

Appendix A

GLM Results for Exposure to 85/85, Thermal Shock, and Mechanical Shock

Table A.1 Significant Coefficients for the Two GLM Analyses by Test Time for HCLV PTH

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	7.14	0.04	0.05	0.14
Flux				
Site 2	0.06		-0.17	
Site 3				
Site 4				
Site 5				
Site 6				
Site 7				
Site 8	0.07			
Site 9				
Site 10				
Site 11		0.13		
Site 12				0.80
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux		-0.16		
Site 13 * Flux				
Site 16 * Flux				
Model R ²	2.0%	2.3%	3.7%	19.1%
Standard Deviation	0.13	0.18	0.17	0.36

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	7.15	0.03	0.04	0.13
OSP				
Immersion Sn				
Immersion Ag		0.07	0.07	0.34
Ni/Au				
Ni/Pd/Au	-0.04			
Flux				
Model R ²	0.7%	1.3%	1.7%	7.7%
Standard Deviation	0.10	0.10	0.17	0.38

Table A.2 Significant Coefficients for the Two GLM Analyses by Test Time for HCLV SMT

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	7.26	0.04	0.05	2.48
Flux				
Site 2				-0.48
Site 3				
Site 4				
Site 5			-0.10	
Site 6				
Site 7				
Site 8	0.06	-0.09		
Site 9				
Site 10	-0.07		0.110	
Site 11				
Site 12				
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux		-0.14		
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux			-0.105	
Site 16 * Flux				
Model R ²	4.2%	7.7%	10.9%	2.1%
Standard Deviation	0.09	0.12	0.13	0.70

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	7.26	0.03	0.07	2.49
OSP			-0.08	
Immersion Sn				-0.15
Immersion Ag		-0.02		
Ni/Au			-0.10	
Ni/Pd/Au				
Flux	-0.02			
Model R ²	1.5%	0.3%	9.8%	0.7%
Standard Deviation	0.09	0.1	0.13	0.70

Table A.3 Significant Coefficients for the Two GLM Analyses by Test Time for HVLC PTH

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	5.018	5.004	4.999	4.998
Flux				
Site 2				
Site 3				
Site 4	0.007			
Site 5				
Site 6				
Site 7				
Site 8	0.005			
Site 9	0.004			
Site 10				
Site 11				
Site 12	0.004	0.006		
Site 13				
Site 14				-0.005
Site 15				
Site 16				
Site 4 * Flux	-0.008			
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux		0.006		
Site 13 * Flux				
Site 16 * Flux				
Model R ²	13.3%	5.2%	0.0%	3.2%
Standard Deviation	0.005	0.006	0.006	0.006

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	5.018	5.004	4.998	4.998
OSP				
Immersion Sn	0.003		0.002	
Immersion Ag	0.003	0.003		
Ni/Au				-0.003
Ni/Pd/Au				
Flux				
Model R ²	7.6%	2.5%	2.6%	3.2%
Standard Deviation	0.005	0.006	0.006	0.006

Table A.4 Significant Coefficients for the Two GLM Analyses by Test Time for HVLC SMT

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	5.038	5.034	5.039	
Flux				
Site 2				
Site 3				
Site 4				
Site 5				
Site 6				
Site 7				
Site 8	0.172	0.173	0.170	
Site 9				
Site 10	0.111	0.111	0.109	
Site 11				
Site 12	0.122	0.125	0.120	
Site 13				
Site 14				
Site 15	0.125	0.126	0.125	
Site 16				
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux				
Site 16 * Flux				
Model R ²	20.9%	21.5%	18.7%	
Standard Deviation	0.100	0.100	0.112	

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	5.032	5.027	5.033	
OSP				
Immersion Sn	0.095	0.100	0.097	
Immersion Ag	0.087	0.090	0.085	
Ni/Au				
Ni/Pd/Au				
Flux				
Model R ²	14.0%	15.3%	12.9%	
Standard Deviation	0.100	0.100	0.110	

Table A.5 Significant Coefficients for the Two GLM Analyses by Test Time for HSD PTH

