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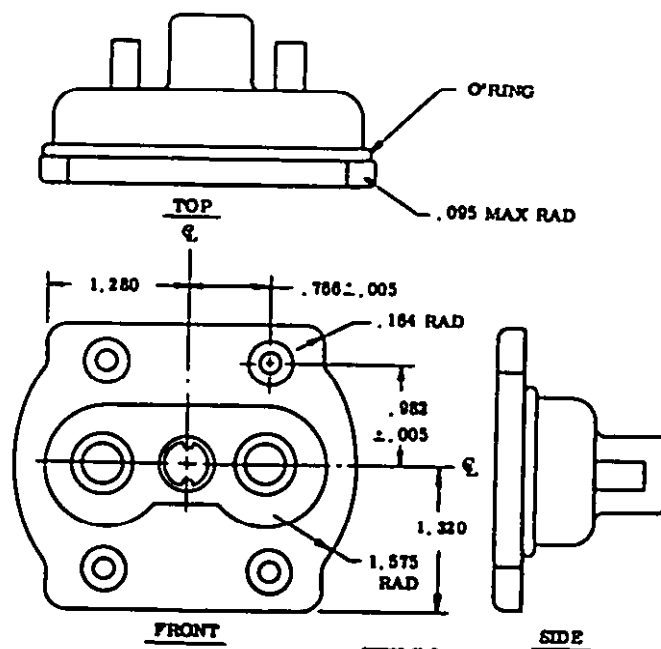
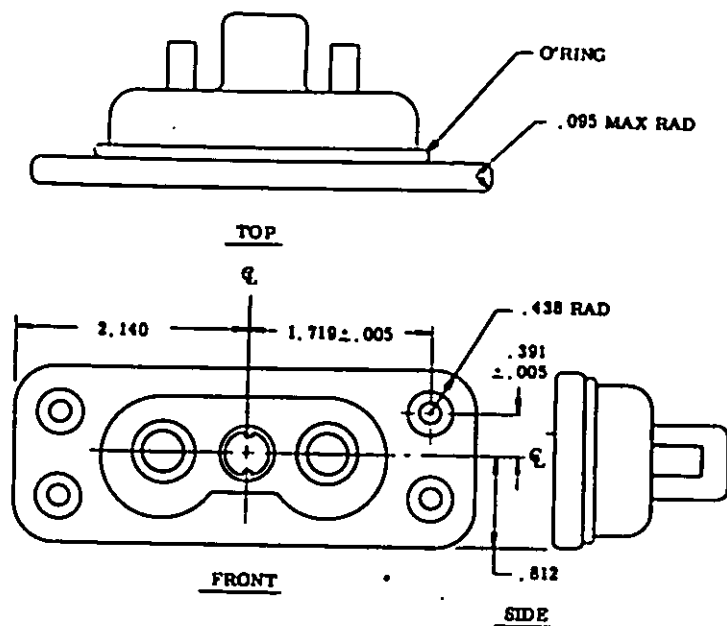
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FED. SUP CLASS  
5935ALL DIMENSIONS ARE TYPICAL. ALL TOLERANCES ARE  $\pm .010$  UNLESS OTHERWISE SPECIFIED.

## RECEPTACLES

AMSC N/A

Ⓕ DENOTES CHANGES

|   |                                |   |  |                              |  |
|---|--------------------------------|---|--|------------------------------|--|
| P.A.<br>NAVY - AS<br>Other Cost<br>USAF - 99<br>ARMY - AV | INTER-<br>NATIONAL<br>INTEREST | TITLE<br>RECEPTACLES, ELECTRIC,<br>AIRCRAFT STORAGE BATTERY |  | MILITARY STANDARD<br>MS 3509 |  |
| PROCUREMENT SPECIFICATION<br>MIL-E-81099                  |                                | SUPERSEDES  |  | SHEET 1 OF 6                 |  |

DD FORM 672-1 (Coordinated)

