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# Conductive Elastomer

EMI Shielding Materials

Waveseal Conductive Elastomers are designed for applications which require both EMI shielding and environmental sealing. The compound formulations are developed by combining elastomeric polymers with highly conductive fillers, providing excellent EMI shielding and sealing across a wide temperature range. All formulations are compounded to be compatible with common fluids and to resist compression set resulting in years of continuous service. Waveseal Conductive Elastomers are available in standard and custom configurations including Extruded Profiles, Sheet Stock, Custom Molded, and Die-Cut gaskets.

## Waveseal Material Specification

| Material Type | | S1610 | S1620 | F1630 | F1640 | S1650 | S1660 | F1670 | S1680 | F1690 |
|---|---|---|---|---|---|---|---|---|---|---|
| Elastomer Type - Silicone (SIL) or Fluorosilicone (F.SIL) | | SIL | SIL | F.SIL | F.SIL | SIL | SIL | F.Sil | SIL | F.SIL |
| Filler Material* | | Ag/Cu | Ag/Al | Ag/Cu | Ag/Al | Ag/G | Ni/C | Ni/C | Ni/Al | Ni/Al |
| MIL-DTL-83528D Material Type | | A | B | C | D | M | - | - | - | - |
| **Physical Properties** | **Test Method** | **S1610** | **S1620** | **F1630** | **F1640** | **S1650** | **S1660** | **F1670** | **S1680** | **F1690** |
| Operating Temp – °C (max) | ASTM D1328 | 125 | 160 | 125 | 160 | 160 | 160 | 160 | 125 | 125 |
| Operating Temp – °C (min) | ASTM D1329 | -55 | -55 | -55 | -55 | -55 | -55 | -55 | -55 | -55 |
| Hardness – Shore A (±7) | ASTM D2240 | 65 | 65 | 75 | 70 | 65 | 60 | 65 | 70 | 70 |
| Compression Set – % (max) | ASTM D395 | 32 | 32 | 35 | 30 | 30 | 25 | 30 | 30 | 30 |
| Specific Gravity – SG (±0.25) | ASTM D792 | 3.5 | 2.0 | 3.8 | 2.0 | 1.9 | 2.0 | 2.0 | 1.9 | 2.0 |
| Tensile Strength – PSI (min) | ASTM D412 | 200 | 200 | 180 | 180 | 200 | 200 | 200 | 160 | 160 |
| Elongation – % (min/max) | ASTM D412 | 100/300 | 100/300 | 100/300 | 60/260 | 100/300 | 100/300 | 100/300 | 50/200 | 50/200 |
| Tear Strength – PPI (min) | ASTM D624 (DIE C) | 25 | 30 | 35 | 35 | 30 | 30 | 30 | 35 | 35 |
| **Electrical Properties and Stability** | **Test Method** | **S1610** | **S1620** | **F1630** | **F1640** | **S1650** | **S1660** | **F1670** | **S1680** | **F1690** |
| Volume Resistivity - Ω/cm (max) | MIL-DTL-83528 | 0.004 | 0.008 | 0.010 | 0.012 | 0.006 | 0.100 | 0.100 | 0.100 | 0.150 |
| Shielding Effectiveness – dB (min) @ 20 MHz –10GHz | MIL-DTL-83528 | 110 | 100 | 110 | 90 | 100 | 100 | 100 | 115 | 115 |
| During vibration – Ω/cm (max) | MIL-DTL-83528 | 0.006 | 0.012 | 0.015 | 0.015 | 0.009 | 0.100 | 0.150 | 0.200 | 0.200 |
| After vibration – Ω/cm (max) | MIL-DTL-83528 | 0.004 | 0.008 | 0.010 | 0.012 | 0.006 | 0.100 | 0.100 | 0.100 | 0.150 |
| After Heat Aging – Ω/cm (max) | MIL-DTL-83528 | 0.010 | 0.010 | 0.015 | 0.015 | 0.015 | 0.100 | 0.100 | 0.200 | 0.200 |
| After Break – Ω/cm (max) | MIL-DTL-83528 | 0.008 | 0.015 | 0.015 | 0.015 | 0.009 | 0.100 | 0.125 | 0.200 | 0.200 |
| After Exposure to EMP – Ω/cm (max) | MIL-DTL-83528 | 0.010 | 0.010 | 0.015 | 0.015 | 0.015 | 0.100 | 0.100 | 0.150 | 0.200 |
| Compression / Deflection – % (min) | MIL-DTL-83528 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 5.0 | 5.0 | 5.0 | 5.0 |

* Ag/Cu – Silver-plated Copper, Ag/Al – Silver-plated Aluminum, Ag/G – Silver-plated Glass, Ni/C – Nickel-coated Graphite, Ni/Al – Nickel-plated Aluminum

