

PRODUCT DATA SHEET

NEMA MW 35-C or MW 73-C

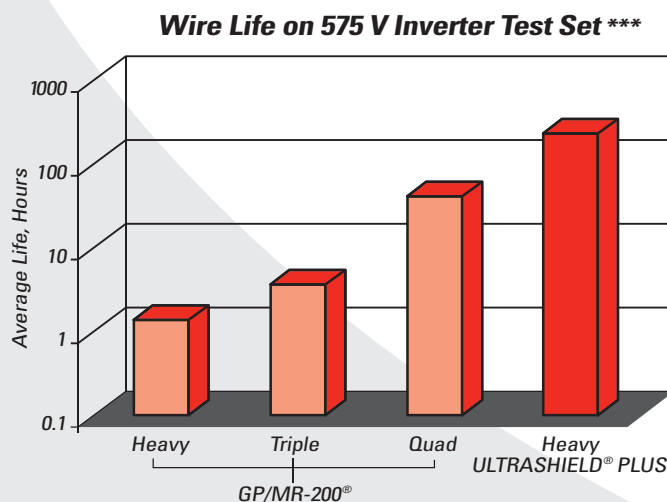
Class 200 Copper - Round Conductors - Polyester/Polyamideimide coated magnet wire / winding wire.

APPLICATION

ULTRASHIELD® PLUS magnet wire, which is specifically designed for use in motors that may be subjected to higher voltage spikes present in inverter duty applications, has been enhanced for easy identification and differentiation. The enhanced product has exhibited increased resistance to partial discharges and improved abrasion resistance to repeated scrape. The combination of the modified polyester basecoat and polyamideimide topcoat provides an insulation system with outstanding toughness and excellent dielectric properties. ULTRASHIELD® PLUS magnet wire has improved voltage endurance and thermal properties, compared to standard NEMA MW 35-C magnet wire, while retaining superior chemical resistance to common solvents and refrigerants. ULTRASHIELD® PLUS conforms to all of the requirements of NEMA MW 35-C and MW 73-C.

ULTRASHIELD® PLUS is recommended but not limited to the following applications :

- Inverter Duty Drive Motors
- Rotating Machines
- Hermetic Motors
- DC Motors
- Power Tools
- Automotive Alternators and Generators
- Transformers, All Dry Types through Class 200
- Electronics, All Types of Coils through Class 200



ENGINEERING HIGHLIGHTS

1. THERMAL CLASSIFICATION

ULTRASHIELD® PLUS magnet wire on copper conductor is UL listed at Class 200, and is recommended for NEMA MW 35-C and MW 73-C wire applications with higher burnout requirements.

2. THERMOPLASTIC FLOW

ULTRASHIELD® PLUS magnet wire has excellent thermoplastic flow (cut-thru) properties, with typical test values of 390°C.

3. WINDABILITY

ULTRASHIELD® PLUS magnet wire has been extensively wound in various motor applications and has been highly commended for its superior windability performance.

4. ELECTRICAL

The electrical properties for ULTRASHIELD® PLUS have been measurably improved. Voltage endurance for the enhanced ULTRASHIELD® PLUS magnet wire at 3000V and room temperature increased by 20% and at 1000V and 200C increased by 30%. Testing with sinusoidal and with inverter waveshapes shows that ULTRASHIELD® PLUS magnet wire lasts many times longer than standard NEMA MW 35-C and MW 73-C insulation (see graph at lower left). While no standards for this type of testing have been universally accepted, our testing shows dramatic improvement in insulation life, especially under severe duty applications at higher temperatures.

5. CHEMICAL

ULTRASHIELD® PLUS magnet wire has been tested for resistance to R-22 refrigerant and the results show it to be compatible for hermetic systems.

Successful results are also seen with samples tested for 24 hours at room temperature in a wide variety of other solvents such as petroleum naphtha, toluene, ethanol, 5% sulfuric acid, 1% potassium hydroxide, butyl acetate, and acetone.

6. TERMINATION

Insulation piercing, mechanical stripping, and flame welding processes can all be used successfully with ULTRASHIELD® PLUS magnet wire. If the connection is to be soldered, it is recommended that mechanical stripping be used to remove the insulation prior to soldering.

7. NORMAL AVAILABILITY

- Round Copper Sizes:
9 - 30 AWG, Heavy Build

Please consult Magnet Wire Marketing for additional size (including metric) and build information.

