

# High Voltage Winding Wire (HVWW®)

Magnet Wire | Winding Wire



<b>NEMA</b>	Exceeds <b>NEMA MW 20C</b> Requirements
<b>IEC</b>	Follow <b>IEC 60317-30</b> Requirements
<b>Thermal Class</b>	230°C
<b>Conductor</b>	Copper or Aluminum
<b>Shape</b>	Rectangular
<b>Insulation Material</b>	PEEK (Super engineering plastic) and polyamide-imide or polyimide hybrid coatings
<b>Size Range</b>	Film thickness: <ul style="list-style-type: none"> <li>• Enameled layer: min 20μ-50μ</li> <li>• PEEK layer min 40μ-300μ</li> </ul> Uneven coating also available. Please discuss with your Essex Furukawa representative.
<b>Key Applications</b>	Electric and Hybrid Electric Vehicles Electric Traction Motors Inverter-Duty Drive Motors DC Motors Power Tools Generators

## PRODUCT DESCRIPTION

Essex Furukawa offers a HVWW® product designed for use in the automotive industry. Our technology benefits customers demanding lighter weights to achieve smaller and more efficient traction motors.

High voltage creates high heat. In the electric vehicle industry, heat resistance, flexibility and repeated stress are ongoing obstacles to magnet wire performance. Our engineers accepted the challenge to perfect every design element for an exceptional product.

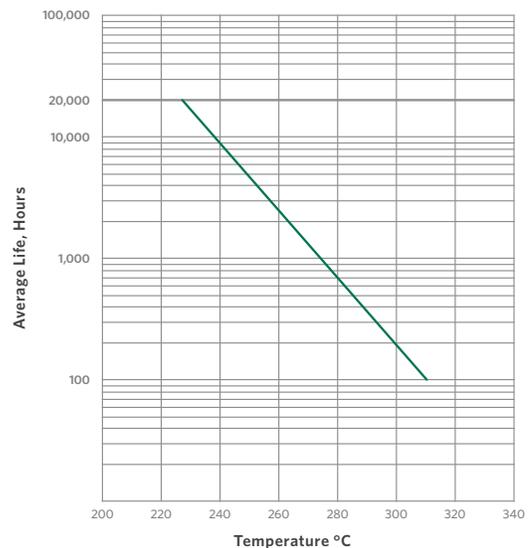
Specially formulated to provide outstanding resistance to Partial Discharge and Corona effect, HVWW® is suitable for a variety of key applications exhibiting high flexibility and property retention maintaining product performance even after the winding operation.

## FEATURES AND BENEFITS

<b>Thermal Classification</b>	High temperature rating at Class 240°C
<b>Thermoplastic Flow</b>	While PEEK insulation has a melting point above 340°C, our HVWW® is reinforced with a Polyamide-imide enameled insulation that has a cut-through temperature of 450°C. These two materials combined create excellent heat resistance and reliability.
<b>Heat Shock</b>	Exceeds NEMA MW 20C with 300°C
<b>Windability</b>	HVWW® has excellent Windability due to its highly flexible design, durable insulation and excellent adhesion between the Copper, PAI, and PEEK layers which improves the installation process. This also enables new design innovation otherwise not possible with more rigid materials. The malleable rectangular shape fills any gaps, leading to higher power and torque.
<b>Electrical</b>	HVWW® will be able to increase the Partial Discharge Inception Voltage to meet any requirement of motor driving voltage and environment condition due to increase the Coating Thickness. This allows for a complete corona free motor without using insulation paper.
<b>Chemical</b>	HVWW® has been tested to show excellent resistance to ATF oil through immersion testing containing water weight of 0.5% at 150°C for 2.0 hours.
<b>Stripping Method</b>	Allows for multiple methods. Distributed winding for rectangular wire is mainly adopted segment conductor winding system. The thicker HVWW® enamel is machine pressed for welding purposes. Laser film removal is also possible, but it is necessary to also consider the film thickness.
<b>Normal Availability</b>	Rectangular wire, cross section area maximum 7.8 mm². Please consult with your Essex Furukawa representative for additional size information.

## THERMAL ENDURANCE

Round 16 AWG Heavy Build





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## PROPERTIES

		TEST DETAILS	TYPICAL PERFORMANCE*	REQUIRED PERFORMANCE**
<b>THERMAL</b>				
Thermal Cycle		>2,000 cycles @-40°C-150°C	No cracks	No cracks
Thermal Endurance		20,000hours per ASTM D 2307	241°C	240°C
Thermoplastic Flow		Crossing method, 5°C/minute rise rate	450°C, 2kg weight	450°C, 2kg weight
<b>PHYSICAL</b>				
Abrasion Resistance		Unidirectional Scrape	1,700g	> 710g min
		Repeated Scrape	180 strokes, 700g	-
Adherence and Flexibility		(1.0 × width diameter) bending radius = wire width/2.	180° edgewise bend, no crack	(1.0 × width diameter) bending radius = wire width/2.
Elongation		Elongate to break	> 40%	> 32%
Springback		Mandrel wrap thick bend	45°	< 58°
<b>ELECTRICAL</b>				
Continuity		100 ft, graphite fiber brush	0 fault @ 1,500 VDC	< 5 fault @ 1,500 VDC
Dielectric Breakdown Voltage	Room Temperature	Allow pairs	16,000 volts	> 5,700 volts
	Rated Temperature	Allow pairs @ 240°C	1,3000 volts	> 4,275 volts
Inverter Endurance		200°C, 575 VAC, 4,000 Hz, 10% elongation	> 300 hours	-
Pulse Endurance		GB/T-21707, 100 ns rise time	> 24 hours	12 hours
Voltage Endurance		150°C, 3,500 VAC, 60 Hz, 10% elongation	> 150 minutes	-
<b>CHEMICAL</b>				
Solubility	Xylene and/or Xylene/Butyl where applicable	Immersed in 60°C Xylene solvent x 0.5 hr, needle scrape	Passes	> 575 g

\* Performance data is representative of Round 18 AWG heavy build Copper magnet wire where applicable. \*\* Requirements for Round 18 AWG heavy build per NEMA MW 37-C.

For a list of product patents, visit [essexfurukawa.com/product-patents](http://essexfurukawa.com/product-patents).