



TEST REPORT

10/14/2022

GT-22-163

Revision 1

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Glenair GS22759-18 Commercial Equivalent Wire
Test Report to AS22759/18 and AS22759/19
(Ref. QTP-1147)

| Revision | Description of Changes | Date | Author |
|----------|------------------------|------------|--------|
| 1 | Initial Release | 10/14/2022 | MLS |



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1.0 Scope

This report summarizes the test results of Glenair's GS22759-18 commercial equivalent wire to AS22759/18. All tests were performed according to AS22759 and QTP-1147 except the ovens were not calibrated per ASTM Type II oven requirements, where applicable.

2.0 Reference Documents

| | |
|-------------------------|--|
| AS22759 Revision D | Wire, Electrical, Fluoropolymer-Insulated, Copper or Copper Alloy |
| 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 |
| GS22759-18 Revision 3 | Glenair AS22759/18 Wire, Tin-Coated Copper Conductor, ETFE Insulated, 600-Volt, 150°C |
| GS22759-19 Revision 3 | Glenair AS22759/19 Wire, Silver-Coated High Strength Copper Conductor, ETFE Insulated, 600-Volt, 150°C |

3.0 Test Specimens

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

Table I

| Part Number | Description |
|-----------------|---|
| GS22759-18-20-9 | Glenair AS22759/18 20 AWG Wire Tin-Coated Copper Conductor ETFE-insulated |
| GS22759-18-16-9 | Glenair AS22759/18 16 AWG Wire Tin-Coated Copper Conductor ETFE-insulated |
| GS22759-18-10-9 | Glenair AS22759/18 10 AWG Wire Tin-Coated Copper Conductor ETFE-insulated |



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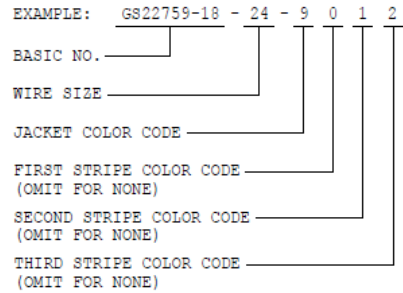
GS22759-18

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| REVISIONS | | | |
|-----------|---|----------|----------|
| REV. | DESCRIPTION | DATE | APPROVED |
| 1 | PRELIMINARY | 02/01/22 | LKJ |
| 2 | PRELIMINARY: ADDED STRIPES TO PART NUMBER. | 09/12/22 | MMJ |
| 3 | PRELIMINARY: TEMP RATING, FROM COND. TO WIRE. | 09/26/22 | MMJ |

| PART NUMBER | WIRE SIZE | STRANDING (NUMBER OF STRANDS X SIZE GAGE OF STRANDS) | DIAMETER OF STRANDED CONDUCTOR (INCHES) | | RESISTANCE AT 20°C (68°F) (OHMS/1000 FEET) (MAX) | FINISHED WIRE | |
|-----------------|-----------|---|---|-------|--|-------------------|-----------------------------|
| | | | (MIN) | (MAX) | | DIAMETER (INCHES) | WEIGHT (LB/1000 FEET) (MAX) |
| GS22759-18-26-* | 26 | 19 X 38 | .0175 | .0204 | 41.3 | .032 ± .002 | 1.52 |
| GS22759-18-24-* | 24 | 19 X 36 | .0225 | .0244 | 26.2 | .036 ± .002 | 2.12 |
| GS22759-18-22-* | 22 | 19 X 34 | .0285 | .0314 | 16.2 | .043 ± .002 | 3.16 |
| GS22759-18-20-* | 20 | 19 X 32 | .0365 | .0394 | 9.88 | .051 ± .002 | 4.76 |
| GS22759-18-18-* | 18 | 19 X 30 | .0455 | .0494 | 6.23 | .061 ± .002 | 7.10 |
| GS22759-18-16-* | 16 | 19 X 29 | .0515 | .0554 | 4.81 | .070 ± .002 | 9.14 |
| GS22759-18-14-* | 14 | 19 X 27 | .0645 | .0694 | 3.06 | .085 ± .002 | 14.1 |
| GS22759-18-12-* | 12 | 37 X 28 | .0835 | .0894 | 2.02 | .107 ± .003 | 21.6 |
| GS22759-18-10-* | 10 | 37 X 26 | .106 | .112 | 1.26 | .134 ± .003 | 34.1 |

