

## Certificate of Compliance

Customer	The University of Arizona	Revision:	1.0b
Address	1303 E University Blvd, Box 5 Tucson AZ 85719	Date Code	2040
Part Number	GUSTO-UA-DWG-00342	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422296 - 1.00
Sierra Tool Number	171653	Date Shipped	10/8/2020
Number of Layers	8		
Surface Finish	HAL		
Quantity of PCB Shipped:	3		

(Plus solder sample if required.)

### Compliance to:

Master Drawing	None		
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3	and IPC-1601, IPC-A-600 (latest revision)	
Lead Free	No	NASA Outgassing	No
RoHS / REACH *	Yes, with exception of Lead in surface finish.	Positive Etch Back	No
UL	---	Halogen Free	No
Special ID, marking, comments	None		

### Specific paragraphs and inspection items:

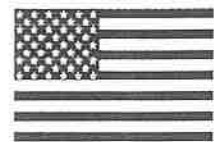
<p>3.2 Material  <b>Visual</b>          3.3.1 Edges of Printed Board          3.3.2 Laminate Imperfections          3.3.3 Plating and Coating Voids in the Hole          3.3.4 Lified Lands          3.3.5 Marking and Traceability          3.3.9 Workmanship  <b>Solderability</b>          3.3.6 Surface          3.3.6 Plated Through Holes  <b>Dimensional</b>          3.4 Printed Board Dimensional          3.4.1 Hole Size          3.4.1 Hole Pattern Accuracy          3.4.1 Pattern feature accuracy          3.4.2 Annular ring (external)          3.4.3 Bow and twist          3.7 Solder Mask Coverage          3.6.2.11 Plating / coating thickness  <b>Conductor Width &amp; Spacing</b>          3.5.1 Internal and External Width          2.5.2 Internal and External Spacing</p>	<p>IPC-6012</p>	<p><b>Conductor Surfaces</b>          3.3.8 junction of gold plate to solder finish          3.5.4.1 Nick, dents, pinholes          3.4.4.5 - 7 Dewetting / nonwetting / final finish coverage          3.5.4.4 Edge printed board connector          3.5.4.2 Surface mount  <b>Physical</b>          3.3.7 Plating adhesion          3.7.2 Solder mask cure and adhesion  <b>Structural Integrity After Thermal Stress</b>          3.6.2.1 Plating integrity          3.6.2.3 Laminate voids          3.6.2.6 &amp; 8 Etchback / negative etchback          3.6.2.9 Annular ring and Breakout (internal)          3.6.2.10 Lified Lands          3.6.2.11 Hole plating thickness          3.6.2.15 Surface plating and conductor thickness          3.6.2.14 Copper foil thickness (internal)          3.6.2.16 Metal core spacing          3.6.2.17 Dielectric thickness          3.6.2.18 Material fill of Blind and Buried Vias  <b>Cleanliness</b>          3.9.1 Cleanliness prior to solder mask application          Foreign Object Debris (FOD)</p>
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The above order has been both visually inspected, microsection, tested, and conformed to the customer specification, customer's master drawings, and purchase order.

All material used in the manufacture of the above order meet the material and manufacturing specifications as specified on the customer's drawings and purchase order subject to subsequent communication / agreement. Sierra Circuits hereby certifies that the item was last substantially transformed ("Substantially Transformed") in the United States of America. Sierra hereby certifies that the information is accurate and TAA Compliant, which is defined to mean that the article is wholly the growth, product or manufacture of the U.S.A. or Substantially Transformed in the U.S.A.

"RoHS / REACH" Compliant Manufactured in the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as regulated by the European Union dated 18 December 2006. Furthermore, they do not contain any of the 174 materials that are considered substance of very high concern (SVHC), updated on July 7, 2017.  
 (refer to URL <http://ec.europa.eu/environment/>)

MADE IN



U. S. A.

*Marina Demayo*

Inspector

*October 8, 2020*

Date



1108 West Evelyn Ave., Sunnyvale, CA 94086  
 Cage Code: 0ZHS4  
 (408) 735-7137  
[ales@prtkexpress.com](mailto:ales@prtkexpress.com)  
[www.prtkexpress.com](http://www.prtkexpress.com)

