



**NEMA MW 35-C or MW 73-C**

Class 200° Copper - Round Conductor - Polyester/Polyamideimide coated magnet wire/winding wire

**APPLICATION**

ULTRASHIELD® PLUS magnet wire has been specifically designed for use in motors that may be subjected to higher voltage spikes present in inverter duty applications. The combination of the modified polyester basecoat and amide-imide 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 may be considered 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 200°C, 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**

Voltage endurance is the area where ULTRASHIELD® PLUS magnet wire really excels. 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**

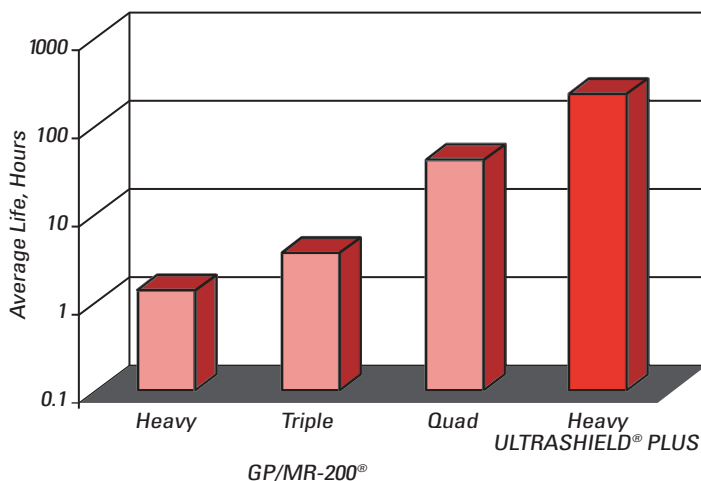
Insulation piercing, mechanical stripping, and flame welding processes can all be used successfully with ULTRASHIELD® PLUS magnet wire. If the connection is to be soldered, it is recommended that mechanical stripping be used to remove the insulation prior to soldering.

**7. NORMAL AVAILABILITY**

- Round Copper:  
9 through 30 AWG, Heavy Build

(Other Sizes and Builds by Special Arrangement)

**Wire Life on 575 V Inverter Test Set \*\*\***





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

### THERMAL PROPERTIES

#### THERMOPLASTIC FLOW

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

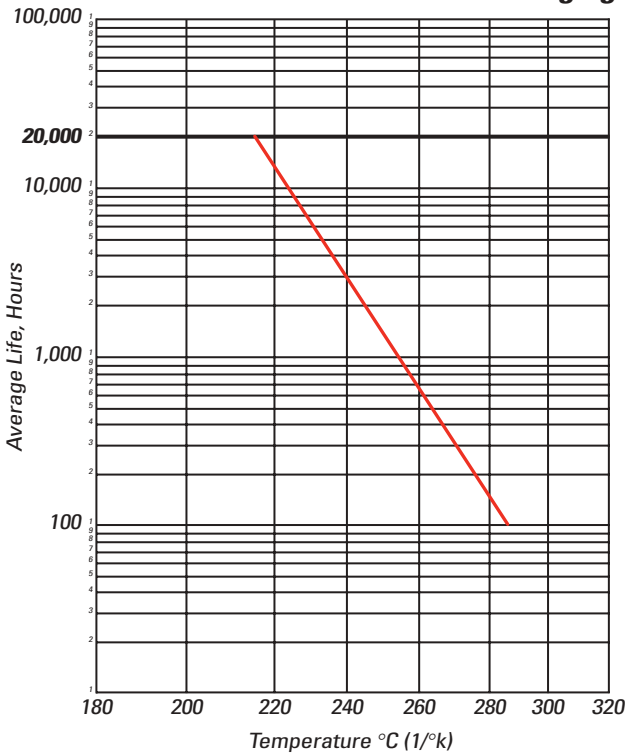
#### HEAT SHOCK RESISTANCE

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

#### THERMAL AGING

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

18 H ULTRASHIELD® PLUS Thermal Aging



### PHYSICAL PROPERTIES

#### ABRASION RESISTANCE: UNIDIRECTIONAL

TYPICAL PERFORMANCE: 1966 g., avg.  
REQUIRED PERFORMANCE: 1150 g., minimum avg.†

#### ABRASION RESISTANCE: REPEATED SCRAPE

TYPICAL PERFORMANCE: 250 strokes, avg.\*

### 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

#### 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†

#### CONTINUITY

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

### CHEMICAL PROPERTIES

#### SOLUBILITY

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

#### REFRIGERANT RESISTANCE (R-22)

##### EXTRACTION

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

#### DIELECTRIC BREAKDOWN VOLTAGE

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