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

PLATE NO. 2200

PROJECT NO. 5935-3529

APPROVED 7 DEC 70 REVISED 25 SEP 73 25 JULY 1980 9 AUG 83 27 NOV 85

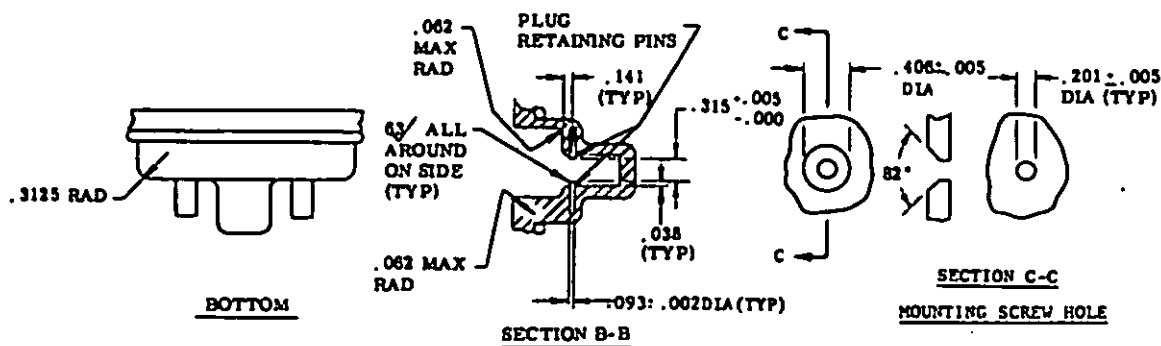
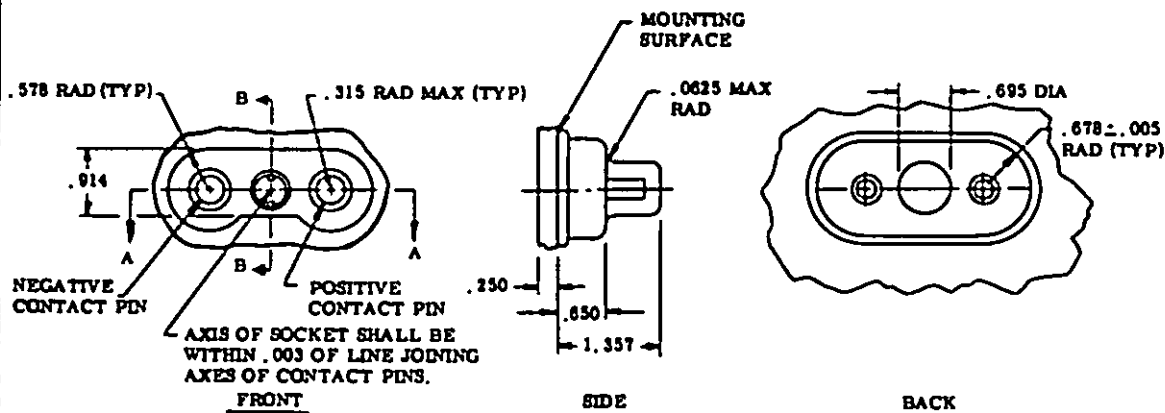
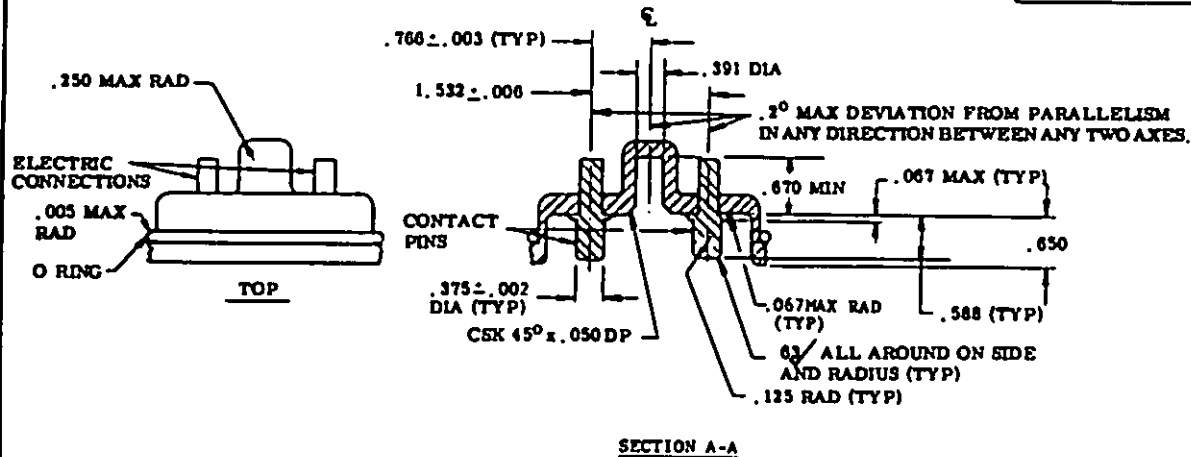
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ALL TOLERANCES ARE  $\pm .005$  UNLESS OTHERWISE SPECIFIED.  
STYLES 1 AND 2  
RECEPTACLES

