

<b>OBJS2</b> System Component, Electrical Insulation - Component		<b>E200050</b>
<b>P LEO &amp; CO (B C) LTD</b> PO BOX 94250 RICHMOND BC V6Y 2A6 CA		
<b>System Component</b>	<b>System Designation</b>	<b>System Temp (Class)</b>
<b>SM62, 8M81, 8M82, N410MICA5(0.4), L/PEN/L***, 1P9FR, 1TF07, 1A025, 1PEN2, 1H86A, 1TF05, 1PEN3, 1H86R, 0L50, 0L55, 2T- TFT.xx, 2T-TFL.xx, Fiberglas 2R-YG, Silicone Coated Fiberglas 2R-SG, TP- ####, TK-####, 2T- TFS.xx, DMD###, DPD###, SM61, D/M###, 1PEN2R, 1PEN3R, 1N012, 1G006, 1G015, 1G027, 1P130, 1H860, 1K063, 1PG880, 1H850, 1PN820, 1PN828, 1G130, 1G155, 1G180, 1K7170, 1K7177, 1K7270, 1P700, 1P702, 1P705, 1P703, 1P707, 1P717, 1P751, 1P808, 1P800, 1P801, 1P802, 1K7171, 1H861, 1H862, 1H863, 1P350, 1P830, 1N008, 1N155, 1P133, 1P135, 1H818, 1H866, 1P833, 1K7172, 1P701, 1K063CR, 1K7171CR, PB-2, NMN (N###MN*&amp;*), N/PEN/N (N###PEN/N*&amp;*, N###/1P801(**), N###/1P802(**), N###/1PEN2(**), N###/1PN2R(**), N###/1P801(**), N###/1P802(**), N###/PEN2(**), N###/PN2R(**), N###/1N012(**), N###/N155(**), OL50/N###OL50(**), N###/OL50(**), N###MN*&amp;*, N###M*&amp;*, N###PEN/N*&amp;*, N###/PEN*&amp;*, N###/K/N*&amp;*, L/PEN/L**</b>	<b>H85</b>	<b>180(H)</b>
Copyright © 2006 Underwriters Laboratories Inc.		

## 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.

## Winding Wire

- Recognized Component - Magnet wire (OBMW2), single build or greater, round or rectangular listed below or
- Recognized Component - Single and Multi-Layer Insulated Winding Wire (OBJT2) listed below or
- Recognized Component - Appliance Wiring Material (AVLV2) listed below

(unless otherwise noted, winding wire types listed below may be used in combination within a single product)

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

Bare Conductor - Insulated with Nomex 410, 414, 416, 464, 418, 424, 425, 411, E56A, 992, 993, or 994, minimum thickness 0.002 in., 50 percent overlap

## Ground & Interwinding Insulations

Designation (no.)	mils(mm)	comments
<b>BASF (Allied Signal)</b>		
Petra 130	20 (0.51)	
<b>Dupont Teijin Films</b>		
Teonex Q51	1.0 (0.03)	PEN
<b>E. I. Dupont de Nemours &amp; Co.</b>		
Kaladex 2000	1 (0.03)	
Nomex 410	5 (0.13)	aramid insulating paper
Nomex 411	11.5 (0.29)	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 424	5 (0.13)	aramid insulating paper
Nomex 425	5 (0.13)	aramid insulating paper
Nomex 464	5 (0.13)	aramid insulating paper
Nomex 992	10 (0.25)	aramid insulating paper
Nomex 993	8.3 (0.21)	aramid insulating paper
Nomex 994	8.3 (0.21)	aramid insulating paper
Nomex E56A	7.5 (0.19)	aramid insulating paper
Rynite 530	20 (0.51)	polyethylene terephthalate (PET)
Rynite FR530	20 (0.51)	polyethylene terephthalate (PET)
<b>Innovative Paper Technologies, LLC</b>		
CeQuin 3000	5 (0.13)	
TufQuin 110	5 (0.13)	
<b>P. Leo</b>		
1PEN2	1 (layers)	Recognized Component - Insulating Tape (OANZ2)
1PEN3	1 (layers)	Recognized Component - Insulating Tape (OANZ2)
1PN2R	1 (layers)	Recognized Component - Insulating Tape (OANZ2)
1PN3R	1 (layers)	Recognized Component - Insulating Tape (OANZ2)
L/PEN/L ***		L Represents Polyester Film, PEN represents Kaladex film, minimum 1 mil thickness. *** represents each layer thickness in mils
N###/1P801(**)		N### represents Nomex 410, 411, 414, 416, 464, 418, 419, E56, E56A. (**) represents total minimum thickness of Nomex: 5 mils for 410, 414, 416, 464 ; 10 mils for Nomex 411, 3 mils for E56, E56A, 419. 1P801 is a UL Recognized Tape (OANZ2) by P Leo.
N###/1P802(**)		N### represents Nomex 410, 411, 414, 416, 464, 418, 419, E56, E56A. (**) represents total minimum thickness of Nomex: 5 mils for 410, 414, 416, 464 ; 10 mils for Nomex 411, 3 mils for

