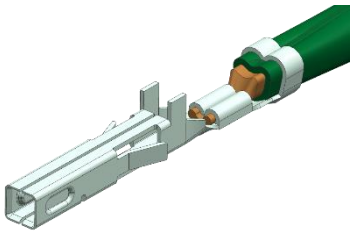
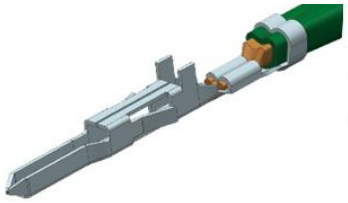
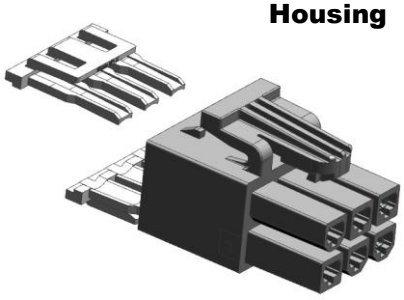
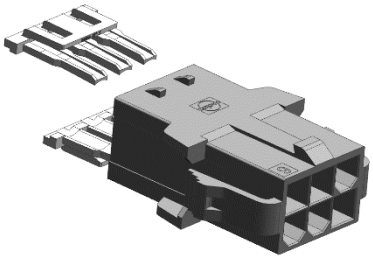
molex

TEST SUMMARY

Mini-Fit Sigma, Wire to Wire

INTERCONNECT SYSTEMS

See section 2.1 for series numbers

Receptacle With TPA	Plug With TPA
Female Crimp Terminal 	**Male Crimp Terminal** 
TPA	**TPA**
Receptacle Housing 	**Plug Housing** 

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DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
2131370002-TS	ALUO02	YXZHENG	YXZHENG

1.0 SCOPE

This Test Summary covers the performance results for the **MINI-FIT SIGMA Wire-To-Wire**, 4.20mm pitch dual row and single row connector series using brass and phos bronze terminals with Tin plating terminated with 16 to 24 AWG wire using Molex crimp technology. This document includes results when Sigma product is mated to Sigma product as well as results when Sigma product is mated to standard product. The TPA (terminal position assurance) is intended to ensure the crimp terminals are fully seated and to prevent incidence of terminal back-out due to partially seated terminals.

2.0 PRODUCT DESCRIPTION

2.1 NAMES AND SERIES NUMBER(S)

WIRE-TO-WIRE				
Description	Series Number	UL (600 V)	CSA (250 V)	IEC (250 V)
Mini-Fit Sigma, Female Crimp Terminal	172718	Yes	Yes	Yes
Mini-Fit Sigma, Male Crimp Terminal	172765	Yes	Yes	Yes
Mini-Fit Sigma, Receptacle Hsg, Dual Row	172708	Yes	Yes	Yes
Mini-Fit Sigma, Receptacle Hsg, Single Row	200453	Yes	Yes	Yes
Mini-Fit Sigma, TPA	172709	Yes	Yes	Yes
Mini-Fit Sigma, Plug Hsg, Dual Row	172762	Yes	Yes	Yes
Mini-Fit Sigma, Plug Hsg, Panel Mount, Dual Row	172767	Yes	Yes	Yes
Mini-Fit Sigma, Plug Hsg, Single Row	200471	Yes	Yes	Yes
Mini-Fit Sigma, Plug Hsg, Panel Mount, Single Row	200488	Yes	Yes	Yes

2.2 DIMENSIONS, MATERIALS, PLATING AND MARKINGS

See the appropriate sales drawings for the information on dimensions, materials, plating and markings.

2.3 SAFETY AGENCY APPROVALS

UL File Number: TBD
CSA: TBD
IEC 61984 Certification: TBD*, tested to and found in compliance with IEC 61984. NRTL type examination certificate available from Molex upon requ*est. Contact Molex Safety Agency team for questions regarding certification on specific part numbers.

2.4 PRODUCT SPECIFICATION TITLE AND DOCUMENT NUMBER

Title: Product Specification Mini-Fit Sigma Connector System
Document No: 2131370000-PS

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See sales drawings and the other sections of this specification for the necessary referenced documents and specifications.

