



# TEST REPORT

September 30, 2025

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### Glenair GS22759 Low Fluoride, Light-weight Qualification Test Report

| Revision | Description of Changes | Date    | Author |
|----------|------------------------|---------|--------|
| 1        | Initial Release        | 9/30/25 | JCR    |

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## 1.0 Scope

This report summarizes the test results of Glenair's GS22759-51 and GS22759-52 commercial equivalent wire to AS22759/51 and AS22759/52. All tests were performed according to AS22759 and QTP-1541.

## 2.0 Reference Documents

|                         |                                                                                                                                                                   |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AS22759 Revision E      | Wire, Electrical, Fluoropolymer-Insulated, Copper or Copper Alloy                                                                                                 |
| AS22759/51 Revision C   | Wire, Electrical, Fluoropolymer-Insulated, Crosslinked Modified ETFE, Low Fluoride, Lightweight, Silver-Coated High Strength Copper Alloy, 200 °C, 600 Volt, RoHS |
| AS22759/52 Revision C   | Wire, Electrical, Fluoropolymer-Insulated, Crosslinked Modified ETFE, Low Fluoride, Lightweight, Silver-Coated Copper, 200 °C, 600 Volt, RoHS                     |
| AS4373 Revision F       | Test Methods for Insulated Electric Wire                                                                                                                          |
| ASTM D3032 Revision 21A | Standard Test Methods for Hookup Wire Insulation                                                                                                                  |
| AS29606 Revision B      | General Specification for Wire, Electrical, Stranded, Uninsulated Copper, Copper Alloy, or Aluminum, or Thermocouple Extension                                    |
| AS5768 Revision C       | General Specification for Tool, Stripper, Electrical Insulation                                                                                                   |
| GS22759-51              | MIL-STAR, AS22759/51 Type Wire, Silver-Coated High Strength Copper Conductor, Crosslinked Modified ETFE Insulated, Low Fluoride, Light Weight, 600-Volt, 200°C    |
| GS22759-52              | MIL-STAR, AS22759/52 Type Wire, Silver-Coated Copper Conductor, Crosslinked Modified ETFE Insulated, Low Fluoride, Light Weight, 600-Volt, 200°C                  |



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## 3.0 Test Specimens

The part number and description of the wire tested are listed in Table I.

**Table I**

| Part Number     | Description                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GS22759-51-XX-9 | MIL-STAR, AS22759/51 XX AWG Wire, Silver-Coated High Strength Copper Conductor, Crosslinked Modified ETFE Insulated, Low Fluoride, Light Weight, 600-Volt, 200°C |
| GS22759-52-XX-9 | MIL-STAR, AS22759/52 XX AWG Wire, Silver-Coated Copper Conductor, Crosslinked Modified ETFE Insulated, Low Fluoride, Light Weight, 600-Volt, 200°C               |



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GS22759-51

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| REVISIONS |                                     |          |          |
|-----------|-------------------------------------|----------|----------|
| REV.      | DESCRIPTION                         | DATE     | APPROVED |
| 1         | PRELIMINARY                         | 10/02/23 | MBT      |
| 2         | PRELIMINARY: ADD NOTE 8.            | 08/09/24 | MBT      |
| 3         | PRELIMINARY: REVISE NOTES AND TITLE | 09/17/24 | MBT      |

