DEFENSE LOGISTICS AGENCY
DEFENSE SUPPLY CENTER, COLUMBUS
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COLUMBUS, OH 43216-5000

IN REPLY
REFER TO DSCC-VAT 17 June 2004

MEMORANDUM FOR MILITARY/INDUSTRY DISTRIBUTION

SUBJECT: Proposed Drafts of MIL-PRF-39016 Specification Sheets

The initial drafts of the following documents are now available for viewing and downloading from the DSCC-VA Web site:

Specification Sheet	Project #
MIL-PRF-39016/7G	5945-1246
MIL-PRF-39016/8G	5945-1247
MIL-PRF-39016/9J	5945-1248
MIL-PRF-39016/10G	5945-1249
MIL-PRF-39016/11G	5945-1250
MIL-PRF-39016/12G	5945-1251
MIL-PRF-39016/13J	5945-1252
MIL-PRF-39016/15K	5945-1253
MIL-PRF-39016/16G	5945-1254
MIL-PRF-39016/20J	5945-1255
MIL-PRF-39016/21G	5945-1256

Specification Sheet	Project #
MIL-PRF-39016/23F	5945-1257
MIL-PRF-39016/24F	5945-1258
MIL-PRF-39016/25F	5945-1259
MIL-PRF-39016/26F	5945-1260
MIL-PRF-39016/27F	5945-1261
MIL-PRF-39016/28F	5945-1262
MIL-PRF-39016/29G	5945-1263
MIL-PRF-39016/30F	5945-1264
MIL-PRF-39016/35C	5945-1265
MIL-PRF-39016/41E	5945-1266
MIL-PRF-39016/43E	5945-1267

http://www.dscccols.com/Programs/MilSpec
or
http://www.dscc.dla.mil/Programs/MilSpec/DocSearch.asp

The proposed drafts of the documents are forwarded for your review and comment. The proposed changes reflect updates as required by MIL-STD-961, standardizing the terminology for the mounting pads, deletion of the particle impact noise (PIND), incorporation of previous amendments, and correcting editorial errors.

If these documents are of interest to you, please submit your typed comments or suggestions using electronic mail or by letter. Comments may be resubmitted if it is believed that insufficient consideration has been given to previous comments. Please provide additional justification for these items. Comments or suggested changes that are not editorial in nature should include justification. Industrial activities should indicate whether they are commenting from the standpoint of a "User" or "Manufacturer." Military review activities should forward comments to their custodians in sufficient time to allow for consolidating the departmental reply. All Navy review activities are requested to send their comments to this center in lieu of the Navy - EC custodian. All agencies, industry, and coordinated custodian comments should be sent to this center. Comments originating from the military departments must be identified as either "Essential" or "Suggested." Essential comments, which must be accepted or withdrawn, should be supported by test data unless they obviously require no data.

Comments should be returned to this Center no later than 45 days from the date of this letter. If no response is received by the specified date, it is assumed that you concur with the document. Any further coordination concerning this document will be circulated only to firms and organizations that furnish comments or reply that they have an interest.

If there are any questions, please contact Mr. Jim Crum, by electronic mail at james.crum@dla.mil (preferred method of notification); by telephone at commercial 614-692-0542, DSN 850-0542; by facsimile 614-692-6939; or by mail at Defense Supply Center Columbus, Electronic Components Team, DSCC-VAT, P.O. Box 3990, Columbus, OH 43216-5000.

Signature on File

KENDALL A. COTTONGIM
Chief
Electronic Components Team

22 Attachments

NOTE: This draft, dated 17 June, 2004 prepared by DLA-CC has not been approved and is subject to modification.
DO NOT USE FOR ACQUISITION PURPOSES. (Project 5945-1267)

