



**DEFENSE LOGISTICS AGENCY  
LAND AND MARITIME  
P.O. BOX 3990  
COLUMBUS, OHIO 43218-3990**

August 19, 2015

**MEMORANDUM FOR MILITARY/INDUSTRY DISTRIBUTION**

**SUBJECT:** Initial Drafts of Revisions to: CAGE Code 037Z3, Detailed Drawings 01003A, 01040B, 02003A, and 02004B.  
Project Number(s): 5935-2015-E01, E02, E03, and E04

These initial drafts for these subject documents are now available for viewing and downloading from the DLA Land and Maritime-VA Web site:

<http://www.landandmaritime.dla.mil/programs/milspec/>

Major changes to these documents include updates to Title Block Headings, Associated Documents, and Vendor Information.

Please return comments to this Center no later than close of business 30 days from the date of the letter. Any further coordination concerning these documents will be circulated only to firms and organizations that furnish comments or reply that they have an interest. Lack of response to these drafts will be construed as concurrence.

Manufacturers desiring to be listed as a source, which meet the requirements of these drawings, are requested to complete and submit the attached Certificate of Compliance (CoC) along with any comments.

If these documents are of interest to you, please provide your comments or suggested changes. The point of contact for these documents is Mr. Jenkins, phone number 614-692-0560, facsimile transmission, 614-692-6939, e-mail [Howard.E.Jenkins@dla.mil](mailto:Howard.E.Jenkins@dla.mil), or may be mailed via the US Postal Service to DLA LAND AND MARITIME, ATTN: VAI (Attention: Howard Jenkins), P.O. Box 3990, Columbus, OH 43218-3990.

Attachment: 1 (CoC)

Sincerely,

*/ SIGNED /*

ABDONASSER M. ABDOUNI  
Chief,  
Interconnection Branch

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Project Number(s): 5935-2015-E01, E02, E03, and E04 – **Continued.**

cc:

DLA:

01003, MN 5935-01-483-3909 (John Grable)  
01040, MN 5935-01-491-4235 (James Barnes)

MILITARY:

Air Force – 85 (Brad Steiner)

02003, MN 5935-01-548-1386 (Air Force managed, Brad Steiner)  
SOS: F01, LOCKHEED MARTIN AERONAUTICAL SYSTEMS MARIETTA,  
GA 30063-0659

Navy - SH (Ruth Butler)

02004, MN 5935-01-561-8419 (Navy managed, Ruth Butler)  
SOS: NRP, NAVICP-ERP 700 ROBBINS AVENUE PHILADELPHIA, PA  
19111-5098

INDUSTRY:

01003: Amphenol Aerospace (Ron Williams)

01040: Amphenol Aerospace; Aero-Electric Connector: (Bobbie Gentile)

02003: Amphenol Aerospace; TE Connectivity (TYCO): (Frank Hungate)

02004: Amphenol Aerospace; TE Connectivity (TYCO)

Distribution List:

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REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Page 4, 3.1, add: "see table I and figure 1". Table I, change BIN code from 926 to 936.	23 April 2004	Richard Taylor
	Page 6, 3.3, change dimension from: 02004-925 to: 02003-926. Remove MIL-STD-1344 and replace with EIA-364.		
B	Updates to Header, Vendor Information, and Assoc. Doc's.	DRAFT	

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3  
HAS CHANGED NAMES TO:  
DLA LAND AND MARITIME  
COLUMBUS, OHIO 43218-5000

Prepared in accordance with ASME Y14.100

Source control drawing

REV	B	B	B	B	B	B	B	B	B	B								
PAGE	1	2	3	4	5	6	7	8	9	10								
REV STATUS OF PAGES	REV		B	B	B	B	B	B	B	B	B	B	B					
	PAGE		1	2	3	4	5	6	7	8	9	10						