| PART NUMBER     | WIRE SIZE | STRANDING<br>(NUMBER OF STRANDS X SIZE GAGE OF STRANDS) | DIAMETER OF STRANDED CONDUCTOR (INCHES) |       |                                                  |                   | FINISHED WIRE               |  |
|-----------------|-----------|---------------------------------------------------------|-----------------------------------------|-------|--------------------------------------------------|-------------------|-----------------------------|--|
|                 |           |                                                         |                                         |       | RESISTANCE AT 20°C (68°F) (OHMS/1000 FEET) (MAX) | DIAMETER (INCHES) | WEIGHT (LB/1000 FEET) (MAX) |  |
|                 |           |                                                         | (MIN)                                   | (MAX) |                                                  |                   |                             |  |
| GS22759-51-30-A | 30        | 7 X 38                                                  | .0105                                   | .0124 | 117.4                                            | .024 ± .002       | .66                         |  |
| GS22759-51-28-A | 28        | 7 X 36                                                  | .0135                                   | .0154 | 74.4                                             | .027 ± .002       | .91                         |  |
| GS22759-51-26-A | 26        | 19 X 38                                                 | .0175                                   | .0204 | 44.8                                             | .032 ± .002       | 1.4                         |  |
| GS22759-51-24-A | 24        | 19 X 36                                                 | .0225                                   | .0244 | 28.4                                             | .037 ± .002       | 2.0                         |  |
| GS22759-51-22-A | 22        | 19 X 34                                                 | .0285                                   | .0314 | 17.5                                             | .043 ± .002       | 2.9                         |  |
| GS22759-51-20-A | 20        | 19 X 32                                                 | .0365                                   | .0394 | 10.7                                             | .050 ± .002       | 4.4                         |  |

## PART NUMBER DEVELOPMENT:

EXAMPLE: GS22759-51 - 24 - 9 0 1 2

BASIC NO.

WIRE SIZE

JACKET COLOR CODE

FIRST STRIPE COLOR CODE  
(OMIT FOR NONE)

SECOND STRIPE COLOR CODE  
(OMIT FOR NONE)

THIRD STRIPE COLOR CODE  
(OMIT FOR NONE)

| COLOR CODE | COLOR  |
|------------|--------|
| 0          | BLACK  |
| 1          | BROWN  |
| 2          | RED    |
| 3          | ORANGE |
| 4          | YELLOW |
| 5          | GREEN  |
| 6          | BLUE   |
| 7          | VIOLET |
| 8          | GRAY   |
| 9          | WHITE  |

## NOTES: UNLESS OTHERWISE SPECIFIED

- WIRE IS MANUFACTURED TO MEET THE APPLICABLE REQUIREMENTS OF SAE-AS22759/51.
- MATERIALS:
  - CONDUCTOR: SILVER COATED HIGH STRENGTH COPPER ALLOY PER SAE-AS29606
  - INSULATION: CROSSLINKED MODIFIED ETFE (ETHYLENE-TETRAFLUOROETHYLENE), LOW FLUORIDE
- PERFORMANCE:
  - VOLTAGE RATING: 600 VRMS AT SEA LEVEL
  - TEMPERATURE RATING: 200°C (392°F) MAX CONTINUOUS
- COLOR CODE IN ACCORDANCE WITH MIL-STD-681.
- CONSULT FACTORY FOR CUSTOM STRIPE COLOR OPTIONS.
- CONSULT FACTORY FOR COMPLIANCE AND QUALIFICATION RESULTS.

|                                |            |                 |     |            |                               |                                                                                                                                                                |  |
|--------------------------------|------------|-----------------|-----|------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| UNLESS OTHERWISE SPECIFIED     |            | DRAWN           | MBT | 10/02/23   | <b>GLENAIR, INC.</b> CAD 1997 |                                                                                                                                                                |  |
| DIMENSIONS ARE IN INCHES       |            | CHECK           | MBT | 10/02/23   |                               |                                                                                                                                                                |  |
| TOLERANCES:                    |            | ENG'G           | MBT | 10/02/23   |                               |                                                                                                                                                                |  |
| FRACTIONS                      | ± 1/16     | <i>D. Brown</i> |     |            |                               | MIL-STAR, AS22759/51 TYPE WIRE, SILVER COATED HIGH STRENGTH COPPER CONDUCTOR, CROSSLINKED MODIFIED ETFE INSULATED, LOW FLUORIDE, LIGHT WEIGHT, 600-VOLT, 200°C |  |
| DECIMALS                       | .XX ± .030 |                 |     |            |                               |                                                                                                                                                                |  |
| ANGLES                         | ± 1°       |                 |     |            |                               |                                                                                                                                                                |  |
| DO NOT SCALE THIS DRAWING      |            | QUANTITY        |     | 06324      | SIZE                          | C                                                                                                                                                              |  |
| B/F                            |            | P/C             |     | GS22759-51 |                               | 3                                                                                                                                                              |  |
| NON REPAIRABLE COMMERCIAL ITEM |            | SCALE           |     | N/A        | WEIGHT                        | N/A                                                                                                                                                            |  |
|                                |            |                 |     | SHEET      |                               | 1 OF 1                                                                                                                                                         |  |

