164439-1-1-P Sensitivity Pass Date: 11/01/2021 2a rings per ASTM F519 Lot # 93118 Sensitivity Pass Date: 09/21/2022
pH	7.60 pH
Specific Gravity	1.251 Specific Gravity
Metal Content	100.4gm/L Metal Content
Hydrogen Embrittlement	CONFORMS
200 Hour Fracture Test	Pass AMS2451/4, MIL-STD-865, PS13113 and BAC5854 Report Number 23-77612
168 Hour Fracture Test	Pass DPS 9.89
250 Hour Corrosion Test	AMS 2451/4 and ASTM B117 / Lab Report #2302-02-0208
Solution Appearance	Yellow
Solution Manufacturing Date	January 30, 2023
HE Certification Pass Date	February 16, 2023
Recommended Shelf Life	MIL-STD-865 and AMS2451/4: January 30, 2027 BAC 5854, DPS 9.89 and PS 13113 Retest Before: Feb. 16, 2024



Quality Technician

02/20/2023

Date



"Specialists in Embrittlement Testing"

Date: February 16 2023

To: **SIFCO OH**
5708 Schaaf Road
INDEPENDENCE, OH 44131

Test Report: 23-77612

Reference P.O.: PO00009437
SN 1,2,3,4

Test: **NOTCH TENSILE HYDROGEN EMBRITTLEMENT**

Sample Identification: SAMPLES A, B, C, D:

Job / SN: SOLUTION 5070 BATCH 2301100

Process: BRUSH CADMIUM PLATE

PO Specification: MIL-STD-865E, AMS 2451/4E, PS13113F

Test Method Scope: ASTM F519-18

Receive Date: Feb 07, 2023
Test Start Date: Feb 07, 2023
Test End Date: Feb 16, 2023

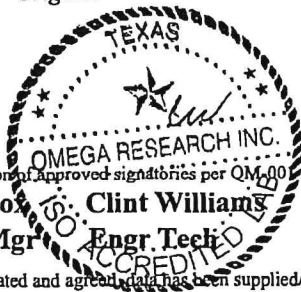
Sample Lot: 79H **Mfg.:** GREEN
Notched Ultimate Tensile Load: 9245 **Units:** LBS
Test Load: 6934 **Units:** LBS

Results: Conforms

The above identified notched tensile samples were subjected to a 200-hour sustained load test at a load of 75% of the Notch Ultimate Tensile Load (NUTL). Results above are applicable to submitted purchase order specifications. Additionally, results apply to the samples as received. Variances as applicable are noted at bottom right of report:

Report Revision: 1
Revision Description: 1 - Original

APPROVED



Testing performed under direct supervision of approved signatories per QM-001 ISO 17025 Quality Manual PARA 7.8.

Jeremy Riley **Joshua Cox** **Clint Williams**
Ops Mgr **Quality Mgr** **Engr. Tech**

Decision Rule: Per previously communicated and agreed, data has been supplied/reported as observed without accounting for measurement uncertainty.

Report invalid unless color seal present. Page 1 of 1

"Specialists in Embrittlement Testing"

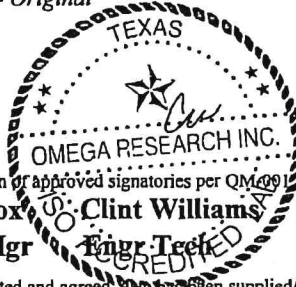
Date: February 16 2023
To: SIFCO OH
5708 Schaaf Road
INDEPENDENCE, OH 44131
Test Report: 23-77612
Reference P.O.: PO00009437
S/N 0177P, 0182P
Test: NOTCH TENSILE HYDROGEN EMBRITTLEMENT
Sample Identification: SAMPLES A, B:
Job / SN: SOLUTION 5070 BATCH 2301100
Process: BRUSH CADMIUM PLATE 1A2
PO Specification: BAC 5854M, BAC 5144
Test Method Scope: ASTM F519-18
Receive Date: Feb 07, 2023
Test Start Date: Feb 07, 2023
Test End Date: Feb 16, 2023
Sample Lot: P **Mfg.:** ONAMAC
Notched Ultimate Tensile Load: 15860 **Units:** LBS
Test Load: 11895 **Units:** LBS
Results: Conforms