### Boards Shipped to IPC Specifications

Customer: The University of Arizona	SN Range	Boards shipped per C of C =
Address: 1303 E University Blvd, Box 3, Tucson AZ 85719	from	Boards shipped per this form =
Part # G167C-USA-DWG-000342	to	IPC-6012 Rev D Amd 1, Class 3
PO # 59272line 3, COIN 24101	Specification / Rev / Amd:	
	1	

Panel SN#	Board SN#	Tool Number	Work Order	Boards per Panel
SIN #001	1	171653	422296	1
SIN #003	3			1
	4			1

*Deliver the board serial numbers that did not ship*

# SIERRA CIRCUITS

1108 West Evelyn Ave., Sunnyvale, CA 94086  
Cage Code: 0ZHS4  
(408) 735-7137  
files@protoexpress.com  
www.protoexpress.com

## Electrical Test Certificate of Compliance

Customer	The University of Arizona	Revision	1.0b
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	Date Code	2040
Part Number	GUSTO-UA-DWG-00342	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422296 - 1.00
Sierra Tool Number	171653	Date Tested	10/7/2020
Number of boards Passed	7	Boards shipped might be less then the boards that passed electrical test.	

### Compliance to:

Master Drawing None  
Specification / Rev / Amd IPC-6012 Rev D.Amd 1, Class 3

Test Level C  
Test Method Resistive

### Test Stamp:

Stamped on PCB

### Resistive Test Parameters:

Isolation (Shorts/Leakage) Meg Ohms 10  
Continuity (Open) 10  
Voltage 40  
Adjacency Used Yes  
Horizontal Distance 0.05  
Vertical Distance 0.05  
Source Data Used Net List from Gerber Data  
Additional Comments None



### High Potential (Hi-Pot):

Voltage No Requirement

Comments or addition results: None

Sierra Circuits, Inc. certifies that this work order has been electrically tested in accordance with IPC-9252 "Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards"  
The above order has been electrical tested, and conformed to the order specifications and the customer's drawings & purchase order.

*78-Sukhpal Kaur*

*October 7, 2020*

Inspector

Date





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## Certificate of Compliance - Dimension

Customer The University of Arizona  
 Address 1303 E University Blvd. Box 5 Tucson AZ 85719  
 Part Number GUSTO-UA-DWG-00342  
 Purchase Order # 559272/line 3, COIN 24101  
 PCB Type Type 3  
 Sierra Tool Number 171653

**Lot Conformance Inspection (LCI)**

Revision 1.0b  
 Date Code 2040

Manufactured Work Order 422296 - 1,00  
 Number of Pnl in Work Order 2  
 Number of Bds Released 8  
 Boards per Panel 4  
 Sample Size Required 2

**Compliance to:**

Master Drawing None

Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3

Disposition:  Accept  Reject

Comments:

Marina Demayo

October 8, 2020

Inspector

Date

Item	Nominal (Print Spec)	Tolerance		Measurement from Boards					Measurement Tool Serial Number & Calibration Date
		+	-	Board #1 <small>001-001</small>	Board #2 <small>1-003</small>	Board #3	Board #4	Board #5	
1	5.079	0.005	0.005	5.079	5.079				caliper/dr7305/5-20-21
2	8.976	0.005	0.005	8.976	8.976				caliper/dr7305/5-20-21
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									



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## Certificate of Compliance - Hole Size

Customer The University of Arizona  
 Address 1303 E University Blvd. Box 5 Tucson AZ 85719  
 Part Number GUSTO-UA-DWG-00342  
 Purchase Order # 559272/line 3, COIN 24101  
 PCB Type Type 3  
 Sierra Tool Number 171653

### Lot Conformance Inspection (LCI)

Revision 1.0b  
 Date Code 2040  
 Manufactured Work Order 422296 - 1.00  
 Number of Pnl in Work Order 2  
 Number of Bds Released 8  
 Boards per Panel 4  
**Sample Size Required 2**

### Compliance to:

Master Drawing None

Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3

All dimensions in inches.