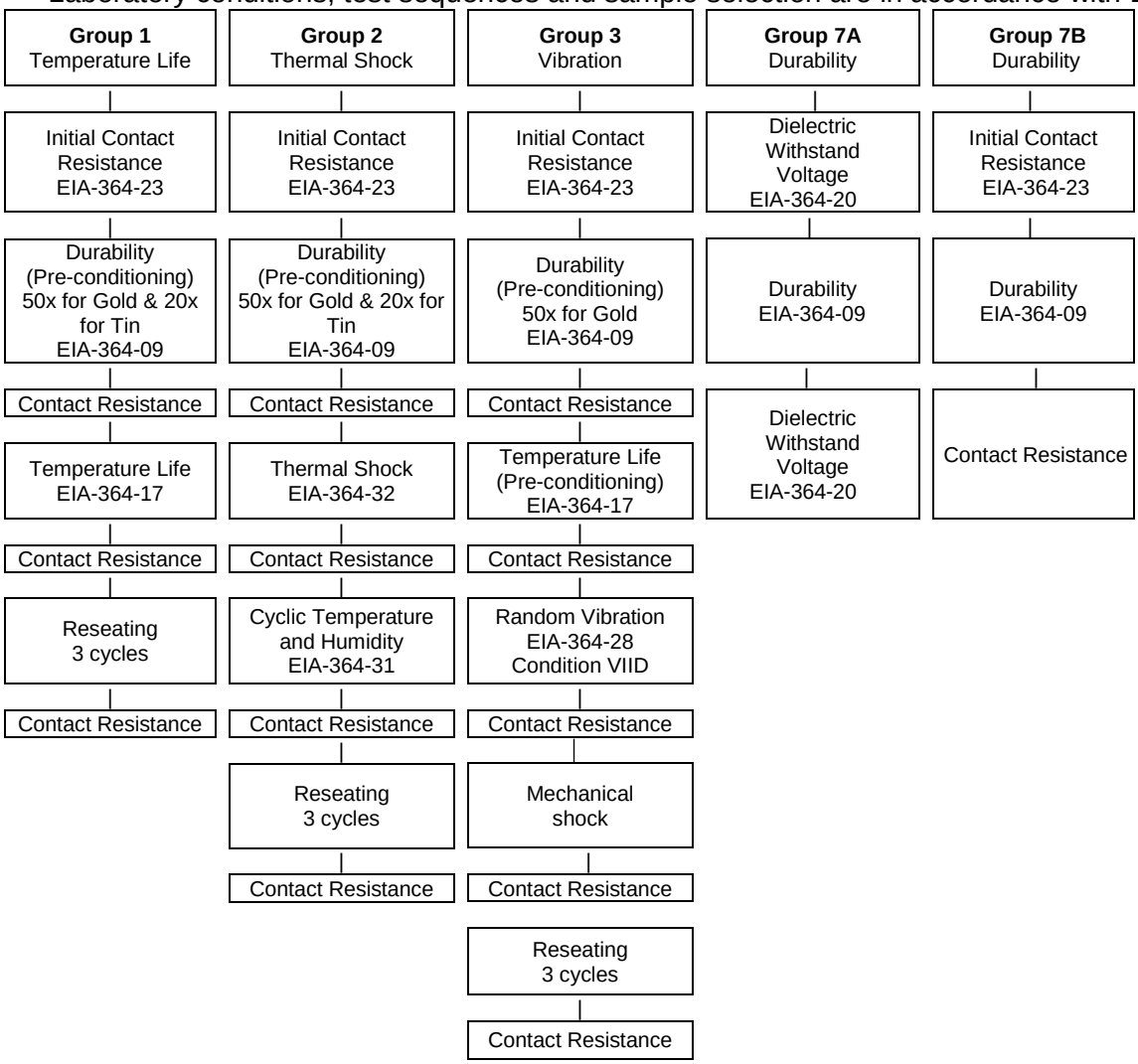
4.0 GLOW WIRE TEST

ITEM	REQUIREMENT	Result	Comment
Glow Wire @ 750°C (IEC 60335-1) Horizontal and vertical directions • Housing • TPA • Assembly loaded with crimped terminals Assembly loaded with crimped terminals and TPA	No flame >0.2 sec Ignition of paper below test sample	No ignition of part No Ignition of Pape	Pass Pass

Testing was performance in Molex Reliability Lab.

5.0 TEST SEQUENCES

Laboratory conditions, test sequences and sample selection are in accordance with EIA-364.



TEST SUMMARY

Individual Tests
Connector Mate and Un-mate Forces per circuit
Crimp Terminal Insertion Force
Crimp Terminal Retention Force W and W/O TPA
Thumb Latch Yield Strength
Wire Crimp Pullout Force

6.0 MECHANICAL PERFORMANCE RESULTS

Sigma Receptacle mated to Sigma Plug					
DESCRIPTION	**TREATMENT**	**REQUIREMENT**	**MEAN**	**MIN.**	**MAX.**
Mate Force Per Circuit (brass)	Initial	**14.7** N MAX	**3.86** N	**2.43** N	**7.88** N
Unmate Force Per Circuit (brass)	Initial	**1.0** N MIN	**3.55** N	**2.69** N	**4.77** N
Mate Force Per Circuit (phos bronze)	Initial	**14.7** N MAX	**5.05** N	**3.99** N	**7.29** N
Unmate Force Per Circuit (phos bronze)	Initial	**1.0** N MIN	**3.73** N	**2.73** N	**5.00** N

172718 FEMALE TERMINAL SERIES					
DESCRIPTION	**TREATMENT**	**REQUIREMENT**	**MEAN**	**MIN.**	**MAX.**
Terminal Insertion Force (brass)	Initial	**15** N MAX	**2.41** N	**2.17** N	**2.75** N
Terminal Insertion Force (phos bronze)	Initial	**15** N MAX	**2.71** N	**2.38** N	**3.35** N
Terminal Retention Force (brass)	Initial	**30** N MIN	**58.41** N	**55.36** N	**60.97** N
Terminal Retention Force (brass) With TPA	Initial	**60** N MIN	**74.92** N	**67.81** N	**81.27** N
Terminal Retention Force (phos bronze)	Initial	**30** N MIN	**64.89** N	**59.84** N	**70.19** N

172765 MALE TERMINAL SERIES					
DESCRIPTION	**TREATMENT**	**REQUIREMENT**	**MEAN**	**MIN.**	**MAX.**
Terminal Insertion Force (brass)	Initial	**15** N MAX	**2.50** N	**1.52** N	**4.58** N
Terminal Retention Force (brass)	Initial	**30** N MIN	**61.93** N	**50.04** N	**61.81** N
Terminal Retention Force (brass) With TPA	Initial	**60** N MIN	**85.62** N	**77.91** N	**92.00** N

SIGMA RECEPTACLE HOUSING SERIES TO PLUG HOUSING SERIES					
DESCRIPTION	**TREATMENT**	**REQUIREMENT**	**MEAN**	**MIN.**	**MAX.**
Thumb Latch Yield Strength	Initial	**50** N MIN	**131.00** N	**127.98** N	**138.49** N