PMIC	PREPARED BY Jeffery Tunstall	DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO 43216-5000
Original date of drawing  9 August 2002	CHECKED BY Abdo Abdouni	TITLE CONTACT ELECTRICAL CONNECTOR CONCENTRIC TWINAX, PIN, SHIELDED, SIZE 12 (FOR MIL-DTL-38999 SERIES I, III, AND IV CONNECTORS)
	APPROVED BY Richard Taylor	
	SIZE <b>A</b>	CAGE CODE <b>037Z3</b>
	REV <b>B</b>	PAGE <b>1</b> OF <b>10</b>

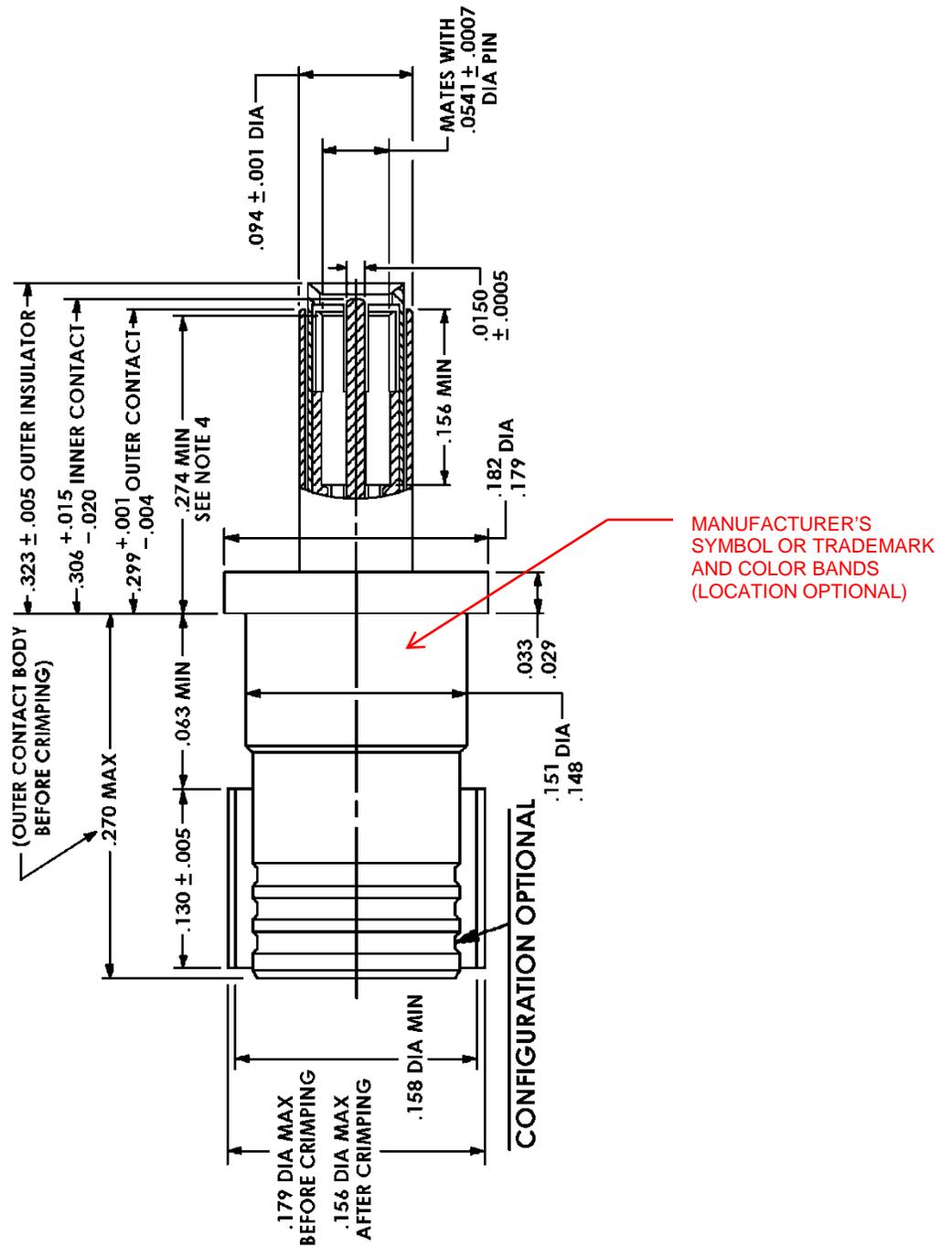


FIGURE 1. Pin contact.

