## Amide-Imide



FEATURES		DENEEITC
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Thermal Classification	Class 220°C on Copper conductor with a Thermal Endurance of 233°C per ASTM D 2307	
Thermoplastic Flow	Excellent thermoplastic flow (cut-thru) properties	
Solderability	N/A	
Heat Shock	Passes all heat shock resistance testing at 20°C above rated temperature	
Windability	Adhesion and flexibility properties result in an excellent windability	
Electrical	High burnout and AC overload resistance	
Chemical	High moisture and chemical resistance	
Stripping Method	Insulation piercing, mechanical stripping, hot staking and flame welding processes can all be used with Amide-Imide magnet wire. If the connection is to be soldered, the insulation must be removed prior to soldering.	

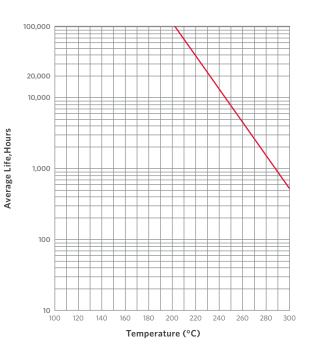
NEMA	мw 81-С	
Thermal Class	220°C	
Conductor	Copper	
Shape	Round, Square, Rectangular	
Insulation Material	Polyamide-imide	
Size Range	Round Single Build: 4-39.5 AWG Round Heavy Build: 4-39.5 AWG Square and Rectangular	
Key Applications	Form Wound Coils Fractional and Integral HP Motors Hermetic Motors DC Motors Automotive Alternators and Generators All Dry Type Transformers Electronics, Power Tools	

## **PRODUCT DESCRIPTION**

Amide-Imide has an improved single insulation system has been engineered to enhance adhesion, scrape abrasion and chemical resistance with improved thermal properties resulting in a measured thermal index of 233°C. This product is suited for demanding applications such as high slot-fills, difficult insertions, severe winding applications, and high temperature systems.