APPROVED 7 DEC 1970 REVISED 7 DEC 1970 SEE SHEETS 1 THRU 6

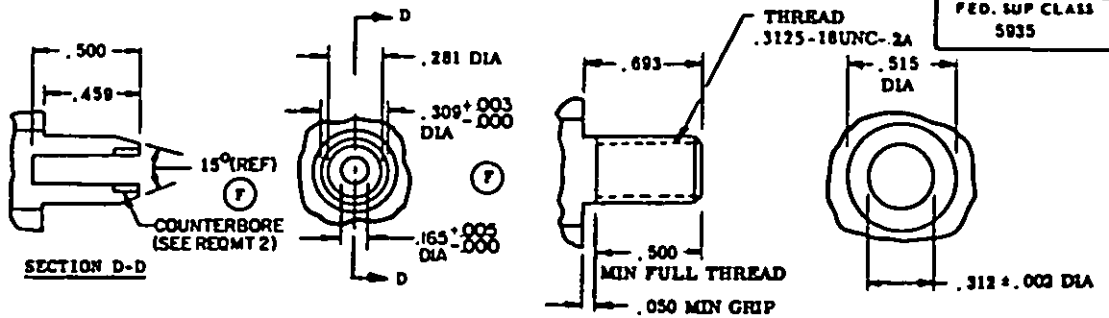
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HOLLOW POST (TYP)

THREADED POST (TYP)

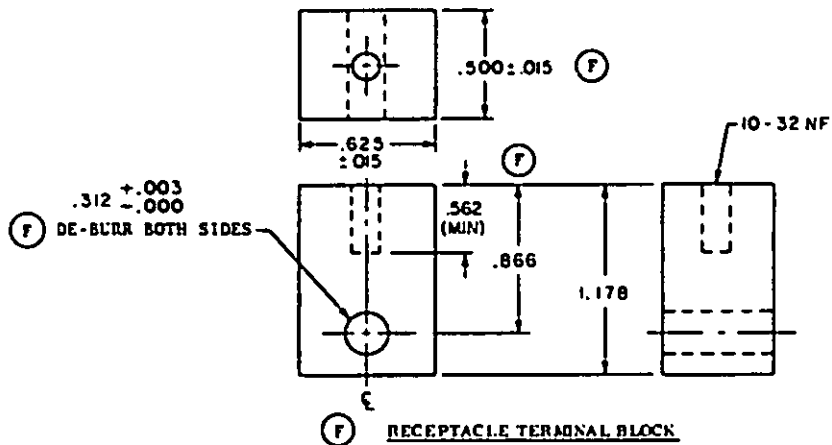
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## ELECTRIC CONNECTIONS

