

**RUBADUE WIRE CO INC**  
5610 Boeing Dr, Loveland CO 80538

<u>System Component</u>	<u>System Designation</u>	<u>System Class</u>
D-(10 to 40)-X-XX-F-XX-M (M = or > 2.0), D-(10 to 40)-X-XX-T-XX-N (N = or > 3.0), D-(16 to 40)-X-XX-T-XX-L (L = or > 1.5), D-(18 to 40)-X-XX-T-XX-L-SB-X (L = or > 1.5), D-(30 to 40)-X-XX-T-XX-P (P = or > 1.25), D-(30 to 40)-X-XX-T-XX-U (U = or > 1.0), D-(30 to 40)-X-XX-T-XX-U-SB-X (U = or > 1.0), D-(4-6)-X-A-XX-F-I, D-(7-10)-X-A-XX-F-H, S-(10 to 26)-X-XX-T-X-V (V = or > 3.4), S-(10 to 40)-X-XX-F-X-N (N = or > 3.0), S-(18 to 40)-X-XX-F-X-M (M = or > 2.0), S-(22 to 40)-X-XX-T-X-L (L = or > 1.5), S-(22 to 40)-X-XX-T-X-L-SB-X (L = or > 1.5), S-(4-6)-X-A-XX-F-G, S-(7-10)-XX-A-XX-F-C, T-(10 to 40)-X-XX-F-XXX-M (M = or > 2.0), T-(10 to 40)-X-XX-T-XXX-M (M = or > 2.0), T-(18 to 40)-X-XX-T-XXX-L (L = or > 1.5) (b), T-(18 to 40)-X-XX-T-XXX-L-SB-X (L = or > 1.5), T-(20 to 40)-X-XX-T-XXX-U (U = or > 1.0), T-(20 to 40)-X-XX-T-XXX-U-SB-X (U = or > 1.0), T-(4-10)-X-A-XX-F-J, TCA3 (a), TCA3 (b)	TCA	155(F)

Report Date: 1998-06-19

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An Authorization Letter is Required for Adoption of this System

**Construction Details (Table I)**

Complies with IEC Publication 85

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 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 below minimum.

Note: Magnet Wire - Litz wire maybe constructed by braiding strands of Recognized Component OBMW2 magnet wire ANSI types listed below with or without nylon 6/6 serving, vario

**Filament Wire**

Additional Ground & Interwinding insulation **is not** required to separate this winding from other windings or between this winding and grounded/dead metal Recognized Component Single and Multi-Layer Insulated Winding Wire (OBJT2) listed below 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