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Inches	mm	Inches	mm
.0005	0.013	.130	3.30
.0007	0.018	.148	3.76
.001	0.03	.151	3.84
.004	0.10	.156	3.96
.005	0.13	.158	4.01
.015	0.38	.179	4.55
.0150	0.381	.182	4.62
.020	0.51	.270	6.86
.029	0.74	.274	6.96
.033	0.84	.299	7.59
.0541	1.374	.306	7.77
.063	1.60	.323	8.20
.094	2.39		

**NOTES:**

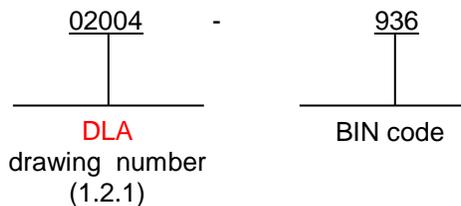
1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Dimensions shown apply after plating.
4. Point at which a square ended pin of the same basic diameter as the mating contact first engages the intermediated contact spring. Provision for a clearance hole shall be provided for the test pin.

FIGURE 1. Pin contact – Continued.

**1. SCOPE**

1.1 Scope. This drawing covers the general requirements and tests for a size 12 concentric twinax pin contact for MIL-DTL-38999 series I, III and IV.

1.2 Part or Identifying Number (PIN). The complete PIN constructed using the following format:



1.2.1 DLA requirements drawing. The **DLA** requirements drawing shall state the requirement values and design modifications required of the contacts to be procured by the Government.

**2. APPLICABLE DOCUMENTS**

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this document. This section does not include documents cited in other sections of this document or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this document, whether or not they are listed.

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## 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

### DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-38999 - Connectors, Electrical, Circular, Miniature, High Density, Quick Disconnect (Bayonet, Threaded, or Breech Coupling), **Environment Resistant with Crimp Removable Contacts or Hermetically Sealed with Fixed, Solderable Contacts**, General Specification for

~~MIL-C-39029 - Contacts, Electrical Connector, General Specification for.~~

### DEPARTMENT OF DEFENSE STANDARDS

~~MIL-STD-1344 - Test Methods for Electrical Connectors~~

(Copies of this document are available online at <http://quicksearch.dla.mil.>)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, issues of these documents are those cited in the solicitation or contract.

### ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION (ECIA)

EIA-364 - Electrical Connector/Socket Test Procedures Including Environmental Classifications  
EIA-364-06 - Contact Resistance Test Procedure for Electrical Connectors  
EIA-364-08 - Crimp Tensile Strength Test Procedure for Electrical Connectors  
EIA-364-20 - Withstanding Voltage Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts  
EIA-364-23 - Low Level Contact Resistance Test Procedure For Electrical Connectors and Sockets  
EIA-364-27 - Mechanical Shock (Specified Pulse) Test Procedure for Electrical Connectors and Sockets  
EIA-364-28 - Vibration Test Procedure for Electrical Connectors and Sockets  
EIA-364-37 - Contact Engagement and Separation Test Procedure for Electrical Connectors

(Copies of these documents are available online at <http://www.eciaonline.org.>)

### SAE INTERNATIONAL

SAE-AS31971 - Pin, Gage, for Socket Contact Engagement Test.

SAE-AS39029 - Contacts, Electrical Connector, General Specification for

(Copies of these documents are available online at <http://standards.sae.org.>)

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### 3. REQUIREMENTS

3.1 Design, construction, and physical dimensions (see 4.4.1). The design, construction, and physical dimensions shall be as specified in MIL-DTL-38999 and **MIL-C-39029 SAE-AS39029** (as applicable) (see table I and figure 1).

TABLE I. Design characteristics.

BIN code	Color bands			Contact cavity size	Cable accommodated	Type	Class
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>				
936	White	Orange	Blue	12	M17/176-00002	D	B

3.1.1 Assembly procedure. Manufacturer's recommended assembly instructions shall be shipped with unit package.

#### 3.2 Performance.

3.2.1 Electrical characteristics. Sockets shall meet the requirements of **MIL-C-39029 SAE-AS39029** except where specified herein.

