# EVAFLEX® 5
# [With SHIELD FFC]

Part No. 20818-0**E

## Test Report

Product Specification no. PRS-2671

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| 1 | T22021 | January 20, 2022 | M.Muro | - | H.Ikari |
| 0 | T20068 | September 3, 2020 | S.Shigekoshi | M.Muro | Y.Shimada |
| Rev. | ECN | Date | Prepared by | Checked by | Approved by |

**1. Purpose**

To evaluate the performance of EVAFLEX 5Connector in accordance with PRS-2671.

**2. Specimen**

EVAFLEX 5 （Part No. 20818-0**E）

**3. Test Sequence**

All the evaluations were performed in accordance with Table 1. Test Sequence.

**4. Result**

See Table 2 to 4, Graph 1 to 11. For the details of the testing conditions and requirements, see PRS-2671.
The “n” in the tables show the number of measurement points.

**5. Conclusion**

All the specimens met the requirements of PRS-2671.

**Table 1. Test Sequence and Sample Quantity**

| Test Item | Group | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
| Contact Resistance | | | 2,6 | | | 1,3,5 | 1,3 | 1,3 | 1,5 | 1,5 | 1,3 | 1,3 | | |
| Insulation Resistance | | | | | | | | | 2,6 | 2,6 | | | | |
| D. W. Voltage | | | | | | | | | 3,7 | 3,7 | | | | |
| Temp. Rise | 1 | | | | | | | | | | | | | |
| Differential Impedance | | 1 | | | | | | | | | | | | |
| Mating Force | | | 1,5 | | | | | | | | | | | |
| Un-mating Force | | | 3,7 | | | | | | | | | | | |
| Durability | | | 4 | | | | | | | | | | | |
| Contact Retention Force | | | | 1 | | | | | | | | | | |
| FFC Retention Force | | | | | 1 | | | | | | | | | |
| Vibration | | | | | | 2 | | | | | | | | |
| Shock | | | | | | 4 | | | | | | | | |
| Thermal Shock | | | | | | | 2 | | | | | | | |
| High Temperature Life | | | | | | | | 2 | | | | | | |
| Humidity (Steady State) | | | | | | | | | 4 | | | | | |
| Humidity (Cycling) | | | | | | | | | | 4 | | | | |
| Salt Water Spray | | | | | | | | | | | 2 | | | |
| $H_2S$ Gas | | | | | | | | | | | | 2 | | |
| Solderability | | | | | | | | | | | | | 1 | |
| Soldering Heat Resistance | | | | | | | | | | | | | | 1 |
| Sample QTY. | 5 | 5 | 5 | 20 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 10 | 10 |