5.0 MECHANICAL PERFORMANCE RESULTS (CONT.)

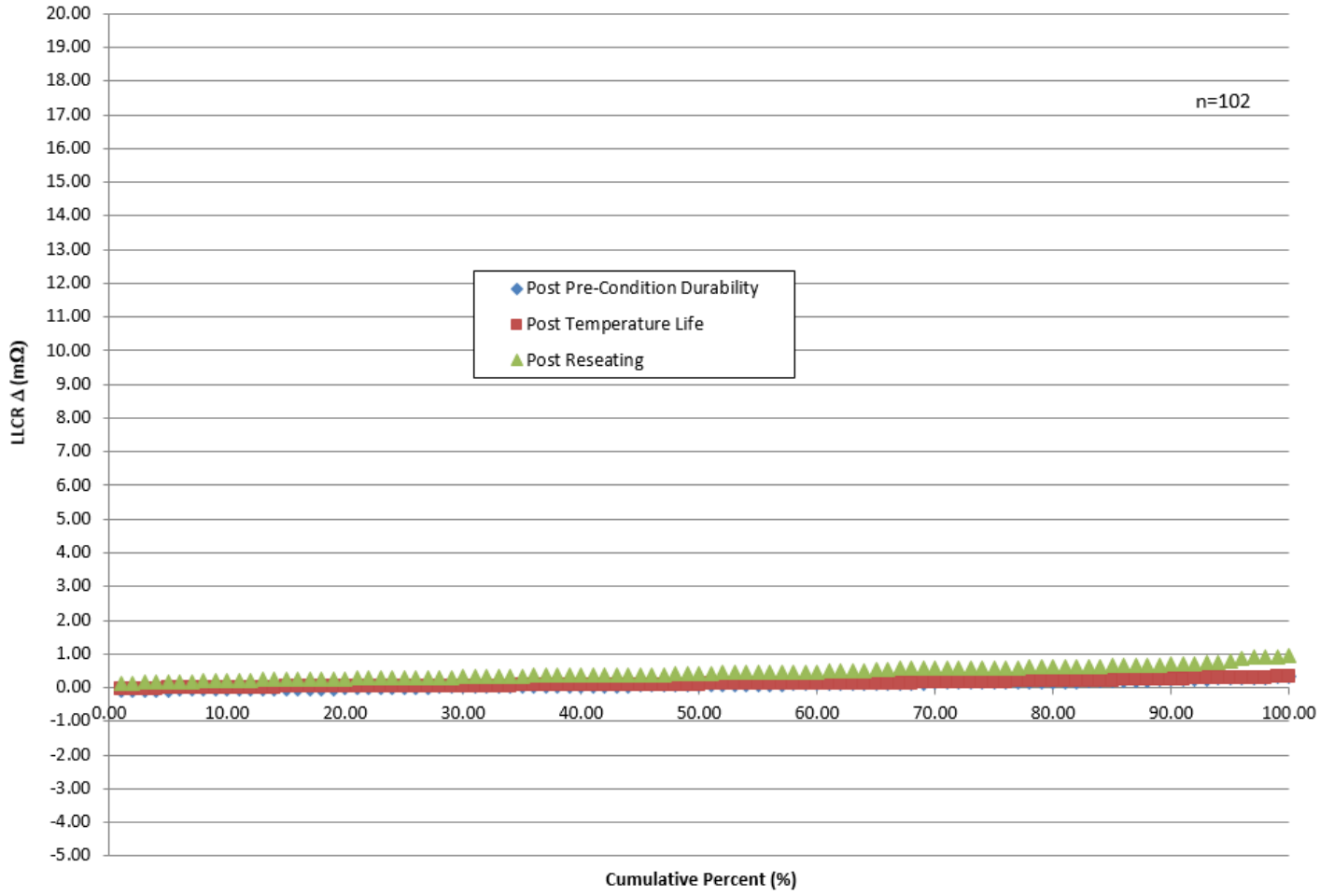
SIGMA PLUG HOUSING SERIES					
DESCRIPTION	**TREATMENT**	**REQUIREMENT**	**MEAN**	**MIN.**	**MAX.**
Dual Row Panel Mount Retention Force	Initial	**220** N MIN	**261.26** N	**237.78** N	**271.06** N
Sigle Row Panel Mount Retention Force	Initial	**150** N MIN	**156.18** N	**151.13** N	**162.55** N