INCH-POUND

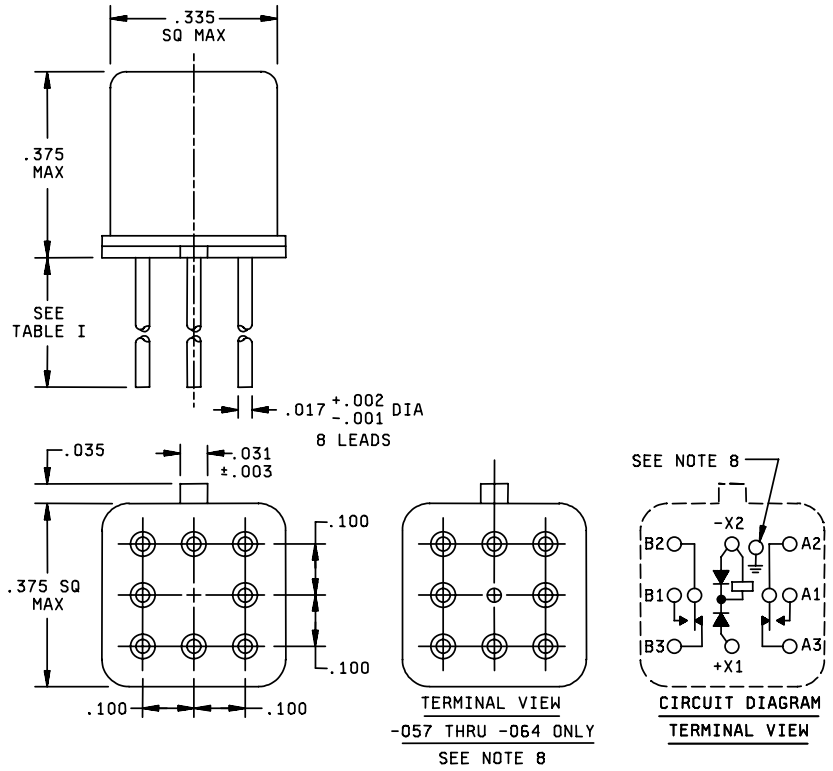
MIL-PRF-39016/43E
DRAFT
SUPERSEDING
MIL-PRF-39016/43D
20 July 1988

PERFORMANCE SPECIFICATION SHEET

RELAYS, ELECTROMAGNETIC, ESTABLISHED RELIABILITY, DPDT, LOW LEVEL TO 1.0 AMPERE, WITH INTERNAL DIODES FOR COIL TRANSIENT SUPPRESSION, AND POLARITY REVERSAL PROTECTION TERMINALS 0.100-INCH GRID PATTERN (SENSITIVE, 60 MILLIWATTS, COIL OPERATE POWER AT 25°C)

This specification sheet is approved for use by all Departments and Agencies of the Department of Defense.

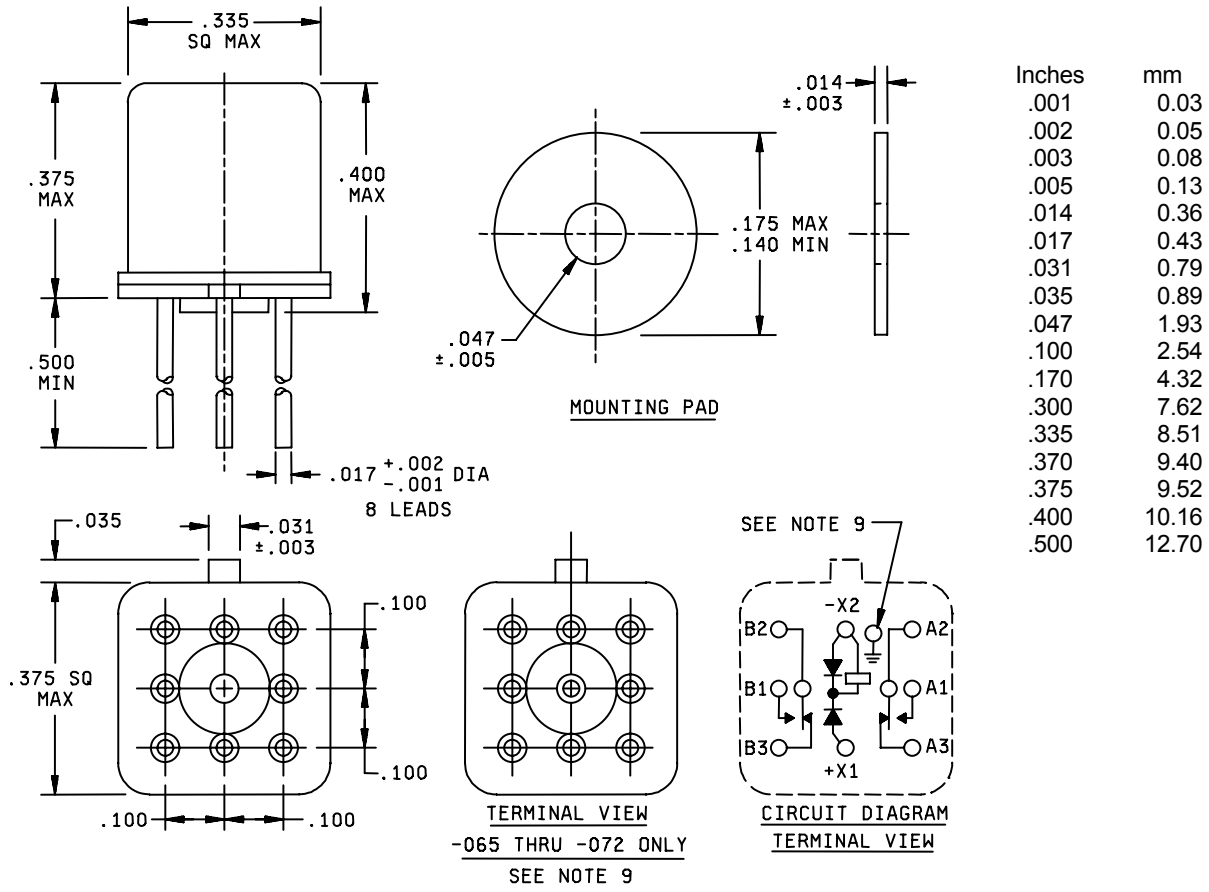
The complete requirements for acquiring the relays described herein shall consist of this specification sheet and the latest issue of MIL-PRF-39016.



