

MIL-PRF-55110G, AMENDMENT 3 GROUP B INSPECTION

Manufacturer: Customer Name Attention of: Customer Contact Address: 12345 Main Street City, State, Zip Code Phone: 123-456-7890 Purchase Order No: P.O #	Report No: 52706 Report Date: 9/11/2013
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Sample Submission Identification

The following sample(s) were submitted and received in a suitable condition for testing in accordance with the indicated test method and/or specification(s) indicated in the following section(s) of this test report:

RETENTION MONTH: Customer Requirement
 DATE RECEIVED: 8/26/2013
 CAGE CODE/FSCM NO.: Cage Code
 MATERIAL TYPE: IPC-4101:/
 SAMPLE IDENTIFICATION: Sample A
 PART NUMBER: Part #
 NUMBER OF LAYERS: 02
 DATE CODE: 1234
 SERIAL NUMBER(S): X, Y
 PRODUCTION MONTH: Month 2013

TEST RESULTS SUMMARY: All test results indicate that the samples tested met or exceeded the minimum requirements as specified in the indicated test method within this report and the applicable master drawing requirements. Actual detailed test results are enclosed.

Report Signatories(s) and Approval

(Signed for and on behalf of Microtek Laboratories)

• STATEMENT OF CERTIFICATION •

MICROTEK LABORATORIES CERTIFIES THAT THE TEST EQUIPMENT USED COMPLIES WITH THE QUALITY AND CALIBRATION REQUIREMENTS OF ISO/IEC-17025 AND THAT THE DATA CONTAINED IN THIS REPORT IS ACCURATE WITHIN THE TOLERANCE LIMITATION OF ITS EQUIPMENT. MICROTEK LABORATORIES HAS TESTED THE MATERIAL/ITEMS SUBMITTED BY THE CLIENT IN ACCORDANCE WITH THE CLIENT'S STATED REQUIREMENTS. THIS TEST REPORT APPLIES ONLY TO THE SAMPLE(S) TESTED, AND IS NOT NECESSARILY INDICATIVE OF THE QUALITY OR CONDITION OF APPARENTLY IDENTICAL OR SIMILAR PARTS OR PRODUCTS.

ANY OR ALL OF THE PROCESSES INVOLVED MAY BE SUBCONTRACTED AND SHALL BE SO NOTED ON THE APPLICABLE SECTION OF THIS REPORT.

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NOTE: TEST(S) IDENTIFIED WITH (**) ARE NOT CURRENTLY IN MICROTEK LABORATORIES A2LA ISO/IEC 17025 SCOPE OF ACCREDITATION.

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QUALITY • INTEGRITY • RESULTS

RESISTANCE TO SOLVENTS

Material Identification: IPC-4101:/
Test Sample Identification: Sample A, Part #
Test Procedures: MIL-PRF-55110G, Amendment 3, paragraphs A.3.7.3.2 and A.4.8.3.2;
IPC-TM-650, Method 2.3.4; MLP-101, Section 4.3.4
Test Method Variation(s): None
Sample Prep Performed by: Thang Nguyen
Test(s) Performed by: Thang Nguyen
Test Date: 08/27/2013

TEST RESULTS:

The specimen(s), when tested as specified above for Resistance to Solvents, showed no evidence of physical damage and the marking remained legible.