6.0 ELECTRICAL / ENVIRONMENTAL PERFORMANCE RESULTS

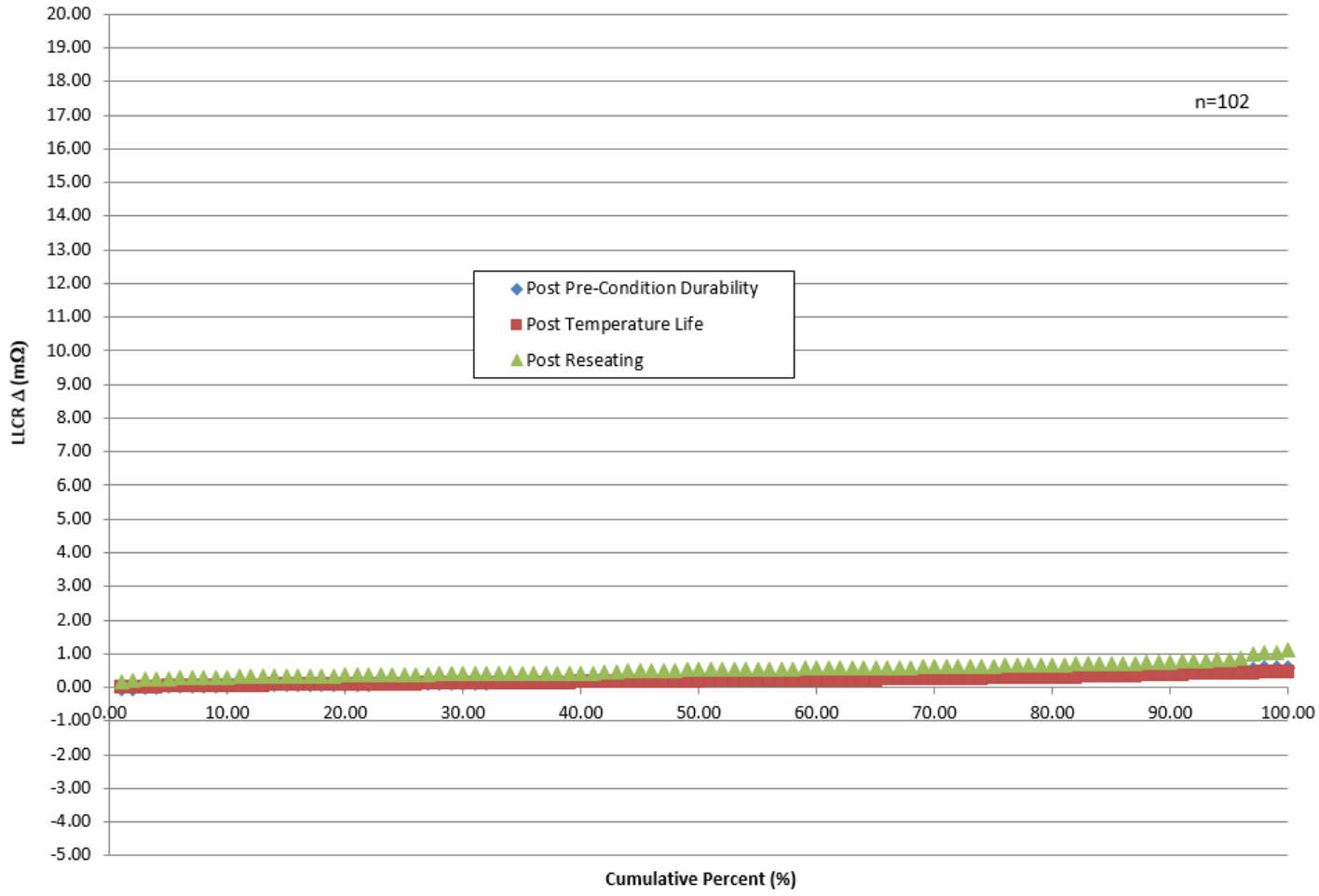
(Note that measured LLCR values are for one mated interface minus bulk resistance)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
GROUP 1	Contact Resistance (Low Level)	**Sigma Receptacle mated to Sigma Plug – BRASS**				
		Initial	10 mΩ MAX	**3.90** mΩ	**3.73** mΩ	**4.16** mΩ
		After Durability (pre-conditioning)	20 mΩ Δ MAX	**0.10** mΩ	**-0.08** mΩ	**0.37** mΩ
		After Temp Life	20 mΩ Δ MAX	**0.13** mΩ	**-0.05** mΩ	**0.44** mΩ
		After Reseating	20 mΩ Δ MAX	**0.47** mΩ	**0.11** mΩ	**2.14** mΩ
		Sigma Receptacle mated to Sigma Plug – PHOS BRONZE				
		Initial	10 mΩ MAX	**4.13** mΩ	**3.98** mΩ	**4.29** mΩ
		After Durability (pre-conditioning)	20 mΩ Δ MAX	**0.25** mΩ	**-0.05** mΩ	**0.80** mΩ
		After Temp Life	20 mΩ Δ MAX	**0.20** mΩ	**-0.02** mΩ	**0.54** mΩ
		After Reseating	20 mΩ Δ MAX	**0.54** mΩ	**0.17** mΩ	**1.32** mΩ

