1.0 SCOPE

1.1 This specification sets forth the electrical and mechanical parameters for the "Spot-of-Gold" Mini PV, Crimp-to-Wire type disconnect when mated with a .025± .001 square pin.

2.0 APPLICABLE DOCUMENTS

2.1 The following documents and specifications form a part of this specification to the extent specified herein.

UNS-C17200	- Beryllium Copper
ASTM B-194	- Beryllium Copper
MIL-G-45204	- Gold Plating: Electro Deposited
MIL-STD-202	- Test Methods for Electronic Parts
CDA-725	- Copper Nickel
UNS-C72500	- Copper Nickel

3.0 ELECTRICAL AND MECHANICAL PARAMETERS

3.1 Qualifications

3.1.1 The contacts furnished under this specification shall be a product which has been tested and passed the tests specified herein.

3.2 Definitions

3.2.1 Mini PV Contact: A Mini PV contact is a metallic assembly consisting of a contact body and a pin retention spring normally crimped to wire and intended to mate with a .025" ± .001" square pin.

3.2.2 Contact Body: A contact body is the electrical contact member of the assembly used to form a housing for the retention spring and incorporating wire and insulation barrels used for crimping to 18 to 32 AWG wire.

3.2.3 Retention Spring: A retention spring is the mechanical component of the assembly used to force the male pin in contact with the contact area of the body.

3.3 Materials

3.3.1 Contact Body: The copper body shall be fabricated from 1/4 hard copper nickel (CDA-725). UNS-C72500

3.3.2 Retention Spring: The retention spring shall be fabricated from beryllium copper UNS-C17200 (ASTM B-194), 1/2 hard, heat treated to 175,000 PSI minimum tensile strength.

3.4 Finish

3.4.1 Contact Body: The contact body shall be supplied mill finish with a "Spot-of-Gold" .025" in diameter and .001" minimum in height located in the contact area of the body.

3.4.2 Retention Spring: The contact spring plating shall be .000005" minimum gold over .000050 nickel underplating.

3.5 Banned/Restricted Substances

All product where the part number ends in “LF” meet the European Union directives and other country regulations as described in GS-22-008. The part numbers that do not end in “LF” meet all regulations except for Pb in SnPb plating, if available. Tin plated “LF” product has 100% tin plating in the interface and has not been tested for whisker growth in all interconnect environments.

3.6 Manufacturing Processability

This product is not designed to be exposed to manufacturing solder processes.

4.0 PERFORMANCE PARAMETERS

The Mini PV contact shall meet the mechanical, electrical and environmental parameters specified herein. Tests shall be performed in accordance with MIL-STD-202, where applicable.

4.1 Mechanical

4.1.1 Initial Insertion Force: The initial insertion force is measured using a push-pull type gage, calibrated in grams, using an insertion speed of one inch per minute and a steel gage pin (.0260 _ .0001 - .0002 square, V4 finish). See Table 1.

4.1.2 Withdrawal Force: Is measured using a push-pull type gage calibrated in grams using a withdrawal speed of one inch per minute, and a steel gage pin (.0240 + .0002 - .0000 square, V4 finish). Measurements are taken after five insertion cycles with a .026 + .0000 - .0002 square steel pin. See Table 1.

4.1.3 Normal Force: Normal force is the force the retention spring applies to the mating pin and is perpendicular to the pin. At a normal deflection of .012 inch in the assembled part, the spring shall meet the normal force requirements as shown in Table II and Figure 1. After five (5) deflection cycles, the chord height of the spring shall not change more than .0015". See Figure II.

4.1.4 Crimp Tensile Strength: Contacts crimped to wires shall be placed in a standard tensile testing machine, and an axial load applied. The wire shall not pull out of the wire barrel, nor break, nor become distorted to such an extent that it is unusable before the minimum strength is reached. Minimum tensile strength shall be 75% of wire tensile strength.

4.1 Electrical

4.2.1 Initial Contact Resistance: D.C. resistance shall be measured using the four point voltage current method. The Ohmmeter used must have an accuracy of at least ± 0.5 milliohms. The digital read-out shall be capable of 3 digit display with accuracy of ± 1 in the last digit. The probe shall provide suitable metal-to-metal contact. The contact resistance, when measured as described above, shall be 3.0 milliohms maximum initial and 5.0 milliohms maximum after aging. See Figure III.

4.2.2 Current Carrying Capacity: A contact mated with an 0.25" ± .001" square production pin and subjected to 3 Ampere continuous load shall show no more than 30^{O} C temperature rise above ambient.

4.2.3 Wear Test: All contacts cycled 500 times on a standard production pin of .025" ± .001" square, shall be tested and shall meet the contact resistance as described in 4.2.1.