REWORK SIMULATION

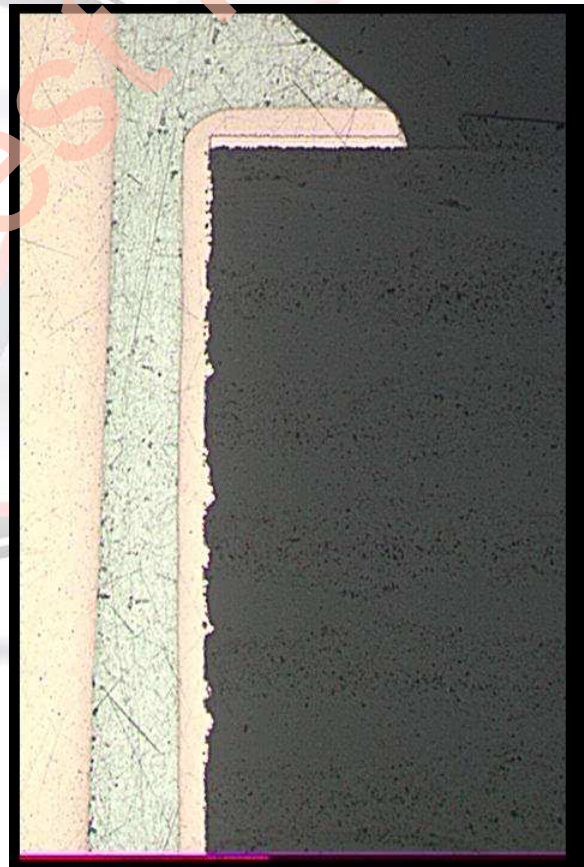
Material Identification: IPC-4101:/
 Test Sample Identification: Sample A, Part #
 Serial Number(s): X, Y
 Test Procedures: MIL-PRF-55110G, Amendment 3, paragraphs A.3.7.4.4 and A.4.8.4.4;
 IPC-TM-650, method 2.1.1 and 2.4.36; MLP-101, Section 4.4.36
 Test Method Variation(s): None
 Sample Prep Performed by: Thang Nguyen
 Test(s) Performed by: Eric Benjamins Test Date: 09/08/2013

TEST RESULTS:

The specimen(s), when tested by method A as specified above, met the applicable requirements as specified in MIL-PRF-55110G, Amendment 3, paragraph A.3.7.4.4. See photomicrographs on type 2 and 3 specimen(s).



S/N: X
 P/N: Sample A, Part #
 Defects: None Found
 Post Rework Simulation
 Vertical Microsection
 Photomicrograph @ 100X



S/N: Y
 P/N: Sample A, Part #
 Defects: None Found
 Post Rework Simulation
 Vertical Microsection
 Photomicrograph @ 100X

SURFACE PEEL STRENGTH

Material Identification: IPC-4101/
 Test Sample Identification: Sample A, Part #
 Serial Number(s): See "Results" below
 Test Procedures: MIL-PRF-55110G, Amendment 3, paragraphs A.3.7.4.7 and A.4.8.4.7;
 IPC-TM-650; Method 2.4.8; MLP-101, Section 4.4.8
 Test Method Variation(s): None
 Sample Prep Performed by: Jaime Juarez
 Test(s) Performed by: Jaime Juarez Test Date: 08/30/2013

TEST RESULTS:

The Peel Strength testing, as given by the methods above, showed that the specimen(s) met or exceeded the minimum peel strength requirement. The actual peel strength test results for the specimen(s) are shown below.

SAMPLE IDENTIFICATION	LINE WIDTH (inches)	PEEL STRENGTH (pounds/inch of width)
Sample A, Part #	0.130"	5.23
	0.130"	5.69
	0.130"	4.77
	0.130"	6.31

DIELECTRIC WITHSTANDING VOLTAGE

Material Identification: IPC-4101/
Test Sample Identification: Sample A, Part #
Serial Number(s): X, Y
Test Procedures: MIL-PRF-55110G, Amendment 3, paragraphs A.3.7.5.3 and A.4.8.5.3;
IPC-TM-650, method 2.5.7; MLP-101, Section 4.5.7
Test Method Variation(s): None
Sample Prep Performed by: Thang Nguyen
Test(s) Performed by: Thang Nguyen
Test Date: 09/04/2013

TEST RESULTS:

The specimen(s), when tested for Dielectric Withstanding Voltage as specified above, met the requirements of MIL-PRF-55110G, Amendment 3, paragraph A.3.7.5.3, showing no evidence of sparkover, flashover or dielectric breakdown.