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	17.13	0.55	0.98	0.37
Flux			-0.46	
Site 2				
Site 3				2.60
Site 4	0.14			
Site 5		0.61		
Site 6			-1.00	
Site 7				
Site 8				
Site 9		1.89		
Site 10				
Site 11				-2.30
Site 12				-3.50
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux				
Site 16 * Flux	0.19			
Model R ²	5.1%	9.8%	4.3%	9.5%
Standard Deviation	0.19	1.30	1.33	3.52

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	17.13	0.88	0.88	0.52
OSP	0.05			
Immersion Sn				
Immersion Ag				-2.89
Ni/Au				
Ni/Pd/Au				
Flux		-0.35	-0.36	
Model R ²	0.9%	1.6%	1.8%	6.7%
Standard Deviation	0.20	1.00	1.30	3.5

Table A.6 Significant Coefficients for the Two GLM Analyses by Test Time for HSD SMT

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	9.23	0.94	1.16	-0.002
Flux				
Site 2		-1.59		
Site 3				
Site 4				
Site 5				
Site 6				
Site 7				
Site 8				-1.60
Site 9				
Site 10				
Site 11				
Site 12		-1.27		
Site 13				
Site 14				
Site 15	0.12			
Site 16				
Site 4 * Flux				
Site 5 * Flux	-0.10			
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux				
Site 16 * Flux				
Model R ²	6.1%	6.4%	0.0%	2.3%
Standard Deviation	0.13	1.65	1.99	2.25

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	9.21	0.77	1.23	-0.04
OSP				
Immersion Sn				
Immersion Ag			-0.56	
Ni/Au				-0.25
Ni/Pd/Au		0.35		
Flux	0.03			
Model R ²	1.0%	0.3%	0.8%	0.2%
Standard Deviation	0.10	1.00	1.90	2.2

Table A.7 Significant Coefficients for the Two GLM Analyses by Test Time for HF PTH 50 MHz

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-0.721	-0.034	-0.002	-2.666
Flux				
Site 2				
Site 3				
Site 4				
Site 5				
Site 6				
Site 7				
Site 8				
Site 9				
Site 10				
Site 11				
Site 12				-28.1
Site 13	-0.180	0.197	0.192	
Site 14			-0.073	
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux				-18.5
Site 11 * Flux				
Site 13 * Flux	0.160	-0.206	-0.180	
Site 16 * Flux				
Model R ²	20.6%	29.5%	24.1%	20.5%
Standard Deviation	0.055	0.048	0.063	14.1

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-0.720	-0.034	0.003	-3.28
OSP			-0.010	
Immersion Sn				
Immersion Ag				-13.6
Ni/Au	-0.034	0.023		
Ni/Pd/Au				
Flux				
Model R ²	4.3%	2.3%	0.3%	8.1%
Standard Deviation	0.060	0.050	0.072	15.00

Table A.8 Significant Coefficients for the Two GLM Analyses by Test Time for HF PTH f(-3dB)

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	283.0	-0.9	0.5	-1.05
Flux				
Site 2				
Site 3				
Site 4				
Site 5				
Site 6			-2.2	
Site 7				
Site 8				
Site 9				
Site 10				
Site 11				
Site 12				-116
Site 13	-1.8			
Site 14				
Site 15	-1.5			
Site 16				
Site 4 * Flux				
Site 5 * Flux		0.7		
Site 7 * Flux		-1.2		-68
Site 11 * Flux				
Site 13 * Flux				-79
Site 16 * Flux				
Model R ²	7.1%	10.8%	10.2%	23.4%
Standard Deviation	2.0	0.9	1.5	58.5

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	283.0	-1.0	0.5	4.19
OSP		0.1	-0.5	
Immersion Sn				
Immersion Ag				-53.0
Ni/Au	-1.6			
Ni/Pd/Au				
Flux				-23.8
Model R ²	7.8%	0.2%	1.6%	10.9%
Standard Deviation	2.0	0.9	1.5	62.0