RUBADUE WIRE CO INC [E206198] - Recognized Component

D-(10 to 40)-X-XX-F-XX-M (M = or > 2.0)	4.1 (0.1)	minimum overall wall thickness
D-(10 to 40)-X-XX-T-XX-N (N = or > 3.0)	3.6 (0.09)	minimum overall wall thickness
D-(16 to 40)-X-XX-T-XX-L (L = or > 1.5)	3.6 (0.09)	minimum overall wall thickness
D-(18 to 40)-X-XX-T-XX-L-SB-X (L = or > 1.5)	3.6 (0.09)	minimum overall wall thickness
D-(30 to 40)-X-XX-T-XX-P (P = or > 1.25)	3.6 (0.09)	minimum overall wall thickness
D-(30 to 40)-X-XX-T-XX-U (U = or > 1.0)	3.6 (0.09)	minimum overall wall thickness
D-(30 to 40)-X-XX-T-XX-U-SB-X (U = or > 1.0)	3.6 (0.09)	minimum overall wall thickness
D-(4-6)-X-A-XX-F-I	4.5 (0.11)	minimum overall wall thickness
D-(7-10)-X-A-XX-F-H	4.5 (0.11)	minimum overall wall thickness
S-(10 to 26)-X-XX-T-X-V (V = or > 3.4)	3.6 (0.09)	minimum overall wall thickness
S-(10 to 40)-X-XX-F-X-N (N = or > 3.0)	4.1 (0.1)	minimum overall wall thickness
S-(18 to 40)-X-XX-F-X-M (M = or > 2.0)	4.1 (0.1)	minimum overall wall thickness
S-(22 to 40)-X-XX-T-X-L (L = or > 1.5)	3.6 (0.09)	minimum overall wall thickness
S-(22 to 40)-X-XX-T-X-L-SB-X (L = or > 1.5)	3.6 (0.09)	minimum overall wall thickness
S-(4-6)-X-A-XX-F-G	4.5 (0.11)	minimum overall wall thickness
S-(7-10)-XX-A-XX-F-C	4.5 (0.11)	minimum overall wall thickness
T-(10 to 40)-X-XX-F-XXX-M (M = or > 2.0)	4.1 (0.1)	minimum overall wall thickness
T-(10 to 40)-X-XX-T-XXX-M (M = or > 2.0)	3.6 (0.09)	minimum overall wall thickness
T-(18 to 40)-X-XX-T-XXX-L (L = or > 1.5) (b)	3.6 (0.09)	minimum overall wall thickness
T-(18 to 40)-X-XX-T-XXX-L-SB-X (L = or > 1.5)	3.6 (0.09)	minimum overall wall thickness
T-(20 to 40)-X-XX-T-XXX-U (U = or > 1.0)	3.6 (0.09)	minimum overall wall thickness
T-(20 to 40)-X-XX-T-XXX-U-SB-X (U = or > 1.0)	3.6 (0.09)	minimum overall wall thickness
T-(4-10)-X-A-XX-F-J	4.5 (0.11)	minimum overall wall thickness
TCA3 (a)	4.1 (0.1)	minimum overall wall thickness
TCA3 (b)	4.1 (0.1)	minimum overall wall thickness

**Enameled Wire**

Recognized Component - Magnet wire (OBMW2), single build or greater, round or rectangular, copper or aluminum unless stated otherwise for the types listed below Ground Insulation is required to separate this winding from grounded/dead metal Interwinding Insulation **is** required to separate this winding from other enameled wire Unless otherwise noted, Winding Wire types listed below may be used in combination within a single product

<u>ANSI Type</u>	<u>Temp(°C)</u>	<u>Basecoat(Topcoat)</u>
MW 79	or 155°C	Polyurethane
MW 80	or 155°C	Polyurethane (Polyamide)
MW 82	or 180°C	Polyurethane
MW 83	or 180°C	Polyurethane (Polyamide)
MW 85	or 180°C	Polyurethane

**Ground and Interwinding Insulations**

any Recognized Component Plastic (QMFZ2), polyethylene terephthalate film (PET) 5 mils minimum

<u>Designation</u>	<u>mils(mm)</u>	<u>comments</u>
<u>3M COMPANY [E17385] - Recognized Component</u>		
1 (a)	5 (0.13)	
1205	1[layers]	
1298 (b)	5[layers]	
1298CR	5[layers]	
1318-1 (a)	5[layers]	
1318-2 (a)	3[layers]	
1350-1 (b)	5[layers]	
1350-2 (c)	3[layers]	