The above identified notched tensile samples were subjected to a 200-hour sustained load test at a load of 75% of the Notch Ultimate Tensile Load (NUTL). Results above are applicable to submitted purchase order specifications. Additionally, results apply to the samples as received. Variances as applicable are noted at bottom right of report:

Report Revision: 1
Revision Description: 1 - Original
One sample was metallographically cross-sectioned longitudinally across the notch and evaluated at 80-100X magnification for complete plating coverage of the notch. Conforms. Photo attached Samples Loaded on individual frames.

Testing performed under direct supervision of approved signatories per QMS9120 ISO 17025 Quality Manual PARA 7.8.

Jeremy Riley Ops Mgr
Joshua Cox Quality Mgr
Clint Williams Engr. Tech



APPROVED

Decision Rule: Per previously communicated and agreed, data has been supplied/reported as observed without accounting for measurement uncertainty.

Report invalid unless color seal present. Page 1 of 1



"Specialists in Embrittlement Testing"

Date: February 16 2023

To: SIFCO OH
5708 Schaaf Road
INDEPENDENCE, OH 44131

Test Report: 23-77612

Reference P.O.: PO00009437
S/N 0182P

Test: PHOTOMICROGRAPH

Sample Identification: SAMPLE A:

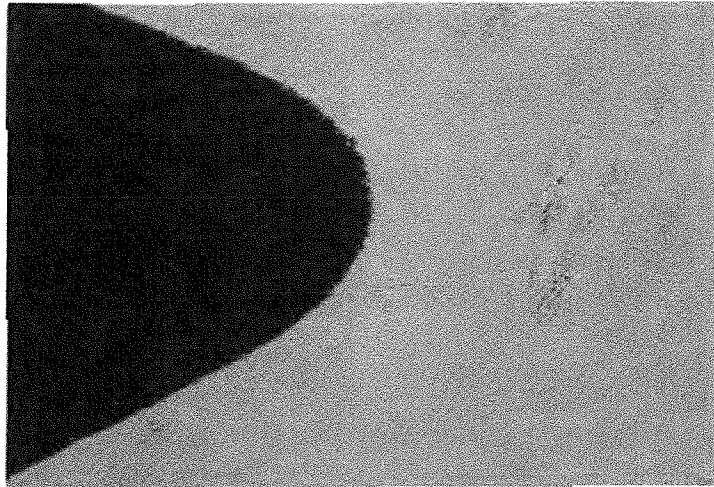
Job / SN: SOLUTION 5070 BATCH 2301100

Process: BRUSH CADMIUM PLATE 1A2

PO Specification: BAC 5854M, BAC 5144

Test Method Scope: ASTM E3-11(2017)

Receive Date: Feb 07, 2023



Report Revision:
1

Revision Description:

1 - Original

Testing performed under direct supervision of approved signatories per OM-008 ISO 17025 Quality Manual PARA 7.8.

Jeremy Riley **Joshua Cox** **Clint Williams**
Ops Mgr **Quality Mgr** **Engr Tech**

Decision Rule: Per previously communicated and agreed, data has been supplied/reported as observed without accounting for measurement uncertainty.

Report invalid unless color seal present. Page 1 of 1





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CERTIFIED TEST REPORT

Sifco ASC
5708 E Schaaf Rd
Independence OH 44131

Job No.: 2302-02-0208
Date: 2-15-2023
Cust. PO#: PO00009436

Description: 1 sample Solution Code: 5070 Batch# 2301100

Material: Steel with Cadmium Plating with 3002 Conversion Coating

Spec: AMS 2451/4E

TEST RESULTS

250 Hour Salt Spray (ASTM B117-19)

Cust. Reqs.: Shall show no visual evidence of corrosion on significant surfaces after being subjected for 250 ±1 hour

Test panel exhibited no corrosion products.

