

System Component, Electrical Insulation - Component		<b>E210549</b>
<b>EFI POLYMERS</b> 4600 HOLLY ST DENVER CO 80216		
<b>System Component</b>	<b>System Designation</b>	<b>System Temp (Class)</b>
11T201-/7H016-, 11T202-7H002-, 11G203-/7H015-, 11G203-/7H016-, 11F209-/7H202-, 11Z001-, 11T206-/7H013-	Octagon B1	130(B)
report date: 2000-08-03	© 2014 UL LLC	

## Construction Details (Table I)

The use of this insulation system is limited to the combination of materials specified below. Where more than one item is designated under Insulation Function, they may be used together, unless otherwise indicated, or they may be used as alternates to one another. Functions designated "optional" are not necessarily required for every design. Insulation thicknesses and/or layers indicated below are minimum.

<b>Winding Wire</b>	<ul style="list-style-type: none"> <li>- Recognized Component - Magnet wire (OBMW2), single build or greater, round or rectangular, copper or aluminum unless stated otherwise for the types listed below</li> <li>- Recognized Component - Single and Multi-Layer Insulated Winding Wire (OBJT2) listed below</li> <li>- Recognized Component - Appliance Wiring Material (AVLV2) listed below</li> <li>- Bare conductors wrapped or interleaved with a paper or film listed below need not be a Recognized Component</li> </ul>
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(unless otherwise noted, winding wire types listed below may be used in combination within a single product)

MW 24 or 155C Polyester-amide-imide (Polyamide)  
 MW 26 or 155C Polyester-imide  
 MW 27 or 155C Polyester-imide (Polyamide)  
 MW 28 and 130C Polyurethane (Polyamide)  
 MW 30 or 180C Polyester-amide-imide  
 MW 35 or 200C Polyester-amide-imide (Polyamide-imide)  
 MW 73 or 200C Polyester-amide-imide (Polyamide-imide)  
 MW 74 or 200C Polyester-amide-imide  
 MW 75 and 130C Polyurethane  
 MW 76 or 180C Polyester-amide-imide (Polyamide)  
 MW 77 or 180C Polyester-imide  
 MW 78 or 180C Polyester-imide (Polyamide)  
 MW 79 or 155C Polyurethane  
 MW 80 or 155C Polyurethane (Polyamide)  
 MW 82 or 180C Polyurethane  
 MW 83 or 180C Polyurethane (Polyamide)

## Ground & Interwinding Insulations

Designation (no.)	mils(mm)	comments
<b>Dupont Teijin Films</b>		
Mylar	5 (0.13)	polyethylene terephthalate film (PET)
<b>E. I. Dupont de Nemours &amp; Co.</b>		
Nomex® 410	5 (0.13)	aramid insulating paper
Nomex® 411	12 (0.3)	aramid insulating paper
Nomex® 414	5 (0.13)	aramid insulating paper
Nomex® 416	5 (0.13)	aramid insulating paper
Nomex® 418	5 (0.13)	aramid insulating paper
Nomex® 992	10 (0.25)	aramid insulating paper
Nomex® 993	8 (0.2)	aramid insulating paper
Nomex® 994, 994 NPT	8 (0.2)	aramid insulating paper
Nomex® E56	8 (0.2)	aramid insulating paper
Zytel 101L	28 (0.71)	
Zytel 103HSL	28 (0.71)	
Zytel 70G13L	28 (0.71)	
Zytel 70G30HSL	28 (0.71)	
Zytel 70G33HS1L	28 (0.71)	
Zytel 70G33L	28 (0.71)	polyamide 66
Zytel FR50	28 (0.71)	polyamide 66

## Lead Wires (optional)

125 EPDM - ethylene propylene diene monomer  
 125 XLPE - chemically crosslinked polyethylene  
 125 XLPE - irradiated crosslinked polyethylene  
 150 E/TFE - ethylene/tetraflouroethylene  
 150 PTFE - polytetraflouroethylene  
 150 SI - silicone rubber - with or without glass braid  
 150 XLPE - chemically crosslinked polyethylene  
 200 PTFE - polytetraflouroethylene  
 200 SI - silicone rubber - with or without glass braid  
 200 TFE - tetraflouroethylene - +

+ To be isolated from direct contact with windings (magnet wire) by any insulating material (tape, layer insulation, sleeving, etc.) listed in this table - unless specifically excluded from this requirement by a special note at the beginning of this table.

## Minor Sheet Insulations

(optional) layer, outer, wrap etc.

Designation (no.)	comments
<b>3M Innovative Paper Technologies</b>	
CeQuin 30F, 30F30, F30F	
CeQuin 500	
CeQuin IF, IFI, FIF	

CeQuin IG, IGI, GIG

CeQuin X

**Dupont -Teijin Films**

Mylar

**E. I. Dupont de Nemours & Co.**

Nomex 410

Zytel 70G33L

**Radici Plastics USA Inc.**

RADILON A RN66G30L

**Von Roll USA Inc. (Bedford Materials)**

5JF44

varnish glass cloth

Memco 100 DMD

Pyroglas

Pyrolam 100X

**Tapes (optional)**

Designation (no.)	comments
<b>3M (Minnesota Mining &amp; Mfg Co)</b>	
10	thermosetting rubber, polyester nonwoven/epoxy resin composite
11	thermosetting rubber adhesive, black acetate cloth
1182	copper foil
12	
1276	
1312	polyester filament reinforced polyester film
1318	acrylic adhesive, polyester film
1350	polyester film
27	thermosetting rubber adhesive, glass cloth
44	thermosetting rubber adhesive, web reinforced polyester film
46	thermosetting rubber adhesive, web reinforced polyester film
56	thermosetting rubber adhesive, polyester film
57	thermosetting rubber adhesive, polyester film
60	thermosetting silicone adhesive, PTFE film
69	thermosetting silicone adhesive, glass cloth
90	glass cloth
92	thermosetting silicone adhesive, polyimide film
MR94B	thermosetting rubber adhesive, reinforced polyester film
Super 10	polyester film/epoxy resin composite
Super 20	polyester film/epoxy resin composite
<b>Electro Tape Specialties Inc</b>	
ETS-149-21	
ETS-21 FR	
ETS-23	
ETS-269	woven fiberglass
ETS-29	