1350CR-1	5[layers]	
1350CR-2	3[layers]	
1350F-1 (b)	5[layers]	
1350F-2 (c)	3[layers]	
1350T-1 (b)	4[layers]	
1350T-2 (b)	3[layers]	
1350T-3 (b)	2[layers]	
1351-1 (a)	5[layers]	
1351-2 (c)	3[layers]	
1351T-1 (a)	4[layers]	
1351T-2 (a)	3[layers]	
44-T (a)	3[layers]	
44D (a)	4[layers]	
44D-A (a)	1[layers]	
44T-A (a)	3[layers]	
5	5[layers]	
54 (a)	5[layers]	
55	5[layers]	
56 (a)	5[layers]	
57 (a)	3[layers]	
58 (a)	3[layers]	
74 (a)	10[layers]	
75	5[layers]	
92	1[layers]	
<u>3M Japan Limited [E59505] - Recognized Component</u>		
SUPER 10-T	2 (0.05)	
SUPER 10-W	2[layers]	
<u>BONDTEC PACIFIC CO LTD [E175868] - Recognized Component</u>		
370S (b) *** this product is no longer Recognized ***	10[layers]	
371F (a) *** this product is no longer Recognized ***	10[layers]	
<u>CHYUN YIH TAPE CO LTD [E81174] - Recognized Component</u>		
PB416F	2[layers]	
<u>DuPont Specialty Products USA LLC [E39505] - Recognized Component</u>		
Kapton® 100CR, 100CRC	1 (0.03)	
Kapton® 100H, 100HN, 100HN-S, 100H-ZT, 100HN-ZT, 100FPC-ZT, 100TAB-ZT, 100PST, 100HA, 100TN, 100V, 100VN, 100FPC, 100FPC-A, 100HPP-ST, 100PST-A	1 (0.03)	
<u>DuPont Specialty Products USA, LLC [E34739] - Recognized Component</u>		
Nomex® 410	5 (0.13)	
<u>Mylar Specialty Films [E93687] - Recognized Component</u>		
KALADEx Kaladex 1030 *** this product is no longer Recognized ***	1[layers]	
<u>Nichiban Co., Ltd.</u>		
553H-UL	3 (0.08)	Recognized Component Insulating Tape (OANZ2)
<u>Nitto Denko</u>		
386UL	1[layers]	
<u>NITTO DENKO CORP [E34833] - Recognized Component</u>		
3161-FT1 *** this product is no longer Recognized ***	5[layers]	
3161-FT2 *** this product is no longer Recognized ***	3[layers]	
31CT-1 (a) *** this product is no longer Recognized ***	5[layers]	
31CT-2 (a) *** this product is no longer Recognized ***	3[layers]	
<u>P LEO &amp; CO LTD [E126174] - Recognized Component</u>		
1H860 (f)	3[layers]	
1H866 (g)	1[layers]	
1H86R (g)	1[layers]	
1K7170	1[layers]	
1K7177 *** this product is no longer Recognized ***	1[layers]	
1K7178	1[layers]	
1N012	2[layers]	
1P130-3 (b) (\$)	3[layers]	
1P135 (c) *** this product is no longer Recognized ***	3[layers]	
1P756 (h)	5[layers]	
1P801	5[layers]	
1P802	5[layers]	
1PEN2	1[layers]	
1PEN3	1[layers]	
1PN2R	1[layers]	
1PN3R	1[layers]	
<u>SUMITOMO BAKELITE CO LTD [E41429] - Recognized Component</u>		
SUMIKON AM-3200 *** this product is no longer Recognized ***	11.8[layers]	
SUMIKON PM-9630	11.8 (0.3)	
SUMIKON PM-9720	11.8 (0.3)	
SUMIKON PM-9750	11.8 (0.3)	
SUMIKON PM-9820, PM-9825	11.8 (0.3)	
SUMIKON PM-9830	11.8 (0.3)	
SUMIKON PM-9850	11.8 (0.3)	
<u>SYMBIO INC [E50292] - Recognized Component</u>		
35661	1[layers]	
KA170	3[layers]	
KA180	2[layers]	
MY130 (b)	3[layers]	
<u>TERAOKA SEISAKUSHO CO LTD [E56086] - Recognized Component</u>		
560S #2	2 (0.05)	
560S #3	1[layers]	
560S #5 *** this product is no longer Recognized ***	1[layers]	
561S #2 *** this product is no longer Recognized ***	3[layers]	
561S #3 *** this product is no longer Recognized ***	2[layers]	
561S #7 *** this product is no longer Recognized ***	1[layers]	
630F #25 (a)	5[layers]	
630F2 #50 (i) *** this product is no longer Recognized ***	3[layers]	
631S #25, 632S #25 (a)	5[layers]	
631S2 #50, 632S2 #50 (a) *** this product is no longer Recognized ***	3[layers]	

632S #25 (a) *** this product is no longer Recognized ***	5[layers]
635F *** this product is no longer Recognized ***	1[layers]
636F	1[layers]
650S #25	5[layers]
650S #50	3[layers]
652S #25	5[layers]
653F #25	5[layers]
654S #25	5[layers]
<u>TOYOBO FILM SOLUTIONS LIMITED [E206562] - Recognized Component</u>	
Teonex Film Q(l)(m), NQ(l)(m), K(l)(m) *** this product is no longer Recognized ***	1[layers]