※Numbers indicate test sequences

**Table 2. Test Result**

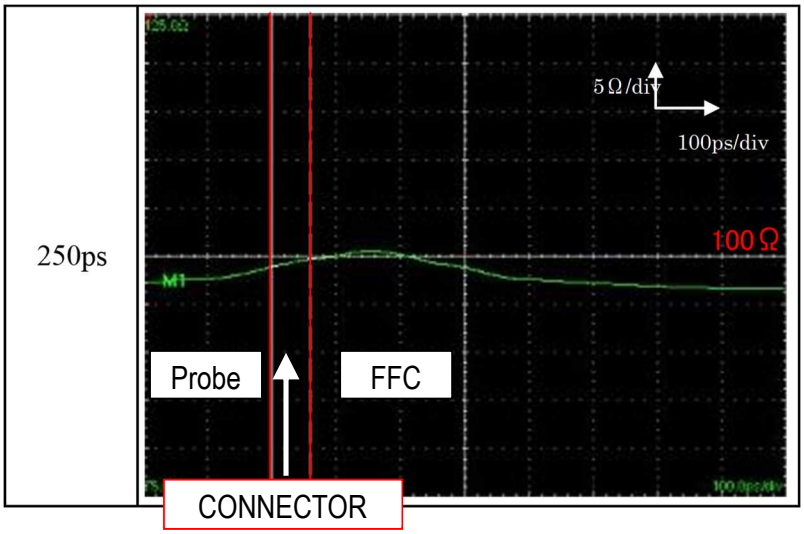
| Test Item | Measurements | | | Spec. | Set | n | Data | | | | | Judge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AVG(X) | MAX. | MIN. | s | X±3s | |
| A Group Temperature Rise | | | 0.3A/Pin(51P) | ΔT=30K(℃) MAX. | 5 | - | ΔT=14.8K(℃) MAX | | | | | ○ |
| | | | 0.5A/Pin(30P) (15A/CONN.) | ΔT=30K(℃) MAX. | 5 | - | ΔT=26.5K(℃) MAX | | | | | ○ |
| | | | 0.6A/Pin(20P) (12A/CONN.) | ΔT=30K(℃) MAX. | 5 | - | ΔT=27.2K(℃) MAX | | | | | ○ |
| B Group Differential Impedance | | | MAX. Side | 100±10Ω | 5 | - | 100.122 | 100.51 | 99.70 | 0.352 | 101.178 | ○ |
| | | | MIN. Side | | | - | 100.032 | 100.38 | 98.83 | 0.675 | 98.007 | ○ |
| C Group Durability | Contact Resistance (mΩ) | | Initial | 60mΩ MAX. | 5 | 255 | 33.199 | 37.46 | 28.13 | 2.101 | 39.502 | ○ |
| | | | I/W 30cycles | ΔR=40mΩMAX. | 5 | 255 | -0.987 | 1.39 | -3.96 | 1.057 | 2.184 | ○ |
| | 41P | Insertion Force (N) | Initial | 29.2N MAX. | 5 | - | 14.906 | 15.50 | 14.20 | 0.478 | 16.340 | ○ |
| | | | I/W 30cycles | | 5 | - | 9.568 | 10.25 | 9.14 | 0.497 | 11.059 | ○ |
| | | Withdrawal Force (N) | Initial | 4.25N MIN. | 5 | - | 12.829 | 13.88 | 11.93 | 0.717 | 10.678 | ○ |
| | | | I/W 30cycles | | 5 | - | 8.782 | 9.50 | 8.05 | 0.532 | 7.186 | ○ |
| | 51P | Insertion Force (N) | Initial | 30N MAX. | 5 | - | 17.588 | 18.19 | 17.12 | 0.483 | 19.037 | ○ |
| | | | I/W 30cycles | | 5 | - | 10.635 | 11.49 | 10.01 | 0.615 | 12.480 | ○ |
| | | Withdrawal Force (N) | Initial | 5N MIN. | 5 | - | 16.187 | 17.90 | 14.81 | 1.129 | 12.800 | ○ |
| | | | I/W 30cycles | | 5 | - | 10.477 | 12.37 | 9.34 | 1.252 | 6.721 | ○ |
| D Group Contact Retention Force | | | | 0.5N MIN. | - | 20 | 1.283 | 1.47 | 1.08 | 0.196 | 0.695 | ○ |
| E Group FFC Retention Force | 41P | | FFC Retention Force | 22N MIN. | 5 | - | 36.509 | 37.50 | 36.08 | 0.575 | 34.784 | ○ |
| | | | Appearance | No abnormality in the lock part. | 5 | - | No abnormality | | | | | ○ |
| | 51P | | FFC Retention Force | 25N MIN. | 5 | - | 44.908 | 45.73 | 44.01 | 0.763 | 42.619 | ○ |
| | | | Appearance | No abnormality in the lock part. | 5 | - | No abnormality | | | | | ○ |
| F Group Vibration ↓ Shock | Contact Resistance (mΩ) | | Initial | 60mΩ MAX. | 5 | 255 | 32.829 | 37.97 | 27.90 | 2.040 | 38.949 | ○ |
| | | | After Vibration | ΔR=40mΩMAX. | 5 | 255 | 0.241 | 4.60 | -3.85 | 1.506 | 4.759 | ○ |
| | | | After Shock | | 5 | 255 | -3.207 | 4.60 | -7.78 | 3.187 | 6.354 | ○ |
| | Discontinuity | | During Vibration | 1μs MAX. | 5 | - | No discontinuity | | | | | ○ |
| | | | During Shock | | 5 | - | No discontinuity | | | | | ○ |
| | Appearance | | After Vibration | No abnormality adversely affecting the performance shall occur. | 5 | - | No abnormality | | | | | ○ |
| | | | After Shock | | 5 | - | No abnormality | | | | | ○ |