## THERMAL ENDURANCE

Round 18 AWG Heavy Build







## Amide-Imide

Magnet Wire | Winding Wire

THERMAL     Heat Shock   20% Elongation, 3xD mandrel wrap   300°C   240°C, no cracks     Thermal Endurance   20.000 hrs, per ASTM D2207   223°C   220°C     Thermoplastic Flow   5°C/minute rise rate   399°C   350°C     PHYSICAL   5°C/minute rise rate   399°C   350°C     Abrasion Resistance   Unidirectional Scrape   1840g   1150g min.     Repeated Scrape per JIS C 3003   790 strokes avg   -     Adherence and Flexibility   20% Elongation, 3xD mandrel wrap   No cracks   No cracks     Coefficient of Friction   Dynamic Coefficient of Friction   Dry Lube: 0.02 - 0.06   -     Springback   Elongation, 3xD mandrel wrap   No cracks   32%     Springback   No Remarker wrap   40%   a 32%     Breaddown WW 750   Dry Lube: 0.02 - 0.06   -     Elecerta CL   Unidirectional Scrape   40%   a 32%     Springback   No Remarker wrap   40%   x 52%     Breaddown WW 750   \$1 fault @ 1.500 VDC   \$5 fault @ 1.500 VDC   \$5 fault @ 1.500 VDC     Breaddown Weither applicable   Twisted pairs @ ambient   15,000 voits   5,700	PROPERTIES				
Heat Shock   20% Elongation, 3xD mandrel wap   900°C   240°C, no cracks     Thermal Endurance   20.000 hrs, per ASTM D2307   233°C   220°C     Thermoplastic Flow   Crossing method, 5°C/minute rise rate   399°C   350°C     PHYSICAL   Undirectional Scrape   1840g   1150g min.     Abrasion Resistance   Undirectional Scrape per JIS C 3003   790 strokes avg   -     Adherence and Flexibility   20% Elongation, 3xD mandrel wap   No cracks   No cracks     Coefficient of Friction   Dynamic Coefficient of Friction per MW 750   Dry Lube: 0.02 - 0.06   -     Elongatio to brack   40%   \$22%     Springback   No Cracks   0.00   -     Elengatio to brack   40%   \$25%     Electra CAL   100 ft, graphite fiber brush   <1 fout (± 1,500 VDC   \$5700 volts     Breakdown Voltage   Read Temperature   Twisted pairs @ 20°C   12,000 volts   4,275 volts     Solubility   Yolen and/or where applicable   Immersed in 60°C solvent x 0.5hr, needles scrape   Passes   -   -     Solubility   Yolen and/or where applicable   Immersed in 60°C solvent x 0.5hr, neaperature, as to tal tis of thom sot nom <th></th> <th></th> <th>TEST DETAILS</th> <th>TYPICAL PERFORMANCE*</th> <th>REQUIRED PERFORMANCE**</th>			TEST DETAILS	TYPICAL PERFORMANCE*	REQUIRED PERFORMANCE**
Thermal Endurance 20.000 hrs, per ASTM D2307 233°C 220°C   Thermoplastic Flow Crossing method, 5°C/minute rise rate 390°C 350°C   PHYSICAL Undirectional Scrape 1840g 1150g min.   Abrasion Resistance Undirectional Scrape per JIS C 3003 790 strokes avg -   Adherence and Flexibility 20% Elongation, 3xD mandrel wrap No cracks No cracks   Coefficient of Friction Dynamic Coefficient of Friction Der MW 750 Dry Lube: 0.02 - 0.06 -   Elongatio to brak 40% \$22%   Springback No cracks 000 reg MW 750 Sever MU 750   Elengatio to brak 40% \$25%   Elengatio to brak 40% \$25%   Springback No cracks 500 volts \$5700 volts   Elengatio to brak \$100 ft, graphite fiber brush \$17 fault & 1.500 VDC \$5700 volts   Dielectric Solubility 100 ft, graphite fiber brush \$1000 volts \$2700 volts   Solubility 100 ft, graphite fiber brush \$1000 volts \$2700 volts \$2700 volts   Cotter Soluents Vylene and/or where applicable Trwisted pairs @ arobient x 0.5kr, negles scrape Passes \$000 volts   Solubility Vylene and/or where applicable Immersed in 60°C s	THERMAL				
Thermoplastic Flow   Crossing method, 5°C/minute rise rate   399°C   350°C     PHYSICAL     Advasion Resistance   Unidirectional Scrape   1840g   1150g min.     Repeated Scrape per JIS C 3003   790 strokes avg   .     Adherence and Flexibility   20% Elongation, 3x0 mandrel wrap   No cracks   No cracks     Coefficient of Friction   Dry Lube: 0.02 · 0.06   .     Springback   Opmanic Coefficient of Friction     Springback   NEMA mandrel wrap   46° <s58°< td="">     Elengation to friction     Springback   100 ft, graphite fiber brush   1 fault # 1.500 VDC   &lt;5 fault # 1.500 VDC</s58°<>	Heat Shock		20% Elongation, 3xD mandrel wrap	300°C	240°C, no cracks
Intermopisatio Flow 5°C/minute rise rate 5°PC/minute rise rate 5°PC/minute rise rate   PHYSICAL Atherence and Flexibility Unidirectional Scrope 1840g 1150g min.   Adherence and Flexibility 20% Elongation, 3AD mandrel wrap No cracks No cracks   Coefficient of Friction Dynamic Coefficient of Friction Por cracks 40% 32%   Springback 0.00 ft, graphite fiber brush 40% 458°   ELECTRICAL 0.00 ft, graphite fiber brush 115,000 VDC ≤ 5 fault ± 1.500 VDC   Continuity 100 ft, graphite fiber brush ≤ 1 fault ± 1.500 VDC ≤ 5 fault ± 1.500 VDC   Dielectric Area Twisted pairs © 20% C solvent x 0.5hr, needle scrape % passes No exposed bare conductor   Solubility Xylene and/or Yelene global Solubility Sylene and/or   Solubility Immersed in 60% C solvent x 0.5hr, needle scrape Passes No exposed bare conductor   Residence for 24 hours at room temperature. Passes - -   Solubility Immersed in 60% C solvent x 0.5hr, needle scrape Passes - -   Solubility Kylene and/or Soluceneedle x 24 hours at room temperature. - -   Solubility Immersed in 60% C solvent x 0.5hr, needle scrape - -	Thermal Endurance		20,000 hrs, per ASTM D2307	233°C	220°C
