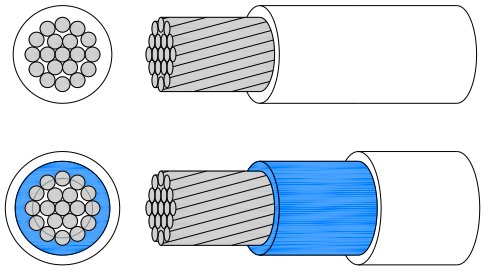
MARMON AEROSPACE & DEFENSE
680 HAYWARD STREET, MANCHESTER NH 03103
WWW.MARMON-AD.COM / 866.303.9473
A MARMON WIRE & CABLE / BERKSHIRE HATHAWAY COMPANY

Mission Critical Connectivity Systems

**Drawing Number**
**AD50**

**Product Type**
**Space Grade**
**Electrical Wire**



**Conductor:**
Coated Copper

**Insulation:**
Radiation Cross-linked
Modified ETFE

## APPLICATIONS

Marmon's AD50 is a Space-Grade wire with excellent properties across the board. The AD50 wire uses a proprietary blend of irradiation cross-linked Ethylene-Tetrafluoroethylene Copolymer (XL-ETFE) along with advanced material processing to create a low off-gassing (also called Fluoride Evolution) wire. AD50 wire is manufactured to meet the requirements of AS22759/32-46 as well as the extra requirements herein.

## ELECTRICALS

| Test | Test Method | Requirement* |
|---|---|---|
| Conductor Resistance (DCR) | AS4373 Method 403 | AS29606 |
| Insulation Electrical Resistance (IR) | AS4373 Method 504 | 3000/5000 MΩ-kft. Min. |
| High Frequency Spark Test | AS4373 Method 505 | 5700 VRMS |
| Electrical Surface Resistance | AS4373 Method 506 | 500 MΩ-inch Min. |
| Wet Dielectric Voltage | AS4373 Method 510 | 2500 VRMS at 60 Hz |
| Humidity Resistance | AS4373 Method 603 | 3000/5000 MΩ-kft. Min. |

## PHYSICALS

| Test | Test Method | Requirement* |
|---|---|---|
| Total Mass Loss (TML) | ASTM E595 | <1.0% |
| Collected Volatile Condensable Materials (CVCM) | ASTM E595 | <0.1% |
| Insulation Concentricity | AS4373 Method 101 | 70% Min. |
| Shrinkage | AS4373 Method 104 | 6 hours at 200/230°C |
| Conductor Tensile Break Strength | AS4373 Method 402 | AS29606 |
| Smoke Resistance | AS4373 Method 513 | 200/250°C |
| Fluid Resistance | AS4373 Method 601 | 5% Max. Increase |
| Wicking | AS4373 Method 607 | 24 hours, 2.25" Max. |
| Fluoride Off-Gassing | AS4373 Method 608 | 35 PPM Max. |
| Cold Bend | AS4373 Method 702 | 4 hours at -65°C |
| Insulation Tensile Strength | AS4373 Method 705 | 5000 PSI Min. |
| Insulation Elongation | AS4373 Method 705 | 75/125% Min. |
| Wrap Back Bend Resistance | AS4373 Method 708 | 2 hours at 200/313°C |
| Identification Durability | AS4373 Method 710 | 125 Cycles at 500 grams |
| Flame Resistance | AS4373 Method 801 | 3" Max. |
| Thermal Shock Mechanical Resistance | AS4373 Method 805 | -55°C to 150/200°C |
| Thermal Mechanical Resistance (Life Cycle) | AS4373 Method 807 | 500 hours at 200/230°C |
| Insulation Blocking | AS4373 Method 808 | 24 hours at 200/230°C |
| Crosslink Proof | AS4373 Method 811 | 7 hours at 300°C |
| Laser Markability | AS4373 Method 1001 | 55% Min. Average |

**Requirements vary by AWG size and temperature rating of the slash sheet.*

## PART NUMBERING SYSTEM

| Specification | - | Type | - | Conductor AWG Size | Conductor Plating Type | - | Conductor Plating Thickness | - | Insulation Color | Stripe Color |
|---|---|---|---|---|---|---|---|---|---|---|
| AD50 | / | LW | - | 30 | SC | - | 40 | - | 9 | |

## Types

| Type | Designation | Insulation Layers |
|---|---|---|
| Light Weight | LW | 1 |
| Normal Weight | NW | 2 |

## CONDUCTOR PLATINGS

| Letter Designation | Material & Coating Type | Specification | Temperature Rating | Plating Thicknesses |
|---|---|---|---|---|
| TC | Tin-Coated Copper | ASTM B33 & AS29606 | -100°C to +150°C | 20 or 30 µ-inches |
| SC | Silver-Coated Copper | ASTM B298 & AS29606 | -100°C to +200°C | 40 or 80 µ-inches |
| NC | Nickel-Coated Copper | ASTM B355 & AS29606 | -100°C to +200°C | 50 or 80 µ-inches |
| SA | Silver-Coated Copper-Alloy | ASTM B624 & AS29606 | -100°C to +200°C | 40 or 80 µ-inches |
| NA | Nickel-Coated Copper-Alloy | ASTM B624 & AS29606 | -100°C to +200°C | 50 or 80 µ-inches |