Comments:

Disposition:

Accept

Reject

*Marina Demayo*

*October 8, 2020*

Inspector

Date

Hole Symbol or Type	Nominal (Print Spec)	Tolerance		Measurement from Boards (Holes) & Serial Numbers					Measurement Tool Serial Number
		+	-	Board #1 001-001	Board #2 1-003	Board #3	Board #4	Board #5	
via	0.013	0.003	0.003	via	via				pingage/1006063
plated	0.022	0.003	0.003	0.022	0.022				pingage/1006063
plated	0.028	0.003	0.003	0.028	0.028				pingage/1006063
plated	0.035	0.003	0.003	0.035	0.035				pingage/1006063
plated	0.039	0.003	0.003	0.039	0.039				pingage/1006063
plated	0.045	0.003	0.003	0.045	0.045				pingage/1006063
plated	0.055	0.003	0.003	0.055	0.055				pingage/1006063
plated	0.055	0.003	0.003	0.055	0.055				pingage/1006063
plated	0.095	0.003	0.003	0.095	0.095				pingage/1005958
plated	0.106	0.003	0.003	0.106	0.106				pingage/1005958
non_plated	0.125	0.003	0.003	0.125	0.125				pingage /1005958
plated	0.126	0.003	0.003	0.126	0.126				pingage/1005958
plated	0.130	0.003	0.003	0.130	0.130				pingage/ 1005958
non_plated	0.200	0.003	0.003	0.200	0.200				pingage/1005958



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## Certificate of Compliance - Bow & Twist

Customer The University of Arizona  
 Address 1303 E University Blvd. Box 5 Tucson AZ 85719  
 Part Number GUSTO-UA-DWG-00342  
 Purchase Order # 559272/line 3, COIN 24101

### Lot Conformance Inspection (LCI)

Revision: 1.0b  
 Date Code 2040  
 Work Order 422296 - 1.00

Board Length 5.08 inches  
 Board Width 8.98 inches  
 Panels in lot 2  
 # of Samples 2

Sierra Tool Number 171653

### Compliance to:

Master Drawing None  
 Specification / Rev / Amd IPC-6012 Rev D Amd 1, Class 3  
 Design Surface mount components

Specification 0.75%

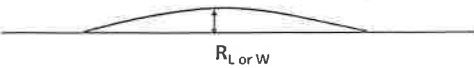
Bow									
Board #	S/N #	Length (L)	Width (W)	Go/No-Go gauge for sample length R <sub>L</sub>	Go/No-Go gauge for sample width R <sub>W</sub>	Max. height off table along Brd length (inches) R <sub>L</sub>	Max. height off table along Brd width (inches) R <sub>W</sub>	% Bow <sub>L</sub>	% Bow <sub>W</sub>
1	1-001	5.080	8.980	0.038	0.067	0.000	0.000	0.00%	0.00%
2	1-003	5.080	8.980	0.038	0.067	0.000	0.000	0.00%	0.00%
3									
4									
5									

#### Calculations for Bow:

$R_L = L(B) / 100$        $\% \text{Bow}_W = (R_W / W) \times 100$   
 $R_W = W(B) / 100$        $\% \text{Bow}_L = (R_L / L) \times 100$

#### Where:

R<sub>L</sub> = Go/No-Go feeler / pin gage size for sample length  
 R<sub>W</sub> = Go/No-Go feeler / pin gage size for sample width  
 L = Board Length measurement  
 W = Board Width measurement  
 B = Maximum allowable Bow %



#### Calculations for Twist:

$\% \text{Twist} = (R / (2 \cdot D)) \times 100$

#### Where:

L = length of board (inches)  
 W = width of board (inches)  
 R<sub>D</sub> = max. height off table along diagonal board length (inches)  
 D = diagonal board length (inches)  
 R = max. corner height above table (inches)



Note: Any R values of 10 mils or less are considered negligible and are listed as "0"

Twist						Overall Rating	
Board #	S/N #	Diagonal Length (D)	Go/No-Go gauge for sample length R <sub>D</sub>	Max. corner height above table (inches) R	% Twist	Bow & Twist Pass / Fail	Remarks / Comments
1	1-001	10.317	0.155	0.000	0.00%	Pass	
2	1-003	10.317	0.155	0.000	0.00%	Pass	
3							
4							
5							

Measurement Tool Used	granite surface	Serial Number	cr5268	Calibration Date:	1/20/2021
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#### Comments:

Any board rejection requires 100% sort and retest.

*Marina Demayo*

Inspector

*October 8, 2020*

Date

**TAIYO AMERICA, INC.**  
 2675 Antler Drive, Carson City, NV 89701  
 Phone: (775) 885-9959 Fax: (775) 885-9972

**CERTIFICATE OF ANALYSIS and CONFORMANCE**

This is to certify that the following product has been inspected prior to sale and shipment, and complies with Taiyo America's manufacturing specifications for this product.