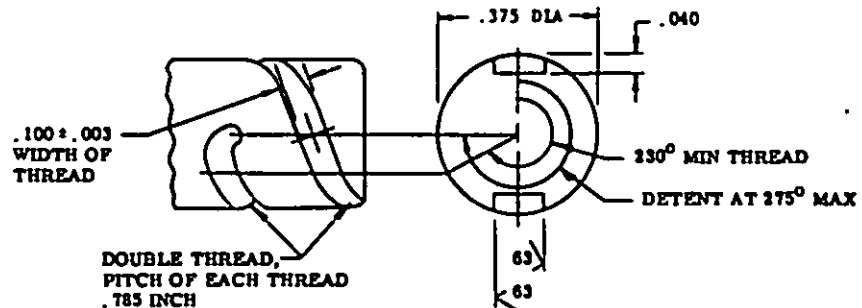
## RECEPTACLES



## EXPANDER



RECEPTACLE TERMINAL BLOCK

ALL THREAD DIMENSIONS ARE TYPICAL, ALL TOLERANCES ARE  $\pm .005$  UNLESS OTHERWISE SPECIFIED.

## TEST SCREW

|   |                                |   |                                 |
|---|--------------------------------|---|---------------------------------|
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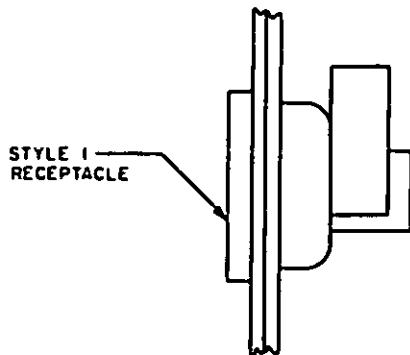
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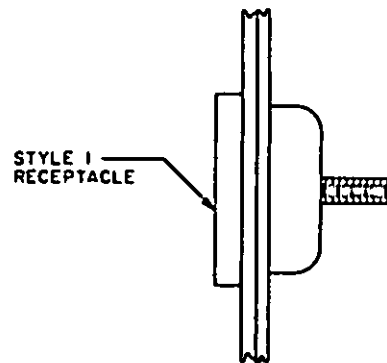
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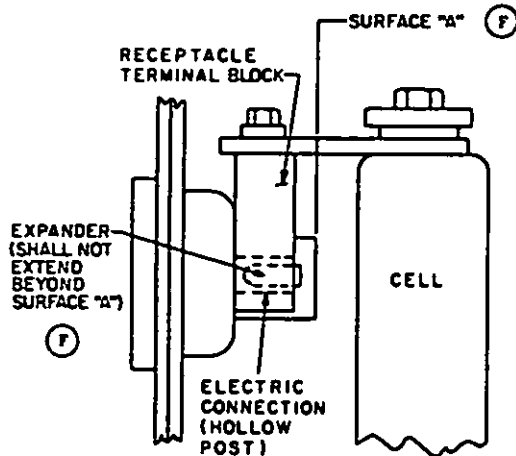
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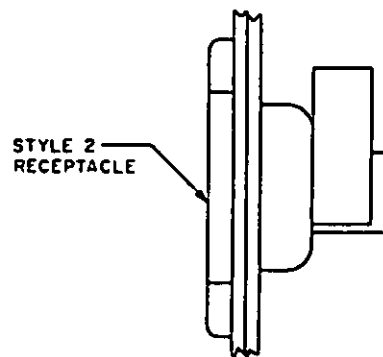
P/N MS3509-28-31 (F)