**Table 3. Test Result**

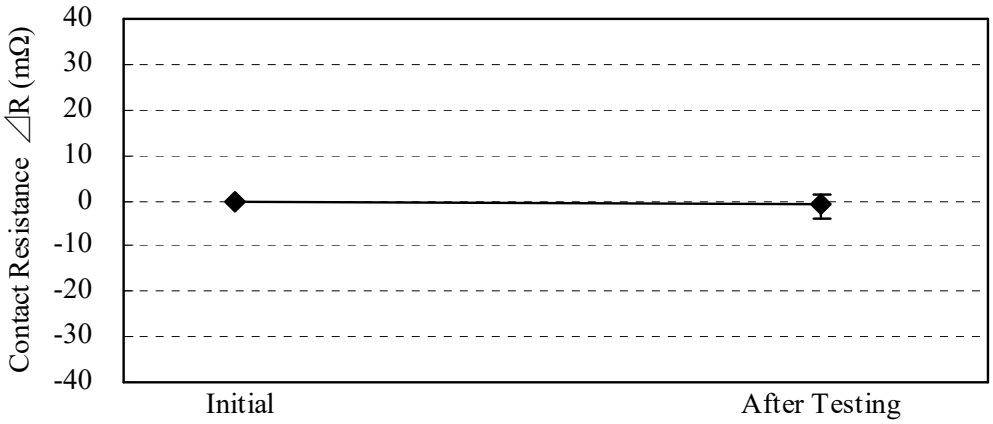
| Test Item | Measurements | | Spec. | Set | n | Data | | | | | Judge |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | AVG(X) | MAX. | MIN. | s | X±3s | |
| G Group Thermal Shock | Contact Resistance (mΩ) | Initial | 60mΩ MAX. | 5 | 255 | 31.884 | 38.77 | 27.36 | 2.600 | 39.684 | ○ |
| | | After Testing | ΔR=40mΩMAX. | 5 | 255 | -2.121 | 3.78 | -8.16 | 2.136 | 4.287 | ○ |
| | Insulation Resistance C/T – C/T | Initial | 100MΩ MIN. | 5 | 5 | $4.0\times10^5$MΩ MIN. | | | | | ○ |
| | | After Testing | | 5 | 5 | $4.0\times10^5$MΩ MIN. | | | | | ○ |
| | Insulation Resistance C/T - Shield | Initial | 100MΩ MIN. | 5 | 5 | $4.0\times10^5$MΩ MIN. | | | | | ○ |
| | | After Testing | | 5 | 5 | $2.0\times10^5$MΩ MIN. | | | | | ○ |
| | Dielectric Strength C/T – C/T | Initial | No abnormalities such as creeping discharge, flashover, insulator breakdown occur. | 5 | 5 | No abnormality | | | | | ○ |
| | | After Testing | | 5 | 5 | No abnormality | | | | | ○ |
| | Dielectric Strength C/T - Shield | Initial | No abnormalities such as creeping discharge, flashover, insulator breakdown occur. | 5 | 5 | No abnormality | | | | | ○ |
| | | After Testing | | 5 | 5 | No abnormality | | | | | ○ |
| | Appearance | | No abnormality adversely affecting the performance shall occur. | 5 | - | No abnormality | | | | | ○ |
| H Group High Temperature Life | Contact Resistance (mΩ) | Initial | 60mΩ MAX. | 5 | 255 | 32.072 | 37.63 | 28.00 | 2.123 | 38.441 | ○ |
| | | After Testing | ΔR=40mΩMAX. | 5 | 255 | 2.053 | 6.28 | -1.79 | 1.682 | 7.099 | ○ |
| | Appearance | | No abnormality adversely affecting the performance shall occur. | 5 | - | No abnormality | | | | | ○ |
| J Group Humidity (Steady State) | Contact Resistance (mΩ) | Initial | 60mΩ MAX. | 5 | 255 | 32.226 | 37.08 | 27.72 | 1.908 | 37.950 | ○ |
| | | After Testing | ΔR=40mΩMAX. | 5 | 255 | 0.501 | 3.15 | -2.29 | 1.139 | 3.918 | ○ |
| | Insulation Resistance C/T – C/T | Initial | 100MΩ MIN. | 5 | 5 | $1.5\times10^6$MΩ MIN. | | | | | ○ |
| | | After Testing | | 5 | 5 | $2.0\times10^4$MΩ MIN. | | | | | ○ |
| | Insulation Resistance C/T - Shield | Initial | 100MΩ MIN. | 5 | 5 | $1.5\times10^6$MΩ MIN. | | | | | ○ |
| | | After Testing | | 5 | 5 | $1.0\times10^6$MΩ MIN. | | | | | ○ |
| | Dielectric Strength C/T – C/T | Initial | No abnormalities such as creeping discharge, flashover, insulator breakdown occur. | 5 | 5 | No abnormality | | | | | ○ |
| | | After Testing | | 5 | 5 | No abnormality | | | | | ○ |
| | Dielectric Strength C/T - Shield | Initial | No abnormalities such as creeping discharge, flashover, insulator breakdown occur. | 5 | 5 | No abnormality | | | | | ○ |
| | | After Testing | | 5 | 5 | No abnormality | | | | | ○ |
| | Appearance | | No abnormality adversely affecting the performance shall occur. | 5 | - | No abnormality | | | | | ○ |