This product meets all the requirements of IPC-SM-840E Classes H and T and Bellcore (Telecordia) GR-78-CORE and is UL recognized 94V-0 (File #E166421, UL Name: PSR-4000JA).

PSR-4000 LDI (US)	Lot # 0073117	Mfg. Date: 7-31-20	Warranty Ends: 1-31-21
<u>PROPERTY</u>	<u>TEST METHOD</u>	<u>MANUFACTURING SPECIFICATION</u>	<u>RESULT</u>
VISCOSITY	Toki Sangyo RE100U Viscometer 5 rpms @ 25°C	Before mixing: Report Only After mixing: 220 - 270 ps	427 ps 251 ps
THIXOTROPIC INDEX	Toki Sangyo RE100U Viscometer Viscosity ratio: 5 rpm / 50 rpm	After mixing: Report Only	1.4
FINENESS OF GRIND	TAI-0-0002	5 microns maximum	5 microns

<b>VISUAL EXAMINATION</b>	Microscopic examination:		
	1. 1-mil drawdown of wet film	No bubbles, pits, voids, particles, color differences.	Passed <input checked="" type="checkbox"/>
	2. Wet film drawdown on grind gauge	No bubbles, pits, voids, particles, color differences.	Passed <input checked="" type="checkbox"/>
<b>SCREENABILITY</b>	Visual inspection of screen printed panel	No surface defects, such as bubbles, pinholes, etc.	Passed <input checked="" type="checkbox"/>
<b>TACK-DRY</b>	Hot air convection oven 80°C / 30 minutes	Tack-free to the touch	Passed <input checked="" type="checkbox"/>
<b>IMAGING</b>	ORC HMW 680GW - 7 kW 100 mJ / cm <sup>2</sup> Horizontal Developer - 1% Na2CO3 30°C (86°F) / 60 secs., 28 psi	Stouffer 21 step: 12 - 16 (clear on copper)	14
<b>RESISTANCE TO SOLDERING (*)</b>	260°C (500°F) / 30 sec x 1 cycle Rosin-based flux	No discoloration, peeling, or blistering	Passed <input checked="" type="checkbox"/>
<b>SOLVENT RESISTANCE (*)</b>	Immersion in PM Acetate 20°C / 20 mins.	No swelling, softening, or blistering	Passed <input checked="" type="checkbox"/>
<b>PENCIL HARDNESS (*)</b>	TAI-0-0020	6H or greater	8H
<b>ADHESION (*)</b>	TAI-0-0021	100/100 on copper	Passed <input checked="" type="checkbox"/>

(\*) - Final cure for these tests was 60 minutes @ 150°C (302°F) in a convection oven

Verified By: [Signature]  
 Name, Title, Date



DATE : 2020.08.04

# INSPECTION CERTIFICATE

PRODUCT

IJR-4000 FW100

LOT NO.

20200804211

This is to certify that the above mentioned product(s) has duly complied with the requirements of our Quality Conformance Tests, conducted prior to Ex-factory;

This Product meets the requirements of IPC-4781 and the performance requirements of A-A-56032D, Type II, as it applies to printed circuit board applications.

ITEMS	TEST METHOD	SPECIFICATIONS	RESULT
Viscosity	Cone-Plate Type 5rpm / 50°C	10.5 ±1.0cPs	9.5
Pencil Hardness	≥ 3H /on Solder resist	The solder resist must not be seen	4H
Solder Heat Resistance	10sec.×3times/260°C(K-920)	No ink peeling	Pass
Adhesion	Cross Cut 10×10	100/100 No peeling	Pass

Expiration date : 2021-01-01

Please avoid from direct sunlight and keep the optimum temperature( 10~20°C ).

We secure above data.