Inches	mm
.001	0.03
.002	0.05
.003	0.08
.017	0.43
.031	0.79
.035	0.89
.100	2.54
.335	8.51
.375	9.53

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ±.010 (0.25 mm).
4. Terminal numbers shown above are for reference only. Numbers do not appear on the relay.
5. Relays shall have a plus (+) sign placed on the circuit diagram as shown.
6. Coil symbol optional in accordance with MIL-STD-1285.
7. Circuit diagram shown on part is the terminal view.
8. The grounding pin shown is a non-insulated case grounding pin applicable to -057 through -064 only.

FIGURE 1. Dimensions and configuration,



Inches	mm
.001	0.03
.002	0.05
.003	0.08
.005	0.13
.014	0.36
.017	0.43
.031	0.79
.035	0.89
.047	1.93
.100	2.54
.170	4.32
.300	7.62
.335	8.51
.370	9.40
.375	9.52
.400	10.16
.500	12.70

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ±.010 (0.25 mm).
4. Terminal numbers shown above are for reference only. Numbers do not appear on relay.
5. Relays shall have a plus (+) sign placed on the circuit diagram as shown.
6. Coil symbol optional in accordance with MIL-STD-1285.
7. Circuit diagram shown on part is the terminal view.
8. Spacer mounting pad shall be a polyester film per MIL-I-631, type G, class I.
9. The grounding pin shown is a non-insulated case grounding pin applicable to -065 through -072 only.

FIGURE 2. Dimensions and configuration (relay with spacer mounting pad).

REQUIREMENTS:

CONTACT DATA:

Load ratings:

High level (relay case grounded):

Resistive:
1.0 ampere at 28 V dc.
250 milliamperes at 115 V ac 60 and 400 Hz case not grounded.
100 milliamperes at 115 V ac 60 and 400 Hz case grounded.

Inductive: 0.2 ampere at 28 V dc with 0.32 henry inductance.

Lamp: 0.10 ampere at 28 V dc.

Low level: 10 to 50 μA at 10 to 50 mV dc or peak ac.

Intermediate current: Applicable.

Contact resistance or voltage drop:

Initial: 0.10 ohm maximum (0.110 ohm maximum with spacer mounting pad).

High level:

During life: Not more than 5 percent of open circuit voltage.

After life: 0.20 ohm maximum (0.210 ohm maximum with spacer mounting pad).

Low level:

During life: 100 ohms maximum.

After life: 0.15 ohm maximum (0.160 ohm maximum with spacer mounting pad).

Intermediate current:

During: 3 ohms maximum.

After: 0.20 ohm maximum (0.210 ohm maximum with spacer mounting pad).