Table A.9 Significant Coefficients for the Two GLM Analyses by Test Time for HF PTH f(-40dB)

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	472.9	-0.2	-0.2	-11.7
Flux				
Site 2				
Site 3				
Site 4				
Site 5	-3.8		-1.8	
Site 6		0.9		
Site 7				
Site 8		-1.5		
Site 9	-5.7			
Site 10				
Site 11				
Site 12				-140
Site 13	-5.1			
Site 14				
Site 15	-4.5			
Site 16				
Site 4 * Flux				
Site 5 * Flux			2.6	
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux				
Site 16 * Flux				
Model R ²	14.3%	9.6%	7.6%	13.5%
Standard Deviation	5.1	1.2	1.5	77.1

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	472.2	-0.1	-0.3	-8.41
OSP				
Immersion Sn		-0.4		
Immersion Ag				-83.0
Ni/Au	-3.2			
Ni/Pd/Au			0.71	
Flux				
Model R ²	4.5%	1.8%	1.6%	10.9%
Standard Deviation	5.0	1.0	1.5	78.0

Table A.10 Significant Coefficients for the Two GLM Analyses by Test Time for HF SMT 50 MHz

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-0.733	-0.018	0.005	-3.1
Flux				
Site 2				
Site 3			-0.112	-19.2
Site 4				
Site 5				-13.5
Site 6				
Site 7			-0.126	-49.7
Site 8				
Site 9		-0.049		
Site 10				
Site 11				
Site 12	0.031			-31.4
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux	0.021			
Site 5 * Flux				
Site 7 * Flux				25.0
Site 11 * Flux		-0.047		
Site 13 * Flux				
Site 16 * Flux				
Model R ²	3.9%	10.3%	21.1%	32.2%
Standard Deviation	0.039	0.037	0.069	17.2

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-0.733	-0.023	-0.010	-5.62
OSP			0.017	
Immersion Sn				-10.6
Immersion Ag	0.020			-10.7
Ni/Au		0.008		
Ni/Pd/Au				
Flux				
Model R ²	2.7%	0.6%	0.8%	6.1%
Standard Deviation	0.030	0.030	0.077	20.0

Table A.11 Significant Coefficients for the Two GLM Analyses by Test Time for HF SMT f(-3dB)

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	319.8	-1.3	0.7	-15.5
Flux				
Site 2		1.0		108
Site 3				
Site 4				
Site 5				
Site 6				
Site 7			-15.3	
Site 8				
Site 9			-4.0	
Site 10				
Site 11		1.5		
Site 12				-143
Site 13	3.7			
Site 14			-3.9	
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux			-3.7	
Site 7 * Flux			11.9	-102
Site 11 * Flux		-2.2		
Site 13 * Flux	-4.4			
Site 16 * Flux				
Model R ²	8.8%	10.5%	19.1%	14.3%
Standard Deviation	1.9	1.1	4.7	112

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	319.7	-1.3	0.4	-1.98
OSP	0.4			
Immersion Sn			-2.8	
Immersion Ag		0.5		
Ni/Au				
Ni/Pd/Au				
Flux				-41.0
Model R ²	0.7%	1.5%	5.0%	3.0%
Standard Deviation	2.0	1.0	5.0	11.0

Table A.12 Significant Coefficients for the Two GLM Analyses by Test Time for HF SMT f(-40dB)

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	865.5	1.7	-8.1	-80.3
Flux				
Site 2				
Site 3				-244
Site 4				
Site 5	-10.7			-171
Site 6				
Site 7				-430
Site 8		4.9		
Site 9				
Site 10				
Site 11		2.2		
Site 12	-19.7			-365
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux			-23.7	
Site 13 * Flux				
Site 16 * Flux				
Model R ²	5.3%	2.3%	16.1%	29.4%
Standard Deviation	21.0	7.6	9.1	221