Figure 1 – Glenair AS22759/51 Wire Drawing GS22759-51



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GS22759-52

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|-----------|-------------------------------------|----------|----------|
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| 2         | PRELIMINARY: ADD NOTE 4.            | 08/09/24 | MMJ      |
| 3         | PRELIMINARY: REVISE NOTES AND TITLE | 09/17/24 | MMJ      |

| PART NUMBER     | WIRE SIZE | STRANDING<br>(NUMBER OF STRANDS X SIZE GAGE OF STRANDS) | DIAMETER OF STRANDED CONDUCTOR (INCHES) |       |                                                  |                   | FINISHED WIRE               |  |
|-----------------|-----------|---------------------------------------------------------|-----------------------------------------|-------|--------------------------------------------------|-------------------|-----------------------------|--|
|                 |           |                                                         |                                         |       | RESISTANCE AT 20°C (68°F) (OHMS/1000 FEET) (MAX) | DIAMETER (INCHES) | WEIGHT (LB/1000 FEET) (MAX) |  |
|                 |           |                                                         | (MIN)                                   | (MAX) |                                                  |                   |                             |  |
| GS22759-52-30-A | 30        | 7 X 38                                                  | .0105                                   | .0124 | 100.7                                            | .024 ± .002       | .66                         |  |
| GS22759-52-28-A | 28        | 7 X 36                                                  | .0135                                   | .0154 | 63.8                                             | .027 ± .002       | .91                         |  |
| GS22759-52-26-A | 26        | 19 X 38                                                 | .0175                                   | .0194 | 38.4                                             | .032 ± .002       | 1.4                         |  |
| GS22759-52-24-A | 24        | 19 X 36                                                 | .0225                                   | .0244 | 24.3                                             | .037 ± .002       | 2.0                         |  |
| GS22759-52-22-A | 22        | 19 X 34                                                 | .0285                                   | .0304 | 15.1                                             | .043 ± .002       | 2.8                         |  |
| GS22759-52-20-A | 20        | 19 X 32                                                 | .0365                                   | .0384 | 9.19                                             | .050 ± .002       | 4.3                         |  |
| GS22759-52-18-A | 18        | 19 X 30                                                 | .0455                                   | .0484 | 5.79                                             | .060 ± .002       | 6.5                         |  |
| GS22759-52-16-A | 16        | 19 X 29                                                 | .0515                                   | .0544 | 4.52                                             | .068 ± .002       | 8.3                         |  |
| GS22759-52-14-A | 14        | 19 X 27                                                 | .0645                                   | .0684 | 2.88                                             | .085 ± .003       | 13.0                        |  |
| GS22759-52-12-A | 12        | 37 X 28                                                 | .0835                                   | .0874 | 1.90                                             | .103 ± .003       | 19.7                        |  |

PART NUMBER DEVELOPMENT:

EXAMPLE: GS22759-52 - 24 - 9 0 1 2

BASIC NO.