Note: Panel exposed at 15° to 30° from vertical.

(See attached photo)

APPROVED
DS 2/16/23

The above conforms to requirements listed.

Michael R. Gypka
Authorized Agent



CERTIFIED TEST REPORT

Job No.: 2302-02-0208

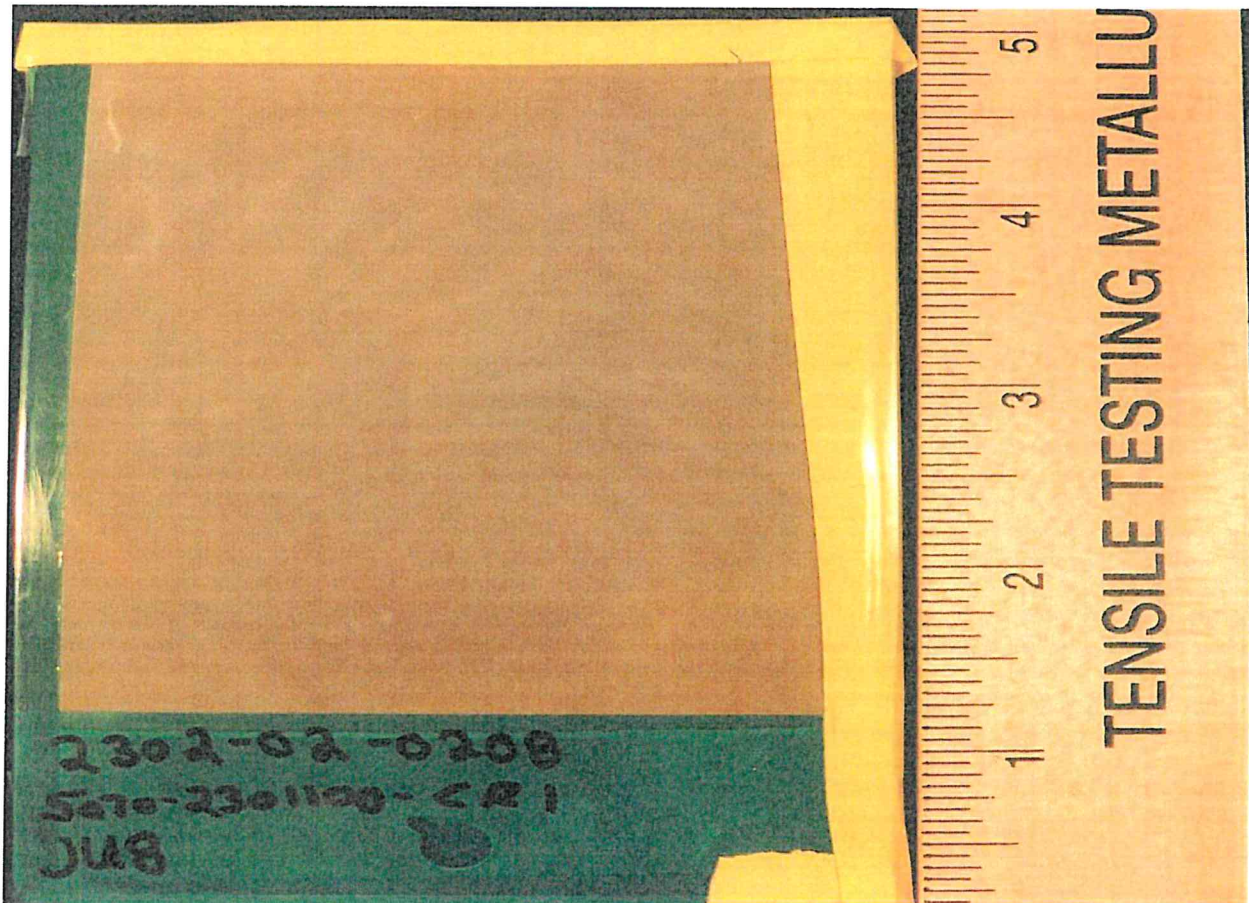


Figure No.: 1

Batch# 2301100
After 250 Hours