**Table 4. Test Result**

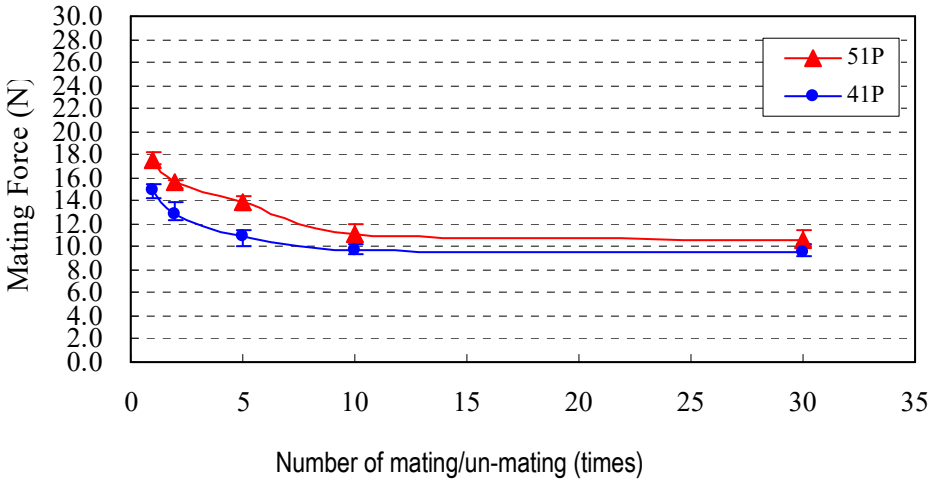
| Test Item | Measurements | | Spec. | Set | n | Data | | | | | Judge |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | AVG(X) | MAX. | MIN. | s | X±3s | |
| K Group Humidity (Cycling) | Contact Resistance (mΩ) | Initial | 60mΩ MAX. | 5 | 255 | 31.023 | 38.71 | 27.10 | 2.649 | 38.970 | ○ |
| | | After Testing | ΔR=40mΩMAX. | 5 | 255 | 1.336 | 7.52 | -5.79 | 2.704 | 9.448 | ○ |
| | Insulation Resistance C/T – C/T | Initial | 100MΩ MIN. | 5 | 5 | $6.0\times10^4$MΩ MIN. | | | | | ○ |
| | | After Testing | | 5 | 5 | $2.0\times10^4$MΩ MIN. | | | | | ○ |
| | Insulation Resistance C/T - Shield | Initial | 100MΩ MIN. | 5 | 5 | $1.0\times10^6$MΩ MIN. | | | | | ○ |
| | | After Testing | | 5 | 5 | $2.0\times10^4$MΩ MIN. | | | | | ○ |
| | Dielectric Strength C/T – C/T | Initial | No abnormalities such as creeping discharge, flashover, insulator breakdown occur. | 5 | 5 | No abnormality | | | | | ○ |
| | | After Testing | | 5 | 5 | No abnormality | | | | | ○ |
| | Dielectric Strength C/T - Shield | Initial | No abnormalities such as creeping discharge, flashover, insulator breakdown occur. | 5 | 5 | No abnormality | | | | | ○ |
| | | After Testing | | 5 | 5 | No abnormality | | | | | ○ |
| | Appearance | | No abnormality adversely affecting the performance shall occur. | 5 | - | No abnormality | | | | | ○ |
| L Group Salt Water Spray | Contact Resistance (mΩ) | Initial | 60mΩ MAX. | 5 | 255 | 32.033 | 37.20 | 27.68 | 2.108 | 38.357 | ○ |
| | | After Testing | ΔR=40mΩMAX. | 5 | 255 | -1.083 | 1.65 | -4.09 | 1.003 | 1.926 | ○ |
| | Appearance | | No abnormality adversely affecting the performance shall occur. | 5 | - | No abnormality | | | | | ○ |
| M Group H2S Gas | Contact Resistance (mΩ) | Initial | 60mΩ MAX. | 5 | 255 | 32.441 | 37.66 | 27.98 | 2.097 | 38.732 | ○ |
| | | After Testing | ΔR=40mΩMAX. | 5 | 255 | 2.069 | 6.05 | -2.20 | 1.530 | 6.659 | ○ |
| | Appearance | | No abnormality adversely affecting the performance shall occur. | 5 | - | No abnormality | | | | | ○ |
| P Group Solderability | Appearance | | More than 95% of The dipped surface Shall be evenly wet. | 10 | - | 100% | | | | | ○ |
| Q Group Soldering Heat Resistance | Appearance | | No abnormality adversely affecting the performance shall occur. | 10 | - | No abnormality | | | | | ○ |



