REVISIONS			
LTR	DESCRIPTION	DATE	APVD
A	AR2330 - Miscellaneous	89-02-13	CGR
B	AR3638 - Vendor Data Code, Convert	89-09-19	RCW
C	RN8778 - Change Cage Code, Convert to QSilver, Add -060	02-03-23	AJI
D	ECO-0187099 - Miscellaneous	08-10-08	MKW

Statement A, Unlimited

1.0 Scope: This drawing details the requirements for a high voltage lead wire composed of silver plated copper conductors insulated with wrapped and fused corona resistant teflon.

- The part number is the seven (7) digit drawing number plus the applicable dash number as specified in Table I herein.
- Paragraph(s), table(s) and/or figure(s) followed by " ▌ " indicate a change by the latest revision.
- All Sheets are the Same Revision Status.

Authorized Vendors, Vendor Part Numbers, QAL Status, and CAGEC are as defined in the Rockwell Collins, Inc. database(s).

Current Design Activity CAGE Code 13499
Rockwell Collins, Inc.
400 Collins Road, NE Cedar Rapids IA 52498

UM	Feet (FT)	**VENDOR ITEM CONTROL DRAWING**
PREP	P.J. Althoff 87-11-03	**Rockwell Collins, Inc** 400 Collins Rd NE CEDAR RAPIDS, IOWA 52498
CHK	C.G. Raap 87-11-03	
ENGR APVD	C.J. Anderson 87-11-03	**WIRE, HIGH VOLTAGE**
		SIZE A | CAGEC 4V792 | DWG NO 858-0002 | REV LTR D
DOCUMENT GENERATED USING INTERLEAF **DO NOT REVISE MANUALLY**		SCALE NONE | SHEET 1 OF 8

2.0 Applicable Documents: The following documents of the issue in effect on date of invitation for bids form a part of this drawing to the extent specified herein.

Federal Specification

QQ-S-571	Solder, Tin Alloy, Lead Alloy and Lead Alloy
TT-I-735	Isopropyl Alcohol

Military Specification

MIL-F-14256	Flux
MIL-W-16878	Wire, Electrical, Insulated, General Specifications for

Military Standard

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts

3.0 Requirements:

3.1 General: The connector shall be designed to meet the material, construction, workmanship and other requirements as specified herein.

3.2 Electrical: See Table II herein.

3.3 Mechanical: See Table III herein.

3.3.1 Etching: Medium etch with a sodium etching process.

Etched insulation shall have a uniform, dull color. Surfaces of treated parts shall be uniform in texture and appearance. There shall be no bare areas where etching was intended.

3.4 Environmental Mechanical Test: See Table IV herein.

4.0 Quality Assurance Provisions:

4.1 Qualification Conformances: The manufacturer shall be responsible for those in-process controls and inspections necessary to supply a product consistently conforming to the requirements of this drawing.

4.2 Verification: The procuring activity reserves the right to test and inspect for any of the requirements of this drawing to determine the acceptability of a lot and to reject nonconforming parts, or lots containing nonconforming parts, on the basis of test results so obtained.

4.2.1 Verification shall consist of the necessary test and inspections required to validate conformance to 3.0 herein.

4.3 Design Change Approval: The manufacturer shall provide notice of any implemented change(s) of the product or quality assurance program which may affect form, fit, function, materials or performance defined by this drawing. Such notification shall include a thorough description of change(s) and address that the changes do not adversely affect performance, quality, reliability, interchangeability, or electrostatic discharge sensitivity where applicable and product will continue to meet the drawing requirements. Based upon the review, the procuring activity shall notify the manufacturer of either granting approval or the denial of impending product shipment(s).

Current Design Activity
CAGE Code 13499

4.4 Adhesion Inspection: In addition to the quality conformance inspection of MIL-W-16878, the following test shall be performed on each lot of wire acquired under this drawing.

Three random samples approximately 6 inches in length of each lot to be tested shall be used. The ends to be potted shall be cleaned with isopropyl alcohol in accordance with TT-I-735 or Micocare Proclean (reference: Rockwell Collins Part Number 005-2892-010). A potting apparatus consisting of three miniature cups, with a means of vertically supporting the samples into mid-section of the cups, shall be used (See Figure 1 herein).

The potting compound shall be part number 30016-11 of Poly-Freeze Inc., or RTV 630, (Rockwell Collins part number 821-0494-010) or equivalent.