Contact bounce: 1.5 milliseconds maximum (applicable to failure rate level “L”).

Contact stabilization time: 2.5 milliseconds maximum (applicable to failure rate levels “M”, “P”, and “R”).

Overload (high level only): Two times rated current. Not applicable to ac load ratings.

COIL DATA: (See table I).

Operate time: 4.0 ms maximum over temperature range with rated coil voltage.

Release time: 7.5 ms maximum over temperature range from rated coil voltage.

ELECTRICAL DATA:

Insulation resistance: 10,000 megohms minimum at 500 V dc, except the resistance between coil and case at high temperature shall be 1,000 megohms minimum.

Dielectric withstanding voltage:	Sea level V rms (60 Hz)	Post intermediate current life test Sea level V rms (60 Hz)	Altitude V rms (60 Hz)
Between case, frame, or enclosure and all contacts in the energized and de-energized positions.	500	500	
Between case, frame, or enclosure and coils.	500	500	125
Between all contacts and coils.	500	500	All terminals to case
Between open contacts in the energized and de-energized positions.	500	375	
Between contact poles.	500	500	
Between coils of dual coil relays.	N/A	N/A	

DIODE CHARACTERISTICS:

Coil transient suppression: Applicable.

Diode block integrity (perform this test after coil transient suppression test in all inspection tables of MIL-PRF-39016): With applicable voltage applied to the relay coil circuit in the reverse direction, monitor leakage current with dc microammeter, oscilloscope, or qualifying activity approved test equipment. Leakage current shall not exceed the specified value.

Block integrity maximum leakage current: 1 μA at 50 V dc.

Maximum negative transient: 1.0 volt.

Breakdown voltage: 100 V dc minimum at 10 microamperes (μA). (This test may be performed in process or as final assembly).

Semiconductor in process screening: Applicable, visual inspection of semiconductors shall be in accordance with MIL-STD-750, method 2073, or 2074.

ENVIRONMENTAL DATA:

Temperature range: -65°C to +125°C.

Vibration (sinusoidal): MIL-STD-202, method 204. Contact chatter shall not exceed 10 microseconds maximum for closed contacts, and 1 microsecond maximum closure for open contacts.

Vibration (random): MIL-STD-202, method 214, test condition IG. Contact chatter shall not exceed 10 microseconds maximum for closed contacts and 1 microsecond maximum closure for open contacts (applicable to qualification and group C testing only).

Shock (specified pulse): MIL-STD-202, method 213, test condition B (75 g's). Contact chatter shall not exceed 10 μs maximum for closed contacts, and 1 μs maximum closure for open contacts.

Magnetic interference: Applicable.

Resistance to soldering heat: Applicable.

Acceleration: Applicable.

Salt atmosphere (corrosion): In accordance with MIL-STD-750, method 1041.

PHYSICAL DATA:

Terminals:

Termination strength: 1 pound pull minimum.

Terminal twist test: As specified in MIL-PRF-39016.

Dimensions and configuration: See figures 1 and 2.

Terminations: See figure 1 and table I.

Weight: 4.3 grams (0.15 ounce) maximum.

Solderability: Applicable.

Minimum marking: Military part number “J” with the date code (example J0430), circuit diagram, manufacturer’s name or source code.

LIFE TEST REQUIREMENTS:

High level: 100,000 cycles per relay.

Low level: 100,000 cycles plus 900,000 cycles mechanical life.

Part or Identifying Number (PIN): M39016/43 - (dash number from table I and suffix letter designating failure rate level).