Group 1 – Sigma Receptacle mated to Sigma Plug – BRASS



Group 1 – Sigma Receptacle mated to Sigma Plug – PHOS BRONZE

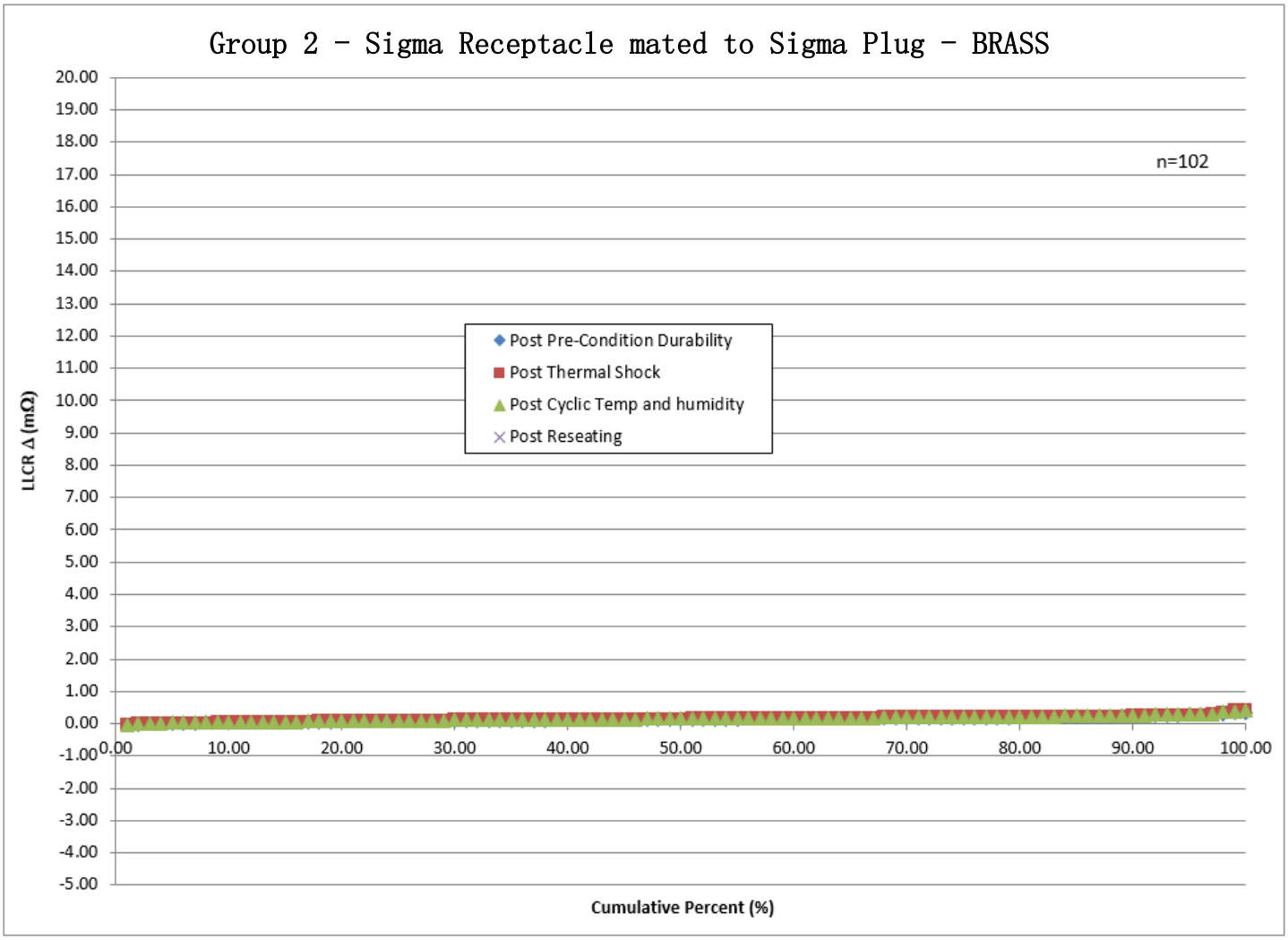


6.0 ELECTRICAL / ENVIRONMENTAL PERFORMANCE RESULTS (CONT.)

(Note that measured LLCR values are for one mated interface minus bulk resistance)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
GROUP 2	Contact Resistance (Low Level)	**Sigma Receptacle mated to Sigma Plug – BRASS**				
		Initial	10 mΩ MAX	**3.89** mΩ	**3.76** mΩ	**4.07** mΩ
		After Durability (pre-conditioning)	20 mΩ Δ MAX	**0.14** mΩ	**-0.05** mΩ	**0.38** mΩ
		After Thermal Shock	20 mΩ Δ MAX	**0.15** mΩ	**-0.03** mΩ	**0.52** mΩ
		After Humidity	20 mΩ Δ MAX	**0.16** mΩ	**-0.03** mΩ	**0.55** mΩ
		After Reseating	20 mΩ Δ MAX	**0.25** mΩ	**0.01** mΩ	**0.70** mΩ
		Sigma Receptacle mated to Sigma Plug – PHOS BRONZE				
		Initial	10 mΩ MAX	**4.14** mΩ	**4.03** mΩ	**4.27** mΩ
		After Durability (pre-conditioning)	20 mΩ Δ MAX	**0.23** mΩ	**-0.10** mΩ	**0.61** mΩ
		After Thermal Shock	20 mΩ Δ MAX	**0.13** mΩ	**-0.05** mΩ	**0.35** mΩ
		After Humidity	20 mΩ Δ MAX	**0.18** mΩ	**0.01** mΩ	**0.42** mΩ
		After Reseating	20 mΩ Δ MAX	**0.32** mΩ	**0.03** mΩ	**0.99** mΩ

TEST SUMMARY



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2131370002-TS	ALUO02	YXZHENG	YXZHENG

