

# Positronic

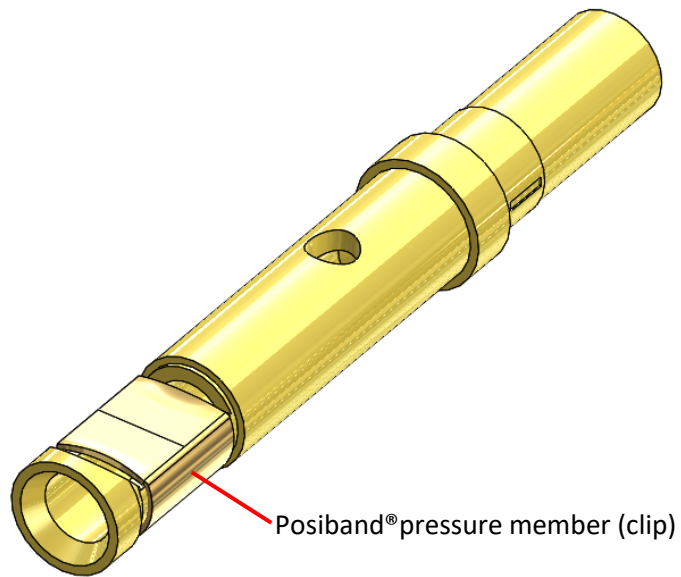
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**THE SCIENCE OF CERTAINTY**

PCN-10555 Project Summary

Posiband® clip plating change

## I. Design Summary



Posiband clips which were historically plated with the same plating as the contact is changing to fewer plating variations as shown below, allowing for more predictable, consistent, and operator friendly mating and un-mating forces.

- Contacts with nickel underplate will have pressure members with gold flash over nickel over copper.
- Contacts without nickel underplate will have pressure members with 50 millionths gold minimum.

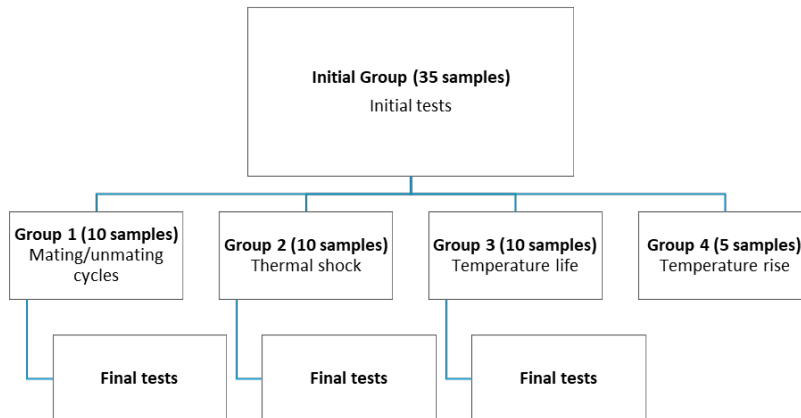
## II. Testing

Relevant combinations (original and experimental) of plating for contacts and Posiband® clips were tested for mechanical and electrical characteristics before and after 3 different conditionings, namely durability, thermal shocks and temperature life.

Finished good references of the contacts used are as follows:

Contact size	FG reference
22	FC8022D2/AA
20	FC6020D2/AA
16	FC114N4/AA

Each sample group's testing path was as follows:



All testing was conducted per the relevant sections of AS39029D and any other industry standard document referenced within the specification.

Requirement	Test Procedure	Performance criteria / Conditioning level	Result
Initial Visual inspection	EIA-364-18		PASS
Low signal contact resistance	EIA-364-23	Size 22: <15mΩ Size 20: <9mΩ Size 16: <5mΩ	PASS
Contact resistance (25°C)	EAI-364-06	Size 22: <73mV drop at 5A Size 20: <55 mV drop at 7.5A	PASS

