

**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-(4-6)-X-A-XX-F-I, D-(7-10)-X-A-XX-F-H, 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-(4-6)-X-A-XX-F-G, S-(7-10)-XX-A-XX-F-C, S-XX-A-01-FXM, T-(18 to 40)-X-XX-T-XXX-L-SB-X (L = or > 1.5), T-(4-10)-X-A-XX-F-J, TCA1, TCA1-AA-SB-X, TCA2, TCA3 (a), TCA3 (b) | RXT-2                     | 155(F)              |

Report Date: 1998-06-19

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alternate constructions: [Table V](#)

An Authorization Letter is Required for Adoption of this System

**Construction Details (Table V)**

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)       |            |  |
| D-(10 to 40)-X-XX-T-XX-N (N = or > 3.0)       |            |  |
| 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-(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-(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)      |            |  |
| T-(18 to 40)-X-XX-T-XXX-L-SB-X (L = or > 1.5) |            |  |
| T-(4-10)-X-A-XX-F-J                           | 4.5 (0.11) | minimum overall wall thickness                               |
| TCA1  |            |  |
| TCA1-AA-SB-X                                  |            |  |
| TCA2  |            |  |
| TCA3 (a)                                      |            |  |
| TCA3 (b)                                      |            |  |
| <u>Rubadue Wire Co. Inc.</u><br>S-XX-A-01-FXM |            | 2.0 mils (0.05mm) Basic (single) insulation of FEF 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 35-A          | or 220°C        | Polyester-amide-imide (Polyamide-imide) |
| MW 36            | or 200°C        | Polyester-amide-imide (Polyamide-imide) |
| MW 36-A          | or 220°C        | Polyester (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 73-A          | or 220°C        | Polyester-amide-imide (Polyamide-imide) |
| MW 74            | or 200°C        | Polyester-amide-imide                   |
| MW 74-A          | or 220°C        | Polyester-amide-imide                   |
| MW 76            | or 180°C        | Polyester-amide-imide (Polyamide)       |

**Ground and Interwinding Insulations**

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

| <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 (0.13)        |                 |
| 1298CR  | 5 (0.13)        |                 |
| 1318-1 (a)  | 5 (0.13)        |                 |
| 1318-2 (a)  | 5 (0.13)        |                 |
| 1350-1 (b)  | 5 (0.13)        |                 |
| 1350-2 (c)  | 5 (0.13)        |                 |
| 1350CR-1  | 5 (0.13)        |                 |
| 1350CR-2  | 5 (0.13)        |                 |
| 1350F-1 (b)                                       | 5 (0.13)        |                 |
| 1350F-2 (c)                                       | 5 (0.13)        |                 |
| 1350T-1 (b)                                       | 5 (0.13)        |                 |
| 1350T-2 (b)                                       | 5 (0.13)        |                 |

|   |             |
|---|-------------|
| 1350T-3 (b)   | 5 (0.13)    |
| 1351-1 (a)  | 5 (0.13)    |
| 1351-2 (c)  | 5 (0.13)    |
| 1351T-1 (a)   | 5 (0.13)    |
| 1351T-2 (a)   | 5 (0.13)    |
| 1351T-3 (a)   | 5 (0.13)    |
| 44-T (a)  | 5 (0.13)    |
| 44D (a)   | 5 (0.13)    |
| 44D-A (a)   | 5 (0.13)    |
| 44T-A (a)   | 5 (0.13)    |
| 5   | 5 (0.13)    |
| 54 (a)  | 5 (0.13)    |
| 55  | 5 (0.13)    |
| 56 (a)  | 5 (0.13)    |
| 57 (a)  | 5 (0.13)    |
| 58 (a)  | 5 (0.13)    |
| 74 (a)  | 5 (0.13)    |
| 92  | 1[layers]   |
| Super 10 (a)  | 5 (0.13)    |
| <u>CELANESE INTERNATIONAL CORP [E41938] - Recognized Component</u>  |             |
| Rynite FR530(l)(+)(f1), FR530L(l)(+)(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)    |
| Nomex® 411  | 11.5 (0.29) |
| Nomex® 414  | 5 (0.13)    |
| Nomex® 416, 416 LAM   | 5 (0.13)    |
| Nomex® 418, 818, 864LAM   | 5 (0.13)    |
| Nomex® 992, 992PSB  | 10 (0.25)   |
| Nomex® 993, 993PSB  | 8.25 (0.21) |
| Nomex® 994, 994PSB  | 8.25 (0.21) |
| Nomex® E56, 356   | 7.5 (0.19)  |
| <u>E. I. Dupont de Nemours &amp; Co.</u>  |             |
| Mylar   | 5 (0.13)    |
| <u>INTERTAPE POLYMER GROUP [E20780] - Recognized Component</u>  |             |
| 4238 (16)*  | 5 (0.13)    |
| 4426-04-(39)*   | 5 (0.13)    |
| 4427-00 (415)*  | 5 (0.13)    |
| 51596* (b)  | 5 (0.13)    |
| 51597   | 5 (0.13)    |
| <u>P. Leo</u>   |             |
| 1K063   | 1[layers]   |
| 1K7170  | 1[layers]   |
| 1K7177  | 1[layers]   |
| 1K7178  | 1[layers]   |
| 1N008   | 3[layers]   |
| 1N020   | 3[layers]   |
| 1N030   | 2[layers]   |
| 1N155   | 2[layers]   |
| 1P1756 (h)  | 5[layers]   |
| 1P801   | 5[layers]   |
| 1P802   | 5[layers]   |
| 1P802B  | 3[layers]   |
| <u>SYMBIO INC [E50292] - Recognized Component</u>   |             |
| KA180   | 1[layers]   |
| MY130 (b)   | 5 (0.13)    |