**TAIYO INK MFG. CO., (KOREA) LTD.**  
166, Manhae-ro, Danwon-gu, Ansan-si,  
Gyeonggi-do, Korea.  
POST CODE: 425-839

**MANAGER : KWANG SEOK, HAN** 

Quality Certificate	
Date	08/07/2020
Purchase order item/date	100243776 12 / 07/23/2020
Shipping plant	Isola Ridgeway, USA
Delivery item/date	82667103 014 / 08/07/2020
Order item/date	1384076 012 / 07/23/2020
Customer number/materialnumber	1003432 / 3H100YYY180240

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130  
**Ship To Address:**  
 Insulectro  
 20362 Window Drive  
 Lake Forest CA 92630

  
**Purchase order item:** 100243776 12  
  
**Materialnumber:** 3H100YYY180240  
  
**Delivery date:** 08/07/2020

  
**Delivery item:** 82667103 014  
  
**Order item:** 1384076 012

**Made In USA**

**Material:** 10.087.107 PCL370HR C0100 S1 S1 222 18.00X24.00

**Construction:** 02X1652 **Grain:** 24.000 " **Surface:** C

**IPC-4101E/98** L 98 0100 S1 /S1 C C

**UL Name:** PCL-FR-370HR

**UL-File:** E41625 **Also meets:** IPC-4101E/99/101/126

Glass fabric: IPC-4412B  
 Copper: IPC-4562A-WAM1

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.

 **Batch:** 16387751 **Quantity:** 211 PC  


  
**Production date:** 08/04/2020

Characteristic	Method	Unit	Value	LSL	USL
Laminate base thickness	IPC-TM-650 2.2.18	"	0.00970	0.00910	0.01090
Peel Strength	IPC TM 650	-	Pass	-	-
Substrate Visual Inspection	-	-	Pass	-	-
Thermal Stress Etched	-	-	Pass	-	-
Thermal Stress Unetched	-	-	Pass	-	-

**All materials certified are RoHS Compliant.**

Approved by:



Pieter Vande Vusse  
 Quality Manager, Isola Ridgeway Site

## Quality Certificate

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:  
Insulectro  
20362 Window Drive  
Lake Forest CA 92630

Date  
07/16/2020  
Purchase order item/date  
100241739 4 / 06/30/2020  
Shipping plant  
Isola Ridgeway, USA  
Delivery item/date  
82659477 031 / 07/16/2020  
Order item/date  
1379815 004 / 06/30/2020  
Customer number/materialnumber  
1003432 / 3HH8380



Purchase order item: 100241739 4



Delivery item: 82659477 031



Material number: 3HH8380



Order item: 1379815 004



Delivery date: 07/16/2020

Made In USA

Material: 10 162 981 PCL370HR 1080 U71 38.00

IPC-4101E/98

P 98 E1080

UL Name: PCL-FRP-370HR

UL-File: E41625

Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16348207

310



Quantity: 500.000 YD



Expiry date: 02/10/2021



Production date: 07/15/2020

Characteristic	Method	Unit	Value	LSL	USL
Resin content AVE	IPC-TM-650 2.3.16.1	%	71.1	69.5	72.5
Minimum viscosity AVE	IPC TM 650	Pas	31.21	20.00	45.00
Flow Window AVE	Isola Internal Test Metho	s	391	300	400
Visual Inspection	-	-	Pass		

Prepreg shelf life is dependent upon storing the material in less than 23 degrees C or 73 degrees F and less than 50% RH.

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse  
Quality Manager, Isola Ridgeway Site

## Quality Certificate

Isola Ridgeway, USA 100 Tillessen Boulevard Ridgeway 29130

Ship To Address:  
 Insulectro  
 20362 Window Drive  
 Lake Forest CA 92630

Date  
 07/21/2020  
 Purchase order item/date  
 100242942 4 / 07/14/2020  
 Shipping plant  
 Isola Ridgeway, USA  
 Delivery item/date  
 82661125 016 / 07/21/2020  
 Order item/date  
 1382262 004 / 07/14/2020  
 Customer number/material number  
 1003432 / 3H80380



Purchase order item: 100242942 4



Material number: 3H80380



Delivery date: 07/21/2020



Delivery item: 82661125 016



Order item: 1382262 004

Made In USA

Material: 10.077.036 PCL370HR 1080 U66 38.00

IPC-4101E/98 P 98 E1080

UL Name: PCL-FRP-370HR

UL-File: E41625

Also meets: IPC-4101E/99/101/126

Glass fabric: IPC-4412B

This material has been manufactured, tested and certified in accordance with the above specified IPC specification and the applicable slash sheet.