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	861.2	2.0	-6.8	-146.2
OSP				
Immersion Sn				
Immersion Ag				
Ni/Au	13.4	1.0		192.0
Ni/Pd/Au				171.0
Flux			-4.4	-117.0
Model R ²	5.2%	0.3%	4.9%	14.4%
Standard Deviation	21.0	7.0	9.7	24.0

Table A.13 Significant Coefficients for the Two GLM Analyses by Test Time for HF TLC 50 MHz Forward

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-47.43	0.22	-0.08	0.04
Flux				
Site 2				
Site 3	0.98			4.40
Site 4				
Site 5	1.19			
Site 6	1.48			
Site 7	-1.51			
Site 8				
Site 9				
Site 10	0.90			
Site 11				3.20
Site 12	-1.40			7.60
Site 13	2.90	-1.17		
Site 14	2.69			
Site 15	2.05			
Site 16	2.19			
Site 4 * Flux		0.96		
Site 5 * Flux	-1.37			
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux		1.41		
Site 16 * Flux	-1.50			
Model R ²	62.3%	6.7%	0.0%	14.7%
Standard Deviation	1.00	1.0	1.01	4.80

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-46.73	0.09	-0.30	0.29
OSP				
Immersion Sn	-0.71			
Immersion Ag	-0.97			4.7
Ni/Au	2.24	-0.45		
Ni/Pd/Au	1.19			
Flux	-0.59	0.48	0.45	
Model R ²	48.1%	6.6%	5.0%	9.1%
Standard Deviation	1.00	1.00	0.99	4.9

Table A.14 Significant Coefficients for the Two GLM Analyses by Test Time for HF TLC 500 MHz Forward

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-17.48	0.06	-0.23	-0.14
Flux				
Site 2				
Site 3	0.64			
Site 4				-1.32
Site 5	0.45			
Site 6	0.53			
Site 7				
Site 8				
Site 9				
Site 10	0.56			
Site 11				
Site 12				-0.85
Site 13		-1.13		
Site 14				
Site 15				
Site 16				
Site 4 * Flux				1.50
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux		1.35		
Site 16 * Flux				
Model R ²	10.7%	8.1%	0.0%	8.1%
Standard Deviation	0.66	0.62	0.60	0.93

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-17.41	0.02	-0.28	-0.09
OSP	0.27			
Immersion Sn			0.20	
Immersion Ag				
Ni/Au				
Ni/Pd/Au		0.23		
Flux				-0.22
Model R ²	2.5%	0.9%	1.8%	1.4%
Standard Deviation	0.60	0.60	0.59	0.96

Table A.15 Significant Coefficients for the Two GLM Analyses by Test Time for HF TLC 1 GHz Forward

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-14.11	0.11	-0.39	-0.22
Flux	-0.16			
Site 2	-0.30			
Site 3	0.37			
Site 4				
Site 5	0.21			
Site 6				
Site 7				-1.26
Site 8				
Site 9				
Site 10	0.46			
Site 11			-0.51	
Site 12				
Site 13		-0.46		
Site 14				
Site 15		-0.35		
Site 16				
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux				1.00
Site 11 * Flux				
Site 13 * Flux		0.59		
Site 16 * Flux				
Model R ²	13.2%	10.9%	6.1%	7.9%
Standard Deviation	0.37	0.31	0.52	0.69

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-14.16	0.11	-0.38	-0.30
OSP	0.09			0.14
Immersion Sn				
Immersion Ag			-0.33	
Ni/Au		-0.15		
Ni/Pd/Au				
Flux				
Model R ²	0.9%	2.8%	4.1%	0.7%
Standard Deviation	0.30	0.30	0.52	0.71

Table A.16 Significant Coefficients for the Two GLM Analyses by Test Time for HF TLC Rev Null Freq

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant				
Flux				
Site 2				
Site 3				
Site 4				
Site 5				
Site 6				
Site 7				
Site 8				
Site 9				
Site 10				
Site 11				
Site 12				
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux				
Site 16 * Flux				
Model R ²				
Standard Deviation				

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant				
OSP				
Immersion Sn				
Immersion Ag				
Ni/Au				
Ni/Pd/Au				
Flux				
Model R ²				
Standard Deviation				