MOISTURE AND INSULATION RESISTANCE

Material Identification: IPC-4101/
 Test Sample Identification: Sample A, Part #
 Serial Number(s): See "Results" below
 Test Procedures: MIL-PRF-55110G, Amendment 3, paragraphs A.3.7.6.1 and A.4.8.6.1;
 IPC-TM-650, method 2.6.3; MLP-101, Section 4.6.3
 Test Method Variation(s): None
 Sample Prep Performed by: Thang Nguyen
 Test(s) Performed by: Thang Nguyen Test Date: 09/04/2013

TEST RESULTS:

The specimen(s), when tested for Moisture and Insulation Resistance, as specified above, met or exceeded the minimum requirement as specified in MIL-PRF-55110G, Amendment 3, paragraph A.3.7.6.1. The minimum insulation resistance measured on the specimen(s) was as follows:

Before Humidity Cycling:		
First Coupon:	X:	8.5 x 10 ¹² ohms
Second Coupon:	Y:	8.1 x 10 ¹² ohms
After Humidity Cycling:		
First Coupon:	X:	2.2 x 10 ¹² ohms
Second Coupon:	Y:	3.0 x 10 ¹² ohms

The specimen(s), when visually inspected after Moisture and Insulation Resistance testing did not exhibit blistering, measling or delamination in excess of that allowed.

REWORK SIMULATION

SAMPLE IDENTIFICATION: Sample A, Part #

SERIAL NUMBER: X

PLATING THICKNESS								
PLATED-THRU HOLE THICKNESS:			PROPERTY		REQUIREMENT (Type 2 and 3)	ACC	REJ	NOTE
Hole #1 Average PTH Cu	0.00108"	A.3.6.1	Annular Ring, Internal	As specified or .002" Min; no break out.				N/A
Hole #2 Average PTH Cu	0.00109"	A.3.6.2	External Conductor Thickness	As specified or IPC-2221 Table 10-2		X		
Hole #3 Average PTH Cu	0.00105"	A.3.6.3	Internal Conductor Thickness	As specified or IPC-2221 Table 10-1				N/A
		A.3.6.4	Dielectric Layer Thickness	As specified or 0.0035" Min.		X		
SURFACE CONDUCTOR THICKNESS:			A.3.6.5	Delamination	None Allowed in Excess of Para A.3.5.1.3	X		
Conductor #1 Cu	0.00171"	A.3.6.6.1	Etchback	As Specified or .0002"0.002"				N/A
Conductor #2 Cu	0.00175"	A.3.6.6.2	Smear Removal	Resin Removal <.001"; Neg Etchback <.0005"				N/A
SURFACE COATING THICKNESS:			A.3.6.6.3	Wicking	<.003"; Does Not Reduce Spacing Below Min	X		
SOLDER [Fused/Reflowed]	N/A	A.3.6.7.1	Laminate Voids/Cracks (As Rec)	.003" Maximum				N/A
FOILS AND DIELECTRICS			A.3.6.7.2	Laminate Voids/Cracks (Stressed)	.003" Maximum Zone B; Allowed in Zone A	X		
CONSTRUCTION	LYR	THICKNESS	A.3.6.8.1	Lifted Lands, As Received	None Allowed			N/A
COPPER FOIL	1	0.00065"	A.3.6.8.2	Lifted Lands, After Stress	< Total Outer Conductor Thickness	X		
DIELECTRIC	1/2	0.05415"	A.3.6.9. 1/2	Plating Thickness	As specified or IAW Table A-1	X		
COPPER FOIL	2	0.00062"	A.3.6.9.3	Copper Plating Defects	As Specified or <20% PTH Cu Reduction	X		
			A.3.6.9.3.1	Copper Plating Voids	One Allowed: <5% PWB; None at Interface	X		
			A.3.6.9.4	Plating Separations	Vertical Edge of External Copper Foil Only	X		
			A.3.6.10	Heatsink Planes	Must Meet A.3.6.9.2 Through A.3.6.9.4			N/A
			A.3.6.11	Plated Hole Wall Deficiencies	Hole Diameter, PTH Cu Thickness Are Met	X		
			A.3.6.12	Metallic Cracks	Outer Foil Only; None Allowed in Plating	X		
			A.3.6.13	Nail Heading	<1.5 Times Cu Foil Thickness	X		
			A.3.6.14.1	Resin Recession, As Received	<.003" or 40% of Total Matl Thicknes/ Side			N/A
			A.3.6.14.2	Resin Recession, After Stress	Allowed	X		
			A.3.6.15	Undercutting	<Total Outer Conductor Thickness	X		
ADDITIONAL REQUIREMENTS:						ACC	REJ	NOTE
			A.3.7.2.2.1	Registration (Method II)	Shall Meet Annular Ring Requirements	X		