## Part Number Examples

| | | |
|---|---|---|
| WS-1802-03-S1620 | 10x20x.032 | Sheet Stock – Ag/Al Silicone |
| WS-1803-02-F1670 | 10x15x.062 | Sheet Stock – Ni/C Fluorosilicone |
| WS-1105-F1640 | .080 Dia. | Solid Round – Ag/Al Fluorosilicone |
| WS-1605-S1610 | .175x.156 | U-Channel – Ag/Cu Silicone |

## Sheet Stock

| Thickness | 10x10 (in) | 10x15 (in) | 10x20 (in) |
|---|---|---|---|
| 0.020 | WS-1801-01 | WS-1801-02 | WS-1801-03 |
| 0.032 | WS-1802-01 | WS-1802-02 | WS-1802-03 |
| 0.062 | WS-1803-01 | WS-1803-02 | WS-1803-03 |
| 0.093 | WS-1804-01 | WS-1804-02 | WS-1804-03 |
| 0.125 | WS-1805-01 | WS-1805-02 | WS-1805-03 |

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# Conductive Elastomer

## EMI Shielding Materials

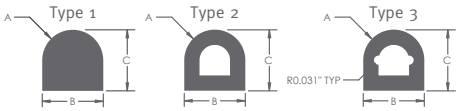
## Round

| Part | A | B | Groove W* | Groove H* |
|---|---|---|---|---|
| WS-1101 | .040 (1.02) | — | .050 (1.27) | .030 (0.76) |
| WS-1102 | .053 (1.35) | — | .062 (1.57) | .040 (1.02) |
| WS-1103 | .062 (1.57) | — | .070 (1.78) | .047 (1.19) |
| WS-1104 | .070 (1.78) | — | .083 (2.11) | .050 (1.27) |
| WS-1105 | .080 (2.03) | — | .090 (2.29) | .060 (1.52) |
| WS-1106 | .093 (2.36) | — | .103 (2.62) | .070 (1.78) |
| WS-1107 | .103 (2.62) | — | .118 (3.0) | .074 (1.88) |
| WS-1108 | .119 (3.02) | — | .130 (3.3) | .090 (2.29) |
| WS-1109 | .125 (3.18) | — | .139 (3.53) | .093 (2.36) |
| WS-1110 | .139 (3.53) | — | .157 (3.99) | .101 (2.56) |
| WS-1111 | .188 (4.78) | — | .210 (5.33) | .141 (3.58) |
| WS-1112 | .216 (5.49) | — | .241 (6.12) | .160 (4.06) |
| WS-1113 | .250 (6.35) | — | .275 (6.98) | .187 (4.75) |
| WS-1201 | .125 (3.18) | .045 (1.14) | .130 (3.3) | .088 (2.23) |
| WS-1202 | .156 (3.96) | .050 (1.27) | .160 (4.06) | .109 (2.76) |
| WS-1203 | .250 (6.35) | .125 (3.18) | .255 (5.71) | .150 (3.81) |
| WS-1204 | .312 (7.92) | .192 (4.88) | .317 (8.05) | .156 (3.96) |
| WS-1205 | .375 (9.53) | .250 (6.35) | .380 (9.65) | .177 (4.49) |
| WS-1206 | .125 (3.18) | .062 (1.57) | .130 (3.3) | .077 (1.95) |
| WS-1207 | .103 (2.62) | .040 (1.02) | .107 (2.72) | .073 (1.85) |
| WS-1208 | .177 (4.5) | .079 (2.01) | .182 (4.62) | .120 (3.05) |

* Recommended Grove Dimension

## Rectangle

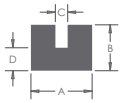
| Part | A | B |
|---|---|---|
| WS-1701 | 0.063 (1.6) | 0.042 (1.07) |
| WS-1702 | 0.095 (2.41) | 0.062 (1.57) |
| WS-1703 | 0.120 (3.05) | 0.075 (1.91) |
| WS-1704 | 0.125 (3.18) | 0.062 (1.57) |
| WS-1705 | 0.156 (3.96) | 0.062 (1.57) |
| WS-1706 | 0.250 (6.35) | 0.062 (1.57) |
| WS-1707 | 0.500 (12.7) | 0.075 (1.91) |
| WS-1708 | 0.500 (12.7) | 0.125 (3.18) |
| WS-1709 | 0.500 (12.7) | 0.188 (4.78) |
| WS-1710 | 0.750 (19.05) | 0.062 (1.57) |
| WS-1711 | 0.880 (22.35) | 0.062 (1.57) |
| WS-1712 | 1.000 (25.4) | 0.250 (6.35) |
| WS-1713 | 1.180 (29.97) | 0.062 (1.57) |