N###/1PEN2(**)	E56, E56A, 419. 1P802 is a UL Recognized Tape (OANZ2) by P Leo. N### represents Nomex 410, 411, 414, 416, 464, 418, 419, E56, E56A. (**) represents total minimum thickness of Nomex: 5 mils for 410, 414, 416, 464 ; 10 mils for Nomex 411, 3 mils for E56, E56A, 419. 1PEN2 is a UL Recognized Tape (OANZ2) by P Leo.
N###/1PN2R(**)	N### represents Nomex 410, 411, 414, 416, 464, 418, 419, E56, E56A. (**) represents total minimum thickness of Nomex: 5 mils for 410, 414, 416, 464 ; 10 mils for Nomex 411, 3 mils for E56, E56A, 419. 1PN2R is a UL Recognized Tape (OANZ2) by P Leo.
N/PEN/N (N###PEN/N*&*	N### represents Nomex 410,411,414,416,464,418,419, E56A. M represents Polyester Film. PEN represents Kaladex. * represents each layer thickness in mils. & - indicates any thickness of Polyester or Kaladex.
N410MICA5(0.4)	N410 represents Nomex 410, thickness of 5 mils N### represents Nomex 410,411,414,416,464,418,419, E56A. M represents Polyester Film. PEN represents Kaladex. * represents each layer thickness in mils. & - indicates any thickness of Polyester or Kaladex.
NMN (N###MN*&*)	

### Lead Wires (optional)

200 FEP - fluorinated ethylene propylene  
 200 PTFE - polytetrafluoroethylene  
 200 SI - silicone rubber - with or without glass braid  
 200 Tefzel

### Minor Sheet Insulations (optional) layer, outer, wrap etc.

**Any sheet insulation or tape described in this table with no minimum thickness requirement.**

Designation (no.)	comments
<b>E. I. Dupont de Nemours &amp; Co.</b>	
Kaladex 2000	
Kaladex 2030	
Kapton CR	
Kapton HN	
Kapton PST	
Nomex 410	
Nomex 411	
Nomex 414	
Nomex 416	
Nomex 419	
Nomex 464	
Nomex 992	
Nomex 993	
Nomex E56	
Nomex E56A	
Nomex N196	
<b>P. Leo</b>	
8M81	
8M82	
D/M###	### = layer thickness in mils
DMD###	### = layer thickness in mils
DPD###	### = layer thickness in mils
L/PEN/L**	** - represents thickness of film

N###/1N012(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. 1N012 is a tape by P. Leo
N###/1P801(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. 1P801 is a tape by P. Leo
N###/1P802(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. 1P802 is a tape by P. Leo
N###/K/N*&*	N### or N is Nomex 410,411,414,416,464,418,419,E56,E56A. M is Polyester Film. * - represents each layer thickness in mils. & - any thickness of polyester or Kaladex 2000.
N###/N155(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. N155 is a tape by P. Leo
N###/OL50(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. OL50 is UL Recognized under file MH18339
N###/PEN*&*	N### or N is Nomex 410,411,414,416,464,418,419,E56,E56A. M is Polyester Film. * - represents each layer thickness in mils. & - any thickness of polyester or Kaladex 2000. PEN is Kaladex film.
N###/PEN2(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. 1PEN2 is a tape by P. Leo
N###/PN2R(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. PN2R is a tape by P. Leo
N###M*&*	N### or N is Nomex 410,411,414,416,464,418,419,E56,E56A. M is Polyester Film. * - represents each layer thickness in mils. & - any thickness of polyester or Kaladex 2000.
N###MN*&*	N### or N is Nomex 410,411,414,416,464,418,419,E56,E56A. M is Polyester Film. * - represents each layer thickness in mils. & - any thickness of polyester or Kaladex 2000.
N###PEN/N*&*	N### or N is Nomex 410,411,414,416,464,418,419,E56,E56A. M is Polyester Film. * - represents each layer thickness in mils. & - any thickness of polyester or Kaladex 2000. PEN is Kaladex film.
OL50/N###OL50(**)	N### indicates Nomex grade 410,411,414,418,416,464,E196,E734,E56, or E56A. (**) - indicates Nomex total thickness in mils. OL50 is UL Recognized under file MH18339
PB-2	
SM61	
SM62	
TK-####	# - represents thickness layer in mils
TP-####	# - represents thickness layer in mils
<b>Sung Won Electric</b>	
DMD	Polyester nonwoven/polyester film/Polyester nonwoven in any combination
NTN	Nomex/Polyester/Nomex
VDMD	Varnished DMD in any combination