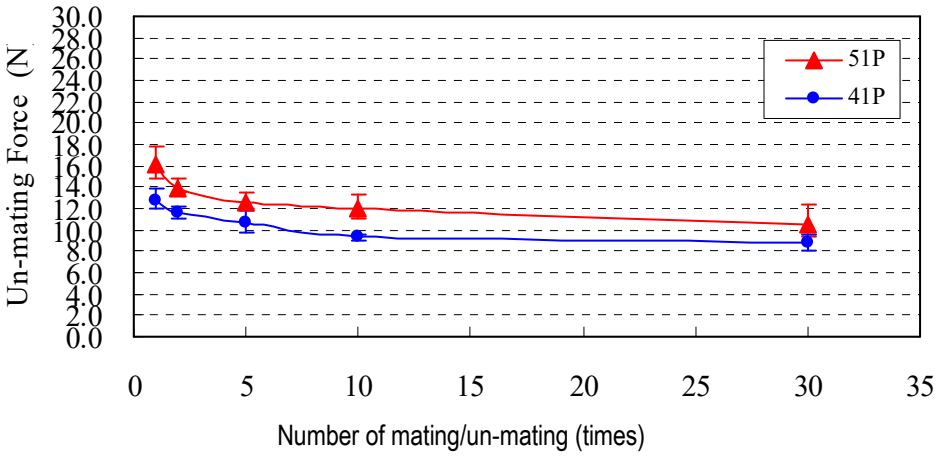

Graph.1 Differential Impedance



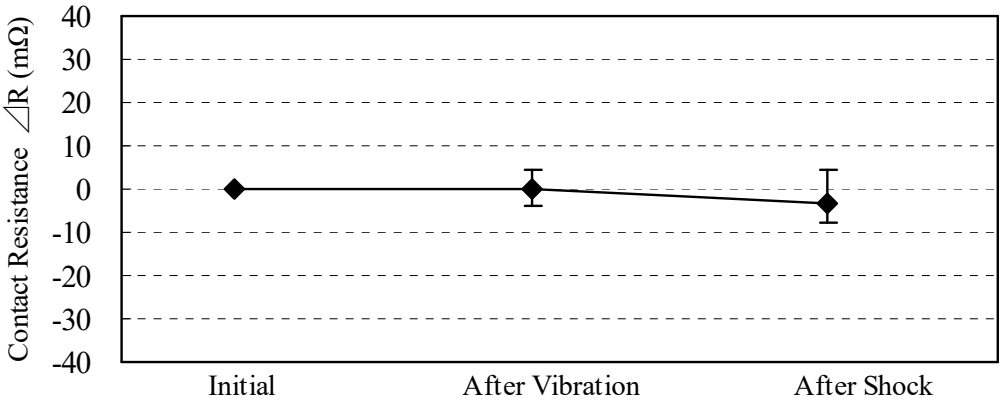

Graph.2 A change of contact resistance: Durability



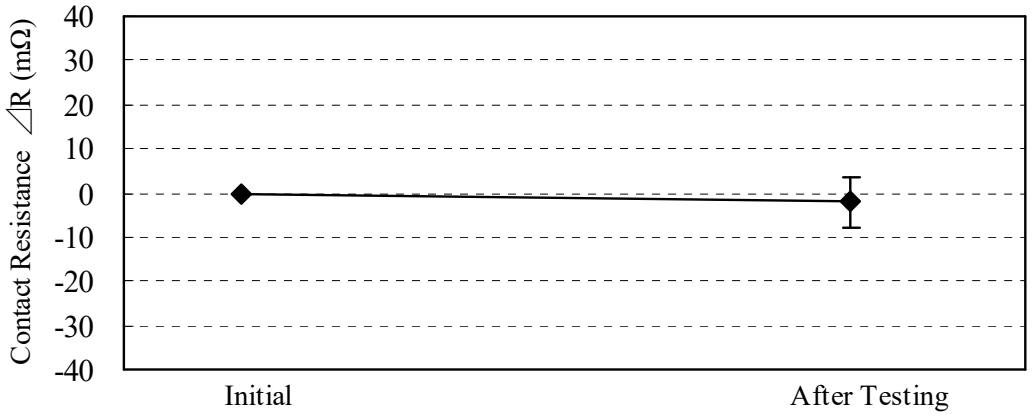

Graph.3 Mating Force



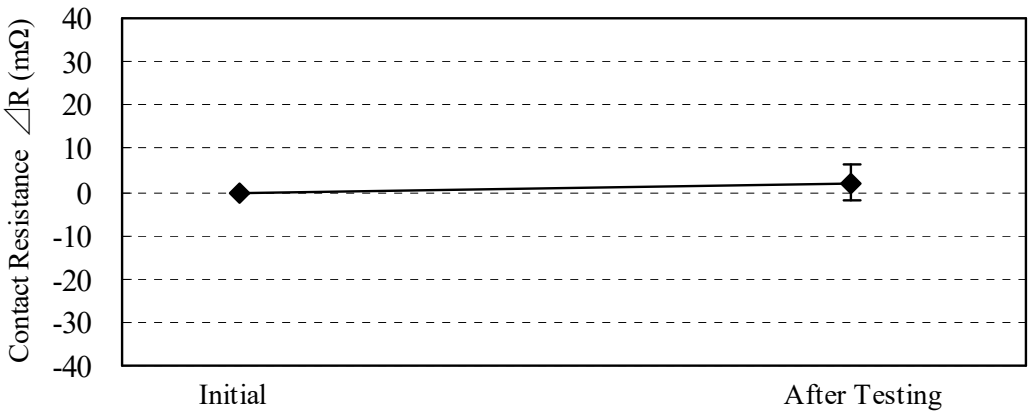

Graph.4 Un-mating Force