4.4.1 Preparation of Poly-Freeze:

The potting compound shall be poured into cups to a depth of one quarter inch, and cured first for one hour at 65.6°C and then at 149°C for eight hours.

4.4.2 Preparation of RTV 630:

Coat sample with SS-4120 (Rockwell Collins part number 005-1579-010) and let it dry for 60 to 80 minutes at 25°C ± 5°C.

The potting compound shall be poured into the cups to a depth of one half inch and cured for a minimum of 1 hour at 100°c ± 5°C until a shore durometer hardness of 50 is measured.

Measure the adhesive strength of the bond by pulling the sample out of the potting material in a tensile test machine at a cross head speed of 1 inch per minute approximately and record the maximum force indicated at which the insulation breaks loose from the potting compound.

The bond strength in pounds per square inch (PSI) shall be calculated by the following formula and the results averaged.

$$\text{Bond Strength} = \frac{A}{B \times C \times D}$$

A = force at point of failure, pounds (lbs)
B = 3.14
C = insulation outside diameter, inch
D = potting depth of sample, inch

The minimum bond strength shall be 30 PSI.

4.4.3 Alternate Adhesion Pull Test: The wire shall meet a 9.5 lbs minimum pull strength when tested in accordance with RCPN 839-0521-001. If wire breaks before reaching the 9.5 lbs point, this is an indication that the adhesion is sufficiently greater than the strength of the wire, and therefore acceptable.

4.4.4 Corrosion Inspection: In addition to performing the quality conformance inspections required by MIL-W-16878, if the supplier used a water based coolant process, they shall inspect each new lot for any visual sign of red plague corrosion by stripping insulation from 0.5 inches of wire. The procuring activity may perform a visual inspection for red plague as a part of the shelf life extension. Material which shows any sign of red plague shall be subject to nonconforming material review procedures.

5.0 Preparation For Delivery:

The etched surface of treated insulation can be easily damaged. Care shall be taken so as to not rub, scrub or brush the etched surface either by operator handling or parts in contact with other parts. The parts shall be packaged in a manner that will afford adequate protection against contamination, corrosion, deterioration, and physical damage during shipment and storage. Parts shall be packaged so they will be easily accessible without damaging the parts. Manufacturer shall package and store the wire in opaque bags as a minimum.

6.0 Notes: The information contained in this section is for reference only.

6.1 Manufacturer's certify shelf life for wire exposed to normal lighting conditions for approximately 30 days. Shelf life for wire stored out of UV light is 3 years.

6.2 Shelf Life Extension: Material shall be recertified for shelf life extension by testing to meet the requirements of 4.4 and subsequent approval by Rockwell Collins Component Applications Engineering.

6.3 Poly-Freeze potting compound can be purchased from:

Poly-Freeze Inc.
16509 Arminta St.
Van Nuys, CA 91406
Cage Code: 56724
Phone : 818-781-5600

TABLE I

Rockwell Collins Dash Number, Cross Reference

Dash Number	Conductor Size AWG	Voltage Rating		Color	Diameter (Inch)		Stranding	Insulation Wall Thick (Inch)
		DC	AC		Minimum	Maximum		
010	18	13,000	6,000	White	.100	.110	19/30	.025
020	22	13,000	6,000	White	.092	.102	19/34	.030
030	18	18,000	8,000	White	.130	.140	19/30	.040
040	26	9,000	4,000	White	.060	.070	19/38	.020
050	26	9,000	4,000	Green	.060	.070	19/38	.020
060	26	9,000	4,000	Red	.060	.070	19/38	.020

TABLE II

Electrical Requirements

(Unless otherwise indicated, all electrical measuremnets are taken at 25°C)

Description	
Dielectric Withstanding Voltage:	As specified in Table I herein
Insulation Resistance:	5 megohms/1000 feet minimum.

TABLE III

Mechanical Requirements

Description	
Dielectric Material:	Wrapped and fused corona resistant polyterafluoroethylene (teflon). The insulation shall be etched. The insulation color shall be as specified int Table I herein.
Wire Material:	Strandard, silver plated annealed copper conductors. The conductor size shall be as specified in Table I herein.
Dimensional:	In accordance with Table I herein.
Marking:	Manufacture's code or symbol, manufacturer's part number and length of wire as a minimum.
Bond Strength:	30 pounds PSI minimum when tested in accordance with 4.4 herein.

TABLE IV

Environmental, Mechanical Test Requirements

In addition to conforming to the electrical and operating requirements initially, the part shall be capable of conforming to the requirements of the drawing herein. During these tests the parts shall be in nonoperating condition, unless otherwise specified.