3.2.2 Low signal level contact resistance (see 4.4.2). Center and intermediate contacts only, see table II.

TABLE II. Low signal level contact resistance. 1/

Maximum contact resistance (milliohms)	
Initial	After conditioning
55	66

1/ Center and intermediate contacts only.

3.2.3 Contact resistance (see 4.4.3). Shall be as specified in table III.

TABLE III. Contact resistance.

Contact	Cable accommodated	Test currents (amperes)	Maximum voltage drop (millivolts)		
			25°C, +3°C, -0°C		175°C, +3°C, -0°C
			Initial	After conditioning	After conditioning
Center	M17/176-00002	1.0	55	66	94
Intermediate	M17/176-00002	1.0	55	66	94
Outer	M17/176-00002	12.0	75	90	128

3.2.4 Voltage rating. 500 V rms maximum working voltage at sea level, 125 V rms maximum working voltage at 70,000 feet.

3.2.5 Operating frequency. 0 to 20 MHz.

3.2.6 Dielectric withstanding voltage (see 4.4.4). Shall be as specified in table IV.

TABLE IV. Dielectric withstanding voltage.

Contacts	Altitude	Test voltage ac rms
Center to intermediate	Sea level	800
Intermediate to outer	Sea level	500

3.2.7 Center contact retention. When tested in accordance with 4.4.8, there shall be no displacement from interface dimensions.

3.2.8 Contact engagement and separation forces (see 4.4.9). The engagement depth shall be a minimum of **0.7L (70%)** of the minimum socket bore (see figure 2). The test pins shall be in accordance with SAE-AS31971, except the

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diameters shall be as specified in table V. Provisions for a clearance hole on the intermediate contact test pins shall be provided.

TABLE V. Contact engagement and separation force.

Socket contact	Test pin diameter (inch)	Minimum separation force (ounces)		Maximum engagement forces (ounces)		Maximum average engagement force (ounces)
		Initial	After conditioning	Initial	After conditioning	
Intermediate	.0548 + .0002 - .0000	NA	NA	20	24	NA
Intermediate	.0534 + .0000 - .0002	0.5	0.4	NA	NA	NA

3.2.9 Crimp tensile strength (center, intermediate, and outer contact crimp joint) (see 4.4.5). Crimp tensile strength shall be as specified in table VI.

TABLE VI. Crimp tensile strength (at ambient).

Cable accommodated	Axial load (pounds, minimum)		
	Center contact	Intermediate contact	Outer contact
M17/176-00002	3.5	3.5	20

3.2.10 Vibration. When tested in accordance with 4.4.6, there shall be no electrical discontinuity of 1 microsecond or greater. There shall be no defects detrimental to the mechanical or electrical performance.

3.2.11 Shock. When tested in accordance with 4.4.7, there shall be no electrical discontinuity of 1 microsecond or greater. There shall be no defects detrimental to the mechanical or electrical performance.

3.2.12 Temperature rating. Contact shall meet the requirements from -65° C to +175° C.

3.3 Mating contact. Mating shall be in accordance with 02003-926.

3.4 Tools. Tools shall be as specified in tables VII and VIII.

TABLE VII. Installation and removal tool.

Installing	Removal
M81969/8-09 or M81969/14-04	M81969/8-10 or M81969/14-04

TABLE VIII. Crimping tools. 1/

Center contact tooling		Intermediate contact tooling		Outer contact tooling	
Basic crimping tool	Positioner	Basic crimping tool	Positioner	Basic crimping tool	Positioner
MH992	K1365	GS212	GP1437	GS200-1	GP959

1/ Daniels Manufacturing Corporation part numbers are specified. Other vendors may provide tools if they are determined to be equivalent.

3.5 Marking. Contacts shall be marked with the manufacturers logo and color bands (BIN code) in accordance with ~~MIL-C-39029~~ SAE-AS39029.

3.6 Qualification. Qualification inspection for contacts specified herein shall not be required.

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3.6.1 Conformance inspection. Conformance inspection shall be in accordance with **MIL-C-39029 SAE-AS39029** and 4.3 herein.