TABLE I. Dash numbers and characteristics. 1/

Dash number 2/			Coil voltages (v dc) 4/		At +25°C					Over temperature range		
Lead length .500 min	Lead length .187 ±.010	Spacer mounting pads (fig.2) 3/	Rated	Max	Coil resistance (ref. only) ohms 5/	Coil circuit current (mA) 5/ 7/		Specified pickup value (voltage) (V dc)	Specified hold value (voltage) (V dc)	Specified dropout value (voltage) (V dc)	Specified pickup value (voltage) (V dc)	Specified hold value (voltage) (V dc)	Specified dropout value (V dc)
						Max	Min						
033	041	049	5.0	7.0	64	78.1	56.8	2.9	2.2	0.8	3.7	2.6	0.7
034	042	050	6.0	10.0	125	48.9	36.3	4.0	2.5	0.9	4.8	3.0	0.8
035	043	051	9.0	15.0	400	23.6	18.1	6.1	3.6	1.1	8.0	4.5	0.9
036	044	052	12.0	20.0	800	16.0	12.5	7.8	4.6	1.3	11.0	5.8	1.0
037	045	053	18.0	30.0	1,600	12.2	9.6	11.3	7.0	1.5	14.5	9.0	1.1
038	046	054	26.5	40.0	3,200	9.0	7.2	15.2	10.8	1.7	19.0	13.0	1.3
039	047	055	36.0	57.0	6,500	6.1	4.9	21.7	14.7	2.3	27.2	19.0	1.7
040	048	056	48.0	75.0	11,000	4.8	3.9	27.8	19.8	2.8	34.8	26.0	2.0
057 6/	---	065 6/	5.0	7.0	64	78.1	56.8	2.9	2.2	0.8	3.7	2.6	0.7
058 6/	---	066 6/	6.0	10.0	125	48.9	36.3	4.0	2.5	0.9	4.8	3.0	0.8
059 6/	---	067 6/	9.0	15.0	400	23.6	18.1	6.1	3.6	1.1	8.0	4.5	0.9
060 6/	---	068 6/	12.0	20.0	800	16.0	12.5	7.8	4.6	1.3	11.0	5.8	1.0
061 6/	---	069 6/	18.0	30.0	1,600	12.2	9.6	11.3	7.0	1.5	14.5	9.0	1.1
062 6/	---	070 6/	26.5	40.0	3,200	9.0	7.2	15.2	10.8	1.7	19.0	13.0	1.3
063 6/	---	071 6/	36.0	57.0	6,500	6.1	4.9	21.7	14.7	2.3	27.2	19.0	1.7
064 6/	---	072 6/	48.0	75.0	11,000	4.8	3.9	27.8	19.8	2.8	34.8	26.0	2.0

1/ Each relay possesses high level and low level capabilities. However, relays previously tested or used above 10 mA resistive at 6 V dc maximum or peak ac open circuits not recommended for subsequent use in low level applications.

2/ The suffix letter L, M, P, or R to designate the applicable failure rate level shall be added to the applicable listed dash number. Failure rate level (percent per 10,000 cycles): L, 3.0; M, 1.0; P, 0.1; R, 0.01. Example, 033L - - - - - -56R.

3/ Relays supplied with spacer mounting pads (-049 through -056 and -65 through -072) shall have the spacer mounting pad rigidly attached.

4/ CAUTION: The use of any coil voltage less than the rated coil voltage will compromise the operation of the relay.

5/ Coil resistance not directly measurable at relay terminals. When rated voltage is applied to the coil terminals, the coil circuit current must be within the limits shown. Measure at 25°C at nominal voltage for 5 seconds, maximum.

6/ Relays are supplied with a case grounding pin welded to the header (see figures 1 and 2).

7/ Delete “Coil resistance” and substitute “Coil current” test in all inspection tables of MIL-PRF-39016.

QUALIFICATION INSPECTION AND SAMPLE SIZE: See table II.

TABLE II. Qualification inspection and sample size.

Single submission	Group submission	
18 units plus 1 open unit for level L at C = 0 2/ 33 units plus 1 open unit for level M at C = 0 2/ Qualification inspection as applicable	M39016/43-038	18 units plus 1 open unit for level L at C = 0 2/ 33 units plus 1 open unit for level M at C = 0 2/ Qualification inspection as applicable
	M39016/43-033 M39016/43-034 M39016/43-035 M39016/43-036 M39016/43-037 M39016/43-039 M39016/43-040	2 units each part number Qualification inspection Q2.
	M39016/43-062	1 unit terminal strength and solderability

1/ The number of units required for qualification testing shall be increased as required in Q5, MIL-PRF-39016, if the contractor elects to test the number of units permitting one or more failures. Prior to performance of qualification testing, the relay manufacturer shall preselect the sampling plan.

Initial qualification of relays supplied with spacer mounting pads (-049 through -056 and -065 through -072), shall be tested as specified below:

Perform the following tests as specified in the qualification inspection table of MIL-PRF-39016, in the order shown below.