## Lead Wires

lead wires are optional for this system

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

+ 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 Cel Sat                           |          |
| CeQuin GeSat                             |          |
| CeQuin IG, IGI, GIG                      |          |
| TufQuin 100, 110, 120                    |          |
| <u>E. I. Dupont de Nemours &amp; Co.</u> |          |
| Nomex®                                   |          |
| <u>Kerafol GMBH</u>                      |          |
| Keratherm F96                            |          |
| <u>Various Manufacturers</u>             |          |
| Kraft Paper                              |          |
| Von Roll USA, Inc.                       |          |

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

thermosetting rubber adhesive, black acetate cloth

12

1554

16

28

thermosetting rubber adhesive, acetate cloth

28L

3

thermosetting rubber adhesive, flatback paper

90

glass cloth

PIA 220

3M COMPANY [E17385] - Listed or Recognized Component

1 (a)

10 (a) \*\*\* this product is no longer Recognized \*\*\*

1039

1046

1169

1194

1205

1218

1245

1298 (b)

1298CR

1312 (a)

1318 clear (a)

1318-1 (a)

1318-2 (a)

1339

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)

1388W-1 (b)

1554K

27 (a)

44 (a)

44-A (a)

44-T (a)

44B-HT (d)

44D (a)

44D-A (a)

44HT (a)

44T-A (a)

46

5

54 (a)

55

56 (a)

57 (a)

58 (a)

60

61

62

63

69 (a), 9 (a)

74 (a)

75

79

79-FR

92

92.2 (min. thickness 3.5 mils)

MR 94

MR 94B (c)

Super 10 (a)

Super 20 (a)

Chomerics

301

Electro Tape Specialties Inc

ETS-21FR

ETS-418

ETS-451

ETS-92

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-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)\*  
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)

51587-17

polyester film

Nitto Denko Corp

156  
315  
31B  
31G-TF  
380  
386 UL  
3885  
5

rubber adhesive, polyester film

Nomex

acrylic adhesive, acetate cloth

NITTO DENKO CORP [E34833] - Listed or Recognized Component

188UL  
3161-F \*\*\* 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 \*\*\*  
354E  
360A  
360UL  
903

P Leo & Co (B.C) Ltd

1E075  
1G22S  
1K7172  
1N015  
1N03S  
1P9FR  
1PETS  
1PG882  
1PG888

silicone adhesive, polyimide film

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

1A022  
1A024  
1A570 \*\*\* this product is no longer Recognized \*\*\*  
1AA02 \*\*\* this product is no longer Recognized \*\*\*  
1AA03 \*\*\* this product is no longer Recognized \*\*\*  
1C821  
1E076 \*\*\* this product is no longer Recognized \*\*\*  
1G006  
1G015  
1G015A  
1G08S  
1G130 (o)  
1G180  
1G18S \*\*\* this product is no longer Recognized \*\*\*  
1G20B  
1G20H  
1H818 (m)  
1H861 (f) \*\*\* this product is no longer Recognized \*\*\*  
1H862 (f) \*\*\* this product is no longer Recognized \*\*\*  
1H863 (f) \*\*\* this product is no longer Recognized \*\*\*  
1H866 (g)  
1H86A (o)  
1K062  
1K063