WIRE SIZE

JACKET COLOR CODE

FIRST STRIPE COLOR CODE  
(OMIT FOR NONE)

SECOND STRIPE COLOR CODE  
(OMIT FOR NONE)

THIRD STRIPE COLOR CODE  
(OMIT FOR NONE)

| COLOR CODE | COLOR  |
|------------|--------|
| 0          | BLACK  |
| 1          | BROWN  |
| 2          | RED    |
| 3          | ORANGE |
| 4          | YELLOW |
| 5          | GREEN  |
| 6          | BLUE   |
| 7          | VIOLET |
| 8          | GRAY   |
| 9          | WHITE  |

NOTES: UNLESS OTHERWISE SPECIFIED

- WIRE IS MANUFACTURED TO MEET THE APPLICABLE REQUIREMENTS OF SAE-AS22759/52.
- MATERIALS:
  - CONDUCTOR: SILVER COATED ANNEALED COPPER PER SAE-AS29606
  - INSULATION: CROSSLINKED MODIFIED ETFE (ETHYLENE-TETRAFLUOROETHYLENE), LOW FLUORIDE
- PERFORMANCE:
  - VOLTAGE RATING: 600 VRMS AT SEA LEVEL
  - TEMPERATURE RATING: 200°C (392°F) MAX CONTINUOUS
- COLOR CODE IN ACCORDANCE WITH MIL-STD-681.
- CONSULT FACTORY FOR CUSTOM STRIPE COLOR OPTIONS.
- CONSULT FACTORY FOR COMPLIANCE AND QUALIFICATION RESULTS.

|                                |            |                 |     |                                                                                                                                                  |                                            |              |  |  |
|--------------------------------|------------|-----------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------|--|--|
| UNLESS OTHERWISE SPECIFIED     |            | DRAWN           | MMJ | 10/02/23                                                                                                                                         | <b>GLENAIR, INC.</b> CND 1999              |              |  |  |
| DIMENSIONS ARE IN INCHES       |            | CHECK           | MMJ | 10/02/23                                                                                                                                         |                                            |              |  |  |
| TOLERANCES:                    |            | ENGR            | MMJ | 10/02/23                                                                                                                                         | 1211 AIR WAY - GLENDALE - CALIFORNIA 91201 |              |  |  |
| FRACTIONS                      | ± 1/16     | <i>D. Brown</i> |     | MIL-STAR, AS22759/52 TYPE WIRE, SILVER COATED COPPER CONDUCTOR, CROSSLINKED MODIFIED ETFE INSULATED, LOW FLUORIDE, LIGHT WEIGHT, 600-VOLT, 200°C |                                            |              |  |  |
| DECIMALS                       | .XX ± .030 |                 |     |                                                                                                                                                  |                                            |              |  |  |
| ANGLES                         | ± 1°       |                 |     |                                                                                                                                                  |                                            |              |  |  |
| DO NOT SCALE THIS DRAWING      |            | QUANTITY        |     | ORDER QTY. NO.                                                                                                                                   | QTY                                        | REV.         |  |  |
| B/F                            |            | P/C             |     | 06324                                                                                                                                            | C                                          | 3            |  |  |
| NEW REPAIRABLE COMMERCIAL ITEM |            | SCALE           |     | N/A                                                                                                                                              | WEIGHT                                     | W/A          |  |  |
|                                |            |                 |     |                                                                                                                                                  |                                            | SHEET 1 OF 1 |  |  |

Figure 2 - Glenair AS22759/52 Wire Drawing GS22759-52



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## 4.0 Summary of Results

The test results are summarized in Table II.

**Table II – Test List**

| Test                                                            | Specification            | Test Requirement                                                                                   | Pass | Results                                 |
|-----------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------|------|-----------------------------------------|
| Materials                                                       | Section 5.1              | Cross-linked<br>Modified ETFE                                                                      | X    | Cross-linked Modified ETFE              |
| Conductor Strand<br>Material Silver Coating<br>Thickness        | AS29606<br>Section 3.3.2 | 40 $\mu$ m minimum                                                                                 | X    | 80 $\mu$ m                              |
| Conductor Construction<br>Prior to Insulation                   | Section 5.2.1            | 19 strands                                                                                         | X    | 19 strands                              |
| Insulated Conductor<br>Geometric<br>Characteristics             | AS4373<br>Method 401     | 20 AWG: 0.0365-<br>0.0394"<br>16 AWG: 0.0515-<br>0.0544"                                           | X    | 20 AWG: 0.0372"<br>16 AWG: 0.0521"      |
| Insulated Conductor<br>Elongation and Tensile<br>Break Strength | AS4373<br>Method 402     | Elongation 6%,<br>min.<br>Break strength:<br>20 AWG 58.1 lbs                                       | X    | 20 AWG: 9.1%, 66.8 lbs<br>16 AWG: 16.4% |
| Insulation Construction<br>and Mechanical<br>Properties         | AS22759<br>5.3.1.1       | No cracks, splits,<br>irregularities, or<br>embedded<br>foreign material<br>at 2X<br>magnification | X    | Pass                                    |