TEST SUMMARY

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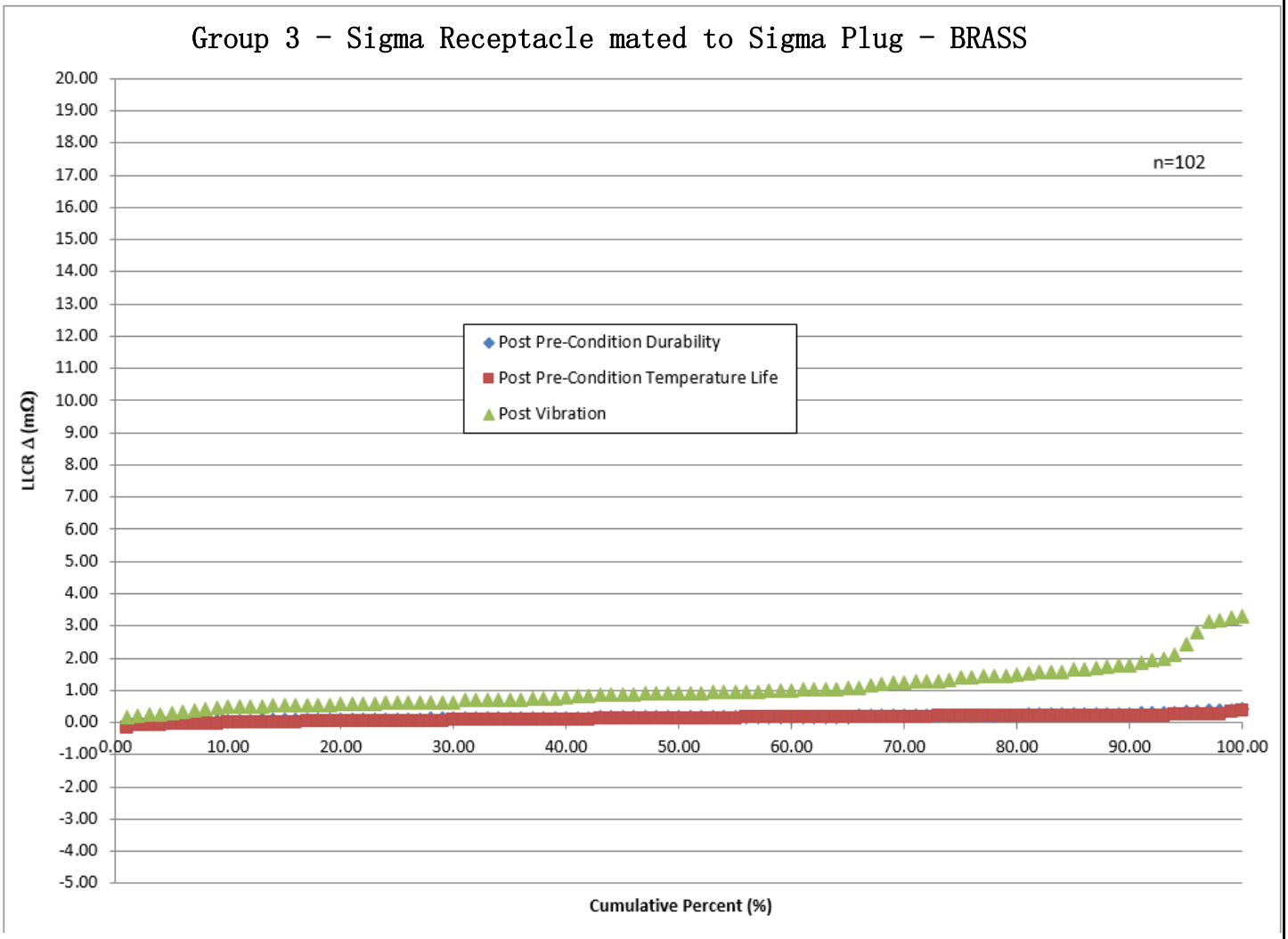
6.0 ELECTRICAL / ENVIRONMENTAL PERFORMANCE RESULTS (CONT.)

(Note that measured LLCR values are for one mated interface minus bulk resistance)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
GROUP 3	Contact Resistance (Low Level)	**Sigma Receptacle mated to Sigma Plug – BRASS**				
		Initial	10 mΩ MAX	**3.88** mΩ	**3.74** mΩ	**4.14** mΩ
		After Durability (pre-conditioning)	20 mΩ Δ MAX	**0.17** mΩ	**-0.03** mΩ	**0.48** mΩ
		After Temp Life (pre-conditioning)	20 mΩ Δ MAX	**0.12** mΩ	**-0.18** mΩ	**0.40** mΩ
		After Vibration	20 mΩ Δ MAX	**1.13** mΩ	**0.17** mΩ	**4.57** mΩ
		Sigma Receptacle mated to Sigma Plug – PHOS BRONZE				
		Initial	10 mΩ MAX	**4.13** mΩ	**3.94** mΩ	**4.24** mΩ
		After Durability (pre-conditioning)	20 mΩ Δ MAX	**0.24** mΩ	**-0.01** mΩ	**0.67** mΩ
		After Temp Life (pre-conditioning)	20 mΩ Δ MAX	**0.18** mΩ	**-0.05** mΩ	**0.66** mΩ
		After Vibration	20 mΩ Δ MAX	**1.26** mΩ	**0.18** mΩ	**5.81** mΩ