## Lead Wires

lead wires are optional for this system

Temp	Insulation
200°C	SR - silicone rubber(with or without braid)
200°C	FEP - fluorinated ethylene propylene
200°C	PTFE - polytetrafluoroethylene
200°C	Perfluoro-alkyl vinyl ether/Al/PET/EVA

any sheet insulation or tape described in this table with no minimum thickness requirement may be used as a minor sheet material

## Tapes

tapes are optional for this system

Designation	comments
<u>3M COMPANY [E17385] - Listed or Recognized Component</u>	
1 (a)	
1181	
1205	
1245	
1298 (b)	
1298CR	
1318-1 (a)	
1318-2 (a)	
1350-1 (b)	
1350-2 (c)	
1350CR-1	
1350CR-2	
1350F-1 (b)	
1350F-2 (c)	
1350T-1 (b)	
1350T-2 (b)	
1350T-3 (b)	
1351-1 (a)	
1351-2 (c)	
1351T-1 (a)	
1351T-2 (a)	
1351T-3 (a)	
44 (a)	
44-T (a)	
44D (a)	
44D-A (a)	
44T-A (a)	
5	
54 (a)	
56 (a)	
57 (a)	
58 (a)	
74 (a)	
75	
92	
MR 94	
MR 94B (c)	
Super 10 (a)	
Super 20 (a)	
<u>3M Japan Limited [E59505] - Listed or Recognized Component</u>	
2245	
CU-35C	
SUPER 10-T	
SUPER 10-W	
<u>BONDTEC PACIFIC CO LTD [E175868] - Listed or Recognized Component</u>	
201 (c) *** this product is no longer Recognized ***	
201S (c) *** this product is no longer Recognized ***	
370S (b) *** this product is no longer Recognized ***	
371F (a) *** this product is no longer Recognized ***	
<u>CHYUN YIH TAPE CO LTD [E81174] - Listed or Recognized Component</u>	
PB416F	
<u>Nichiban Co. Ltd.</u>	
553H-UL	
620UL-T	
<u>Nitto Denko Corp</u>	
386 UL	Nomex
<u>NITTO DENKO CORP [E34833] - Listed or Recognized Component</u>	
3161-FT1 *** this product is no longer Recognized ***	
3161-FT2 *** this product is no longer Recognized ***	
3161FT *** this product is no longer Recognized ***	
31CT (a) *** this product is no longer Recognized ***	
31CT-1 (a) *** this product is no longer Recognized ***	
31CT-2 (a) *** this product is no longer Recognized ***	
31CTF (a) *** this product is no longer Recognized ***	
343B	
343BN (a) *** this product is no longer Recognized ***	
343BN@ (a) *** this product is no longer Recognized ***	
354	

**360A**

P.Leo & Co.(B.C),Ltd

1A605  
1E075  
1K7172  
1P130  
1P808  
1P830  
1P9FR  
1PEN5  
1PN3R  
1TF07

silicone adhesive, polyimide film  
acrylic adhesive, polyester film  
polyester film  
acrylic adhesive, polyester film

P LEO & CO LTD [E126174] - Listed or Recognized Component

**1A025**  
1A570 \*\*\* this product is no longer Recognized \*\*\*  
1C822 \*\*\* this product is no longer Recognized \*\*\*  
**1G006**  
**1G130 (o)**  
**1G155**  
**1G180**  
**1G200**  
**1H818 (m)**  
**1H850 Black (q)**  
**1H850 Natural (o)**  
**1H860 (f)**  
**1H86A (o)**  
**1H86R (g)**  
**1K063**  
**1K063CR**  
**1K7170**  
**1K7171A**  
**1K7178**  
**1N008**  
**1N012**  
**1N155**  
**1P133 (f)**  
1P135 (c) \*\*\* this product is no longer Recognized \*\*\*  
**1P316 (a)**  
**1P350 (e)**  
**1P656 (d)**  
**1P700 (b)**  
**1P756 (h)**  
**1P801**  
**1P802**  
1P802 (k) \*\*\* this product is no longer Recognized \*\*\*  
**1P833 xx (@)**  
**1PEN2**  
**1PEN3**  
**1PN820 (o)**  
**1PN828 (o)**  
**1TF05**

