

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)	RXT-2	155(F)

Report Date: 1998-06-19

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alternate constructions:

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)	4.5 (0.11)	minimum overall wall thickness
D-(10 to 40)-X-XX-T-XX-N (N = or > 3.0)	4.5 (0.11)	minimum overall wall thickness
D-(16 to 40)-X-XX-T-XX-L (L = or > 1.5)	4.5 (0.11)	minimum overall wall thickness
D-(18 to 40)-X-XX-T-XX-L-SB-X (L = or > 1.5)	4.5 (0.11)	minimum overall wall thickness
D-(30 to 40)-X-XX-T-XX-P (P = or > 1.25)	4.5 (0.11)	minimum overall wall thickness
D-(30 to 40)-X-XX-T-XX-U (U = or > 1.0)	4.5 (0.11)	minimum overall wall thickness
D-(30 to 40)-X-XX-T-XX-U-SB-X (U = or > 1.0)	4.5 (0.11)	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)	4.5 (0.11)	minimum overall wall thickness
S-(10 to 40)-X-XX-F-X-N (N = or > 3.0)	4.5 (0.11)	minimum overall wall thickness
S-(18 to 40)-X-XX-F-X-M (M = or > 2.0)	4.5 (0.11)	minimum overall wall thickness
S-(22 to 40)-X-XX-T-X-L (L = or > 1.5)	4.5 (0.11)	minimum overall wall thickness
S-(22 to 40)-X-XX-T-X-L-SB-X (L = or > 1.5)	4.5 (0.11)	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)	4.5 (0.11)	minimum overall wall thickness
T-(10 to 40)-X-XX-T-XXX-M (M = or > 2.0)	4.5 (0.11)	minimum overall wall thickness
T-(18 to 40)-X-XX-T-XXX-L (L = or > 1.5) (b)	4.5 (0.11)	minimum overall wall thickness
T-(18 to 40)-X-XX-T-XXX-L-SB-X (L = or > 1.5)	4.5 (0.11)	minimum overall wall thickness
T-(20 to 40)-X-XX-T-XXX-U (U = or > 1.0)	4.5 (0.11)	minimum overall wall thickness
T-(20 to 40)-X-XX-T-XXX-U-SB-X (U = or > 1.0)	4.5 (0.11)	minimum overall wall thickness
T-(4-10)-X-A-XX-F-J	4.5 (0.11)	minimum overall wall thickness
TCA3 (a)	4.5 (0.11)	minimum overall wall thickness
TCA3 (b)	4.5 (0.11)	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 30	or 180°C	Polyester-amide-imide
MW 35	or 200°C	Polyester-amide-imide (Polyamide-imide)
MW 36	or 200°C	Polyester-amide-imide (Polyamide-imide)
MW 37	or 220°C	Polyester (Polyamide-imide)
MW 38	or 220°C	Polyester (Polyamide-imide)
MW 73	or 200°C	Polyester-amide-imide (Polyamide-imide)
MW 74	or 200°C	Polyester-amide-imide
MW 76	or 180°C	Polyester-amide-imide (Polyamide)
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

Bare Conductor - wapped with Nomex 410, 2 mils (0.051mm) min. 50% overlap.

Ground and Interwinding Insulations

any Recognized Component Plastic (QMFZ2), polyethylene terephthalate film (PET) 1 mils minimum

Designation	mils(mm)	comments
<u>3M COMPANY [E17385] - Recognized Component</u>		
1318 clear (a)	1[layers]	
1318-1 (a)	1[layers]	
1318-2 (a)	1[layers]	
1350-1 (b)	1[layers]	
1350-2 (c)	1[layers]	
1350F-1 (b)	1[layers]	
1350F-2 (c)	1[layers]	
56 (a)	1[layers]	
92	1[layers]	
<u>CELANESE INTERNATIONAL CORP [E344082] - Recognized Component</u>		
ZENITE 6130(+)	15 (0.38)	
ZENITE 7130, 7130 ECO-B(S)	15 (0.38)	
<u>CELANESE INTERNATIONAL CORP [E41938] - Recognized Component</u>		
Rynite FR530(I)(+)(f1), FR530L(I)(+)(f1)	15 (0.38)	
<u>DuPont Specialty Products USA LLC [E39505] - Recognized Component</u>		
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>INTERTAPE POLYMER GROUP [E20780] - Recognized Component</u>		
4238 (16)*	1[layers]	
4426-04-(39)*	1[layers]	
4427-00 (415)*	1[layers]	
51596* (b)	1[layers]	
51597	1[layers]	
<u>Nitto Inc [E20392] - Recognized Component</u>		
P-221 (P-221L, P-221PL, 6379)	1[layers]	
P-222 (P-222L, P-222PL, 6761)	1[layers]	
P-224 AMB (formerly P-224)	1[layers]	
P-245 (a) (P-245 BLK (a))	1[layers]	
P-253	1[layers]	
P-256	1[layers]	
P-262	1[layers]	
P-281 (c) (P-281 BK (c))	1[layers]	
P-286	1[layers]	
<u>P LEO & CO LTD [E126174] - Recognized Component</u>		
1P756 (h)	1 (0.03)	
1P801	1 (0.03)	
1P802	1 (0.03)	
<u>SYMBIO INC [E50292] - Recognized Component</u>		
KA180	1[layers]	
MY130 (b)	1[layers]	