Batch: 16355951 310



Quantity: 631.000 YD



Expiry date: 02/14/2021



Production date: 07/19/2020

Characteristic	Method	Unit	Value	LSL	USL
Resin content AVE	IPC-TM-650 2.3.16.1	%	65.1	64.5	67.5
Minimum viscosity AVE	IPC TM 650	PaS	33.48	20.00	45.00
Flow Window AVE	Isola Internal Test Metho	s	330	300	400
Visual Inspection	-	-	Pass		

Prepreg shelf life is dependent upon storing the material in less than 23 degrees C or 73 degrees F and less than 50% RH.

All materials certified are RoHS Compliant.

Approved by:

Pieter Vande Vusse  
 Quality Manager, Isola Ridgeway Site



# Certificate of Compliance

6920 Pacific Circle,  
Mississauga, ON L5T 1N8  
Phone (905) 362-8404  
Fax (905) 362-0312  
www.advancedcopperfoil.com

Waybill #:   
Shipment: 2079179  
Shipment Date: Sep 23, 2020  
Customer: 16588-ACF  
P.O. #: 150119PN  
Order #: 755867  
Ship Via: MATRIX TRUCK  
Page: 1

## BILL TO

SIERRA PROTO EXPRESS  
1108 WEST EVELYN AVENUE  
SUNNYVALE, CA 94086  
USA

## SHIP TO

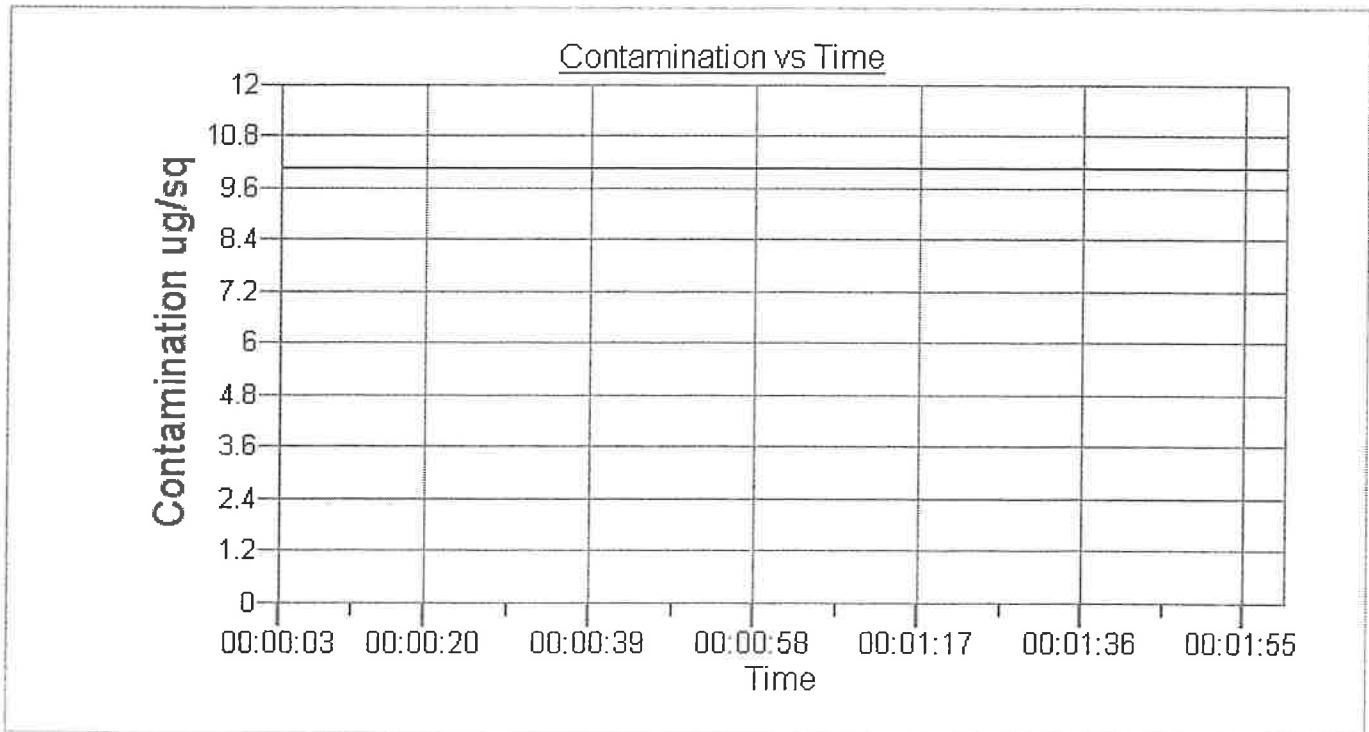
SIERRA PROTO EXPRESS  
1108 WEST EVELYN AVENUE  
SUNNYVALE, CA 94086  
USA

ITEM # / MANUFACTURER	QTY	PRODUCT / DESCRIPTION	LOT # / EXPIRY DATE
1 ADVANCED COPPER FOIL INC.	100	73064F4.A401 ACF2 BF-TZA 1/4oz AL010 13X19 TOOLED (ML4 12x18) ACF2 BF-TZA 1/4oz AL010 13X19 TOOLED (ML4 12x18) IPC 4562A/3	00229747
1 ADVANCED COPPER FOIL INC.	100	73011F4.A401 ACF2 BF-TZA 1/4oz AL010 19X25 TOOLED (18x24 ML4) ACF2 BF-TZA 1/4oz AL010 19X25 TOOLED (18x24 ML4) IPC 4562A/3	91029975
1 ADVANCED COPPER FOIL INC.	120	73037F4.A601 ACF3 BF-TZA 1/4oz AL015 19X25 TOOLED (18x24 ML4) ACF3 BF-TZA 1/4oz AL015 19X25 TOOLED (18x24 ML4) IPC 4562A/3	00131850 ✓