Table A.17 Significant Coefficients for the Two GLM Analyses by Test Time for HF TLC Rev Null Resp

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-33.90	0.20	-0.05	0.02
Flux				
Site 2				
Site 3				
Site 4				
Site 5	1.13			
Site 6				
Site 7				
Site 8				
Site 9				
Site 10				
Site 11				-3.50
Site 12			-1.60	
Site 13		-3.23		
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux	-1.25			
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux		3.60		
Site 16 * Flux				
Model R ²	2.7%	8.2%	2.4%	6.2%
Standard Deviation	1.40	1.70	2.20	3.56

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	-33.70	0.07	0.03	-0.74
OSP				
Immersion Sn	-0.68	0.34		
Immersion Ag			-1.26	
Ni/Au				
Ni/Pd/Au				
Flux				1.03
Model R ²	3.6%	0.6%	3.5%	2.0%
Standard Deviation	1.00	1.00	2.1	3.6

Table A.18 Significant Coefficients for the Two GLM Analyses by Test Time for 10-Mil Pads

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	12.20	13.29	14.45	14.76
Flux	0.74			
Site 2	-0.97			
Site 3	1.02			
Site 4	0.93			
Site 5	0.85			
Site 6				
Site 7				
Site 8				
Site 9		-1.24	-0.95	-0.84
Site 10	1.00			
Site 11				
Site 12	0.91			
Site 13	-0.89	0.23		
Site 14	-0.75			
Site 15	0.98		0.55	
Site 16	-0.76			
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux	0.85			
Site 11 * Flux	1.06			
Site 13 * Flux	1.95			
Site 16 * Flux	1.74			
Model R ²	85.6%	22.7%	10.8%	8.6%
Standard Deviation	0.42	0.51	0.70	0.59

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	11.75	13.21	14.30	14.69
OSP	0.73			
Immersion Sn	0.33			
Immersion Ag	0.48			
Ni/Au		0.21		
Ni/Pd/Au				0.31
Flux	1.77		0.27	
Model R ²	74.8%	1.9%	3.4%	1.7%
Standard Deviation	0.50	0.50	0.72	0.61

Table A.19 Significant Coefficients for the Two GLM Analyses by Test Time for PGA-A

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	11.88	12.50	13.66	13.69
Flux	1.58		0.348	0.22
Site 2	-1.19			
Site 3				
Site 4				-0.54
Site 5				
Site 6				
Site 7				
Site 8				
Site 9	-0.81			
Site 10				
Site 11	-0.34			
Site 12				
Site 13	-0.64			
Site 14	-0.94			
Site 15				
Site 16	-1.14			
Site 4 * Flux		-0.50		0.63
Site 5 * Flux				
Site 7 * Flux				
Site 11 * Flux		-0.64		
Site 13 * Flux	0.91			
Site 16 * Flux	1.34			
Model R ²	88.4%	3.9%	9.7%	9.0%
Standard Deviation	0.40	0.71	0.52	0.49

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	11.38	12.41	13.66	13.66
OSP	0.35			
Immersion Sn		0.25		
Immersion Ag				
Ni/Au				
Ni/Pd/Au	-0.35			
Flux	2.05		0.34	0.256
Model R ²	81.3%	2.0%	9.7%	6.3%
Standard Deviation	0.5	0.70	0.51	0.49

Table A.20 Significant Coefficients for the Two GLM Analyses by Test Time for PGA-B

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	10.71	12.52	13.69	13.83
Flux	2.77		0.40	
Site 2				-0.49
Site 3				
Site 4				
Site 5			-0.44	-0.63
Site 6		-0.41		-0.42
Site 7				
Site 8	0.57			
Site 9				
Site 10				
Site 11				
Site 12				
Site 13				
Site 14				
Site 15				
Site 16	-0.34	-0.61		
Site 4 * Flux				
Site 5 * Flux				0.69
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux				
Site 16 * Flux		0.72		
Model R ²	89.4%	8.0%	15.5%	12.5%
Standard Deviation	0.47	0.53	0.56	0.50