P/N MS3509-30 &amp; -20

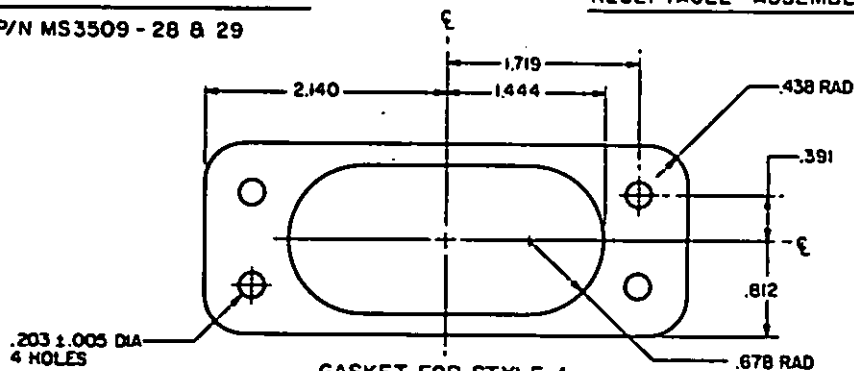


NICKEL-CADMIUM BATTERY  
RECEPTACLE MOUNTING  
P/N MS3509-28 & 29



P/N MS3509-29

## RECEPTACLE ASSEMBLIES



GASKET FOR STYLE 1

P/N MS3509-14

ALL DIMENSIONS ARE TYPICAL. ALL TOLERANCES ARE  $\pm .010$  UNLESS OTHERWISE  
SPECIFIED. THICKNESS .062  $\pm .005$  (F)

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|   |                                |   |                                    |
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| PROCUREMENT SPECIFICATION<br>MIL-E-81099                  | SUPERSEDES                     | SHEET 4 OF 6  |                                    |

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| FED. SUP CLASS 5935   |                                   |           |                      |
|---|-----------------------------------|-----------|----------------------|
| MS PART NO.   | RECEPT ASSY                       | STYLE     | ELECTRIC CONNECTIONS |
| MS3509-1 THROUGH -27 OBSOLETE (WITH THE EXCEPTION OF -14 AND -20) |                                   |           |                      |
| MS3509-20   | 1/                                | 1 (PINK)  | THREADED POST        |
| MS3509-28   | WITH TERMINAL BLOCKS INSTALLED    | 1 (BLUE)  | HOLLOW POSTS         |
| MS3509-28-1   | WITHOUT TERMINAL BLOCKS INSTALLED | 1 (BLUE)  | HOLLOW POSTS         |
| MS3509-29   | WITH TERMINAL BLOCKS INSTALLED    | 2 (BLUE)  | HOLLOW POSTS         |
| MS3509-29-1   | WITHOUT TERMINAL BLOCKS INSTALLED | 2 (BLUE)  | HOLLOW POSTS         |
| MS3509-30   | WITHOUT TERMINAL STRAPS INSTALLED | 1 (PINK)  | THREADED POSTS       |
| MS3509-31   | WITH TERMINAL BLOCKS INSTALLED    | 1 (BLACK) | HOLLOW POSTS         |

1/ MS3509-20 CONSISTS OF 1 MS3509-30 LESS "O" RING PLUS 1 MS3509-14 GASKET.

REQUIREMENTS:

- RECEPTACLES. THE BODY OF EACH RECEPTACLE SHALL BE MOLDED IN ONE PIECE FROM RIGID INSULATING MATERIAL. METAL REINFORCEMENTS MAY BE PROVIDED FOR THE MOUNTING HOLES AND THE PLUG RETAINING PINS. THE CONTACTS SHALL BE INSULATED FROM EACH OTHER AND FROM THE REINFORCEMENTS.
- ELECTRIC CONNECTIONS. EACH RECEPTACLE SHALL INCLUDE TWO ELECTRIC CONNECTIONS AS SHOWN ON SHEET 3 OF THE TYPE LISTED ABOVE, AND SHALL BE INTEGRAL WITH THE CONTACT PINS. EXCEPT FOR THE TYPE MS3509-31 RECEPTACLE, THE CONNECTIONS AND PINS SHALL BE MADE OF COPPER CONFORMING TO THE REQUIREMENTS OF QQ-C-502. THE TYPE MS3509-31 RECEPTACLE CONNECTIONS AND PINS SHALL BE MADE OF COLD FINISHED CARBON STEEL AISI GRADE 1215. THE CONNECTIONS AND PINS SHALL HAVE A CROSS-SECTIONAL AREA OF AT LEAST 0.074 SQUARE INCH AT ALL POINTS BETWEEN THE CONNECTIONS AND THE PINS. THE CONNECTIONS AND PINS SHALL HAVE A METALLIC PROTECTIVE PLATING THAT WILL RESIST RUSTING AND CORROSION. THREADS SHALL CONFORM TO MIL-S-7742. HOLLOW POSTS SHALL BE COUNTER-BORED .187 ± .002 INCH DIAMETER TO A DEPTH OF .098 ± .007 INCH.
- EXPANDERS. EACH RECEPTACLE WHICH HAS HOLLOW POSTS FOR ELECTRIC CONNECTIONS SHALL INCLUDE TWO EXPANDERS. EXPANDERS SHALL BE MADE OF STEEL CONFORMING TO REQUIREMENTS OF QQ-S-763, CLASS 304, CONDITION C.
- MARKING. THE RECEPTACLES SHALL BE MARKED FOR IDENTIFICATION IN ACCORDANCE WITH MIL-STD-130.
- "O" RING SEAL MADE BY PARKER SEAL CO. PART NO. 2-228 OR BY PRECISION RUBBER PRODUCTS CO., PART NO. 228 SHALL BE USED. DIMENSIONS ID 2.234 ± 0.010, MEAN OD 2.512, CROSS SECTION 0.139 ± .004
- GASKETS. GASKETS SHALL BE MADE OF RUBBER CONFORMING TO REQUIREMENTS OF MIL-R-6130 FOR TYPE 2, GRADE A, AND FIRM CONDITION.
- RECEPTACLE TERMINAL BLOCKS. RECEPTACLE TERMINAL BLOCKS SHALL BE OF STEEL, FULL HARD FINISHED WITH A MINIMUM OF 0.0005 NICKEL PLATE.
- THE REQUIREMENTS OF MIL-E-81099 APPLY WITH THE FOLLOWING EXCEPTIONS.
 