SYMBIO INC [E50292] - Listed or Recognized Component

**35661**  
**KA170**  
**KA180**  
**MY130 (b)**  
**NM130**

TERAOKA SEISAKUSHO CO LTD [E56086] - Listed or Recognized Component

**560S #2**  
**560S #3**  
560S #5 \*\*\* this product is no longer Recognized \*\*\*  
561S #2 \*\*\* this product is no longer Recognized \*\*\*  
561S #3 \*\*\* this product is no longer Recognized \*\*\*  
561S #7 \*\*\* this product is no longer Recognized \*\*\*  
**630F #25 (a)**  
630F2 #50 (i) \*\*\* this product is no longer Recognized \*\*\*  
**631S #25, 632S #25 (a)**  
631S #38 (d) \*\*\* this product is no longer Recognized \*\*\*  
631S2 #50, 632S2 #50 (a) \*\*\* this product is no longer Recognized \*\*\*  
635F \*\*\* this product is no longer Recognized \*\*\*  
**636F**  
**650S #25**  
**650S #50**  
**652S #25**  
**653F #25**  
**654S #25**  
673AB 0.27 (b) \*\*\* this product is no longer Recognized \*\*\*  
673AB 0.45 (b) \*\*\* this product is no longer Recognized \*\*\*  
**673F 0.27**  
**673F 0.5**  
673FG 0.45 (b) \*\*\* this product is no longer Recognized \*\*\*  
678F 0.27 (b) \*\*\* this product is no longer Recognized \*\*\*  
**831S**