TEST SUMMARY



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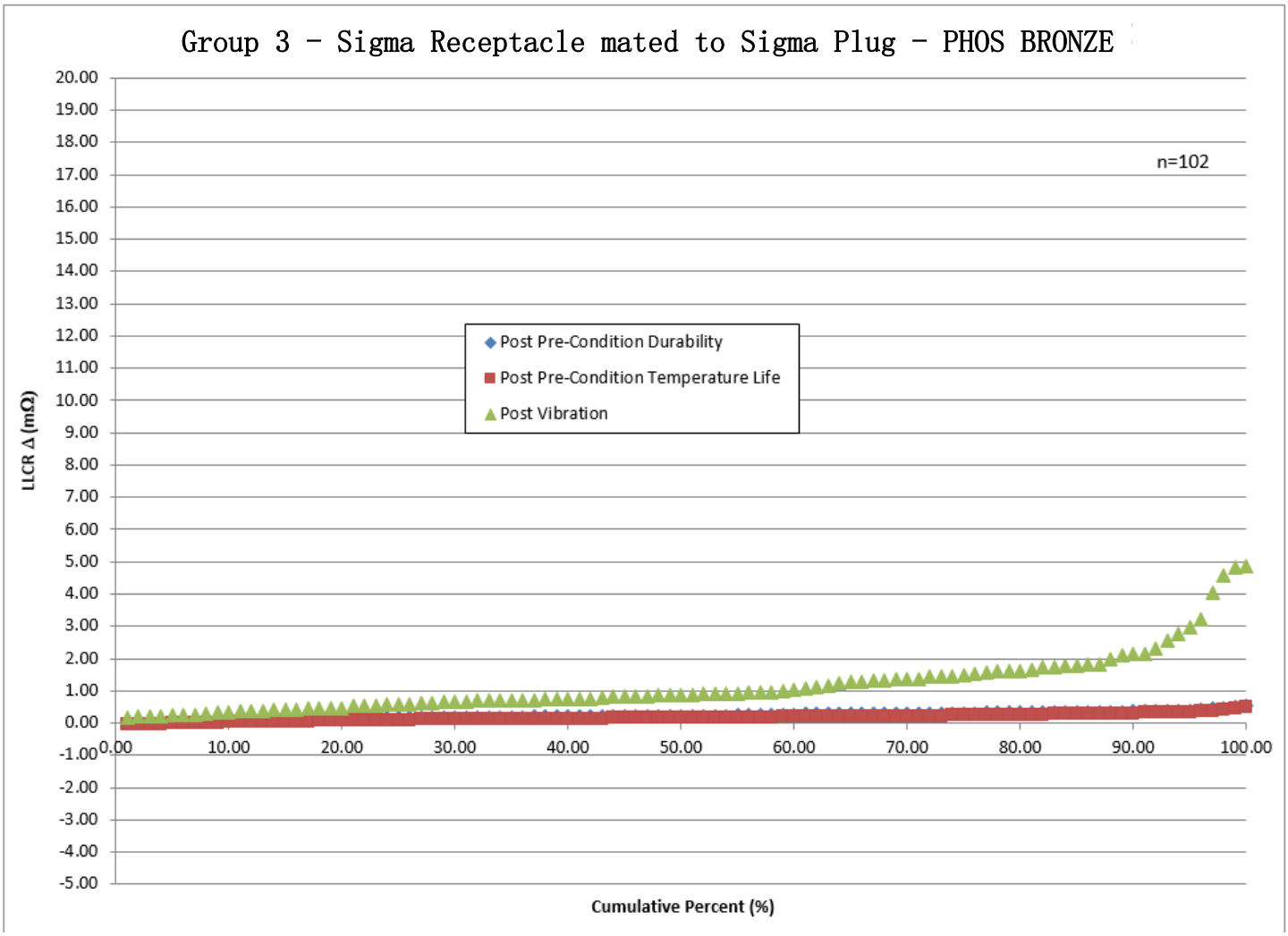
TEST SUMMARY



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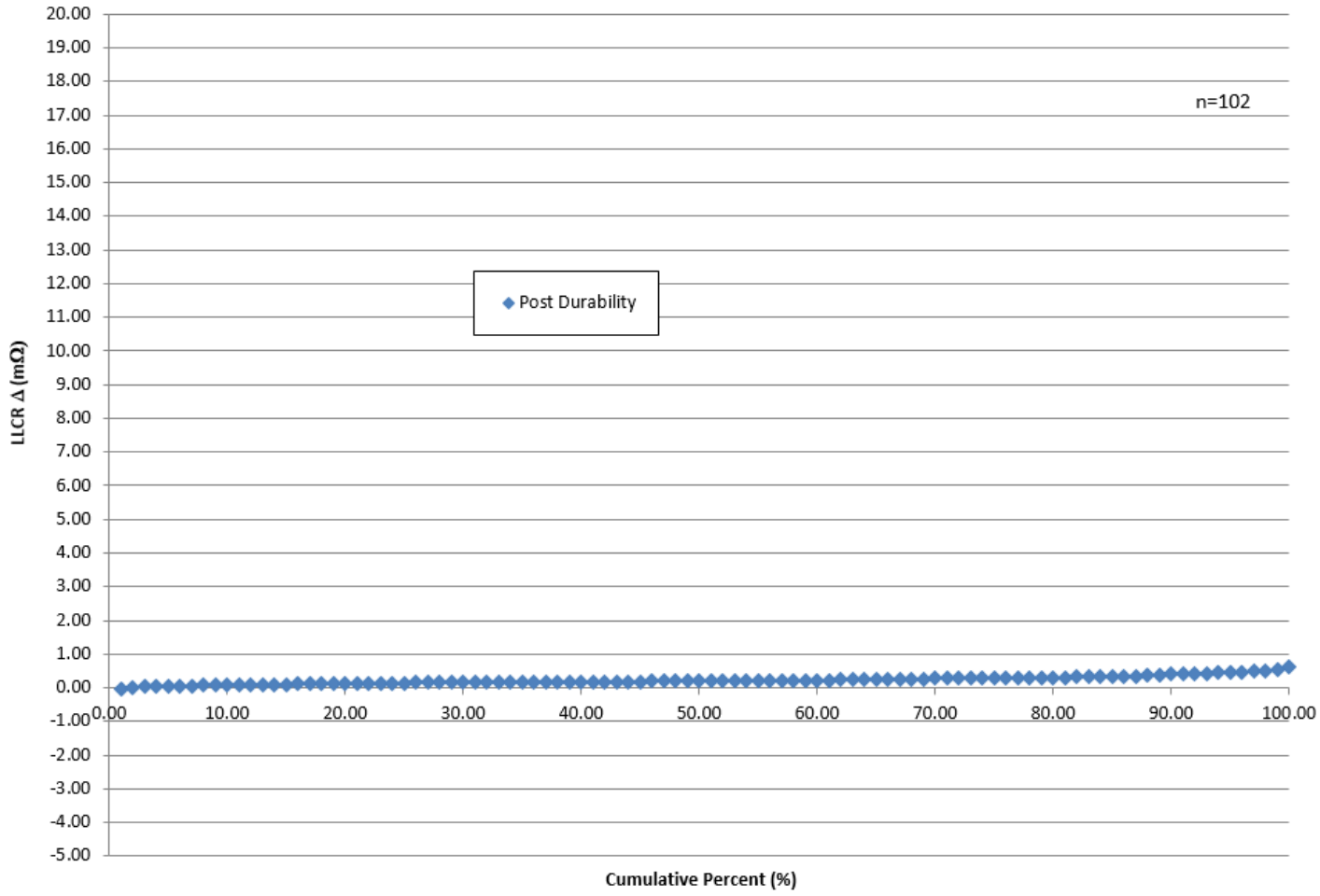
6.0 ELECTRICAL / ENVIRONMENTAL PERFORMANCE RESULTS (CONT.)