3.6 COLOR. THE BODY OF EACH RECEPTACLE SHALL BE A COLOR CONFORMING TO REQUIREMENTS OF FED-STD-595 FOR COLOR NUMBER 21158 (PINK) OR WITHIN THE RANGE OF COLOR NUMBERS 15090 TO 15193 (BLUE). THE TYPE MS3509-31 RECEPTACLE SHALL BE BLACK.

4.2 QUALIFICATION TESTING. REPLACE TEXT WITH: FOR RECEPTACLES HAVING HOLLOW POST ELECTRIC CONNECTIONS, A QUALIFICATION SAMPLE SHALL CONSIST OF TWO RECEPTACLE ASSEMBLIES OF A GIVEN MS PART NUMBER. THE MANUFACTURER SHALL SUBMIT ONE COMPLETED AND ASSEMBLED RECEPTACLE ASSEMBLY WHICH SHALL BE SUBJECTED TO ALL OF THE TESTS OF THE PROCUREMENT SPECIFICATION AS MODIFIED HEREIN EXCEPT THE TESTS OF 4.6.1, 4.6.2, AND 4.6.3. THE SECOND RECEPTACLE ASSEMBLY SHALL HAVE THE RECEPTACLE TERMINAL BLOCK AND EXPANDER DISASSEMBLED AND SHALL BE SUBJECTED TO THE TESTS OF 4.6.1, 4.6.2, AND 4.6.3. FOR RECEPTACLES HAVING THREADED POST ELECTRIC CONNECTIONS, A QUALIFICATION SAMPLE SHALL CONSIST OF ONE RECEPTACLE ASSEMBLY WHICH SHALL BE SUBJECTED TO ALL OF THE TESTS OF THE PROCUREMENT SPECIFICATION AS MODIFIED HEREIN.

4.3.1 INDIVIDUAL TESTS. THE INDIVIDUAL TESTS SHALL BE THOSE OF 4.6.1 AND 4.6.2.

4.3.2 SAMPLING TESTS. ONE RECEPTACLE ASSEMBLY SHALL BE SELECTED AT RANDOM FROM EACH GROUP OF 1001, OR RETAINING GROUPS OF 501 TO 1000 RECEPTACLE ASSEMBLIES, PRODUCED UNDER THE CONTRACT, BUT WITH A MINIMUM OF ONE RECEPTACLE ASSEMBLY BEING SELECTED. THE RECEPTACLE ASSEMBLY SHALL BE SUBJECTED TO THE TESTS OF 4.6.3 THROUGH 4.6.7. ACCEPTANCE OF EACH GROUP OF RECEPTACLES SHALL BE WITHHELD UNTIL THE RECEPTACLE ASSEMBLY REPRESENTING THE GROUP HAS PASSED THE TESTS.