1 ADVANCED COPPER FOIL INC.	60	73041F1.A401 ACF2 TW-YE 1oz AL010 13X19 TOOLED ACF2 TW-YE 1oz AL010 13X19 TOOLED IPC 4562A/3	91041252
1 ADVANCED COPPER FOIL INC.	60	73041F1.A401 ACF2 TW-YE 1oz AL010 13X19 TOOLED ACF2 TW-YE 1oz AL010 13X19 TOOLED IPC 4562A/3	91141512

Sierra Circuits  
1108 West Evelyn Avenue  
Sunnyvale, CA 94086  
Ionic Contamination Testing Report



Test Description:	Test Oct07,20 174749	
Name:	THE UNIVERSITY OF ARIZONA	
Status:	Passed	Nomenclature: 171653
Result:	0.00014 ug/Square	Part Number: GUSTO-UA-DWG-00342
Start Time:	17:47:49	Comment: FINAL
Total Run Time:	00:02:00	Length: 8.97
Test Type:	Dynamic Test	Width: 5.07
Test Date:	10/7/2020	Area: 91
Baseline Resistivity:	247.49 MΩ-cm	Termination: Automatic
Final Resistivity:	253.78 MΩ-cm	Duration: NA
Temperature:	45 Degree C	Sensitivity: 2
Lot / Part No:		%IPA: 76.6
User:	QC	Failpoint: 10.06 ug NaCl/sq





Sierra Circuits Inc  
Certificate of Compliance - XRF

## Analysis Report

10/5/2020 10:22:14 AM

## Analysis Title

Hard Au-Ni-Cu(12mil)

## Analysis Device

Bowman XRF

S/N: Pi819203

<b>Customer</b>	THE UNIVERSITY OF ARIZONA	<b>Part Number</b>	GUSTO-UA-DWG-00342
<b>Work Order</b>	422296 1.00	<b>Tool Number</b>	1.0B
<b>Operator</b>	VICC	<b>Number</b>	171653
			5093

## Analysis Results

Result	1		2	
	μin		μin	
	Au		Ni	
1	56.1		382.5	
2	57.0		217.6	
3	59.5		242.3	
Mean	57.6		280.8	
Min	56.1		217.6	
Max	59.5		382.5	
Range	3.4		164.9	
StdDev	1.74		88.96	
% StdDev	3.02		31.68	
Cp	----		----	
Cpk	----		----	
Cg	0.0		0.0	
Cgk	----		----	

## Sample Images



Sample 1

Sample 2

Sample 3

*mf*

Date:

10-7-20



1108 West Evelyn Ave., Sunnyvale, CA 94086  
 Cage Code: 0ZHS4  
 (408) 735-7137  
 files@protoexpress.com  
 www.protoexpress.com

