## REVISIONS

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## SHEET REVISION STATUS

| SH | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
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| ADDITIONAL APPROVAL | S-311-P-718/4 | |
|---------------------|---------------| |

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

CAGE CODE: 25306
1. SCOPE

1.1 Purpose. This specification covers the detail provisions for connector backshell kits with strain relief capabilities, and for the suppression of radio frequency and electromagnetic interference. They are not intended to provide waterproofing and environmental sealing. The backshells covered by this specification are intended for use with electrical connectors covered by GSFC specifications delineated in Table 1.

Table 1. Backshell - connector compatibility.

<table>
<thead>
<tr>
<th>Backshell Size</th>
<th>Exit Hole Style</th>
<th>Figure</th>
<th>Compatible Specification (GSFC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Square</td>
<td>Round</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>S</td>
<td>R</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>--</td>
<td>R</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>--</td>
<td>R</td>
<td>3</td>
</tr>
</tbody>
</table>

1.2 General specification. Unless otherwise noted, all connector provisions and requirements of GSFC general specification S-311-P-718 and detail specifications S-311-P-718/3, S-311-P-718/5 and S-311-P-718/6 apply to this specification.

1.3 Backshell - type designations. Backshells shall be of the following type designations, and shall be ordered by their type designations only.

```
G | 1 | R
```

- Exit Hole Style (1.3.2)
- Backshell Kit Size (1.3.1)
- GSFC Prefix (Standard for all backshell designations)
1.3.1 Backshell kit size. Select backshell kit size from Table 1.

1.3.2 Exit hole style. Select exit hole style from Table 1 (S for square, R for round).

2.0 APPLICABLE DOCUMENTS

The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

2.1 Specifications.

2.1.1 Federal.

QQ-A-200        Aluminum Alloy, Bar, Rod, Shapes, Structural Shapes, Tube and Wire, Extruded, General Specification for

QQ-A-250        Aluminum and Aluminum Alloy Plate and Sheet, General Specification for

2.1.2 Military.

MIL-A-21180      Aluminum Castings, High Strength

MIL-C-26074      Coatings, Electroless Nickel, Requirements for

MIL-S-5002       Surface Treatments and Inorganic Coatings for Metal Surfaces of Weapons Systems.

2.1.3 NASA/Goddard.

GSFC S-311-P-718 Connectors, Electrical, Rectangular, (Power and Coaxial Contacts)(Including EMI Shielding) for Space Flight Use, Detail Specification for

GSFC S-311-P-718/3 Connectors, Electrical, Rectangular, Polarized Shell, EMI Shielding, (Size 1), for Space Flight Use, Detail Specification for

GSFC S-311-P-718/5 Connectors, Electrical, Rectangular, Polarized Shell, EMI Shielding, (Size 2), for Space Flight Use, Detail Specification for
2.2 Standards.

MS16995  Screw, Cap, Socket Head-Hexagon, Corrosion Resisting Steel, UNC-3A.
DOD-STD-100  Engineering Drawing Practices
MS35275  Screw, Machine-Drilled, Fillister Head, Slotted, Corrosion Resisting Steel, Passivated UNC-2A
MS35338  Washer, Lock-Spring, Helical, Regular (Medium) Series

2.3 Other publications.

NAS1922  Clamp, Hose

2.4 Order of precedence. The order of precedence delineated in the general specification, S-311-P-718 shall apply.

3.0 REQUIREMENTS (1.2)

3.1 Materials, designs and construction. Backshells and their associated integral parts shall be of the materials, design, construction, platings, and physical dimensions as specified herein. (Figures 1 through 20) (Reference: Finishes not specified, which are known to sublimate in a hard vacuum, such as cadmium, shall not be used.)

3.1.1 Material weight loss (vacuum). All backshell constituent parts used shall be such that in no case will outgassing limits of 3.1.4 be exceeded when tested in accordance with GSFC S-311-P-718.

3.1.2 Materials. Materials shall be suitable for the purpose intended and as specified (see 3.1), however, when a definite material is not specified, a material shall be used which will enable the backshells to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guarantee for acceptance of the finished product.
3.1.3 **Backshell weight.** The maximum weight of each backshell kit shall be in accordance with Figures 1, 11 and 16.

3.1.4 **Vacuum effects (materials outgassing).** The material outgassing limits of all materials used shall not exceed 1.0 percent in total weight loss and 0.1 percent in volatile-condensable material.

3.2 **Identification marking.** Each backshell housing (kit) shall be permanently and legibly marked per MIL-STD-130 with the backshell type designation and date-lot identification. Constituent kit parts need not be marked with the GSFC identifier, e.g. S-311-P-718/4-1.