Teraoka Seisakusho Co., Ltd.  
530F

epoxy varnish impregnated nonwoven polyester fabric, acrylic ad

**Core tubes and Bobbins**

(for mechanical support only) cores are optional for this system

Designation

comments

CELANESE INTERNATIONAL CORP [E41938] - employing Recognized materials

**Rynite FR530(I)(+)(f1), FR530L(I)(+)(f1)**

**Zytel 103FHS(+), 103HSL(+)**

KOLON ENP INC [E190675] - employing Recognized materials

## KP212V0(bbbb)

Mitsubishi Chemical Corporation [E53664] - employing Recognized materials

**NOVADURAN 5010N6(c)**

NOVAMID 3010N, 3010N(x) \*\*\* materials are no longer Recognized \*\*\*

TORAY INDUSTRIES INC [E41797] - employing Recognized materials

**1494**

## **Tubing and Sleeving**

tubing and sleeving are optional for this system

Designation

comments

Cosmo Link

PTFE L-type

PTFE T-type

Essex Furukawa Magnet Wire Japan Co., Ltd. [E58401] - Recognized Component

**PI-Tube, PIT-S**

GREAT HOLDING INDUSTRIAL CO LTD [E156256] - Recognized Component

**TFL**

**TFS**

**TFT**

Hitachi

Versafit V2

KURABE INDUSTRIAL CO LTD [E52717] - Recognized Component

**SE-1**

**SE-2**

NIKKAN INDUSTRIES CO LTD [E55258] - Recognized Component

**S-693F-1**

NIKKAN INDUSTRIES CO LTD [E72406] - Recognized Component

**S-693-600**

NIKKAN INDUSTRIES CO LTD [E88468] - Recognized Component

**E-651U-1**

**E-651U-2**

NISSEI ELECTRIC CO LTD [E67922] - Recognized Component

**RSU-1**

Nissei Electric Co., Ltd

RSU-2

P LEO & CO LTD [E176865] - Recognized Component

**2T-TFL-xx.x (a)**

**2T-TFS-xx.x (a)**

**2T-TFT-xx.x (a)**

P LEO & CO LTD [E195829] - Recognized Component

2R-SG# \*\*\* this product is no longer Recognized \*\*\*

SUMITOMO ELECTRIC FINE POLYMER INC [E48762] - Recognized Component

811 or Sumitube F2 \*\*\* this product is no longer Recognized \*\*\*

821 or Sumitube F2 \*\*\* this product is no longer Recognized \*\*\*

**940 or SUMITUBE F2(Z) or SUMITUBE T82**

Zeus Company LLC [E64007] - Recognized Component

**TFE-HW-300**

**TFE-HW-600**

**TFE-LW-150**

## **Tie Cords**

tie cords are optional for this system

Designation

comments

Teijin

BHT-44T

## **Potting Compounds**

potting compounds are optional for this system

Designation

comments

GE Toshiba Silicone

TSE3331

TSE3331K

## **Varnishes**

varnishes are optional for this system

Designation

comments

ELANTAS BECK INDIA LTD [E253938] - Recognized Component

**468-2 (d)**

ELANTAS Europe S.r.l. [E171184] - Recognized Component

**468-2 (d), 468-2FC (d), 468-2-7-xxF (d), 468-2-7FC-xxF (d)**

**Y-210 BLK**

**Y-210PS Thermodur**

ELANTAS North America, Inc [E75225] - Recognized Component

**434 Air Dry**

**468-2 (d), 468-2FC (d), 468-2-7-xxF (d), 468-2-7FC-xxF (d)**

**711-F-2106**

**87V-456, 77X-010, 77X-010F**

**V1380, V1380FC, V1380FC Black, 80381FC**

**V1630, V1630FS, V1630FS50, V1630FS Black, 80361, 80361FS**

**Y-210, Y-210BLK, Y-210 BLACK, Y-210 Grey, Y-210PS Thermodur, EB 920**

ELANTAS ZHUHAI CO LTD [E314793] - Recognized Component

**434 Air Dry**

**468-2 (d), 468-2FC(d)**

711-F-2106  
87V-456, 77X-010, 77X-010F  
V1380, V1380FC, V1380FC Black, 80381FC  
V1630FS, V1630, V1630FS50, V1630FS Black, 80361, 80361FS  
Y-210, Y-210BLK, Y-210 Grey, Y-210PS Thermodur, EB920

John C Dolph Co [E317427] - Recognized Component  
AC-43, EB-43-HG, EB-43-FB, AC-43-66, EG-43/698-D, EG-43/759-D, ER-43/368-D, EB  
43/387-D  
BB-353  
BC-346A, BC-346-A, BC-346B, BC-346-E, BB-348, BB-346-HF, BC-346HF, BG-346A, BB-  
346-A, BB-346/A, BC-370  
PDR-1840, PDR-1874, PDR-1839, BC-363

KYOCERA Corporation [E83702] - Recognized Component  
TVB2024  
TVB2180T

MEIDEN CHEMICAL CO LTD [E202574] - Recognized Component  
754 XL  
880

Resonac Corporation [E72979] - Recognized Component  
WA-238A  
WF-285  
WP-2952, WP-2952F-5  
WP-2952F-2G, WP-2952F-2G(Y), WP-2952F-2G(YL), WP-2952F-2G(FC), WP-2952F-  
2G(H), WP-2952F-2G(K)

## **Miscellaneous Minor Insulations**

miscellaneous minor insulations are optional for this system

Designation	comments
<u>CELANESE INTERNATIONAL CORP [E41938] - employing Recognized materials</u> Rynite FR530(I)(+)(f1), FR530L(I)(+)(f1) Zytel 103FHS(+), 103HSL(+)	
<u>Chang Chun</u> PBT-4130	Coil cover
<u>KOLON ENP INC [E190675] - employing Recognized materials</u> KP212V0(bbbb)	
<u>Mitsubishi Chemical Corporation [E53664] - employing Recognized materials</u> NOVADURAN 5010N6(c) NOVAMID 3010N, 3010N(x) *** materials are no longer Recognized ***	
<u>Teijin</u> CN7000 CN7030 CRN7000 CRN7030	Coil cover Coil Cover Coil cover Coil cover
<u>TORAY INDUSTRIES INC [E41797] - employing Recognized materials</u> 1494	