## Micro Section Analysis Report

Customer	The University of Arizona	Revision	1.0b
Address	1303 E University Blvd. Box 5 Tucson AZ 85719	Date Code	2040
Part Number	GUSTO-UA-DWG-00342	Base Material	Isola 370 HR
Purchase Order #	559272/line 3, COIN 24101	Work Order	422296 - 1.00

Sierra Tool Number	171653	Construction Type	Foil
Surface Finish	HAL	Number of Layers	8
Compliance to: Master Drawing	None		
Specification / Rev / Amd	IPC-6012 Rev D Amd 1, Class 3		

Construction		Serial Number Used: 1	
Layer	Specification		Actual Measurement
	Copper Weight (oz)	Nominal	
Layer 1	0.250	0.00035	0.00036
Dielectric		0.00890	0.00954
Layer 2	1.000	0.00140	0.00131
Dielectric		0.01000	0.00956
Layer 3	1.000	0.00140	0.00132
Dielectric		0.00850	0.00888
Layer 4	1.000	0.00140	0.00130
Dielectric		0.01000	0.00983
Layer 5	1.000	0.00140	0.00132
Dielectric		0.00900	0.00954
Layer 6	1.000	0.00140	0.00131
Dielectric		0.01000	0.00970
Layer 7	1.000	0.00140	0.00132
Dielectric		0.00890	0.00948
Layer 8	0.250	0.00035	0.00036
Dielectric			
Layer 9			
Dielectric			
Layer 10			
Dielectric			
Layer 11			
Dielectric			
Layer 12			
Dielectric			
Layer 13			
Dielectric			
Layer 14			
Dielectric			
Layer 15			
Dielectric			
Layer 16			
Dielectric			
Layer 17			
Dielectric			
Layer 18			
Dielectric			
Layer 19			
Dielectric			
Layer 20			
Dielectric			
Layer 21			

Compliance to the following requirements:

**Structural Integrity After Thermal Stress**

- 3.6.2.1 Plating integrity
- 3.6.2.3 Laminate voids
- 3.6.2.6 & 8 Etchback / negative etchback
- 3.6.2.9 Annular ring and Breakout (internal)
- 3.6.2.10 Lifted Lands
- 3.6.2.11 Hole plating thickness
- 3.6.2.15 Surface plating and conductor thickness
- 3.6.2.14 Copper foil thickness (internal)
- 3.6.2.16 Metal core spacing
- 3.6.2.17 Dielectric thickness
- 3.6.2.18 Material fill of Blind and Buried Vias

**Overall Thickness**

Nominal	0.079
Minimum	0.071
Maximum	0.087
Measured	0.084
Pass/Fail	PASS

Measurement taken over: ALL

Measurement Tool: Optical Microscope

**Solderability Test Results**

Use "S" Coupons if available

Serial Number	Results
001	PASS
	Not Evaluated
	Not Evaluated
	Not Evaluated

Report Completed by: Arnel Fillon

Date: October 8, 2020

External Total Plated Conductor/Pad Thickness		
Spec:	Maximum	Minimum
		None
	Layer 1	0.0030
	Layer 8	0.0028

Coupon	Hole Wall Thickness	
<b>A</b>	Hole Size	0.05910
Reading 1	0.00187	Average =
Reading 2	0.00188	0.00190
Reading 3	0.00196	
<b>B</b>	Hole Size	0.01770
Reading 1	0.00225	Average =
Reading 2	0.00208	0.00212
Reading 3	0.00202	
<b>B2</b>	Hole Size	0.01180
Reading 1	0.00178	Average =
Reading 2	0.00158	0.00168
Reading 3	0.00168	

Comments:



# SIERRA CIRCUITS

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Cage Code: 0ZHS4  
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## Customer Coupon Retention

Customer The University of Arizona  
Address 1303 E University Blvd. Box 5 Tucson AZ 85719  
Part Number GUSTO-UA-DWG-00342  
Purchase Order # 559272/line 3, COIN 24101

Revision: 1.0b  
Date Code 2040  
Base Material Isola 370 HR  
Work Order 422296 - 1.00

Sierra Tool Number 171653  
Number of Layers 8  
Surface Finish HAL

Coupon Shipped Number 1

Date Shipped 10/7/2020

This coupon has been given to the customer upon their request. The customer is responsible for the retention of this coupon as required by all specifications and regulations. Sierra Circuits might not have any additional retention coupons.

*Arnel Fillon*

Inspector

*October 7, 2020*

Date

Attach coupon below