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| <b>Insulation Tensile and Elongation</b>                         | AS4373<br>Method 705 | Tensile strength:<br>5,000 lb/in <sup>2</sup><br>Elongation: 75%     | <b>X</b> | 20 AWG: 7382 psi / 200%<br>16 AWG: 7538 psi / 205%   |
| <b>Fluoride Off-gassing</b>                                      | AS4373<br>Method 608 | Maximum 20<br>PPM                                                    | <b>X</b> | 20 AWG: 17.81 ppm, max<br>16 AWG: 19.08 ppm, max     |
| <b>Insulation Proof Test</b>                                     | AS4373<br>Method 811 | 7 hours at 300°C<br>± 3°C<br>DWV 2500 VDC,<br>60 seconds             | <b>X</b> | Pass                                                 |
| <b>Insulation Blocking</b>                                       | AS4373<br>Method 808 | 24 hours at 200°C<br>± 3°C                                           | <b>X</b> | Pass                                                 |
| <b>Insulation Shrinkage</b>                                      | AS4373<br>Method 104 | 6 hours at 230°C<br>± 3°C<br>0.125" max.<br>shrinkage                | <b>X</b> | 20 AWG: -0.0015"<br>16 AWG: 0.0075"                  |
| <b>Wire Conductor Electrical Resistance</b>                      | AS4373<br>Method 403 | 20 AWG: 10.7<br>Ω/1000 ft., max.<br>16 AWG: 4.52<br>Ω/1000 ft., max. | <b>X</b> | 20 AWG: 9.9 Ω/1000 ft<br>16 AWG: 4.3 Ω/1000 ft       |
| <b>Wire Electrical Insulation Resistance</b>                     | AS4373<br>Method 504 | 5000 MΩ-1000<br>ft., min.                                            | <b>X</b> | 20 AWG: 42000 MΩ-1000 ft<br>16 AWG: 35000 MΩ-1000 ft |
| <b>Wire Electrical Surface Resistance</b>                        | AS4373<br>Method 506 | 500 MΩ-inches,<br>min. at<br>500 VDC                                 | <b>X</b> | 20 AWG: 2470 MΩ, min<br>16 AWG: 3340 MΩ, min         |
| <b>Electrical Dielectric Resistance - Wet Dielectric Voltage</b> | AS4373<br>Method 510 | 2500 V (rms) at<br>60Hz, min.                                        | <b>X</b> | Pass                                                 |



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|-----------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------|----------|------------------------------------------------------|
| <b>Wire Diameter</b>                                            | AS4373<br>Method 901                                | 20 AWG:<br>0.050±0.002"<br>16 AWG:<br>0.068±0.002"                       | <b>X</b> | 20 AWG: 0.0493"<br>16 AWG: 0.0663"                   |
| <b>Wire Weight</b>                                              | AS4373<br>Method 902                                | 20 AWG: 4.4<br>lbs./1000 ft, Max<br>16 AWG: 8.3<br>lbs./1000 ft, Max     | <b>X</b> | 20 AWG: 4.30 lbs/1000 ft<br>16 AWG: 4.80 lbs/1000 ft |
| <b>Wire Insulation Stripping</b>                                | AS5768/1 or<br>AS5768/2,<br>Examined per<br>AS5768  | Insulation readily<br>removable<br>without damage<br>to the conductor    | <b>X</b> | Pass                                                 |
| <b>Workmanship</b>                                              | AS22759<br>5.5.6                                    | No cracks, splits,<br>irregularities, or<br>embedded<br>foreign material | <b>X</b> | Pass                                                 |
| <b>Wire Identification<br/>Printed Marking and<br/>Location</b> | AS22759<br>5.6.1                                    | Marking intervals<br>of 6 to 60 inches                                   | <b>X</b> | 6.000"<br>Pass                                       |
| <b>Wire Color Designators<br/>and Munsell Limits</b>            | UV Munsell<br>Color Limit<br>Cards, MIL-<br>STD-104 | Visual inspection<br>against Munsell<br>color chart                      | <b>X</b> | Pass                                                 |
| <b>UV Laser Marking</b>                                         | AS4373<br>Method 1001                               | 70% minimum<br>average                                                   | <b>X</b> | 20 AWG: 70%<br>16 AWG: 75%                           |