4.2.4 Temperature Cycling: All contacts submitted to temperature cycling test MIL-STD-202C, Method 102A, shall be tested and shall meet contact resistance as described in 4.2.1.

4.2.5 Flowers of Sulphur Aging Test: Unmated contacts shall be placed in an enclosure Flowers of Sulphur and water for 10 days. Temperature within the enclosure shall be 150^{O}F ± 10^{O}F and 80% relative humidity. After aging, terminals shall be stabilized at room temperature and subjected to 5 cycles of mating. Contacts shall then be tested for and meet contact resistance as described in 4.2.1.

4.2.5.1 Set up for Flowers of Sulphur Test using an enclosure with a volume of approximately 32000 cubic centimeters, 100 grams of sulphur and 500 milliliters of distilled water. A quantity of 345 grams of anhydrous sodium carbonate shall be added to the distilled water. Arrangement of materials during test shall be as follows:

1. Water on the bottom in a 150 millimeter diameter by 75 millimeter high beaker.

2. Sulphur in a 150 milliliter beaker placed inside 150 millimeter x 75 millimeter beaker.

3. Test samples placed on a rack suspended over the sulphur and facing the water.

4.2.6 4-4-16 Aging Test: After the initial contact resistance test, contaminate each contact with one of the following contaminants:

a) Synthetic Dust - Formulation II

b) Artificial Perspiration

Contacts contaminated with a and b must be tested in the unmated condition and subjected to 50 cycles in the following environment:

1. $50^{o} \pm 10^{o}$F, 50% maximum R.H. 4 hours
2. $170^{o} \pm 10^{o}$F. 92% ± 3% R.H. 4 hours
3. $170^{o} \pm 10^{o}$F. 50% R.H. 16 hours

After the 50 cycles have been completed, the contacts shall be stabilized to room temperature ($70^{o} \pm .10^{o}$F). Contacts shall then be subjected to 15 cycles (one cycle equals one insertion and one withdrawal) over a .025" ± .001" square steel pin, with V4 finish.

Contacts shall then be mated with a gold plated .025 ± .001" pin and the contact resistance tested. Resistance must not exceed 5.0 milliohms when measured as described in 4.2.1.

4.2.6.1 Test method for 4-4-16 Aging Test:

a) Synthetic dust II is applied to contacts with a 1/2" (maximum) wide brush. After application, samples shall be tapped with fingers to remove excess dust.

1. Synthetic Dust II Formulation:

	Parts
KNO	1.81
KCl^3	2.48
KF	1.48
NH_4C1	4.46
NH_4NO_3	6.67
$Mg^4(NO_3)$ .2.6H_20	2.64
$MgSO_4.7H_20$	38.1
$CaSO_4$	3.39
$CaO.A1_20_3.S10$	20.7
$T10_2$	0.33
$V_2\ O_5$	0.089
MNO_2	0.10
Fe_2O_3	9.42
$CU^2SO_4.5H_2O$	1.57
ZNO	1.25
$HgC1_2$	0.136
$PbC1_2$	2.69
$PbSO_4$	1.47
Card Dust *	17.2

NOTE: Paper fiber 100% pass 80 mesh screen. Estimated 50% by volume consisting of fibers larger and 50% smaller than 75 ± 25 microns, measured on long dimension.

75 micron fiber having average width of 15 microns.

b) Artificial perspiration is applied in the contact area of the contact with an eye dropper.

1. Artificial perspiration formulation:

KC1	10%
NaC1	10%
NaH PO	.005%
Lactic Acid	.005%
Balance Distilled Water	
Adjust to PH of 4 with 10% Sulphuric Acid as required.	

4.2.7 Salt Spray: All contacts submitted to 5% salt spray corrosion test MIL-STD-202C method 101C, Condition B, shall be tested for contact resistance as described in 4.2.1

5.0 QUALITY ASSURANCE PROVISIONS

5.1 Test Conditions: Unless otherwise specified, tests and examinations shall be conducted under any combination of conditions within the following ranges:

Temperature: 20 - 30^{O} C.
Relative Humidity: 80% maximum
Barometric Pressure: 24" to 31" mercury

5.2 Test Samples: The samples shall consist of 25 crimped contacts and 25 standard production pins, representative of production.

5.3 Samples of production contacts shall be examined to insure that all requirements of section 3.0 have been met, except performance. Final examination of product shall include a thorough examination to insure that the contact is free from mechanical defects and that there are not cracks around the crimp area. Inspection shall be made with a device having magnification power of approximately 3 diameters.