Abraion Resistance     Unidirectional Scrape per JIS C 3003     1840g     1150g min.       Adherence and Flexibility     20% Elongation, 3xD mandrel wrap     No cracks     No cracks       Coefficient of Friction per MW 750     Dry Lube: 0.02 - 0.06     -       Elongation     Unidirectification of Friction per MW 750     Dry Lube: 0.02 - 0.06     -       Springback     Elongate to break     40%     a 32%       ELECTRICAL      Springback     s fault @ 1,500 VDC     s 5 fault @ 1,500 VDC       Electric Breaddown Volteg     Room Temperature     Twisted pairs @ ambient     15,000 volts     5,700 volts       Breaddown Volteg     Room Temperature     Twisted pairs @ ambient     15,000 volts     4,275 volts       CHEMICAL     Twisted pairs @ ambient     15,000 volts     4,275 volts     4,275 volts       Breaddown Volteg     Ret Temperature     Twisted pairs @ aboltence, ethanol, 5% buffur: acid, 1% obluers, ethanol, 5% contering in R-22, residue temperature.     Passes     - <t< td=""><td>Thermoplastic Flow</td><td></td><td></td><td>399°C</td><td>350°C</td></t<>	Thermoplastic Flow			399°C	350°C
Abrasion Resistance   Repeated Scrape per JIS C 3003   790 strokes avg   -     Adherence and Flexibility   20% Elongation, 3k0 mandrel wrap   No cracks   No cracks     Coefficient of Friction per MW 750   Dry Lube: 0.02 - 0.06   -     Elongation   Elongate to break   40%   > 32%     Springback   No KEMA mandrel wrap   46°   < 58°	PHYSICAL				
Adherence and Flexibility   20% Elongation, 3xD mandrel wrap   No cracks   No cracks     Coefficient of Friction per MW 750   Dry Lube: 0.02 - 0.06   -     Elongation   Elongate to break   40%   a 32%     Springback   NEMA mandrel wrap   46°   a 58°     ELECTRICAL   100 ft, graphite fiber brush   ≤1 fault @ 1,500 VDC   ≤ 5 fault @ 1,500 VDC     Delectric Marchan   Twisted pairs @ ambient   15,000 volts   5,700 volts     Breaddown Voltage   Room Temperature   Twisted pairs @ 20°C   12,000 volts   4,275 volts     Stubility   Xylene-Matyry kylene-Matyry kylene-Matyry   Immersed in 60°C solvent x 0.5hr, needle: scrape   Passes   No exposed bare conductor     Forter Solvents   Sylene-Matyry kylene-Matyry   Immersed in 60°C solvent x 0.5hr, needle: scrape   Passes			Unidirectional Scrape	1840g	1150g min.
Coefficient of Friction per NW 750     Dry Lube: 0.02 - 0.06     -       Elongation     Elongate to break     40%     \$ 32%       Springback     NEMA mandrel wrap     46°     \$ 58°       ELECTRICAL      100 ft, graphite fiber brush     \$ 1 fault @ 1,500 VDC     \$ 5 fault @ 1,500 VDC       Dielectric Breakdown Voltage     Room Temperature     Twisted pairs @ 20°C     12,000 volts     5,700 volts       Solubility     Kylene and/or Xylene/Butyl where applicable     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     No exposed bare conductor temperature.       Other Solvents     Xylene and/or Xylene (Ketty)     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     No exposed bare conductor temperature.       Bitstring     Christer and acetone for 24 hours at room temperature.     Passes     -       Bitstring     Christer and solvents at room temperature.     Passes     -       Bitstring     R-22 conditioning for 710 minutes     Passes     -       Solubility     6 hrs. relux cycling in R-22 residue (weight as a total % of film)     Passes     -       Dielectric Breakdown temperature.     return of on Bitelectric strength attr Resistance     Passes	Abrasion Resistance		Repeated Scrape per JIS C 3003	790 strokes avg	-
Continuent of Priction     Dry Lube: 0.02 + 0.06     -       Elongation     Elongate to break     40%     ≥ 32%       Springback     NEMA mandrel wrap     46°     ≤ 58°       ELECTRICAL     100 ft, graphite fiber brush     ≤ 1 fault @ 1,500 VDC     ≤ 5 fault @ 1,500 VDC       Dielectric Breakdown Voltage     Room Temperature     Twisted pairs @ ambient     15,000 volts     5,700 volts       CHEMICAL     Twisted pairs @ 220°C     12,000 volts     4,275 volts       CHEMICAL     Twisted pairs @ 220°C     12,000 volts     4,275 volts       Solubility     Xylene and/or kyhere Applicable     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     No exposed bare conductor       Other Solvents     Extraction     fhrs. reflux cycling in R-22 residue     Passes     -       Bilstering     R-22 conditioning for 72 hours at room after Conditioning     returnot of dielectric strength after a at 220 conditioning for 72 hour and 10 minutes in boiling R-113*     Passes     -       Solubility     Solution of collectric strength after and cecone for 72 hour and cecone for 72 hour and 10 minutes in boiling R-134*     Passes     -	Adherence and Flexibil	ity	20% Elongation, 3xD mandrel wrap	No cracks	No cracks