1K063CR  
1K125  
1K220  
1K22A  
1K7170  
1K7177 \*\*\* this product is no longer Recognized \*\*\*  
1K7178  
1K7220  
1KLMN  
1KPIS  
1KPST  
1N008  
1N012  
1N020  
1N030  
1N155  
1N410  
1P133 (f)  
1P135 (c) \*\*\* this product is no longer Recognized \*\*\*  
1P316 (a)  
1P700 (b)  
1P702 (b)  
1P703  
1P707 (b)  
1P717 (b)  
1P756 (h)  
1P801  
1P802B  
1P833 xx (@)  
1PEN2  
1PEN3  
1PFRS \*\*\* this product is no longer Recognized \*\*\*  
1PG880 (o)  
1PN820 (o)  
1PN828 (o)  
1PS25  
1PS2A  
1PS2S  
1TF08  
1TT02

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

65120  
70110

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

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  
NM13

aramid (Nomex) paper

SYMBIO INC [E50292] - Listed or Recognized Component

35660Y (e)  
35661  
KA00  
KA180  
KA200  
MY130 (b)  
MY9YAF (h)

Ticona  
Vectra A130

## **Core tubes and Bobbins**

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

Designation

comments

CELANESE INTERNATIONAL CORP [E41938] - employing Recognized materials

Zytel 101(f2)(r9), 101F(f2)(r9), 101L(f2)(r9)  
Zytel 103FHS(+), 103HSL(+)  
Zytel 70G30HSL, 70G30HSLR  
Zytel 70G30L  
Zytel 70G33L(+)  
Zytel FR50(+)(f1)  
Zytel HTNFR52G30NH(r11)

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

LONGLITE T375J(G5)(G6)

Chang Chun Plastics Co., Ltd.  
PMT 373J

E. I. Dupont de Nemours & Co.  
MX6130

Paramount Tube  
ParaQuin  
Rigid ParaQuin

Phillips  
Ryton R4

RTP CO [E84658] - employing Recognized materials  
RTP 205 FR

Sumitomo Bakelite  
E4008

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

Phillips Petroleum Co.

Ryton R-4 02 XT

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 [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

Atlantic Tubing  
TFS

CHANGYUAN ELECTRONICS GROUP CO LTD [E180908] - Recognized Component

**CB-HFT, CB-HFT(XY), CYG-MT**  
**CB-TT-L**  
**CB-TT-S**  
**CB-TT-T**

Delfingen US-New York Inc

NU-SLEEVE AG-155-B  
NU-SLEEVE AG-155-C-1  
NU-SLEEVE AG-155-C-2  
NU-SLEEVE SG-200-C-1  
NU-SLEEVE SG-200-C-2  
NU-SLEEVE SG-200-C-3

DELFINGEN US-NEW YORK INC [E80713] - Recognized Component

**NU-SLEEVE SG-200-B**

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

**NU Sleeve SG-200-A**  
**NU-Sleeve AG-155-A**  
**NU-Sleeve T117 E, NU-Sleeve T117 HV**  
**NU-Sleeve T117-FR**

DSG-CANUSA GMBH [E107857] - Recognized Component

**Deray-KY175**

Essex

Suflex Acryflex VPI-NF  
Suflex Acryflex  
Suflex Flexicone  
Suflex Silicone Resin  
Suflex Silicone Resin HD  
Suflex Silicone Rubber  
Suflex Silicone Rubber HD  
Suflex Silverflex T & D

GREAT HOLDING INDUSTRIAL CO LTD [E156256] - Recognized Component

**TFT**

Hilec/Delfingen US-New York Inc

Hilec 200 Series  
Hilec 300 Series  
Hilec 400 Series  
Hilec 540 Series  
Hilec 700 Series  
Hilec 800 Series  
Turbo 117G  
Turbo 117U

P LEO & CO LTD [E195829] - Recognized Component

2R-SG-1# \*\*\* this product is no longer Recognized \*\*\*  
2R-SG-2# \*\*\* this product is no longer Recognized \*\*\*  
2R-SG-3# \*\*\* this product is no longer Recognized \*\*\*

P. Leo & Co Ltd

1.2T-TFL

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

Varfil B-A-1  
Varglas H-A-1

VARFLEX CORP [E53690] - Recognized Component  
**Varglas 231, Varglas Viton 231**  
**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

Atkins & Pearce Inc.

13-220  
16-2HT  
17-200-NX  
29-210  
AP-3100-T  
MS9023-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"

Hellermann Tyton

PT2A PEEK Series  
T718R E/TFE Series

Varflex

48

silicone coated fiberglass

Western Filament

50DOF17W  
DHS-1CL

## **Potting Compounds**

potting compounds are optional for this system

Designation

comments

Dow Corning

1-2577

Elantas Electrical Insulation Elantas Pdg Inc

71-5LL

Momentive

TSE3331KEX