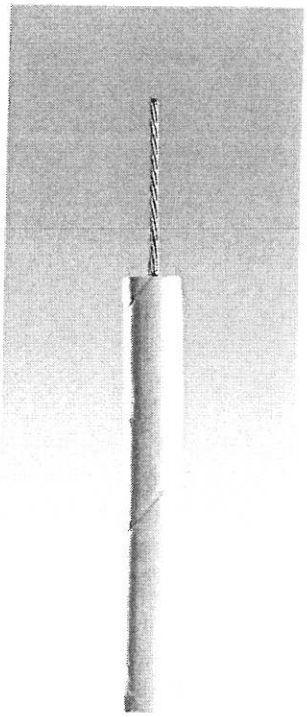
Test Name	MIL-STD-202	Test Procedure
Temperature Range	---	-65°C to +160°C
Temperarue	107	Test Condition F. Subsequent to this test there shall be damage, nor shall the normal operation be impaired at temperature extremes.
Moisture	106	Wire shall meet the post test insulation resistance and dielectric strength tests as specified herein. Omit step 7b.
Solderability	208	Wire to be soldered shall be suitably fluxed with Type R in accordance with MIL-F-14256 and then immersed in a solder pot composed of 60% tin, 40% lead in accordance with QQ-S-571 for 3 seconds at a solder pot temperature of 500°F to 600°F, removed and shaken lightly to remove excess solder. Steam againg is not required. Solder shall adhere to the wire evenly and firmly so that it cannot be lifted with a sharp instrument.
Shelf Life	---	Shelf life shall be 3 years after receipt at the procuring activity when stored unopened at 21 - 27°C, 30% - 70% relative humidity and in a clean, dark place. Material which exceeds manufacture's shelf shall not be used unless recertified (see 6.2 herein).

High Voltage Insulations

Commercial (non-UL) and Style 1911

I. Commercial (non-UL) Corona Resistant PTFE
200°C and 260°C Wrapped Insulation

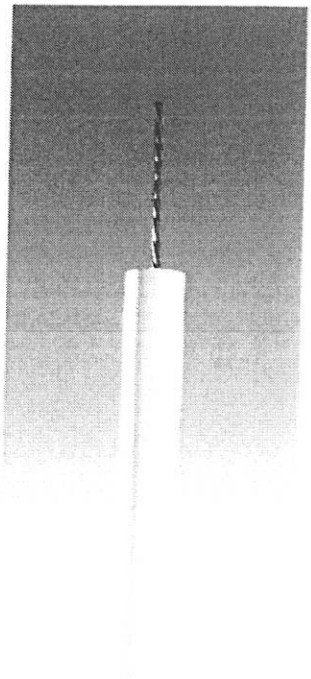
	2,000 VAC 6,000 VDC	3,000 VAC 12,000 VDC	4,000 VAC 15,000 VDC	4,500 VAC 17,000 VDC	5,000 VAC 20,000 VDC	6,000 VAC 25,000 VDC
26 19/38	.064-.073	.074-.083	.084-.093	.094-.103	.104-.113	.124-.134
24 19/36	.069-.078	.079-.088	.089-.098	.099-.108	.104-.118	.129-.139
22 19/34	.075-.084	.085-.094	.095-.104	.105-.114	.115-.124	.135-.145
20 19/32	.083-.092	.093-.102	.103-.112	.113-.122	.123-.132	.143-.153
18 19/30	.092-.101	.102-.111	.112-.121	.122-.131	.132-.141	.152-.162
16 19/29	.098-.107	.108-.117	.118-.127	.128-.137	.138-.147	.158-.168
14 19/27	.112-.121	.122-.131	.132-.141	.142-.151	.152-.161	.172-.182
12 19/25	.129-.138	.139-.148	.149-.158	.159-.168	.169-.178	.189-.199



High Voltage wrapped insulation

II. Style 1911 PTFE and PFA
200°C and 250°C Wrapped and Extruded Insulation

	10,000 VDC	15,000 VDC	20,000 VDC
24 19/36	.084-.094	.104-.114	.124-.134
22 19/34	.090-.100	.110-.120	.130-.140
20 19/32	.098-.108	.118-.128	.138-.148
18 19/30	.107-.117	.127-.137	.147-.157
16 19/29	.113-.123	.133-.143	.153-.163
14 19/27	.127-.137	.147-.157	.167-.177
12 19/25	.144-.154	.164-.174	.184-.194



High Voltage extruded insulation