3.7 Certification as an approved source of supply. In order to be listed as an approved source of supply for contact manufactured to this drawing, a manufacturer shall:

- a. Agree to make available to **DLA Land and Maritime**, upon request, all pertinent test data on its production of the subject part.
- b. Provide to **DLA Land and Maritime** - VAI or its designated agent, upon requests, free of charge and without obligation, a current production sample from its production of the subject part.
- c. Be currently listed on the **U.S. Navy-AS managed** Qualified Products List **QPL-AS39029** for a similar (multiaxial) contact.
- d. Provide a certificate of compliance (**CoC**), certifying that supplied part meets the requirements of this drawing (see 6.4).

4. VERIFICATION

4.1 Qualification inspection. Qualification inspection for contacts specified herein shall not be required.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups **A and B**.

4.2.1.1 Inspection lot. An inspection lot shall consist of all contacts produced under essentially the same conditions, and offered for inspection at one time.

4.2.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table IX, in the order shown.

TABLE IX. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph
Examination of product	3.1	4.4.1

4.3.1.2.1 Sampling plan (group A). Table IX tests shall be performed on a production lot basis. Samples shall be selected in accordance with table X. If one or more defects are found, the lot shall be screened for that particular defect and defects removed. A new sample of parts shall be selected in accordance with table X and all group A tests again performed. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this drawing.

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TABLE X. Lot and sample size.

Lot size	Sample size
1 to 13	100 percent
14 to 150	13 units
151 to 280	20 units
281 to 500	29 units
501 to 1,200	34 units
1,201 to 3,200	42 units
3,201 and over	50 units

4.3.2 Certification testing. Manufactures, by providing a certificate of compliance (CoC), certifies that the contacts provided to this drawing shall be capable of passing appropriate group B inspections of ~~MIL-C-39029~~ SAE-AS39029 and those listed in table XI of this drawing. All contacts submitted for group B inspection shall have first passed group A inspections.

TABLE XI. Group B inspections.

Inspection	Requirement paragraph	Test method paragraph
Vibration	3.2.10	4.4.6
Shock	3.2.11	4.4.7
Center contact retention	3.2.7	4.4.8
Low signal level contact resistance	3.2.2	4.4.2
Contact resistance	3.2.3	4.4.3
Dielectric withstanding voltage	3.2.6	4.4.4
Contact engagement and separation forces	3.2.8	4.4.9
Crimp tensile strength	3.2.9	4.4.5

4.3.2.1 Preparation of samples. Contacts shall be terminated in accordance with manufacturer's instructions (see 3.1.1).

4.3.2.2 Mated contacts. Mated contacts shall be tested in a suitable MIL-DTL-38999 connector approved for listing on the applicable qualified products list, using the appropriate installation tool.

4.4 Methods of inspection.

4.4.1 Examination of product. Contact shall be examined before and, when appropriate, after wiring to ensure conformance with this drawing. In-process controls of the component parts, unrelated to lot size of finished contacts, may be utilized in lieu of examination of those components in the finished contacts to assure conformance of these component parts. Contacts shall be examined to verify that physical dimensions, materials, design, marking, assembly instructions and installing and removal tool data, and workmanship are in accordance with the applicable requirements (see 3.1).

4.4.2 Low signal level contact resistance (see 3.2.2). The low signal level contact resistance of mated contact pairs shall be measured in accordance with ~~test procedure number 23 of~~ EIA-364-23 at 25° C ± 3° C with the pin contact engaged to a depth of .7L (70%), in accordance with figure 2 (see EIA-364).

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4.4.3 Contact resistance (see 3.2.3). With the pin contact engaged to a depth of .7L (70%), (see figure 2), the voltage drop of mated pairs shall be measured in accordance with the test procedure ~~number 06 of~~ EIA-364-06 at 25 degrees C  $\pm$  3 degrees C and at the maximum rated temperature. Measurements shall be taken after the temperatures of the contacts have stabilized. Voltage drop measurement connection points may be permanent connections.