3.3 **Performance.**

3.3.1 **EMI effectiveness.** The EMI effectiveness provisions of GSFC S-311-P-718 apply.

4.0 **QUALITY ASSURANCE PROVISIONS (1.2)**

4.1 **Final inspection.** Each backshell kit (and constituent piece part) shall be:

- a. 100% inspected per the workmanship provisions of the general specification, GSFC S-311-P-718
- b. checked for critical dimensions (per applicable figure)

5.0 **PREPARATION FOR DELIVERY (1.2)**

6.0 **NOTES (1.2)**

Custodian:

Code 408
Goddard Space Flight Center
Greenbelt, MD 20771
FIGURE 1 - BACKSHELL KIT (SIZE 1) (GIR AND GIS)
(PAGE 1 OF 4)
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. THESE BACKSHELL KITS ARE DESIGNED TO FUNCTION IN CONJUNCTION WITH GSFC NUMBER S-311-P-718/3 CONNECTOR.

3. FN 3, EMI GASKET, IS A Cu/Ag FILLED SILICONE RUBBER ELASTOMER (CHO-SEAL 1215) PRODUCED BY CHOMERICS INC., (CAGE CODE 18565).

4. SHIELD TERMINATION CLAMPS SUPPLIED TO BE USED IN CONJUNCTION WITH A CONDUCTIVE EPOXY OR SOLDER. ALTERNATIVE TERMINATION METHODS SUCH AS "MAGNEFORMING", "HEAT SHRINKABLE" RINGS AND CALIBRATED BANDING SYSTEMS MAY ALSO BE USED. BACKSHELL USERS TO SELECT TERMINATION METHOD.

5. WHEN INSTALLING BACKSHELL TO CONNECTOR, RECOMMENDED TORQUE RANGE FOR FN 6 AND FN 7 SCREWS IS 12–14 IN-LBS AND FOR FN 5 SCREWS IS 6–8 IN-LBS.

6. ALL COMPONENTS OF THIS KIT SHALL BE PACKAGED SEPARATELY AS LOOSE ITEMS TO BE ASSEMBLED BY USER.

7. MAXIMUM WEIGHT PER KIT: 1.2 POUNDS.

FIGURE 1 - BACKSHELL KIT (SIZE 1) (GIR AND GIS) (CONTD) (PAGE 2 OF 4)
GIS
SAME AS GIR EXCEPT AS SHOWN

FIGURE 1 - BACKSHELL KIT (SIZE 1) (GIR AND GIS) (CONTD)
(PAGE 3 OF 4)
<table>
<thead>
<tr>
<th>QTY PER ASSY</th>
<th>GIS</th>
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<th>FIND NO.</th>
<th>FIG NO.</th>
<th>PART OR IDENTIFYING NO.</th>
<th>NOMENCLATURE OR DESCRIPTION</th>
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<td>S-700-42/4-6</td>
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**FIGURE 1 - BACKSHELL KIT (SIZE 1) (GIR AND GIS) (CONT'D) (PAGE 4 OF 4)**
NOTE: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

FIGURE 2 - BACKSHELL HOUSING, ROUND HOLE (SIZE 1) (S-700-42/4-1)
(PAGE 1 OF 2)
FIGURE 2 – BACKSHELL HOUSING, ROUND HOLE (SIZE 1)  
(S-700-42/4-1) (CONT'D)  
(PAGE 2 OF 2)
NOTE: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.

FIGURE 3 - BACKSHELL HOUSING, SQUARE HOLE (SIZE 1) (S-700-42/4-2) (PAGE 1 OF 2)
FIGURE 3 - BACKSHELL HOUSING, SQUARE HOLE (SIZE 1)  
(S-700-42/4-2) (CONT'D)  
(PAGE 2 OF 2)
### Thread Data Table

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<th>Thread Form Diameter</th>
<th>Thread Dimensions Before Plating</th>
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<td>Minor</td>
<td>.1070-.1165</td>
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### Section A-A

- .295
- .285
- .255
- .245
- .173
- .178
- .1250
- .1200
- .1.010
- .0990
- .250
- .240

**Note:** Unless otherwise specified

1. Interpret per DOD-STD-100.

**Figure 4 - Cable Support Bracket (Size 1) (S-700-42/4-3)**
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.
2. Cu/Ag FILLED SILICONE RUBBER, PURCHASE FROM CHOMERICS INC. (CAGE CODE 18565), PART NO. CHO-SEAL 1215 (COLOR GRAY)

FIGURE 5 - EMI GASKET (SIZE 1) (S-700-42/4-4)
### Thread Data Table

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<td>Minor</td>
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**Note:** Unless otherwise specified

1. Interpret per DOD-STD-100.

**Figure 6 – Cable Clamp (Size 1) (S-700-42/4-5)**
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.
2. MAKE FROM MS16995-11.
3. AFTER MODIFICATION, PASSIVATE PER MIL-S-5002.