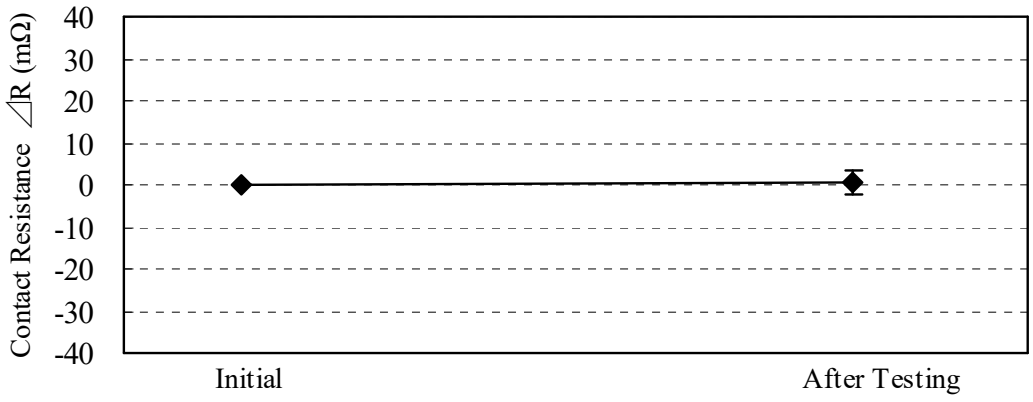

Graph.5 A change of contact resistance: Vibration and Shock



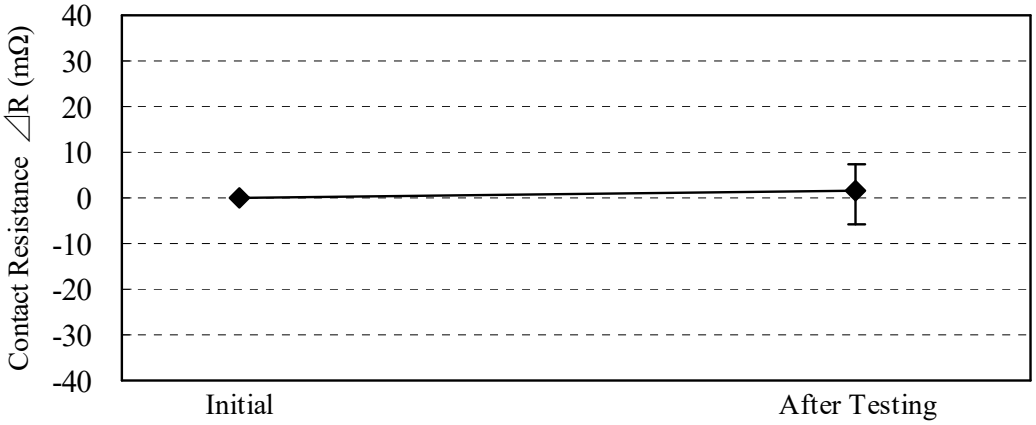

Graph.6 A change of contact resistance: Thermal Shock



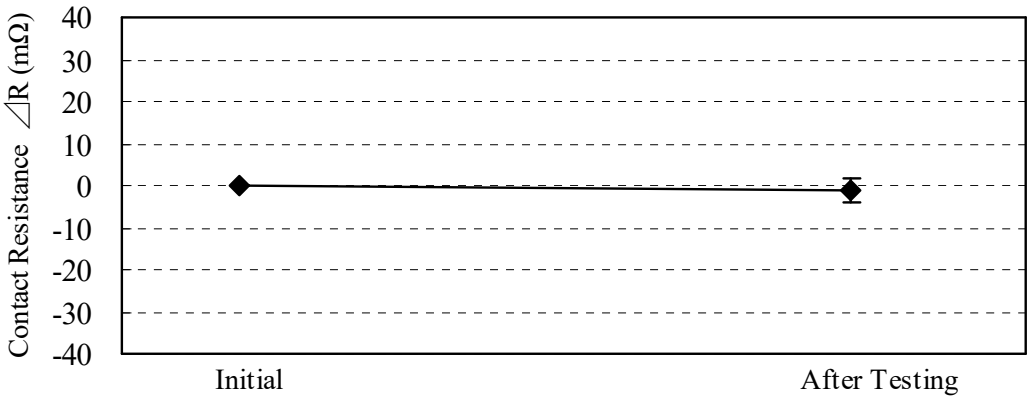

Graph.7 A change of contact resistance: High temperature life