PART NUMBER DEVELOPMENT:



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

NOTES:

1. WIRE IS MADE IN ACCORDANCE WITH AS22759/18.
2. CONDUCTOR IS TIN COATED COPPER PER AS29606.
3. INSULATION IS ETFE (ETHYLENE-TETRAFLUOROETHYLENE).
4. WIRE MAXIMUM CONTINUOUS TEMPERATURE RATING IS 150°C (302°F).
5. VOLTAGE RATING IS 600 VOLTS (RMS) AT SEA LEVEL.
6. COLOR CODE PER MIL-STD-681. SEE MIL-STD-681 FOR ADDITIONAL WIRE COLOR CODES.
7. CONSULT FACTORY FOR CUSTOM STRIPE COLOR ORDER.

| | | | | | |
|----------------------------|--|-------------------------------|-----|--------------|--|
| UNLESS OTHERWISE SPECIFIED | | DRAWN | LKJ | 02/01/22 | GLENAIR, INC. CAD 1990 1211 AIR WAY - GLENDALE - CALIFORNIA 91201 |
| DIMENSIONS ARE IN INCHES | | CHECK | SP | 02/01/22 | |
| TOLERANCES: | | ENGR | LKJ | 02/01/22 | |
| FRACTIONS ± 1/16 | | | | APPROVED | AS22759/18 WIRE, TIN COATED COPPER CONDUCTOR ETFE INSULATED, 600-VOLT, 150°C |
| DECIMALS .XXX ±.030 | | | | APPROVED | CODE IDENT. NO. 06324 |
| ANGLES ± 1° | | | | APPROVED | SIZE C |
| DO NOT SCALE THIS DRAWING | | RELEASE DATE | | | GS22759-18 |
| B/F 21A5343 | | P/C | | | REV. 3 |
| | | NON REPARABLE COMMERCIAL ITEM | | SCALE N/A | WEIGHT N/A |
| | | | | SHEET 1 OF 1 | |

Figure 1 – Glenair AS22759/18 Wire Drawing GS22759-18



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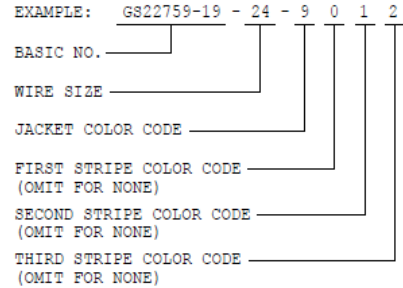
GS22759-19

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| REVISIONS | | | |
|-----------|---|----------|----------|
| REV. | DESCRIPTION | DATE | APPROVED |
| 1 | PRELIMINARY | 02/01/22 | LKJ |
| 2 | PRELIMINARY: ADDED STRIPES TO PART NUMBER. | 09/12/22 | MMJ |
| 3 | PRELIMINARY: TEMP RATING, FROM COND. TO WIRE. | 09/26/22 | MMJ |

| PART NUMBER | WIRE SIZE | STRANDING (NUMBER OF STRANDS X SIZE GAGE OF STRANDS) | DIAMETER OF STRANDED CONDUCTOR (INCHES) | | FINISHED WIRE | | |
|-----------------|-----------|---|---|-------|--|-------------------|-----------------------------|
| | | | (MIN) | (MAX) | RESISTANCE AT 20°C (68°F) (OHMS/1000 FEET) (MAX) | DIAMETER (INCHES) | WEIGHT (LB/1000 FEET) (MAX) |
| GS22759-19-26-* | 26 | 19 X 38 | .0175 | .0204 | 44.8 | .032 ± .002 | 1.41 |
| GS22759-19-24-* | 24 | 19 X 36 | .0225 | .0244 | 28.4 | .036 ± .002 | 1.99 |
| GS22759-19-22-* | 22 | 19 X 34 | .0285 | .0314 | 17.5 | .043 ± .002 | 2.98 |
| GS22759-19-20-* | 20 | 19 X 32 | .0365 | .0395 | 10.7 | .051 ± .002 | 4.59 |