FIGURE 7 - SOCKET HEAD CAP SCREW, MODIFIED (SIZE 1) (S-700-42/4-6)
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.
2. MAKE FROM MS16995-18.
3. AFTER MODIFICATION, PASSIVATE PER MIL-S-5002.

FIGURE 8 - SOCKET HEAD CAP SCREW, MODIFIED (SIZE 1) (S-700-42/4-7)
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.
2. MAKE FROM MS16995-18.
3. AFTER MODIFICATION, PASSIVATE PER MIL-S-5002.

FIGURE 9 - SOCKET HEAD CAP SCREW, MODIFIED (SIZE 1) (S-700-42/4-8)
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. MAKE FROM NAS1922-0450-3H.

△ CLAMPS WITH CURVED SHAPE MUST BE GROUND FLAT AS SHOWN.

FIGURE 10 – CLAMP, HOSE, BAND, MODIFIED (SIZE 1) (S-700-42/4-9)
FIGURE 11 - BACKSHELL KIT, (SIZE 2) (G2R)
(PAGE 1 OF 3)
FIGURE 11 – BACKSHELL KIT, (SIZE 2) (G2R) (CONT'D)
(PAGE 2 OF 3)
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<td>1 1 S-700-42/4-10</td>
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NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. THESE BACKSHELL KITS ARE DESIGNED TO FUNCTION IN CONJUNCTION WITH GSFC S-311-P-718/5 CONNECTOR.

3. FN 3, EMI GASKET, IS A Cu/Ag FILLED SILICONE RUBBER ELASTOMER (CHO-SEAL 1215) PRODUCED BY CHOMERICS INC., (CAGE CODE 18565).

4. SHELL TERMINATION CLAMPS SUPPLIED TO BE USED IN CONJUNCTION WITH A CONDUCTIVE EPOXY OR SOLDER, ALTERNATE TERMINATION METHODS SUCH AS "MAGNEFORMING", "HEAT SHRINKABLE" RINGS AND CALIBRATED BANDING SYSTEMS MAY ALSO BE USED. BACKSHELL USERS SHOULD SELECT TERMINATION METHOD.

5. WHEN INSTALLING BACKSHELL TO CONNECTOR, RECOMMENDED TORQUE RANGE FOR FN 4 SCREWS IS 12-14 IN-LBS.

6. MAXIMUM WEIGHT PER KIT – 0.6 POUNDS.

7. ALL COMPONENTS OF THIS KIT SHALL BE PACKAGED SEPARATELY AS LOOSE ITEMS TO BE ASSEMBLED BY USER.

FIGURE 11 - BACKSHELL KIT, (SIZE 2) (G2R) (CONTD)
2.370

1.010

2.000

2.130

.825

.775

4X R .250

4X R .125

.138-32 UNC-2B

SEE THD DATA TABLE

THREADED DATA TABLE

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<th>NOMINAL THREAD SIZE AND SERIES</th>
<th>THREAD FORM DIAMETER</th>
<th>THREAD DIMENSIONS</th>
<th>BEFORE PLATING</th>
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<tr>
<td>.138-32 UNC-2B</td>
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<td>MINOR</td>
<td>.1040 -.1140</td>
<td>.1070 -.1165</td>
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NOTE: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.

FIGURE 12 - BACKSHELL HOUSING, ROUND HOLE (SIZE 2) (S-700-42/4-10)
(PAGE 1 OF 3)
SECTION A-A

FIGURE 12 - BACKSHELL HOUSING, ROUND HOLE (SIZE 2)
(S-700-42/4-10) (CONTD)
(PAGE 2 OF 3)
FIGURE 12 – BACKSHELL HOUSING, ROUND HOLE (SIZE 2) (S-700-42/4-10) (CONTD) (PAGE 3 OF 3)
**thread data table**

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**note:** unless otherwise specified
1. interpret per dod-std-100.

**Figure 13 - Cable Support Clamp, (Size 2) (S-700-42/4-11)**
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. Cu/Ag FILLED SILICONE RUBBER ELASTOMER, PURCHASE FROM CHOMERICS INC., (CAGE CODE 18565), PART NO. CHO-SEAL 1215 (COLOR-GRAY).