Springback     NEMA mandrel wrap     46°     ≤ 58°       ELECTRICAL     I00 ft, graphite fiber brush     \$ 1 fault @ 1,500 VDC     \$ 5 fault @ 1,500 VDC       Dielectric Breakdown Voltage     Room Temperature     Twisted pairs @ ambient     15,000 volts     5,700 volts       Dielectric Breakdown Voltage     Rated Temperature     Twisted pairs @ 220°C     12,000 volts     4,275 volts       CHEMICAL     Xylene and/or Xylene/Butyl where applicable     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     No exposed bare conductor       Solubility     Xylene and/or Xylene/Butyl where applicable     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     No exposed bare conductor       Solubility     Extraction     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     -       Solubility     Extraction     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     -       Solubility     Extraction     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     -       Solubility     Extraction     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     -       Bistering     Extraction     Immersed in 60°C solvent x 0.5hr, needle scrape <td< td=""><td>Coefficient of Friction</td><td></td><td>-</td><td>Dry Lube: 0.02 - 0.06</td><td>-</td></td<>	Coefficient of Friction		-	Dry Lube: 0.02 - 0.06	-
ELECTRICAL     Continuity   100 ft, graphite fiber brush   < 1 fault @ 1,500 VDC	Elongation		Elongate to break	40%	≥ 32%
Continuity   100 ft, graphite fiber brush   < 1 fault @ 1,500 VDC	Springback		NEMA mandrel wrap	46°	≤ 58°
Dielectric Breakdown Voltage     Room Temperature     Twisted pairs @ ambient     15,000 volts     5,700 volts       Dielectric Breakdown Voltage     Rated Temperature     Twisted pairs @ ambient     15,000 volts     4,275 volts       CHEMICAL     Solubility     Xylene and/or Xylene/Butyl where applicable     Immersed in 60°C solvent x 0.5hr, needle scrape     Passes     No exposed bare conductor       Other Solvents     Petroleum naphtha, 3% toluene, ethanol, 5% upfurci acid, 1% potassium hydroxide, butyl acetate, and acetone for 24 hours at room temperature.     Passes     -       Extraction     6 hrs. reflux cycling in R-22, residue (weight as a total % of film)     Passes     -       Dielectric Breakdown after Conditioning     R-22 conditioning for 72 hour (weight as a total % of film)     Passes     -       Blistering     R-22 conditioning for 72 hour (at 125°C oven for 10 minutes)     Passes     -       Softening     16 hour immersion in at room temperature.     Passes     -       Softening     16 hour immersion in at room and 10 minutes in boiling R-113"     Passes     -       Crazing     elongation immersed one hour and 10 minutes in boiling R-113"     Passes     -	ELECTRICAL				
Dielectric   Rated Temperature   Twisted pairs @ 220°C   12,000 volts   4,275 volts     CHEMICAL   Xylene and/or   Immersed in 60°C solvent x 0.5hr, needle scrape   Passes   No exposed bare conductor     Solubility   Xylene Ad/or   Immersed in 60°C solvent x 0.5hr, needle scrape   Passes   No exposed bare conductor     Other Solvents   Extraction   6 hrs. reflux cycling in R-22, residue (weight as a total % of film)   Passes   -     Dielectric Breakdown after Conditioning   R-22 conditioning for 72 hour   Passes   -   -     Blistering   R-22 conditioned specimens transferred to a 125°C oven for 10 minutes   Passes   -   -     Softening   Ich our immersion in at room temperature, scrape with .016°needle   Passes   -   -     Softening   Refrigerant and 10 minutes in boiling R-113"   Passes   -   -     Refrigerant Resistance   Extraction   Exposure to both R-134a and   Passes   -	Continuity		100 ft, graphite fiber brush	≤ 1 fault @ 1,500 VDC	≤ 5 fault @ 1,500 VDC
Rated Temperature   Twisted pairs @ 220°C   12,000 volts   4,275 volts     CHEMICAL   Xylene and/or Xylene/Butyl where applicable   Immersed in 60°C solvent x 0.5hr, needle scrape   Passes   No exposed bare conductor     Other Solvents   Xylene/Butyl where applicable   Immersed in 60°C solvent x 0.5hr, needle scrape   Passes   No exposed bare conductor     Other Solvents   Extraction   6 hrs. reflux cycling in R-22, residue (weight as a total % of film)   Passes   -     Bistering   R-22 conditioned specimens transferred to a 125°C oven for 10 minutes   Passes   -     Softening   16 hour immersed in a torom (elegation in mersed one hour and 10 minutes in boiling R-113")   Passes   -     Refrigerant Commatibility   Exposure to both R-134a and   Passes   -   -	Dielectric Breakdown Voltage	Room Temperature	Twisted pairs @ ambient	15,000 volts	5,700 volts