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	10.77	12.55	13.72	13.70
OSP		-0.23	-0.33	-0.21
Immersion Sn				
Immersion Ag				
Ni/Au				
Ni/Pd/Au	-0.38	-0.40		
Flux	2.71		0.39	0.20
Model R ²	88.7%	5.6%	16.0%	6.7%
Standard Deviation	0.4	0.50	0.56	0.51

Table A.21 Significant Coefficients for the Two GLM Analyses by Test Time for the Gull Wing

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	11.72	12.59	13.76	13.32
Flux	0.81		-0.37	
Site 2				
Site 3				
Site 4				
Site 5	0.37			
Site 6				
Site 7				
Site 8				-0.64
Site 9				
Site 10	0.47			
Site 11	-0.65			
Site 12	0.54			
Site 13				
Site 14				
Site 15		0.67		
Site 16		0.66		
Site 4 * Flux				
Site 5 * Flux				
Site 7 * Flux	0.47			
Site 11 * Flux	1.61			
Site 13 * Flux				
Site 16 * Flux				
Model R ²	55.4%	3.3%	2.8%	1.7%
Standard Deviation	0.54	1.1	1.10	1.06

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85	Thermal Shock	Mech Shock
Constant	11.55	12.62	13.76	13.22
OSP	0.30			
Immersion Sn	0.27			
Immersion Ag				
Ni/Au				0.46
Ni/Pd/Au		0.63		
Flux	1.09		-0.37	
Model R ²	48.2%	1.9%	2.8%	2.6%
Standard Deviation	0.50	1.00	1.10	1.0

Table A.22 Significant Coefficients for the Two GLM Analyses by Test Time for Stranded Wire 1

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	12.90	0.000	0.001	0.005
Flux	0.55			
Site 2				
Site 3				
Site 4		-0.001		
Site 5		-0.001		
Site 6				
Site 7				
Site 8				
Site 9				
Site 10				
Site 11				
Site 12			0.024	0.042
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux		0.002		
Site 7 * Flux				
Site 11 * Flux				
Site 13 * Flux	-2.21			
Site 16 * Flux				0.079
Model R ²	3.6%	6.5%	12.5%	11.7%
Standard Deviation	2.57	0.002	0.014	0.041

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	12.94	0.000	0.001	0.006
OSP		-0.001		
Immersion Sn				
Immersion Ag	1.06		0.010	0.019
Ni/Au				
Ni/Pd/Au				
Flux				
Model R ²	1.8%	1.6%	4.5%	2.1%
Standard Deviation	2.00	0.001	0.014	0.043

Table A.23 Significant Coefficients for the Two GLM Analyses by Test Time for Stranded Wire 2

**GLM from Eq. 1.1:
Sites and Interactions with Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	23.44	-0.000	0.011	0.033
Flux				
Site 2				
Site 3		0.003		
Site 4				
Site 5				
Site 6				
Site 7				
Site 8				
Site 9				
Site 10	-1.56			
Site 11				
Site 12			0.077	
Site 13				
Site 14				
Site 15				
Site 16				
Site 4 * Flux				
Site 5 * Flux	-2.31			
Site 7 * Flux				
Site 11 * Flux		-0.002	0.074	
Site 13 * Flux				
Site 16 * Flux				0.130
Model R ²	8.6%	8.2%	8.2%	4.1%
Standard Deviation	1.90	0.003	0.067	0.098

**GLM from Eq. 1.2:
Surface Finishes and Flux**

Experimental Factor	Pre-Test	85/85 (Delta 1)	Thermal Shock (Delta 2)	Mech Shock (Delta 3)
Constant	23.34	0.000	-0.001	0.021
OSP	-0.43			
Immersion Sn				
Immersion Ag		-0.001	0.038	
Ni/Au				
Ni/Pd/Au				
Flux			0.026	0.029
Model R ²	0.8%	0.9%	7.4%	2.2%
Standard Deviation	2.00	0.002	0.067	0.099