PART NUMBER DEVELOPMENT:



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

NOTES:

1. WIRE IS MADE IN ACCORDANCE WITH AS22759/19.
2. CONDUCTOR IS SILVER COATED HIGH STRENGTH COPPER PER AS29606.
3. INSULATION IS ETFE (ETHYLENE-TETRAFLUOROETHYLENE).
4. WIRE MAXIMUM CONTINUOUS TEMPERATURE RATING IS 150°C (302°F).
5. VOLTAGE RATING IS 600 VOLTS (RMS) AT SEA LEVEL.
6. COLOR CODE PER MIL-STD-681. SEE MIL-STD-681 FOR ADDITIONAL WIRE COLOR CODES.
7. CONSULT FACTORY FOR CUSTOM STRIPE COLOR ORDER.

| | | | | |
|--|--------------------------------|-----------|--|---|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS ± 1/16 DECIMALS .XX ± .030 .XXX ± .015 ANGLES ± 1° | DRAWN | LKJ | 02/01/22 | GLENAIR, INC. CAD 1997® 1211 AIR WAY - GLENDALE - CALIFORNIA 91201 AS22759/19 WIRE, SILVER COATED HIGH STRENGTH COPPER CONDUCTOR ETFE INSULATED, 600-VOLT, 150°C |
| | CHECK | SF | 02/01/22 | |
| | ENGR | LKJ | 02/01/22 | |
| DO NOT SCALE THIS DRAWING | APPROVED <i>L. Brown</i> | | CODE IDENT. NO. 06324 SIZE C PART NO. GS22759-19 REV. 3 | |
| B/F 21A5343 P/C | NON REPAIRABLE COMMERCIAL ITEM | SCALE N/A | WEIGHT N/A | SHEET 1 OF 1 |

Figure 2 – Glenair AS22759/19 Wire Drawing GS22759-19



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4.0 Summary of Results

The test results are summarized in Table II.

Table II

| Test | Specification | Test Requirements | Results |
|--|------------------------------|---|---------|
| Insulated Conductor Tin Solderability | AS4373 Method 105 | 95%, min. | Pass |
| Insulated Conductor Geometric Characteristics (Diameter) | AS29606 AS22759/16 | 20 AWG: $0.051 \pm 0.002''$ 16 AWG: $0.070 \pm 0.002''$ 10 AWG: $0.134 \pm 0.003''$ | Pass |
| Insulated Conductor Elongation | AS29606 AS4373 Method 402 | 20 AWG: 10%, min. 16 AWG: 10%, min. 10 AWG: 10%, min. | Pass |
| Insulation Construction (Material Type) | AS22759/16 | ETFE | Pass |
| Insulation Tensile Strength and Elongation | AS4373 Method 705 | 5000 psi tensile strength, min. 150% elongation, min. | Pass |
| Short-Term Thermal Stability | AS4373 Method 811 | 7 hours at $230^{\circ}\text{C} \pm 2^{\circ}\text{C}$ DWV 2000 VDC, 60 seconds | Pass |
| Insulation Blocking | AS4373 Method 808 | 24 hours at $200^{\circ}\text{C} \pm 2^{\circ}\text{C}$ | Pass |
| Insulation Shrinkage | AS4373 Method 104 | 6 hours at $200^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 0.125" max. shrinkage | Pass |



