

RUBADUE WIRE CO INC

5610 Boeing Dr, Loveland CO 80538

| System Component | System Designation | System Class |
|---|--------------------|--------------|
| 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, D-AA-X-XX-F-XX-N, 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, TCA2, TCA3 (a), TCA3 (b) | RXT-2 | 155(F) |

Report Date: 1998-06-19

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alternate constructions: [Table III](#)

Construction Details (Table III)

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) | 2.0 (0.05) | minimum overall wall thickness |
| D-(10 to 40)-X-XX-T-XX-N (N = or > 3.0) | 1.2 (0.03) | 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) | 1.2 (0.03) | minimum overall wall thickness |
| D-(30 to 40)-X-XX-T-XX-P (P = or > 1.25) | 1.2 (0.03) | minimum overall wall thickness |
| D-(30 to 40)-X-XX-T-XX-U (U = or > 1.0) | 1.2 (0.03) | minimum overall wall thickness |
| D-(30 to 40)-X-XX-T-XX-U-SB-X (U = or > 1.0) | 1.2 (0.03) | 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) | 1.2 (0.03) | minimum overall wall thickness |
| S-(10 to 40)-X-XX-F-X-N (N = or > 3.0) | 2.0 (0.05) | minimum overall wall thickness |
| S-(18 to 40)-X-XX-F-X-M (M = or > 2.0) | 2.0 (0.05) | 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) | 1.2 (0.03) | 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) | 2.0 (0.05) | minimum overall wall thickness |
| T-(10 to 40)-X-XX-T-XXX-M (M = or > 2.0) | 1.2 (0.03) | 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) | 1.2 (0.03) | minimum overall wall thickness |
| T-(20 to 40)-X-XX-T-XXX-U (U = or > 1.0) | 1.2 (0.03) | minimum overall wall thickness |
| T-(20 to 40)-X-XX-T-XXX-U-SB-X (U = or > 1.0) | 1.2 (0.03) | minimum overall wall thickness |
| T-(4-10)-X-A-XX-F-J | 4.5 (0.11) | minimum overall wall thickness |
| TCA2 | 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 |
| Rubadue Wire Co. Inc. D-AA-X-XX-F-XX-N | 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

| ANSI Type | Temp(°C) | Basecoat(Topcoat) |
|-----------|----------|---|
| 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 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) |

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> | |
| 1318-1 (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. [E444082] - 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>INTEK TAPES PVT LTD. [E171030] - Recognized Component</u> | |
| F-391 | 1[layers] |
| <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 DENKO CORP. [E34833] - Recognized Component</u> | |
| 3161F *** this product is no longer Recognized *** | 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] |
| <u>P LEO & CO LTD. [E126174] - Recognized Component</u> | |
| 1K063 | 1[layers] |
| 1K7170 | 1[layers] |
| 1K7220 | 1[layers] |
| 1P756 (h) | 1[layers] |
| 1P801 | 1[layers] |
| 1P802 | 1[layers] |
| <u>SYMBIO INC. [E50292] - Recognized Component</u> | |
| KA180 | 1[layers] |
| MY130 (b) | 1[layers] |

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 |
|---|--|
| <u>3M (Minnesota Mining & Mfg Co)</u> | |
| 11 | thermosetting rubber adhesive, black acetate cloth |
| 3 | thermosetting rubber adhesive, flatback paper |
| 90 | glass cloth |
| <u>3M COMPANY [E17385] - Listed or Recognized Component</u> | |
| 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)

Intek Tapes PVT LTD

F-302
F-361
F-520

INTEK TAPES PVT LTD [E171030] - Listed or Recognized Component

F-300
F-304 *** this product is no longer Recognized ***
F-376 *** this product is no longer Recognized ***
F-391
F-620
F-954
F311

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

31-C75
31G-TF
386 UL
3885

Nomex

NITTO DENKO CORP [E34833] - Listed or Recognized Component

3161F *** this product is no longer Recognized ***
31C
31CT-1 (a) *** this product is no longer Recognized ***
31CT-2 (a) *** this product is no longer Recognized ***
320A-UL *** this product is no longer Recognized ***
343B
343BN@ (a) *** this product is no longer Recognized ***
360A

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

P Leo & Co (B C) Ltd

1E075
1K7172
1P130
1P830
1P9FR

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

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

1A024
1A025
1C821
1G015
1G180
1G20H
1H818 (m)
1H86A (o)
1K062
1K063
1K7170
1K7177 *** this product is no longer Recognized ***
1K7178
1K7200
1K7220
1KPST
1N012
1N155
1P133 (f)
1P135 (c) *** this product is no longer Recognized ***
1P316 (a)
1P656 (d)
1P700 (b)
1P702 (b)
1P717 (b)
1P756 (h)
1P801
1P802
1P802 (k) *** this product is no longer Recognized ***
1PEN2
1PG880 (o)
1PN820 (o)
1PS25
1TF08
1TT02

PPLADHESIVE PRODUCTS LTD [E86214] - Listed or Recognized Component

65120
70110

SAINT-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

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
Ben Har ST
Silverflex T&D

ATKINS & PEARCE INC [E63446] - Recognized Component
ACRYL

Atkins & Pearce Inc.
Suflex Acryflex VPI-NF
Suflex Acryflex
Suflex Flexicone
Suflex Silicone Rubber Resin
Thin Wall

Atlantic Tubing
TFS

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"

Variflex
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
468-2 (d), 468-2FC (d), 468-2-7-xxF (d), 468-2-7FC-xxF (d)
C1525A, C1525F35, C1525G45
V1380, V1380FC, V1380FC Black, 80381FC
V1630, V1630FS, V1630FS50, V1630FS Black, 80361, 80361FS

ELANTAS ZHUHAI CO LTD [E314793] - Recognized Component
468-2 (d), 468-2FC(d)
C1525A, C1525F35, C1525G45
V1380, V1380FC, V1380FC Black, 80381FC
V1630FS, V1630, V1630FS50, V1630FS Black, 80361, 80361FS

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 magnet wire.

SUZHOU TAIHU ELECTRIC ADVANCED MATERIAL CO LTD [E228349] - Recognized Component
ET-90(a)