Solubility   Xylene and/or Xylene/Butyl where applicable   Immersed in 60°C solvent x 0.5hr, needle scrape   Passes   No exposed bare conductor     Other Solvents   Petroleum naphtha, 3% toluene, ethanol, 5% sulfuric acid, 1% potassium hydroxide, butyl acetate, and acetone for 24 hours at room temperature.   Passes   -     Extraction   6 hrs. reflux cycling in R-22, residue (weight as a total % of film)   Passes   -     Dielectric Breakdown after Conditioning   R-22 conditioned specimens transferred to a 125°C oven for 10 minutes   Passes   -     Softening   16 hour immersion in at room temperature, scrape with .016°needle   Passes   -     Softening   16 hour immersion in at room temperature, scrape with .016°needle   Passes   -     Refrigerant Compatibility   Exposure to both R-134a and   Passes   -		Rated Temperature	Twisted pairs @ 220°C	12,000 volts	4,275 volts
Solubility   Xylene/Butyl where applicable   immersed in 60°C Solvent X 0.5nr, needle scrape   Passes   No exposed bare conductor needle scrape     Other Solvents   Petroleum naphtha, 3% toluene, ethanol, 5% sulfuric acid, 1% potassium hydroxide, butyl acetate, and acetone for 24 hours at room temperature.   Passes   -     Extraction   6 hrs. reflux cycling in R-22, residue (weight as a total % of film)   Passes   -     Dielectric Breakdown after Conditioning   R-22 conditioned specimens transferred to a 125°C oven for 10 minutes   Passes   -     Blistering   R-22 conditioned after 8% elongation immersed after 8% elongation immersed one hour and 10 minutes in boiling R-113"   Passes   -     Refrigerant Compatibility   Exposure to both R-134a and   Passes   -	CHEMICAL				
Other Solvents   ethanol, 5% sulfuric acid, 1%   Passes   -     Other Solvents   potassium hydroxide, butyl acetate, and acetone for 24 hours at room temperature.   Passes   -     Extraction   6 hrs. reflux cycling in R-22, residue (weight as a total % of film)   Passes   -     Dielectric Breakdown after Conditioning   retention of dielectric strength after R-22 conditioning for 72 hour   Passes   -     Blistering   R-22 conditioned specimens transferred to a 125°C oven for 10 minutes   Passes   -     Softening   16 hour immersion in at room temperature, scrape with .016"needle   Passes   -     Crazing   elongation immersed one hour and 10 minutes in boiling R-113"   Passes   -	Solubility	Xylene/Butyl		Passes	No exposed bare conductor
Refrigerant Resistance   Extraction   (weight as a total % of film)   Passes   -     Refrigerant Resistance   Dielectric Breakdown after Conditioning   retention of dielectric strength after R-22 conditioning for 72 hour   Passes   -     Blistering   R-22 conditioned specimens transferred to a 125°C oven for 10 minutes   Passes   -     Softening   16 hour immersion in at room temperature, scrape with .016"/needle   Passes   -     Crazing   elongation immersed one hour and 10 minutes in boiling R-113"   Passes   -     Refrigerant Compatibility   Exposure to both R-134a and   Passes   -	Other Solvents		ethanol, 5% sulfuric acid, 1% potassium hydroxide, butyl acetate, and acetone for 24 hours at room	Passes	-
Refrigerant Resistance after Conditioning R-22 conditioning for 72 hour Passes -   Blistering R-22 conditioned specimens transferred to a 125°C oven for 10 minutes Passes -   Softening 16 hour immersion in at room temperature, scrape with .016"needle Passes -   Crazing elongation immersed one hour and 10 minutes in boiling R-113" Passes -	Refrigerant Resistance	Extraction		Passes	-
Resistance Distring to a 125°C oven for 10 minutes Passes -   Softening 16 hour immersion in at room temperature, scrape with .016"needle Passes -   Crazing elongation immersed one hour and 10 minutes in boiling R-113" Passes -			-	Passes	-
Softening temperature, scrape with .016"needle Passes -   Crazing "Specimens annealed after 8% elongation immersed one hour and 10 minutes in boiling R-113" Passes -		Blistering		Passes	-
Crazing elongation immersed one hour and 10 minutes in boiling R-113" Passes -   Refrigerant Compatibility Exposure to both R-134a and Passes -		Softening	temperature, scrape with .016"needle	Passes	-
		Crazing	elongation immersed one hour	Passes	-
	Refrigerant Compatibil	ity		Passes	-

\* 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 81-C.