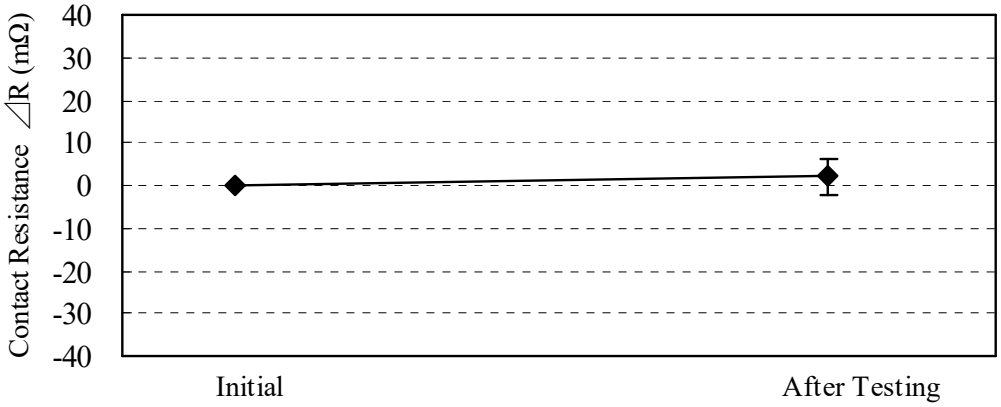

Graph.8 A change of contact resistance: Humidity(Steady State)




Graph.9 A change of contact resistance: Humidity(Cycle)




Graph.10 A change of contact resistance: Salt water Spray




Graph.11 A change of contact resistance: Gas ($H_2S$)