NOTE: The master drawing was not supplied with the samples submitted for evaluation; test results reflect the requirements of MIL-PRF-55110G, Amendment 3.

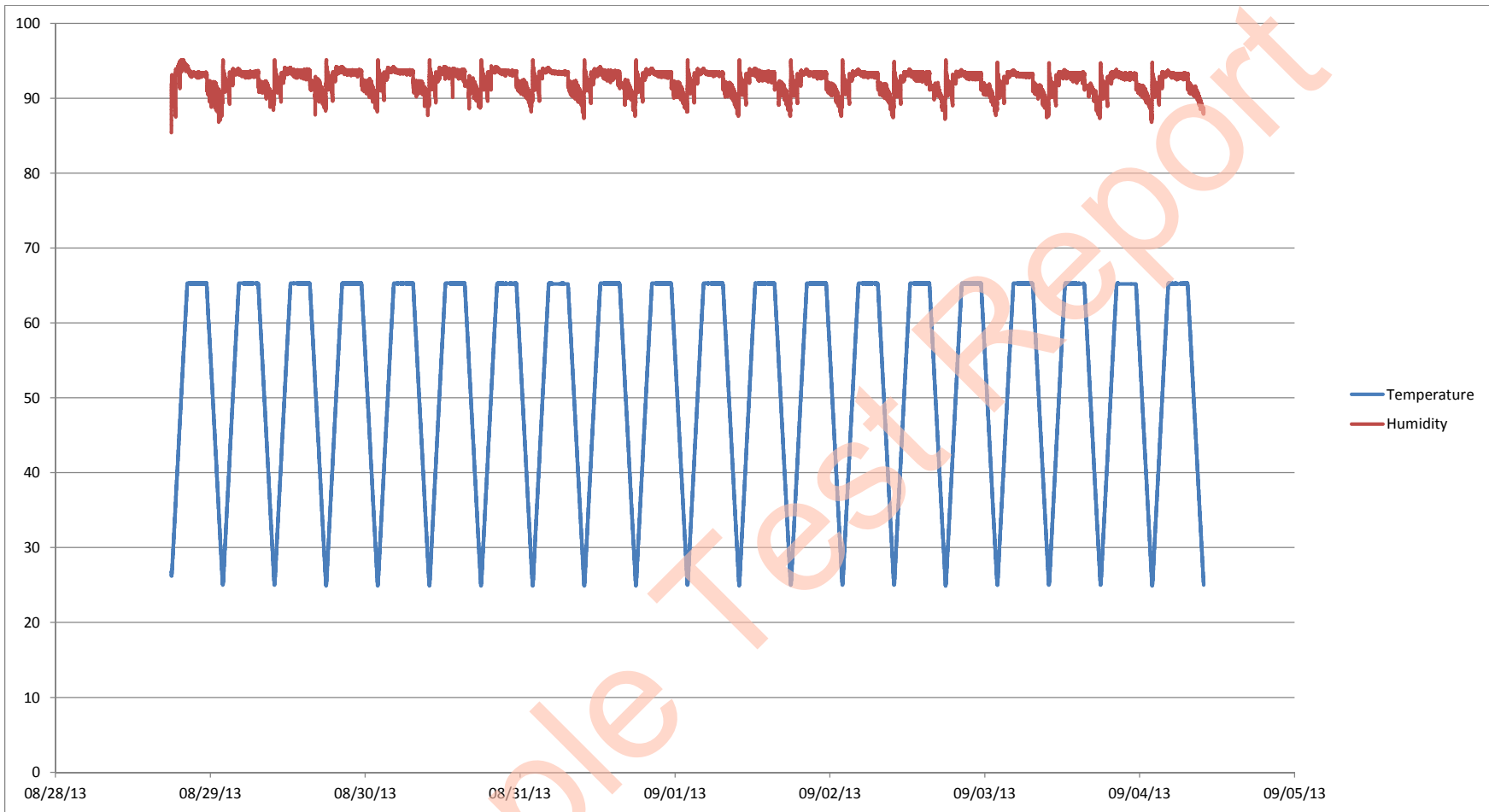
REWORK SIMULATION

SAMPLE IDENTIFICATION: Sample A, Part #

SERIAL NUMBER: Y

PLATING THICKNESS								
PLATED-THRU HOLE THICKNESS:			PROPERTY		REQUIREMENT (Type 2 and 3)	ACC	REJ	NOTE
Hole #1 Average PTH Cu	0.00158"	A.3.6.1	Annular Ring, Internal	As specified or .002" Min; no break out.				N/A
Hole #2 Average PTH Cu	0.00159"	A.3.6.2	External Conductor Thickness	As specified or IPC-2221 Table 10-2		X		
Hole #3 Average PTH Cu	0.00157"	A.3.6.3	Internal Conductor Thickness	As specified or IPC-2221 Table 10-1				N/A
		A.3.6.4	Dielectric Layer Thickness	As specified or 0.0035" Min.		X		
SURFACE CONDUCTOR THICKNESS:			A.3.6.5	Delamination	None Allowed in Excess of Para A.3.5.1.3	X		
Conductor #1 Cu	0.00223"	A.3.6.6.1	Etchback	As Specified or .0002"0.002"				N/A
Conductor #2 Cu	0.00219"	A.3.6.6.2	Smear Removal	Resin Removal <.001"; Neg Etchback <.0005"				N/A
SURFACE COATING THICKNESS:			A.3.6.6.3	Wicking	<.003"; Does Not Reduce Spacing Below Min	X		
SOLDER [Fused/Reflowed]	N/A	A.3.6.7.1	Laminate Voids/Cracks (As Rec)	.003" Maximum				N/A
FOILS AND DIELECTRICS			A.3.6.7.2	Laminate Voids/Cracks (Stressed)	.003" Maximum Zone B; Allowed in Zone A	X		