## INSULATION AND STRIPE COLOR CODE

| Color | Number Designation | Color | Number Designation |
|---|---|---|---|
| Black | 0 | Green | 5 |
| Brown | 1 | Blue | 6 |
| Red | 2 | Violet (Purple) | 7 |
| Orange | 3 | Gray (Slate) | 8 |
| Yellow | 4 | White | 9 |

## M27759 MILSPEC CROSS-REFERENCE

| Conductor | Light Weight | Normal Weight |
|---|---|---|
| Tin Copper | B – /32 | D – /34 |
| Silver Copper | R – /44 | P – /43 |
| Silver Alloy | C – /33 | E – /35 |

| Conductor | Light Weight | Normal Weight |
|---|---|---|
| Nickel Copper | S – /45 | M – /41 |
| Nickel Alloy | T – /46 | N – /42 |

**M22759 Equivalents for reference only.*

## LIGHT WEIGHT PART NUMBERS

| Part Number | AWG | Stranding | Conductor Diameter | Insulation Diameter | Weight (Lbs/kft) |
|---|---|---|---|---|---|
| AD50/LW-30XX-##-* | 30 | 7 X 38 | .0120” | .0240 ± .0020” | .59 |
| AD50/LW-28XX-##-* | 28 | 7 X 36 | .0145” | .0270 ± .0020” | .85 |
| AD50/LW-26XX-##-* | 26 | 19 X 38 | .0185” | .0320 ± .0020” | 1.3 |
| AD50/LW-24XX-##-* | 24 | 19 X 36 | .0235” | .0370 ± .0020” | 1.8 |
| AD50/LW-22XX-##-* | 22 | 19 X 34 | .0295” | .0430 ± .0020” | 2.8 |
| AD50/LW-20XX-##-* | 20 | 19 X 32 | .0375” | .0500 ± .0020” | 4.2 |
| AD50/LW-18XX-##-* | 18 | 19 X 30 | .0470” | .0600 ± .0020” | 6.3 |
| AD50/LW-16XX-##-* | 16 | 19 X 29 | .0530” | .0680 ± .0020” | 8.1 |
| AD50/LW-14XX-##-* | 14 | 19 X 27 | .0665” | .0850 ± .0030” | 12.7 |
| AD50/LW-12XX-##-* | 12 | 37 X 28 | .0855” | .1030 ± .0030” | 19.2 |

*NOTE *: To be replaced by desired Conductor Plating Letter Designation*
*NOTE XX: To be replaced by desired Insulation and Stripe Color Code*
*All values are nominal unless otherwise stated*

## NORMAL WEIGHT PART NUMBERS

| Part Number | AWG | Stranding | Conductor Diameter | Insulation Diameter | Weight (Lbs/kft) |
|---|---|---|---|---|---|
| AD50/NW-26XX-##-* | 26 | 19 X 38 | .0185” | .040 ± .002” | 1.7 |
| AD50/NW-24XX-##-* | 24 | 19 X 36 | .0235” | .045 ± .002” | 2.3 |
| AD50/NW-22XX-##-* | 22 | 19 X 34 | .0295” | .050 ± .002” | 3.1 |
| AD50/NW-20XX-##-* | 20 | 19 X 32 | .0375” | .058 ± .002” | 4.7 |
| AD50/NW-18XX-##-* | 18 | 19 X 30 | .0470” | .070 ± .003” | 7.0 |
| AD50/NW-16XX-##-* | 16 | 19 X 29 | .0530” | .077 ± .003” | 8.9 |
| AD50/NW-14XX-##-* | 14 | 19 X 27 | .0665” | .094 ± .003” | 14 |
| AD50/NW-12XX-##-* | 12 | 37 X 28 | .0855” | .111 ± .003” | 20 |
| AD50/NW-10XX-##-* | 10 | 37 X 26 | .108” | .134 ± .004” | 32 |
| AD50/NW-8XX-##-* | 8 | 133 X 29 | .162” | .195 ± .008” | 58 |
| AD50/NW-6XX-##-* | 6 | 133 X 27 | .203” | .241 ± .010” | 91 |
| AD50/NW-4XX-##-* | 4 | 133 X 25 | .255” | .310 ± .010” | 150 |

*NOTE *: To be replaced by desired Conductor Plating Letter Designation*
*NOTE XX: To be replaced by desired Insulation and Stripe Color Code*
*All values are nominal unless otherwise stated*

RoHS & Reach Compliant
ISO9001 & AS9100C Certified