Lead Wires

lead wires are optional for this system

Temp	Insulation
125°C	XLPE - crosslinked polyethylene +
150°C	SR - silicone rubber(with or without braid)
150°C	EPDM - ethylene propylene diene monomer
150°C	Perfluoro-alkyl vinyl ether/Al/PET/EVA
150°C	XLPE - crosslinked polyethylene
150°C	FEP - fluorinated ethylene propylene
200°C	SR - silicone rubber(with or without braid)
200°C	Perfluoro-alkyl vinyl ether/Al/PET/EVA
200°C	FEP - fluorinated ethylene propylene

+ 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 exclude requirement by a special note at the beginning of this table.

Minor Sheet Materials

(layer, outer, wrap etc.) minor sheet is optional for this system

Designation	comments
<u>3M Innovative Paper Technologies</u>	
CeQuin 30F, 30F30, F30F	
CeQuin 500	
CeQuin GeSat	
CeQuin IG, IGI, GIG	
CeQuinbord CEL SAT	
TufQuin 100, 110, 120	
<u>Dupont -Teijin Films</u>	
Mylar	
<u>E. I. Dupont de Nemours & Co.</u>	
Nomex®	
<u>Various Manufacturers</u>	
Kraft Paper	
<u>Von Roll USA, Inc.</u>	
5JF	
Memco 100 DMD	
Pyroglass	
Pyrolam 100X	

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
3M (Minnesota Mining & Mfg Co)	

11
3
90

thermosetting rubber adhesive, black acetate cloth
thermosetting rubber adhesive, flatback paper
glass cloth

3M COMPANY [E17385] - Listed or Recognized Component

1194
1245
1312 (a)
1318 clear (a)
1318-1 (a)
1318-2 (a)
1339
1350-1 (b)
1350-2 (c)
1350F-1 (b)
1350F-2 (c)
27 (a)
44 (a)
46
56 (a)
60
69 (a), 9 (a)
92
Super 20 (a)

Chomerics

101
202
301

Compac

812-8
836-7
837-5

Dielectric Polymers

NT 590

Electro Tape Specialties Inc

ETS-21FR
ETS-23
ETS-29
ETS-418
ETS-451
ETS-92
ETS-94
ETS-95
ETS-97

ELECTRO TAPE SPECIALTIES INC [E52363] - Listed or Recognized Component

ETS-149
ETS-269

IDEAL TAPE CO INC [E82910] - Listed or Recognized Component

IT-700 (b)
IT-7007 (b)
IT-7017 (b)
IT-7170 (c)
IT-7177
IT-720 (b)
IT-725
IT-7270
IT-7300
IT-750 Natural (b)
IT-7807 (b)

INTERTAPE POLYMER GROUP [E20780] - Listed or Recognized Component

4238 (16)*
4309 (6228)*
4426-04-(39)*
4427-00 (415)*
4428 (23)*
4616-00 (51)*
4617 (58)*
51587-04*
51589-00
51596* (b)
51597

Intertape Polymer Group (Tesa, Tuck, Spinnaker)

4194
4353
50501
51582
51587-17

polyester film

Nitto Denko Corp

156
315
380
5

rubber adhesive, polyester film

acrylic adhesive, acetate cloth

NITTO DENKO CORP [E34833] - Listed or Recognized Component

188UL
3161F *** this product is no longer Recognized ***
354E
360UL
903

Nitto Inc [E20392] - Listed or Recognized Component

P-213, P-213S, EE-7240
P-221 (P-221L, P-221PL, 6379)
P-222 (P-222L, P-222PL, 6761)

P-224 AMB (formerly P-224)
P-234
P-245 (a) (P-245 BLK (a))
P-248
P-253
P-256
P-262
P-277
P-281 (c) (P-281 BK (c))
P-286
P-422
P-430 NAT

Nitto Permacel

P-21
P-241
P-427

thermosetting rubber adhesive, glass cloth

thermosetting silicone adhesive, PTFE film

PPI ADHESIVE PRODUCTS LTD [E86214] - Listed or Recognized Component

65120
70110

SAINTE-GOBAIN PERFORMANCE PLASTICS CORP [E51201] - Listed or Recognized Component

G565
K103A
K250A (d)
M54A

M97 (b) *** this product is no longer Recognized ***

Saint-Gobain Performance Plastics Corp.