(Note that measured LLCR values are for one mated interface minus bulk resistance)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
GROUP 7	Contact Resistance (Low Level)	**Sigma Receptacle mated to Sigma Plug – BRASS**				
		Initial	10 mΩ MAX	**3.86** mΩ	**3.70** mΩ	**4.00** mΩ
		After Durability	20 mΩ Δ MAX	**0.23** mΩ	**-0.03** mΩ	**0.94** mΩ
		Sigma Receptacle mated to Sigma Plug – PHOS BRONZE				
		Initial	10 mΩ MAX	**4.10** mΩ	**3.95** mΩ	**4.22** mΩ
		After Durability	20 mΩ Δ MAX	**0.37** mΩ	**-0.03** mΩ	**1.68** mΩ
	Dielectric Withstanding Voltage	2200 VAC	No breakdown or flashover	**ALL PASS**		

TEST SUMMARY

Group 7 – Sigma Receptacle mated to Sigma Plug - BRASS



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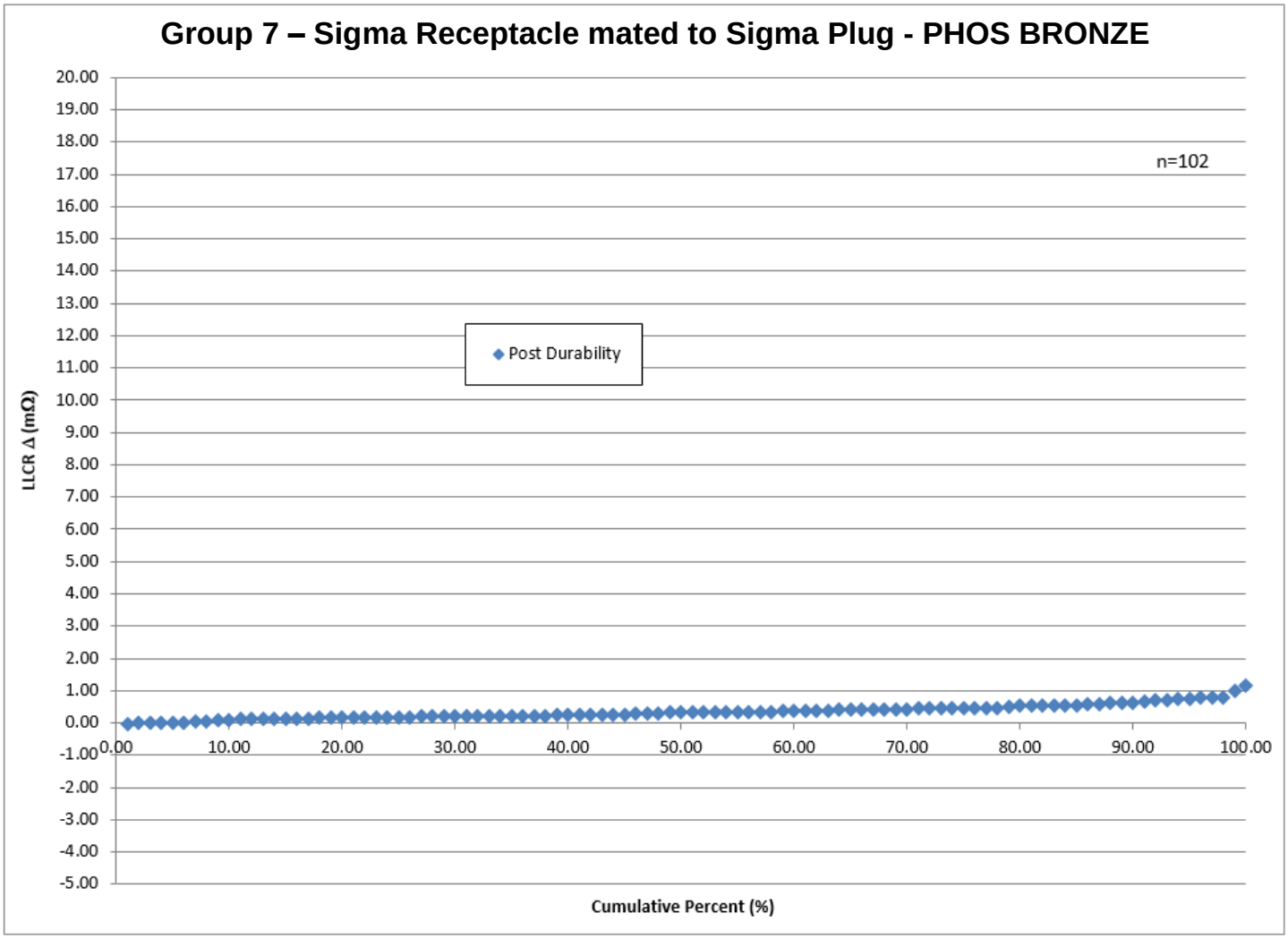
Group 7 – Sigma Receptacle mated to Sigma Plug - PHOS BRONZE
n=102
Post Durability
LLCR Δ (mΩ)
Cumulative Percent (%)
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00