FIGURE 14 - EMI GASKET, (SIZE 2) (S-700-42/4-12)
NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.
2. MAKE FROM MS16995-18.
3. AFTER MODIFICATION, PASSIVATE PER MIL-S-5002.

FIGURE 15 – SOCKET HEAD CAP SCREW, MODIFIED (SIZE 2) (S-700-42/4-13)
FIGURE 16 - BACKSHELL KIT, (SIZE 3) (G3R)  
(PAGE 1 OF 3)
FIGURE 16 - BACKSHELL KIT, (SIZE 3) (G3R) (CONTD)  
(PAGE 2 OF 3)
# PARTS LIST

<table>
<thead>
<tr>
<th>QTY PER ASSY</th>
<th>PKG NO.</th>
<th>CAGE CODE</th>
<th>PART OR IDENTIFYING NO.</th>
<th>NOMENCLATURE OR DESCRIPTION</th>
<th>MATERIAL</th>
<th>SPECIFICATION</th>
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<tr>
<td>1</td>
<td>7</td>
<td>NAS1922-0075-3</td>
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<td>2</td>
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<td>MS35275-217</td>
<td>SCR, FILLISTER, HD</td>
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<td>SCR, CAP, SCH, MOD</td>
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<td>S-700-42/4-16</td>
<td>GASKET, EMI</td>
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## NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. THESE BACKSHELL KITS ARE DESIGNED TO FUNCTION IN CONJUNCTION WITH GSFC S-311-P-718/6 CONNECTOR.

3. FN 3 EMI GASKET, IS A Cu/Ag FILLED SILICONE RUBBER ELASTOMER (CHO-SEAL 1215) PRODUCED BY CHOMERICS INC., (CAGE CODE 18565).

4. SHELL TERMINATION CLAMPS SUPPLIED TO BE USED IN CONJUNCTION WITH A CONDUCTIVE EPOXY OR SOLDER. ALTERNATE TERMINATION METHODS SUCH AS "MAGNEFORMING", "HEAT SHRINKABLE" RINGS AND CALIBRATED BANDING SYSTEMS MAY ALSO BE USED. BACKSHELL USERS SHOULD SELECT TERMINATION METHOD.

5. WHEN INSTALLING BACKSHELL TO CONNECTOR, RECOMMENDED TORQUE RANGE FOR FN 4 SCREWS IS 6-8 IN-LBS.

6. MAXIMUM WEIGHT PER KIT – 0.4 POUNDS.

7. ALL COMPONENTS OF THIS KIT SHALL BE PACKAGED SEPARATELY AS LOOSE ITEMS TO BE ASSEMBLED BY USER.

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**FIGURE 16 – BACKSHELL KIT, (SIZE 3) (G3R) (CONT'D)**

(PAGE 3 OF 3)
NOTE: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.

FIGURE 17 – BACKSHELL HOUSING, ROUND HOLE (SIZE 3) (S-700-42/4-14) (PAGE 1 OF 3)
FIGURE 17 - BACKSHELL HOUSING, ROUND HOLE (SIZE 3)  
(S-700-42/4-14) (CONTD)  
(PAGE 2 OF 3)
FIGURE 17 - BACKSHELL HOUSING, ROUND HOLE (SIZE 3) (S-700-42/4-14) (CONTD) (PAGE 3 OF 3)
THREAD DATA TABLE

<table>
<thead>
<tr>
<th>NOMINAL THREAD SIZE AND SERIES</th>
<th>THREAD FORM DIAMETER</th>
<th>THREAD DIMENSIONS</th>
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<td>BEFORE PLATING</td>
<td>AFTER PLATING</td>
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<tr>
<td>.112-40 UNC-2B</td>
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<td>.1150 - .1214</td>
<td>.1120 - .1189</td>
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<td>PITCH</td>
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<td>MINOR</td>
<td>.0879 - .0964</td>
<td>.0849 - .0939</td>
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NOTE: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.

FIGURE 18 - CABLE SUPPORT CLAMP (SIZE 3) (S-700-42/4-15)
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. Cu/Ag FILLED SILICONE RUBBER ELASTOMER, PURCHASE FROM CHOMERICS INC., (CAGE CODE 18565), PART NO. CHO-SEAL 1215 (COLOR-GRAY).

FIGURE 19 - EMI GASKET (SIZE 3) (S-700-42/4-16)
NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.
2. MAKE FROM MS16995-10.
3. AFTER MODIFICATION, PASSIVATE PER MIL-S-5002.

FIGURE 20 - SOCKET HEAD CAP SCREW, MODIFIED (SIZE 3) (S-700-42/4-17)