OBJS2 System Component, Electrical Insulation - Component **E200050**

P LEO & CO (B C) LTD

PO BOX 94250 RICHMOND BC V6Y 2A6 CA

System Component	System Designation	System Temp (Class)
SM62, 8M81, L/PEN/L*&*, DM**, 1PN820, 1PN82, 1PG880, 1TF07, 1TF05, 1A025, 1PEN2, 1H86A, 1H86R, 0L50, 0L55, 2T-TFT.xx, 2T-TFL.xx, Fiberglas 2R-YG, Silicone Coated Fiberglas 2R-SG, TP-####, TK-####, 2T-TFS.xx, DMD###, DPD###, 1PEN3, 1PN2R, 1PN3R, SM61, 1N012, 1G006, 1G015, 1G027, 1P130, 1H860, 1K063, 1G130, 1G155, 1G180, 1K7170, 1K7177, 1K7270, 1P700, 1P702, 1P705, 1P703, 1P707, 1P751, 1P808, 1P800, 1P801, 1P802, 1K7171, 1H861, 1H862, 1P350, 1P830, 1N008, 1P133, 1P135, 1H818, 1H866, 1P833, 1K7172, 1P701, 1K063CR, 1K7171CR, PB-2, NMN (N###MN*&*), N/PEN/N (N###PEN/N*&*, N###/1P801(**), N###/1P802(**), N###/1PEN2(**), N###/1PN2R(**), N###/1N012(**), N###/N155(**), OL50/N###OL50(**), N###/OL50(**), N###/PEN*&*, D/PEN**	N89	200(N)

Complies with IEC Publication 85

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.

Note: Recognized Component - Magnet Wire (OBMW2), single build or greater. Magnet wire types listed below may be used in combination within a single product.

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 - Bare conductor insulated with Dupont's Nomex materials listed for Ground and Interwinding Insulation, min. thickness 2.0 mils, 50% overlap; bare conductor or PTFE lead wire insulated with Dupont's Kaladex or Quin-T Corp's CeQuin materials or silico

Dupont
Nomax 410
Han Kyung
AWM Style 3132 — constructed with R/C polyester basecoat with polyamid-imide topcoat, rated 220C
Various Manufacturers
MW35, Polyester basecoat w/a polyamide-imide topcoat
MW73, Polyester basecoat w/a polyamide-imide topcoat

Ground & Interwinding Insulations

Designation (no.)	mils(mm)	comments
BASF (Allied Signal)		
Petra 130	20.0 (0.51)	
DuPont		
Nomex 410, 414, 418, 424 or 425	5.0 (0.13)	
Nomex 411	11.5 (0.29)	0.016 min. thickness
Nomex 416	5.0 (0.13)	0.005 min. thickness
Nomex 464	5.0 (0.13)	
Nomex 992	10.0 (0.25)	0.014 min. thickness
Nomex 993 or 994	8.25 (0.21)	0.01155 min. thickness
Nomex E56A	7.5 (0.19)	0.015 min. thickness
Dupont Teijin Films		
Teonex Q51	1.0 (0.03)	PEN
E. I. Dupont de Nemours & Co.		
Kaladex 2000	1.0 (0.03)	
Rynite 530	20.0 (0.51)	polyethylene terephthalate (PET)
Rynite FR530	20.0 (0.51)	polyethylene terephthalate (PET)
Fibertek		
NMN	3-3-3 (layers)	Nomex 410, 416 or 464
Innovative Paper Technologies, LLC		
CeQuin 3000	5.0 (0.13)	
TufQuin 110	5.0 (0.13)	
P. Leo		
1PEN2		Recognized Component - Insulating Tape (OANZ2)
1PEN3		Recognized Component - Insulating Tape (OANZ2)
1PN2R		Recognized Component - Insulating Tape (OANZ2)
1PN3R	1.0 (0.03)	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 E56, E56A, 419. 1P802 is a UL Recognized Tape (OANZ2) by P Leo.
N###/1PEN2(**)	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
NMN (N###MN*&*)	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.

Lead Wires **(optional)**

180 SI - silicone rubber - with or without glass braid +
200 FEP - florinated ethylene propylene
200 PTFE - polytetrafluoroethylene
200 SI - silicone rubber - with or without glass braid
200 Tefzel
220 SI - Silicone rubber - w/polyester braid

+ 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.

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

Designation (no.)	comments
E. I. Dupont de Nemours & Co.	
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	
P. Leo	
8M81	
8M82	
D/PEN**	** - thickness of film
DM**	* - represents each layer thickness in mils.
DMD###	### = layer thickness in mils
DPD###	### = layer thickness in mils
L/PEN/L*&*	* - represents each layer thickness in mils. & - any thickness of polyester or Kaladex 2000.
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 410,411,414,416,418,419,464,E56,E56A. * - represents each layer thickness. & - 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
Sung Won Electric	
DMD	Polyester nonwoven/plyester 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
E. I. Dupont de Nemours & Co.	
Rynite FR530	
Rynite FR530L	
Sumitomo Bakelite	
PM-9630	
PM-9750	
PM-9820	
PM-9850	

Tapes **(optional)**

Designation (no.)	comments
P Leo & Co (B C) Ltd	
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
1N1008	
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
1PN82	
1PN820	woven polyester cloth
1TF05	
1TF07	
Sung-Won Electric Co Inc	
AGT-180	adhesive, glass cloth
AKT-180	
ANT-155	Nomex, adhesive

Spacers and Wedges **(optional)**

Designation (no.)	comments
Glastic Corp.	
FHT	
MTS rod	
SG-200	
TSF	polyester/glass
Sung Won	
EGL	
MFGL	
SK661	
Various Manufacturers	
Wood, Untreated	

Sleevings **(optional)**

Designation (no.)	comments
P. Leo	
2T-TFL.xx	teflon tube
2T-TFS.xx	teflon tube
2T-TFT.xx	teflon tube
Fiberglas 2R-YG	
Silicone Coated Fiberglas 2R-SG	
Stone Industrial	
Nomex	
Sung-Won Electric Co Inc	
S/G	silicone rubber coated fiberglass
Varflex	
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 Vitor 131 H-A-1
Varglas Vitor 231 H-C-1

Tie Cords **(optional)**

Designation (no.)	comments
Teijin	
Polyester	
Toray	
Polyester	
Various Manufacturers	
Fiberglass, unimpregnated	
Western Filament	
50DOF17W	
DHS-1CL	
DRT-45CL	
DRT-45X	
Poly Sleeving	

Varnishes Recognized Component - Varnishes (OBOR2)

Designation (no.)	comments
P. D. George Co	
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	Recognized Component Varnish (OBOR2), with or without silica filled.
60-60VT	Recognized Component Varnish (OBOR2), with or without silica filled.
60-60VT-200	Recognized Component Varnish (OBOR2), with or without silica filled.
60-65S	Recognized Component Varnish (OBOR2), with or without silica filled.
60-65S-30F	Recognized Component Varnish (OBOR2), with or without silica filled.
60-65S-LV	Recognized Component Varnish (OBOR2), with or without silica filled.
8180, 8183, 8180HV, 8183HV, 8180LV, 8183LV, 8183SW	Recognized Component Varnish (OBOR2), with or without silica filled.