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| Test | Specification | Test Requirements | Results |
|---|----------------------|---|---------|
| Wire Conductor Electrical Resistance | AS4373 Method 403 | 20 AWG: 9.88 Ω /1000 ft., max. 16 AWG: 4.81 Ω /1000 ft., max. 10 AWG: 1.26 Ω /1000 ft., max. | Pass |
| Wire Electrical Insulation Resistance | AS4373 Method 504 | 20 AWG: 5000 M Ω -1000 ft., min. 16 AWG: 3000 M Ω -1000 ft., min. 10 AWG: 2000 M Ω -1000 ft., min. | Pass |
| Wire Electrical Surface Resistance | AS4373 Method 506 | 20 AWG: 500 M Ω -inches, min. at 500 VDC 16 AWG: 500 M Ω -inches, min. at 500 VDC 10 AWG: N/A | Pass |
| Electrical Dielectric Resistance – Wet Dielectric Voltage | AS4373 Method 510 | 2000 V (rms) at 60Hz, min. | Pass |
| Wire Diameter | AS4373 Method 901 | 20 AWG: 0.051 \pm 0.002" 16 AWG: 0.070 \pm 0.002" 10 AWG: 0.134 \pm 0.003" | Pass |
| Wire Weight | AS4373 Method 902 | 20 AWG: 3.68 lbs./1000 ft., max. 16 AWG: 9.95 lbs./1000 ft., max. 10 AWG: 35.1 lbs./1000 ft., max. | Pass |
| Wire Insulation Stripping | AS5768/1 AS5768/2 | Insulation readily removable without damage to conductor | Pass |
| Wire Insulation Concentricity and Wall Thickness | AS4373 Method 101 | 70 %, min. | Pass |
| Wire Identification Printed Marking and Location | AS22759 | Marking intervals of 6 to 60 inches | Pass |



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| Test | Specification | Test Requirements | Results |
|--|-------------------|--|---------|
| Workmanship | AS22759 | No cracks, splits, irregularities, or embedded foreign material | Pass |
| Wire Color Designators and Munsell Limits | EIA-359-A | Visual inspection against Munsell color chart | Pass |
| Wire Identification Mark, Stripe, and Band Durability | AS4373 Method 710 | 125 cycles (250 strokes) with 500 gram weight | Pass |
| Wrap Back Bend Mechanical Resistance for Extruded Insulation | AS4373 Method 708 | 2 hours at 200°C ± 2°C No cracking or splitting | Pass |
| Insulation Low Temperature Mechanical Resistance/Cold Bend | AS4373 Method 702 | 4 hours at -65°C ± 2°C DWV 2000 V (rms) at 60 Hz | Pass |
| Insulation Thermal Shock Mechanical Resistance | AS4373 Method 805 | -55°C ± 3°C to 150°C ± 2°C 0.060" max. shrinkage | Pass |
| Thermal Mechanical Resistance – Life Cycle | AS4373 Method 807 | 500 hours at 200°C ± 2°C DWV 2000 V (rms) at 60 Hz | Pass |
| Fluid Resistance – Immersion | AS4373 Method 601 | Diameter increase 5% max. DWV 2000 V (rms) at 60 Hz | Pass |
| Humidity Resistance | AS4373 Method 603 | 20 AWG: 5000 MΩ-1000 ft., min. 16 AWG: 3000 MΩ-1000 ft., min. 10 AWG: 2000 MΩ-1000 ft., min. | Pass |

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| Test | Specification | Test Requirements | Results |
|------------------|-------------------|--|---------|
| Smoke Resistance | AS4373 Method 513 | 200°C ± 2°C No visible smoke | Pass |
| Flammability | AS4373 Method 801 | Self-extinguishing flame within 3 seconds max. Flame travel 3" min. | Pass |

5.0 Conclusion

Glenair's GS22759-18 wire meets all performance requirements of AS22759 except that the ovens were not calibrated per ASTM Type II oven requirements, where applicable. GS22759-19 wire meets AS22759/19 requirements by similarity.