PRODUCT DATA SHEET

Performance data is representative of 18 AWG heavy build copper. **

THERMAL PROPERTIES

HEAT SHOCK RESISTANCE

TYPICAL PERFORMANCE: No topcoat or basecoat cracks
REQUIRED PERFORMANCE: 20%, 3XD, no cracks†

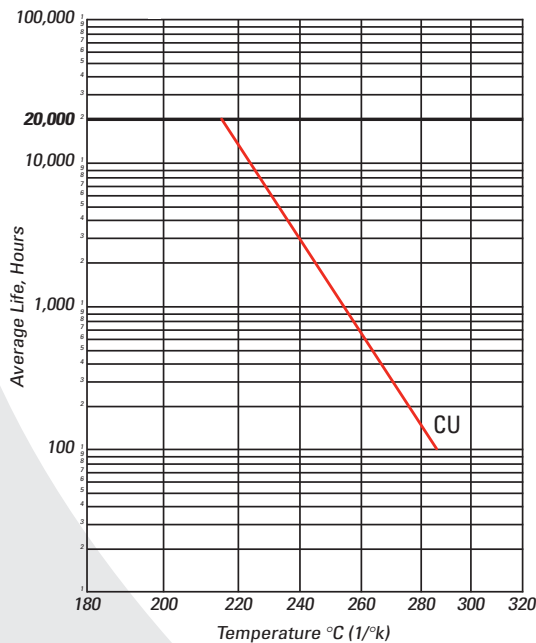
THERMAL AGING

TYPICAL PERFORMANCE: 215°C
REQUIRED PERFORMANCE: 200°C, minimum†

THERMOPLASTIC FLOW

TYPICAL PERFORMANCE: 390°C
REQUIRED PERFORMANCE: 300°C, minimum†

18 AWG Heavy Build ULTRASHIELD® PLUS Thermal Aging



PHYSICAL PROPERTIES

ABRASION RESISTANCE: REPEATED SCRAPE

TYPICAL PERFORMANCE: 496 strokes, avg.*

ABRASION RESISTANCE: UNIDIRECTIONAL

TYPICAL PERFORMANCE: 2100 g., avg.
REQUIRED PERFORMANCE: 980 g., minimum; 1150 g., minimum avg.†



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PHYSICAL PROPERTIES (cont'd)

ADHESION AND FLEXIBILITY

TYPICAL PERFORMANCE: No topcoat or basecoat cracks
REQUIRED PERFORMANCE: 20%, 3XD, no cracks†

COEFFICIENT OF FRICTION

TYPICAL PERFORMANCE: Dry Lube: 0.02 - 0.06*

ELONGATION

TYPICAL PERFORMANCE: 38%
REQUIRED PERFORMANCE: 32%, minimum†

SPRINGBACK

TYPICAL PERFORMANCE: 48 degrees
REQUIRED PERFORMANCE: 58 degrees, maximum†

ELECTRICAL PROPERTIES

CONTINUITY

TYPICAL PERFORMANCE: ≤ 1 fault/100 ft.
REQUIRED PERFORMANCE: 5 faults/100 ft., maximum†

DIELECTRIC BREAKDOWN VOLTAGE

ROOM TEMPERATURE

TYPICAL PERFORMANCE: 12,900 volts, avg.
REQUIRED PERFORMANCE: 5,700 volts, minimum†

RATED TEMPERATURE

TYPICAL PERFORMANCE: 10,982 volts, avg.
REQUIRED PERFORMANCE: 4,275 volts, minimum†

CHEMICAL PROPERTIES

REFRIGERANT RESISTANCE (R-22)

EXTRACTION

TYPICAL PERFORMANCE: 0.02%
REQUIRED PERFORMANCE: 0.25%, maximum†

DIELECTRIC BREAKDOWN VOLTAGE

TYPICAL PERFORMANCE: 11,686 volts
REQUIRED PERFORMANCE: 5,700 volts, minimum†

SOLUBILITY

TYPICAL PERFORMANCE: Passes
REQUIRED PERFORMANCE: 580 g. scrape, minimum†

* Tests not indicated as NEMA are Essex® Standards.

** The values shown represent typical average results and are not intended to be used as design data or specification limits.

*** Data obtained from standard 18 AWG twisted pairs tested at 150°C, with a 575 volt drive and motor (phase-to-phase).

† Requirements of NEMA MW 1000; Section MW 35-C or MW 73-C, as applicable.

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