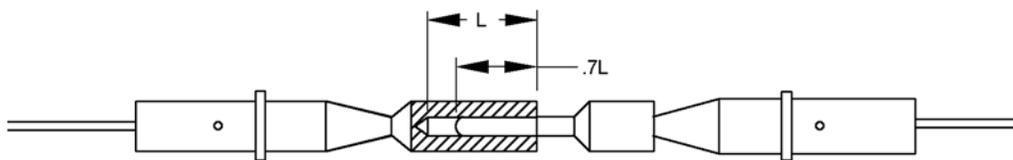


FIGURE 2. Depth of engagement for contact resistance tests.

4.4.4 Dielectric withstanding voltage (see 3.2.6). Contact shall be tested in accordance with test procedure ~~number 20 of~~ EIA-364-20. Test voltage, application points and altitude shall be as specified in table IV herein.

4.4.5 Crimp tensile strength (see 3.2.9). Contacts shall be tested in accordance with test procedure ~~number 08 of~~ EIA-364-08. The following details shall apply:

- a. Quantity: 8.
- b. Identity of crimping tool: See table VIII.
- c. Measurement: See table VI.

4.4.6 Vibration (see 3.2.10). Contacts shall be tested in accordance with test procedure ~~number 28 of~~ EIA-364-28, ~~test condition VI, letter J~~. The duration shall be 8 hours in the longitudinal direction and 8 hours in the perpendicular direction (16 hours total).

4.4.7 Shock (see 3.2.11). Contacts shall be tested in accordance with test procedure ~~number 27 of~~ EIA-364-27, test condition D.

4.4.8 Contact retention (see 3.2.7). An axial force of 4 pounds shall be applied to the center contact after assembly and held for 5 seconds. The center contact shall be inspected after the force has been applied to determine if the contact has been displaced from the specified interface dimensions.

4.4.9 Contact engagement and separation forces (see 3.2.8). Contacts shall be mounted in a suitable fixture for applying gradually increasing loads for the engagement and separation of the SAE AS31971 test pin and in accordance with test procedure ~~number 37 of~~ EIA-364-37. The test pins shall be inserted a minimum of .7L (70%) of the minimum socket bore, in accordance with figure 2. Test pin diameters shall be as specified in table V herein. A maximum diameter test pin shall be inserted and removed from the socket contact. The engagement force shall be measured during insertion. A minimum diameter test pin shall be inserted and removed from the socket contact and the separation force shall be measured during removal.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the Military Service System Commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended uses. Contacts conforming to this drawing are intended for use when military specifications do not exist and qualified military contacts that will perform the required function are not available for OEM application. This drawing is intended to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Complete PIN (see 1.2).
- c. Requirements for delivery: One copy of the quality conformance inspection data pertinent to the contact inspection lot be supplied with each shipment by the contact manufacturer, if applicable.
- d. Requirements for certificate of compliance, if applicable.
- e. Packaging requirements (see 5.1).

6.3 Comments. Comments on this drawing should be directed to **DLA Land and Maritime** - VAI, Post Office Box 3990, Columbus, Ohio 43218-3990 or telephone (614) 692-0566, facsimile (614) 692-6939, or submit comments by email to [CircularConnector@dla.mil](mailto:CircularConnector@dla.mil).

6.4 Certificate of compliance. The certificate of compliance submitted to **DLA Land and Maritime** - VAI, prior to listing as an approved source of supply, shall state that the manufacturer's product meets the requirements stated herein.

6.5 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed on the requirements drawing have agreed to this drawing and a certificate of compliance has been submitted to **DLA Land and Maritime** - VAI.

DLA drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN	Material Number (MN)
02004-936	77820	21-33909-025	1680-01-561-8419
	11139	6162-330-1377	

1/ Parts must be purchased to this **DLA** PIN to assure that all performance requirements and tests are met.

Vendor CAGE number

Vendor name and address

77820

Amphenol Corporation  
40-60 Delaware Street  
Sidney, NY 13838-1304

11139

**TE Connectivity (TYCO Electronics)**  
250 Eddie Jones Way  
Oceanside, CA 92054-1200

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