CONSTRUCTION	LYR	THICKNESS	A.3.6.8.1	Lifted Lands, As Received	None Allowed			N/A
COPPER FOIL	1	0.00062"	A.3.6.8.2	Lifted Lands, After Stress	< Total Outer Conductor Thickness	X		
DIELECTRIC	1/2	0.05503"	A.3.6.9. 1/2	Plating Thickness	As specified or IAW Table A-1	X		
COPPER FOIL	2	0.00065"	A.3.6.9.3	Copper Plating Defects	As Specified or <20% PTH Cu Reduction	X		
			A.3.6.9.3.1	Copper Plating Voids	One Allowed: <5% PWB; None at Interface	X		
			A.3.6.9.4	Plating Separations	Vertical Edge of External Copper Foil Only	X		
			A.3.6.10	Heatsink Planes	Must Meet A.3.6.9.2 Through A.3.6.9.4			N/A
			A.3.6.11	Plated Hole Wall Deficiencies	Hole Diameter, PTH Cu Thickness Are Met	X		
			A.3.6.12	Metallic Cracks	Outer Foil Only; None Allowed in Plating	X		
			A.3.6.13	Nail Heading	<1.5 Times Cu Foil Thickness	X		
			A.3.6.14.1	Resin Recession, As Received	<.003" or 40% of Total Matl Thicknes/ Side			N/A
			A.3.6.14.2	Resin Recession, After Stress	Allowed	X		
			A.3.6.15	Undercutting	<Total Outer Conductor Thickness	X		
ADDITIONAL REQUIREMENTS:						ACC	REJ	NOTE
			A.3.7.2.2.1	Registration (Method II)	Shall Meet Annular Ring Requirements	X		

NOTE: The master drawing was not supplied with the samples submitted for evaluation; test results reflect the requirements of MIL-PRF-55110G, Amendment 3.