Before installation of spacer mounting pad; screening, visual and mechanical inspection (internal), thermal shock, resistance to solvents, vibration (sinusoidal), vibration (random), shock (specified pulse), acceleration, terminal strength, magnetic interference (when specified), capacitance (when specified), coil life (applicable to continuous duty relays only), resistance to soldering heat, salt spray (corrosion), overload (applicable to high level relays only), life, terminal strength, and intermediate current.

After installation of spacer mounting pad perform the following tests as specified in the qualification inspection table of MIL-PRF-39016, in the order shown below:

Insulation resistance, dielectric withstanding voltage, static contact resistance, specified pickup, hold, and dropout values (voltages), coil resistance, operate and release time, contact dynamic characteristics, coil transient suppression (when specified), solderability, seal, visual and mechanical inspection (external).

Qualification inspection (reduced testing for previously qualified relays) for relays supplied with spacer mounting pads (-049 through -056 and 065 through -072) two units of the 26.5 volt rated coil voltage (-052) shall be tested as specified below:

Before installation of spacer mounting pad, perform the following tests as specified in the qualification inspection table of MIL-PRF-39016 in the order shown below:

For failure rate level L only: Screening.

For failure rate levels M, P, and R: Vibration (sinusoidal), vibration (random), test duration shall be 10 minutes, and screening.

After installation of spacer mounting pad, perform the following tests as specified in the qualification inspection table of MIL-PRF-39016, in the order shown below:

Insulation resistance, dielectric withstanding voltage, static contact resistance, specified pickup, hold, and dropout values (voltages), coil resistance, operate and release time, contact dynamic characteristics, coil transient suppression (when specified), solderability, seal, visual and mechanical inspection (external).

Group A testing for relays supplied with spacer mounting pads (-049 through -056 and -065 through -072 shall be tested as specified below:

Perform seal test immediately preceding the A2 electrical tests. Relay leads shall be formed and the spacer mounting pad removed before the seal test. After the seal test, the spacer mounting pad shall be rigidly attached to the relay and the remaining group A tests performed (The seal test is not performed with group A4.)

SUPERSESSION DATA:

Supersession data: See table III.

TABLE III. Supersession data. 1/

Superseded part no. M39016/43-	New part no. M39016/43-		Superseded part no. M39016/43-	New part no. M39016/43-
001	033		017	033
002	034		018	034
003	035		019	035
004	036		020	036
005	037		021	037
006	038		022	038
007	039		023	036
008	040		024	040
009	041		025	041
010	042		026	042
011	043		027	043
012	044		028	044
013	045		029	045
014	046		030	046
015	047		031	047
016	048		032	048

1/ Dash numbers -001 through -032, .350 inch high cans have been canceled and superseded by -033 through -048, .375 inch high cans. The .350 inch high cans are no longer manufactured.

FOR GOVERNMENT LOGISTICAL SUPPORT: See table IV.

TABLE V. Cross reference for Government logistical support.

Superseded part number M39016/43-	New part number M39016/43-	Support with part number M39016/43-		Superseded part number M39016/43-	New part no. M39016/43-	Support with part number M39016/43-		New part number M39016/43-	Support with part no. M39016/43-
001	033	033		029	045	037		057	057
002	034	034		030	046	038		058	058
003	035	035		031	047	039		059	059
004	036	036		032	048	040		060	060
005	037	037			033	033		061	061
006	038	038			034	034		062	062
007	039	039			035	035		063	063
008	040	040			036	036		064	064
009	041	033			037	037		065	065
010	042	034			038	038		066	066
011	043	035			039	039		067	067
012	044	036			040	040		068	068
013	045	037			041	033		069	069
014	046	038			042	034		070	070
015	047	039			043	035		071	071
016	048	040			044	036		072	072
017	033	033			045	037			
018	034	034			046	038			
019	035	035			047	039			
020	036	036			048	040			
021	037	037			049	049			
022	038	038			050	050			
023	039	039			051	051			
024	040	040			052	052			
025	041	033			053	053			
026	042	034			054	054			
027	043	035			055	055			
028	044	036			056	056			

Referenced documents. In addition to MIL-PRF-39016, this document references the following:

MIL-I-631
MIL-STD-202
MIL-STD-750
MIL-STD-1285

Changes from previous issue: Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5945-1267)

Review activities:
Army - AR
Navy - MC, OS, SH
Air Force - 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://www.dodssp.daps.mil.