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| <b>Wrap Back Bend<br/>Mechanical Resistance<br/>for Extruded Insulation</b> | AS4373<br>Method 708 | 2 hours at 313°C ± 3°C<br>No cracking or splitting     | <b>X</b> | Pass                                                         |
| <b>Insulation Low<br/>Temperature Mechanical<br/>Resistance/ Cold Bend</b>  | AS4373<br>Method 702 | 4 hours at -65°C ± 3°C<br>DWV 2500 V (rms) at 60 Hz    | <b>X</b> | Pass                                                         |
| <b>Insulation Thermal Shock<br/>Mechanical Resistance</b>                   | AS4373<br>Method 805 | -55°C ± 3°C to 200°C ± 3°C<br>0.060" max. shrinkage    | <b>X</b> | 20 AWG: 0.0070"<br>16 AWG: 0.0110"                           |
| <b>Thermal Mechanical<br/>Resistance - Life Cycle</b>                       | AS4373<br>Method 807 | 500 hours at 230°C ± 3°C<br>DWV 2500 V (rms) at 60 Hz  | <b>X</b> | Pass                                                         |
| <b>Ambient Mechanical<br/>Resistance – Mandrel<br/>Bend Test</b>            | AS4373<br>Method 712 | No observed cracks and no wet dielectric breakdown     | <b>X</b> | Pass                                                         |
| <b>Fluid Resistance -<br/>Immersion</b>                                     | AS4373<br>Method 601 | Diameter increase 5% max.<br>DWV 2500 V (rms) at 60 Hz | <b>X</b> | Pass                                                         |
| <b>Humidity Resistance</b>                                                  | AS4373<br>Method 603 | 5000 MΩ-1000 ft., min.                                 | <b>X</b> | 20 AWG: 56668 MΩ-1000 ft<br>16 AWG: 52360 MΩ-1000 ft<br>Pass |
| <b>Smoke Resistance</b>                                                     | AS4373<br>Method 513 | 250°C ± 2°C<br>No visible smoke                        | <b>X</b> | No smoke                                                     |

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|---------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------|----------|----------------------------------------------------------------|
| <b>Flammability</b>                                                       | AS4373<br>Method 801 | Self-extinguishing<br>flame within 3<br>seconds max.<br>Flame travel 3"<br>max. | <b>X</b> | 20 AWG: <1 second, 1.805" max<br>16 AWG: <1 second, 1.823" max |
| <b>UV Laser Contrast<br/>Marking Resistance after<br/>Thermal Imaging</b> | AS4373<br>Method 815 | 168 hours at<br>230°C ± 3°C<br>55% minimum<br>average                           | <b>X</b> | 20 AWG: 55%<br>16 AWG: 57%                                     |

## 5.0 Conclusion

Glenair's GS22759-52-16 wire meets all performance requirements of AS22759/52 in 14-18 AWG range. Glenair's GS22759-52-20 wire meet all performance requirements of AS22759/51 and 52 in 20-26 AWG range. In some instances, the oven calibration was performed in accordance with ISO instead of ASTM Type II.