CHAMBER: 378

START: 08/28/2013 04:00 PM

END: 09/04/2013 08:00 AM

1.	52661	5.	52679	9.	52700	13.	N/A	17.	N/A	21.	N/A
2.	52675	6.	52680	10.	52701	14.	N/A	18.	N/A	22.	N/A
3.	52676	7.	52681	11.	52702	15.	N/A	19.	N/A	23.	N/A
4.	52677	8.	52682	12.	52706	16.	N/A	20.	N/A	24.	N/A

APPENDIX A

EQUIPMENT USED IN COMPLETION OF MICROTEK LABORATORIES JOB NUMBER: 52706

Equipment Used for Moisture and Insulation Resistance (MIR) and Dielectric Withstand Voltage (DWV)

Equipment Name	EQ ID	Manufacturer	Model Number	Status	Cal. Date	Cal. Due
Megohmmeter	0140	Quad Tech	1865	Calibrated	2013/03/20	2014/03/20
Oven	0218	Despatch Industries	LAC 1-38B-5	Calibrated	2013/03/25	2014/03/25
Power Supply	0231	Hewlett Packard	6545A	Calibrated	2013/03/20	2014/03/20
Hipot Tester	0244	QuadTech	Sentry 20 AC/DC	Calibrated	2013/03/20	2014/03/20
Fluke Multimeter	0294	Fluke	80 Series	Calibrated	2013/03/20	2014/03/21
Tenney Environmental Chamber	0378	Tenney	BTRC	Calibrated	2013/07/19	2014/07/19
Soldering Station	0379	Weller	WES51	No Calibration Required		
High Resistance Meter	0381	Agilent	4339B	Calibrated	2013/03/19	2014/03/19

Equipment Used for Rework Simulation

Equipment Name	EQ ID	Manufacturer	Model Number	Status	Cal. Date	Cal. Due
Pin/Plug Gauges	0024.2	Vermont Gage	Series A/B	Use With Calibrated Equipment		
Desiccator	0070	Boekel	12Hx12Wx10D	Reference Only		
Microscope	0111	Unitron	Unimet	Calibrated	2013/06/28	2014/06/28
Video Micrometer	0119	Boeckeler	VIA-100	Calibrated	2013/06/28	2014/06/28
Oven	0219	Despatch	LAC1-10-5	Calibrated	2013/05/14	2014/05/14
Struers Router	0276	Struers	N/A	No Calibration Required		
Inverted Microscope	0307	Zeiss	Axiovert 40MAT	Calibrated	2013/06/28	2014/06/28
Abramin	0372	Struers	ABMIN	No Calibration Required		
Solder Station	0386	Weller	WD 1 (M)/ WD 1000	Calibrated	2013/05/13	2014/05/13

Equipment Used for Resistance to Solvents

Equipment Name	EQ ID	Manufacturer	Model Number	Status	Cal. Date	Cal. Due
Digital Thermometer	0162	Fluke	51	Calibrated	2013/03/18	2014/03/18
Probe - Calibration	0227.3	Omega	KTSS-18G-12-CL5	Calibrated	2013/06/14	2014/06/14
Scale Lupe 10X	0262	Peak	1983	Calibrated	2013/06/28	2014/06/28
Alarm Timer	0270	Control Company	94411-00	Calibrated	2013/06/26	2014/06/26
Hot Plate	0389	Corning	PC-420D	Reference Only		

Equipment Used for Peel Strength

Equipment Name	EQ ID	Manufacturer	Model Number	Status	Cal. Date	Cal. Due
Digital Display	0160	Futek	MROJHHC	No Calibration Required		
Load Cell	0164	Futek	L2338J	Calibrated	2012/10/18	2013/10/18
Tensile Tester	0302	Instron	4201	Calibrated	2013/01/17	2014/01/17
Digital Caliper	0336	Mitutoyo	CD-6" CX	Calibrated	2013/02/18	2014/02/18