TABLE 1

Spring Thickness & Finish	Insertion & Withdrawal Maximum Insertion GRAMS	OZ.	Minimum Withdrawal GRAMS	OZ.
.0035 Gold	165	5.82	45	1.59
.0048 Gold	400	14.11	75	2.65
.0065 Gold	675	23.81	175	6.17

TABLE II
MINIMUM NORMAL FORCE

SPRING SIZE	FORCE	
	Grams	Oz.
.0035	150	5.3
.0048	375	13.2
.0065	700	24.7

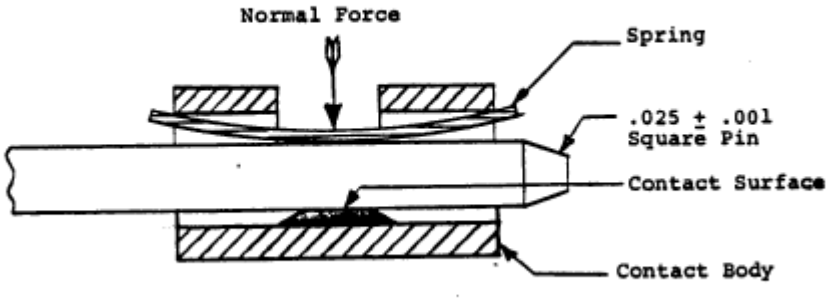

FIGURE 1
NORMAL FORCE

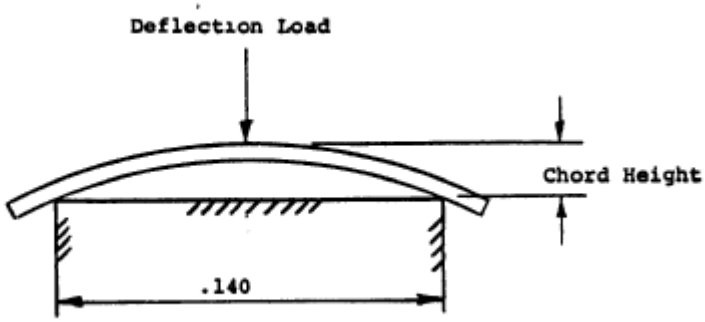

FIGURE II

NORMAL FORCE AND LOAD DEFORMATION

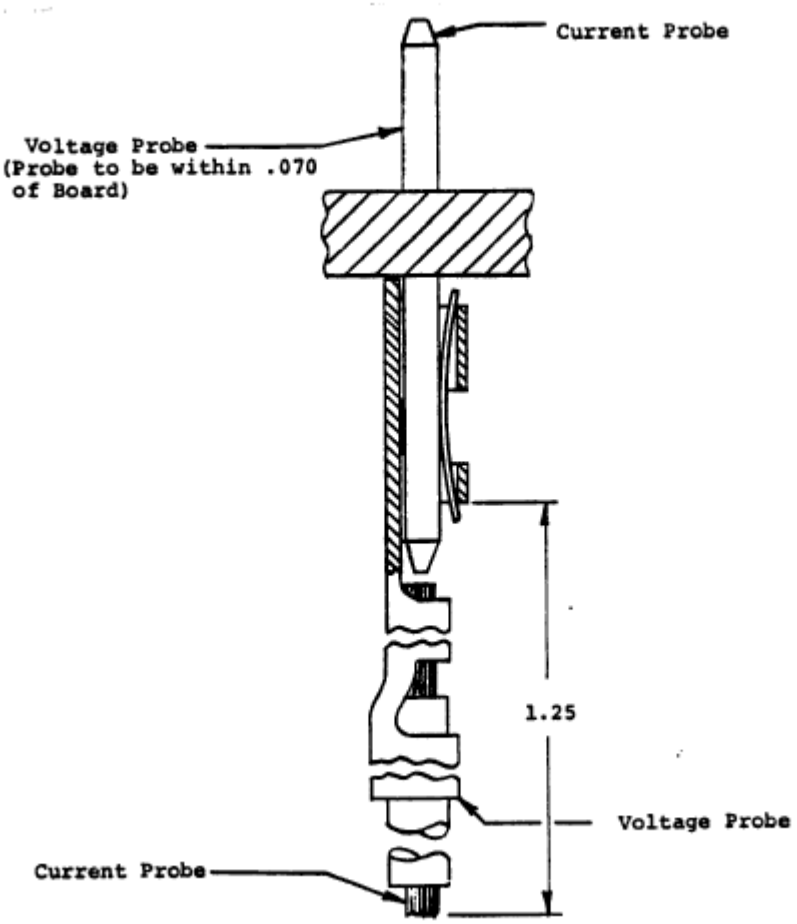

FIGURE III

CONTACT RESISTANCE

REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
A	All	RELEASED	V01294	10/29/90
B	All	Revised format to be consistent with GS-01-001, and change BERG, Dupont, etc. references to FCI.	V01904	08/02/00
C	2	Add sections 3.5 and 3.6 for lead free information	V05-1112	12/13/05
D	All	Change logo	V06-0526	06/02/06