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| PROCUREMENT SPECIFICATION<br>MIL-E-81099                 | SUPERSEDES:   | SHEET 5 OF 6                    |

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5935

ADD: 4.5.1.1 MOUNTING. FOR THE TESTS OF 4.6.3.3 AND SUBSEQUENT TESTS, THE RECEPTACLE SHALL BE MOUNTED WITH AN APPROPRIATE O RING ON A RIGID METAL PLATE HAVING SUITABLE INSTALLATION AND MOUNTING HOLES. FOR BLUE RECEPTACLES, THE PLATE SHALL BE A SIDE OF A BOX MEETING THE REQUIREMENTS OF 4.6.4.3. THE RECEPTACLE SHALL REMAIN ATTACHED TO THE PLATE THROUGHOUT TESTING.

ADD: 4.5.1.2 TEST SCREW. WHENEVER A TEST SCREW IS REQUIRED FOR TESTING, A TEST SCREW AS SHOWN ON THE STANDARD SHALL BE USED, AND SHALL BE ENGAGED WITH THE PLUG RETAINING PINS OF THE RECEPTACLE. THIS TEST SCREW SHALL BE MADE OF STEEL CONFORMING TO THE REQUIREMENTS OF MIL-S-5626 FOR CONDITION D-4 AND HEAT TREATED IN ACCORDANCE WITH MIL-H-6875 TO A HARDNESS OF  $44 \pm 2$  ROCKWELL C AND CHROME PLATED IN ACCORDANCE WITH QM-C-320.

4.5.3 OPERATIONAL TEST. THE EVALUATION TEST SHALL BE PERFORMED AS THE OPERATIONAL TEST OF MIL-STD-810.

ADD: 4.6.3.1 IMMERSION IN ACID. PINK RECEPTACLES SHALL BE IMMersed IN SULFURIC ACID OF SPECIFIC GRAVITY  $1.10 \pm 0.05$  AND AT  $70^\circ\text{F} \pm 4^\circ$  FOR  $20 \pm 1.0$  HOURS. THERE SHALL BE NO DAMAGE TO THE RECEPTACLE BY THIS TEST. THE RECEPTACLE SHALL BE WASHED AND DRIED AFTER THIS TEST.

(F) 4.6.3.2 IMMERSION IN ALKALI. BLUE AND BLACK RECEPTACLES SHALL BE IMMersed IN POTASSIUM HYDROXIDE OF SPECIFIC GRAVITY  $1.300 \pm 0.05$  AND AT  $160 \pm 4^\circ\text{F}$  FOR  $18 \pm 2.0$  HOURS. THERE SHALL BE NO DAMAGE TO THE RECEPTACLE BY THIS TEST. THE RECEPTACLE SHALL BE WASHED AND DRIED AFTER THIS TEST.

(F) 4.6.3.3 STRENGTH OF CONTACTS. WITH TERMINAL BLOCKS INSTALLED, A TORQUE OF 50 INCH-POUNDS ABOUT THE AXIS OF THE CONTACT IN EACH DIRECTION SHALL BE APPLIED TO EACH ELECTRIC CONNECTION. THERE SHALL NOT BE ANY MOVEMENT OF EITHER CONTACTS OR TERMINAL BLOCKS.

ADD: 4.6.3.4 LIFE. A TEST SCREW SHALL BE ENGAGED WITH THE RECEPTACLE AND THE RECEPTACLE SHALL BE SUBJECTED TO 1500 CYCLES OF OPERATION OF THE SCREW AT A RATE OF  $10 \pm 1$  CYCLES PER MINUTE. EACH CYCLE SHALL CONSIST OF ROTATING THE SCREW FROM THE DETENTED POSITION  $180 \pm 5$  DEGREES AND BACK TO THE DETENTED POSITION. A TENSION OF  $10 \pm 1$  POUNDS SHALL BE MAINTAINED ON THE SCREW. THERE SHALL NOT BE ANY DAMAGE DONE TO THE RECEPTACLE BY THIS TEST.