## Cores, Tube, Bobbins (optional) (for mechanical support only)

Designation (no.)	comments
<b>E. I. Dupont de Nemours &amp; Co.</b>	
Rynite FR530	
Rynite FR530L	
<b>Sumitomo Bakelite</b>	
PM-9630	
PM-9750	
PM-9820	
PM-9850	

## Tapes (optional)

Designation (no.)	comments
<b>P Leo &amp; Co (B C) Ltd</b>	
0L50	
0L55	
1A025	
1G006	aramid fiber (Nomex) paper
1G015	silicone adhesive, glass cloth
1G027	rubber adhesive, glass cloth
1G130	glass cloth
1G155	glass cloth
1G180	glass cloth
1H818	reinforced PET, rubber adhesive
1H850	polyester film
1H860	acrylic adhesive, polyester film
1H861	acrylic adhesive, polyester film
1H862	acrylic adhesive, polyester film
1H863	acrylic adhesive, polyester film
1H866	PET film with nonwoven polyester reinforcement fibers, acrylic adhesive
1H86A	
1H86R	
1K063	silicone adhesive, polyimide film
1K063CR	
1K7170	Kapton film
1K7171	silicone adhesive, polyimide film
1K7171CR	
1K7172	silicone adhesive, polyimide film
1K7177	Kapton film
1K7270	Kapton film
1N008	aramid fiber (Nomex), rubber adhesive
1N012	PET film, acrylic adhesive
1N155	aramid fiber (Nomex), rubber adhesive
1P130	acrylic adhesive, polyester film
1P133	PET film, acrylic adhesive
1P135	PET film, acrylic adhesive
1P350	PET film, acrylic adhesive
1P700	polyester film
1P701	polyester film
1P702	polyester film
1P703	polyester film
1P705	polyester film
1P707	polyester film
1P717	polyester film
1P751	polyester film
1P800	polyester film
1P801	acrylic adhesive, polyester film
1P802	acrylic adhesive, polyester film

1P808	polyester film
1P830	acrylic adhesive, polyester film
1P833	PET film, acrylic adhesive
1P9FR	
1PEN2	
1PEN2R	
1PEN3	
1PEN3R	
1PG880	polyester film glass laminate
1PN820	woven polyester cloth
1PN828	woven polyester cloth
1TF05	
1TF07	
<b>Sung-Won Electric Co Inc</b>	
AGT-180	adhesive, glass cloth
AKT-180	
ANT-155	Nomex, adhesive

### Spacers and Wedges (optional)

Designation (no.)	comments
<b>Glastic Corp.</b>	
FHT	
MTS rod	
SG-200	
TSF	polyester/glass
<b>Sung Won</b>	
EGL	
MFGL	
SK661	

### Sleevings (optional)

Designation (no.)	comments
<b>P. Leo</b>	
2T-TFL.xx	teflon tube
2T-TFS.xx	teflon tube
2T-TFT.xx	teflon tube
Fiberglas 2R-YG	
Silicone Coated Fiberglas 2R-SG	
<b>Stone Industrial</b>	
Nomex	
<b>Sung-Won Electric Co Inc</b>	
S/G	silicone rubber coated fiberglass
<b>Varflex</b>	
Varglas Non-Fray Type H	
Varglas Non-Fray Type HM	
Varglas Non-Fray Type HP	
Varglas Silicone Resin 500 H-A-1	
Silicone Resin 500 H-B-1	
Silicone Rubber ES 4400 H-A-1	
Silicone Rubber H-A-1	
Silicone Rubber H-B-1	
Silicone Rubber H-C-1	
Varglas Viton 231 H-A-1	
Varglas Viton 231 H-C-1	

### Tie Cords (optional)

Designation (no.)	comments
-------------------	----------

**Teijin**

Polyester

**Toray**

Polyester

**Western Filament**

50DOF17W

DHS-1CL

DRT-45CL

DRT-45X

**Varnishes (optional)** Recognized Component - Varnishes (OBOR2)

Designation (no.)	comments
<b>P. D. George Co</b>	
Ripley Resin 468-2(+)	(+) - May be replaced by prefix "E" and may be followed by a one to five alphanumeric suffix indicated percent of inert filler and/or color.
50(+3), 50s(+3)	Also represents 50SM(+3), 50VT(+3), 50VTC(+3), 5180(+3), 5183(+3), 5183SW (+3) - May be followed by XXF. Where XX designates level of inorganic filler and letter F or filler.
60-60, 60-60S	
60-60VT	
60-60VT-200	
60-65S	
60-65S-30F	
60-65S-LV	
8180, 8183, 8180HV, 8183HV, 8180LV, 8183LV, 8183SW	