ETS-418  
 ETS-451  
 ETS-92  
 ETS-94  
 ETS-95  
 ETS-97

**Ideal Tape Co Inc**

7017  
 7177  
 720  
 725  
 7300  
 750  
 7807

thermosetting acrylic adhesive, polyester film glass filament  
 thermosetting acrylic adhesive, polyimide film  
 thermosetting rubber adhesive, woven polyester cloth  
 thermosetting rubber adhesive, polyester knit  
 thermosetting silicone adhesive, glass cloth  
 thermosetting rubber adhesive, polyester film glass filament  
 acrylic adhesive, polyester/glass

**Intertape Polymer Group (Tesa, Tuck, Spinnaker)**

4238  
 4426-00  
 4426-04  
 4428  
 4616-00  
 51337  
 51580  
 51580-00  
 51582  
 51596  
 51597

polyester film glass reinforced  
 polyester film laminated to rope fiber  
 polyester film laminated to rope fiber  
 polyimide film  
 glass cloth  
 crepe paper  
  
 polyester film laminated to polyester nonwoven matte  
  
 polyester film laminated to polyester nonwoven matte  
 polyester film with glass filament coating

**Nitto Denko Corp**

188 UL  
 315  
 3161F  
 31B  
 354  
 360N UL  
 380  
 903

silicone adhesive, glass cloth  
 rubber adhesive, polyester film  
 polyester  
  
 epoxy resin polyester nonwoven backing, acrylic adhesive  
 synthetic polymer adhesive, polyimide film  
  
 PTFE

**Permacel**

P-21  
 P-223  
 P-224  
 P-245  
 P-248  
 P-256  
 P-262  
 P-277

thermosetting rubber adhesive, glass cloth  
 thermosetting silicone adhesive, polyimide film  
 thermosetting silicone adhesive, polyimide film  
 thermosetting rubber adhesive, polyester film/non-woven mat  
 thermosetting rubber adhesive, polyester film/paper  
 semi-cured rubber adhesive, polyester film  
 flame retardant thermosetting acrylic adhesive, aramid paper  
 thermosetting rubber adhesive, paper (creped kraft)

P-286

thermosetting acrylic adhesive, polyester film

P-422

thermosetting silicone adhesive, PTFE film

**Saint-Gobain Performance Plastics Corp.**

G551

thermosetting rubber adhesive, glass cloth

G565

silicone adhesive, flame retardant fiberglass cloth

K103

acrylic adhesive, polyimide film

K250

silicone adhesive, polyimide film flame retardant

M54

thermosetting rubber adhesive, polyester film

M97

acrylic adhesive, printable polyester film

**Symbio Inc**

GL06

silicone adhesive, glass cloth

GL15

acrylic adhesive, glass cloth

KA00

NM13

aramid (Nomex) paper

**Spacers and  
Wedges**

(optional)

Designation (no.)

comments

**Glastic Corp.**

1412

1911

FHT

MTS rod

SG-200

TSF

UTR

UTS

polyester/glass

**Haysite**

EFM

flexible, glass reinforced thermosetting polyester

EHC

glass reinforced thermosetting polyester

EMD

ETS

NRMA GPO-1 130

H755

NRMA GPO-1 155

HST-II

glass reinforced thermosetting polyester

HTF

flexible, glass reinforced thermosetting polyester

**Various Manufacturers**

Wood, Untreated

**Sleeving (optional)**

Designation (no.)

comments

**Atkins & Pearce Inc.**

Ben Har 1151-FR

Ben Har 1151-XL-200  
 Ben Har 1151-XL-240  
 Ben Har 1151-XL-FR-1  
 Ben Har Acryl  
 Ben Har Ex-Flex 1500  
 Suflex Acrylflex F  
 Suflex Acrylflex VPI  
 Suflex Flexicone 200  
 Suflex Silicone Resin  
 Suflex Silicone Rubber  
 Suflex Silverflex T & D  
 1062

silicone rubber coated fiberglass

**Hilec/Delfingen US-New York Inc**

Hilec 310  
 Hilec 410  
 Hilec 540  
 Hilec 710  
 Turbo 117F

silicone rubber coated fiberglass

**Varflex**

Varglas A397 acrylic  
 Varglas Non-Fray Type HM  
 Varglas Non-Fray Type HO  
 Varglas Silicone Resin 500  
 Varglas Silicone Rubber  
 Varglas Silicone Rubber ES 4400  
 Varglas Viton 231  
 Siflex

**Tie Cords (optional)**

Designation (no.)

comments

**Varflex**

Fiberglass, Untreated

**Potting  
Compounds**

Designation (no.)

comments

**EFI Polymers**

11F209-/7H202-  
 11G203-/7H015-  
 11G203-/7H016-  
 11T201-/7H016-  
 11T202-7H002-  
 11T206-/7H013-

- 5or 6 digit alphanumeric suffix indicating type and amount of filler and pigment  
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 - 5or 6 digit alphanumeric suffix indicating type and amount of filler and pigment  
 - 5or 6 digit alphanumeric suffix indicating type and amount of filler and pigment

11Z001-

- 5or 6 digit alphanumeric suffix indicating type and amount of filler and pigment

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