4.6.4 EVALUATION. THE EVALUATION TEST SHALL CONSIST OF THE TESTS OF 4.6.4.1 THROUGH 4.6.4.3.

ADD 4.6.4.1 DIELECTRIC STRENGTH. A TEST SCREW SHALL BE INSTALLED IN THE PLUG RETAINING PINS SOCKET. A POTENTIAL HAVING AN EFFECTIVE VALUE OF  $2,500 \pm 500$  VOLTS AND ANY FREQUENCY BETWEEN 0 AND 600 HZ, OR DC, SHALL BE APPLIED BETWEEN THE CONTACTS FOR  $1.0 \pm 0.1$  MINUTE, AND THEN BETWEEN BOTH CONTACTS TOGETHER AND THE MOUNTING PLATE AND TEST SCREW TOGETHER FOR  $1.0 \pm 0.1$  MINUTE. THERE SHALL NOT BE ANY BREAKDOWN OF INSULATION.

ADD: 4.6.4.2 STRENGTH OF PLUG RETAINING PINS. A TEST SCREW SHALL BE ENGAGED WITH THE RECEPTACLE AND A TENSION OF  $300 \pm 50$  POUNDS SHALL BE APPLIED TO THE SCREW. THE TENSION SHALL BE RELEASED AND A TORQUE OF  $10 \pm 1$  FOOT-POUNDS SHALL BE APPLIED TO THE SCREW. THERE SHALL BE NO DAMAGE TO THE RECEPTACLE BY THIS TEST.

ADD: 4.6.4.3 AIR-TIGHTNESS. BLUE RECEPTACLES SHALL BE MOUNTED ON A BOX WHICH SHALL HAVE AN INTERNAL VOLUME OF  $60 \pm 6$  CUBIC INCHES. A PRESSURE GAGE OF THE SMALLEST POSSIBLE INTERNAL VOLUME SHALL BE MOUNTED ON THE BOX. THE BOX SHALL BE CONNECTED TO A SOURCE OF AIR PRESSURE WITH A SHUT-OFF VALVE MOUNTED ON THE BOX. THE BOX SHALL BE AIR-TIGHT EXCEPT FOR THE OPENING FOR THE RECEPTACLE PRESSURE GAGE AND VALVE. A PRESSURE OF  $2.0 \pm 0.2$  POUNDS PER SQUARE INCH SHALL BE APPLIED TO THE INSIDE OF THE BOX. THE VALVE SHALL BE CLOSED, AND THE PRESSURE IN THE BOX SHALL NOT DECAY MORE THAN  $5\%$  IN TEN MINUTES.

4.6.7 TEMPERATURE SHOCK. THE RECEPTACLE ASSEMBLY SHALL BE SUBJECTED TO THE TEMPERATURE SHOCK TEST PROCEDURE 1, METHOD 503.1 OF MIL-STD-810 EXCEPT EXPOSURE PERIODS SHALL BE  $4 (-0, +.5)$  HOURS.

4.6.8 HUMIDITY. THE RECEPTACLE ASSEMBLY SHALL BE SUBJECTED TO THE HUMIDITY TEST PROCEDURE 1, METHOD 507.1 OF MIL-STD-810.

4.6.9 FUNGUS. DELETE IN ITS ENTIRETY.

4.6.10 SALT FOG. THE RECEPTACLE ASSEMBLY SHALL BE SUBJECTED TO THE SALT FOG PROCEDURE 1, METHOD 509.1 OF MIL-STD-810.

## NOTES:

(F) 1. DIMENSIONS. EACH ITEM SHALL CONFORM TO THE DIMENSIONS SHOWN ON THIS STANDARD. ALL LINEAR DIMENSIONS ARE IN INCHES, EXCEPT ROUGHNESS, WHICH ARE IN MICROINCHES. TOLERANCE ON ALL ANGLES IS  $\pm 1$  DEGREE. ALL DIMENSIONS ARE WITH PLATING.

FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.

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