G551

thermosetting rubber adhesive, glass cloth

Symbio Inc

MY1
MY9
NM13

aramid (Nomex) paper

SYMBIO INC [E50292] - Listed or Recognized Component

GL06
GL15
GL27
KA00
KA180
MY130 (b)
NM130

Ticona

Vectra A130
Vectra C130
Vectra E130

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(l)(+)(f1), FR530L(l)(+)(f1)
Zytel 101(f2)(r9), 101F(f2)(r9), 101L(f2)(r9)
Zytel 103FHS(+), 103HSL(+)
Zytel 70G30HSL, 70G30HSLR
Zytel 70G33L(+)
Zytel FR50(+)(f1)

CHANG CHUN PLASTICS CO LTD [E59481] - employing Recognized materials

LONGLITE T373J
LONGLITE T375J(G5)(G6)

E. I. Dupont de Nemours & Co.

MX6130

Paramount Tube

ParaQuin
Rigid ParaQuin

RTP CO [E84658] - employing Recognized materials

RTP 205 FR

SUMITOMO BAKELITE CO LTD [E41429] - employing Recognized materials

SUMIKON PM-8375
SUMIKON PM-9630
SUMIKON PM-9750
SUMIKON PM-9820, PM-9825
SUMIKON PM-9830

TORAY INDUSTRIES INC [E41797] - employing Recognized materials

Ryton R-4(\$\$(f1) *** materials are no longer Recognized ***

Spacer and Wedges

spacer and wedges are optional for this system

Designation

comments

Solvay Specialty Polymers USA L L C [E95746] - employing Recognized materials

RYTON R-4 02 XT(f1)

Various Manufacturers

Wood, Untreated

any material described in this table with no thickness requirement may be used as a spacer or a wedge

Tubing and Sleeving

tubing and sleeving are optional for this system

Designation

comments

ATKINS & PEARCE INC [E15253] - Recognized Component

Silverflex T&D

ATKINS & PEARCE INC [E63446] - Recognized Component

1151-FR

1151-XL-200

1151-XL-240

1151-XL-FR1

ACRYL

Atkins & Pearce Inc.

Ben Har Ex-Flex 1500

NU-FLEX WHS-25

Suflex Acryflex VPI-NF

Suflex Acrylflex

Suflex Flexicone

Suflex Silicone Rubber Resin

Atlantic Tubing

TFS

Delfingen US-New York Inc

Flexite PO-135 shrinkdown

Flexite TFE

NU-SLEEVE AG-155-B

NU-SLEEVE SG-200

DELFINGEN US-NEW YORK INC [E93101] - Recognized Component

NU Sleeve SG-200-A

NU-Sleeve AG-155-A

NU-Sleeve T117-FR

GREAT HOLDING INDUSTRIAL CO LTD [E156256] - Recognized Component

TFT

Hilec/Delfingen US-New York Inc

Hilec 310 Series

Hilec 410 Series

Hilec 540 Series

Hilec 710 Series

TEXLOC LTD [E103313] - Recognized Component

Light Wall (LW) *** this product is no longer Recognized ***

Standard Wall (SW) *** this product is no longer Recognized ***

Thin Wall (TW) *** this product is no longer Recognized ***

Varflex

Silflex

Silicone Rubber ES 4400 H-A-1

Varflo B-A-1

VARFLEX CORP [E53690] - Recognized Component

Varglas 231, Varglas Viton 231

Varglas Non-Fray HM

Varglas Non-Fray HO

VARFLEX CORP [E63450] - Recognized Component

Varglas

Varglas A-397

Varglas Silicone Resin 500

Tie Cords

tie cords are optional for this system

Designation

comments

American Efird Inc.

LP 1008

LP 1012

LP 1126

LP 1552

LP 1556

N884

Atkins & Pearce Inc.

13-220

16-2HT

17-200-NX

29-210

AP-3100-T

MS 9023-T4

Breyden Products

5070, 5100, 5200, 5311, 5312, 5313, 5350, 150, 225, 350

60, 75, 100, 200, 252, 330, 350, 390, 500, 504, 6100, 6200, 6500, 3MC, 5MC, 7MC

optional prefix of "G" or suffixes of "-1"

optional prefix of "HT" or suffixes of "-1" or "-LS"

Varflex

48

silicone coated fiberglass

Western Filament

50DOF17W

50NOF17W

DHS-1CL

Varnishes

varnishes are optional for this system

Designation

comments

ELANTAS North America, Inc [E75225] - Recognized Component

C1525A, C1525F35, C1525G45

V1380, V1380FC, V1380FC Black, 80381FC

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

not valid for use with ANSI Type MW80 magnet wire.

not valid for use with ANSI Type MW80 magnet wire.

not valid for use with ANSI Type MW80 magnet wire.

ELANTAS ZHUHAI CO LTD [E314793] - Recognized Component

C1525A, C1525F35, C1525G45

V1380, V1380FC, V1380FC Black, 80381FC

not valid for use with ANSI Type MW80 magnet wire.

not valid for use with ANSI Type MW80 magnet wire.

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

not valid for use with ANSI Type MW80 magnet wire.

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

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

CC-1105, CC-1105HTC, CC-1103, CC-1105OPT, CC-1105OPT/HTC, CC-1105LV, CB-

1105HTC, PDR-1933, PDR-1711, CC-1155, CC-1156, CC-1106

CC-1305, CC-1305-HTC, CC-1305/503D, CC-1305-HTC-FC, CB-1305-HTC

not valid for use with ANSI Type MW76 or MW80 magnet wire.

not valid for use with ANSI Type MW80 magnet wire.