## D-Shape

| Part | A | B | C | Type | Groove W* | Groove H* |
|---|---|---|---|---|---|---|
| WS-1301 | .031 (0.78) | .062 (1.57) | .068 (1.73) | 1 | .065 (1.65) | .051 (1.29) |
| WS-1302 | .047 (1.19) | .094 (2.39) | .078 (1.98) | 1 | .097 (2.46) | .059 (1.5) |
| WS-1303 | .039 (0.99) | .078 (1.98) | .089 (2.26) | 1 | .080 (2.03) | .066 (1.67) |
| WS-1304 | .047 (1.19) | .094 (2.39) | .094 (2.39) | 1 | .097 (2.46) | .070 (1.78) |
| WS-1305 | .031 (0.78) | .062 (1.57) | .100 (2.54) | 1 | .065 (1.65) | .075 (1.9) |
| WS-1306 | .075 (1.91) | .150 (3.81) | .110 (2.79) | 1 | .155 (3.93) | .083 (2.1) |
| WS-1307 | .061 (1.55) | .122 (3.10) | .135 (3.43) | 1 | .125 (3.17) | .101 (2.56) |
| WS-1308 | .059 (1.49) | .118 (3.00) | .156 (3.96) | 1 | .120 (3.04) | .117 (2.97) |
| WS-1309 | .078 (1.98) | .156 (3.96) | .156 (3.96) | 1 | .160 (4.06) | .117 (2.97) |
| WS-1310 | .089 (2.26) | .178 (4.52) | .175 (4.45) | 1 | .181 (4.6) | .131 (3.32) |
| WS-1311 | .094 (2.39) | .188 (4.78) | .188 (4.78) | 1 | .193 (4.9) | .141 (3.58) |
| WS-1312 | .125 (3.18) | .250 (6.35) | .250 (6.35) | 1 | .255 (6.47) | .187 (4.75) |
| WS-1401 | .078 (1.98) | .156 (3.96) | .156 (3.96) | 2 | .160 (4.06) | .093 (2.36) |
| WS-1402 | .093 (2.36) | .187 (4.75) | .186 (4.72) | 2 | .193 (4.9) | .107 (2.71) |
| WS-1403 | .156 (3.96) | .312 (7.92) | .312 (7.92) | 2 | .320 (8.12) | .187 (4.75) |
| WS-1404 | .156 (3.96) | .312 (7.92) | .312 (7.92) | 3 | .320 (8.12) | .187 (4.75) |
| WS-1405 | .112 (2.84) | .312 (7.92) | .312 (7.92) | 2 | .320 (8.12) | .177 (4.49) |
| WS-1406 | .244 (6.20) | .487(12.37) | .324 (8.23) | 2 | .500 (12.7) | .250 (6.35) |
| WS-1407 | .125 (3.18) | .250 (6.35) | .250 (6.35) | 2 | .255 (6.47) | .150 (3.81) |

* Recommended Grove Dimension



## U Channel

| Part | A | B | C | D |
|---|---|---|---|---|
| WS-1601 | .100 (2.54) | .100 (2.54) | .034 (0.86) | .033 (0.84) |
| WS-1602 | .126 (3.2) | .110 (2.79) | .025 (0.64) | .050 (1.27) |
| WS-1603 | .126 (3.2) | .225 (5.72) | .020 (0.51) | .075 (1.91) |
| WS-1604 | .156 (3.96) | .156 (3.96) | .062 (1.57) | .047 (1.19) |
| WS-1605 | .175 (4.45) | .156 (3.96) | .047 (1.19) | .075 (1.91) |
| WS-1606 | .327 (8.31) | .235 (5.97) | .062 (1.57) | .115 (2.92) |

## Hollow P-Shape

| Part | A | B | C | D |
|---|---|---|---|---|
| WS-1501 | .200 (5.08) | .080 (2.03) | .650 (16.51) | .062 (1.57) |
| WS-1502 | .250 (6.35) | .125 (3.18) | .250 (6.35) | .062 (1.57) |
| WS-1503 | .250 (6.35) | .125 (3.18) | .375 (9.53) | .062 (1.57) |
| WS-1504 | .250 (6.35) | .150 (3.96) | .375 (9.53) | .062 (1.57) |
| WS-1505 | .312 (7.92) | .187 (4.75) | .563 (14.3) | .062 (1.57) |
| WS-1506 | .360 (9.14) | .255 (6.48) | .420 (10.67) | .070 (1.79) |
| WS-1507 | .200 (5.08) | .080 (2.03) | .275 (6.99) | .062 (1.57) |
| WS-1508 | .250 (6.35) | .125 (3.18) | .625 (15.88) | .062 (1.57) |



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