Requirement	Test Procedure	Performance criteria / Conditioning level	Result
		Size 16: <49mV drop at 13A	
Contact engagement force	EIA-364-37	Size 22: <12oz, 3.3N Size 20: <18oz, 5N Size 16: <30oz, 8.3N	PASS
Contact separation force	EIA-364-37	Size 22: >0.7oz, 195mN Size 20: >0.7oz, 195mN Size 16: >2oz, 556mN	PASS
Durability	EIA-364-32	500 mating/unmating cycles	PASS
Thermal shock	EIA-364-32	-55 to +85°C, 5 cycles	PASS
Temperature life	EIA-364-17B	400h at 125°C	PASS
Temperature rise vs current	EIA-364-70		PASS
Visual inspection	EIA-364-18		PASS
Low signal contact resistance	EIA-364-23	Size 22: <17mΩ Size 20: <11mΩ Size 16: <6mΩ	PASS
Contact resistance (25°C)	EAI-364-06	Size 22: <88mV drop at 5A Size 20: <66 mV drop at 7.5A Size 16: <59mV at 13A	PASS
Contact engagement force	EIA-364-37	Size 22: <14oz, 3.9N Size 20: <22oz, 6.1N Size 16: <36oz, 10N	PASS
Contact separation force	EIA-364-37	Size 22: >0.6oz, 167mN Size 20: >0.6oz, 167mN Size 16: >1.5oz, 417mN	PASS

All samples were within AS39029D requirements and no relevant differences between plating combinations were observed with regards to performances.

Full MIL-DTL-M24308H qualification was conducted previously with such plating changes which proved not to have an impact (Reference PCN-10545 for more information).

Testing sequence was as follows:

*Table XI, Qualification Inspection, Group I:*

<u>Visual &amp; Mechanical</u>	<u>PASS</u>
<u>Magnetic Permeability</u>	<u>PASS</u>
<u>Maintenance Aging</u>	<u>N/A<sup>1</sup></u>
<u>Contact Retention</u>	<u>N/A<sup>2</sup></u>
<u>Dielectric Withstanding Voltage @ Sea Level</u>	<u>PASS</u>
<u>Dielectric Withstanding Voltage @ Altitude</u>	<u>PASS</u>
<u>Cable Retention</u>	<u>N/A<sup>3</sup></u>
<u>Insulation Resistance @ Ambient Temp.</u>	<u>PASS</u>
<u>Contact Resistance</u>	<u>PASS</u>
<u>Contact Engagement and Separation Forces</u>	<u>PASS</u>
<u>Mating and Unmating Force</u>	<u>PASS</u>
<u>Temperature Cycling</u>	<u>PASS</u>
<u>Air leakage</u>	<u>N/A<sup>4</sup></u>
<u>Humidity</u>	<u>PASS</u>
<u>Dielectric Withstanding Voltage after Humidity</u>	<u>PASS</u>
<u>Insulation Resistance after Humidity</u>	<u>PASS</u>
<u>Vibration</u>	<u>PASS</u>
<u>Shock</u>	<u>PASS</u>
<u>Durability</u>	<u>PASS</u>
<u>Contact Engagement and Separation Forces after Durability</u>	<u>PASS</u>
<u>Mating and Unmating Force after Durability</u>	<u>PASS</u>
<u>Salt Spray (Corrosion)</u>	<u>N/A<sup>2</sup></u>
<u>Oversize Pin Exclusion</u>	<u>N/A<sup>5</sup></u>
<u>Fluid Immersion</u>	<u>PASS</u>
<u>Mating and Unmating Force after Fluid Immersion</u>	<u>PASS</u>
<u>Insert Retention in Housing</u>	<u>PASS</u>
<u>Final Visual &amp; Mechanical</u>	<u>PASS</u>
<u>Thermal Vacuum Outgassing</u>	<u>PASS</u>

*Table XI, Qualification Inspection, Group II:*

<u>Resistance to Solder Heat</u>	<u>PASS</u>
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*Table XI, Qualification Inspection, Group III:*

<u>Solderability</u>	<u>PASS</u>
<u>Contact Pin Strength</u>	<u>PASS</u>

<sup>1</sup> Not applicable for printed wire board contacts.

<sup>2</sup> Not applicable for non-removable contacts.

<sup>3</sup> Only applies to flat cable connectors.

<sup>4</sup> Only applies to classes H and K.

<sup>5</sup> Only applies to size 20 contacts.

Additional Salt Spray testing was performed per MIL-DTL-24308 ¶ 4.5.19, EIA/ECA-364-26, Condition B and all samples passed.

### III. Conclusion

Having the same plating on contact and pressure member has been shown not to be necessary to ensure the proper functioning and reliability of Positronic's contact assemblies.

Furthermore, having one clip reference per contact size will allow for better performance consistency, especially in terms of mating and un-mating forces.

For the same reasons mentioned above and given that the designs are similar, the plating change shall also be applied to contact sizes 18 and 12.