

設計驗證
工程課
2023.10.20
發行
鈺緯科技開發股份有限公司

承 認 書

SPECIFICATION

客 戶 名 稱：鈺緯科技開發股份有限公司

品　　名：熱收縮套管(UL CSA 合格)

型　　號：F32-14

適 用 機 型：

料　　號：3N160000200 (N0002)

日　　期：112/10/12

編　　號：

設計驗證
工程課
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鈺緯科技開發股份有限公司

承認人 (簽章) Approve By					

凱士士企業股份有限公司 國內部 TEL:556-3336 (A) 台北市松平北路[illegible]

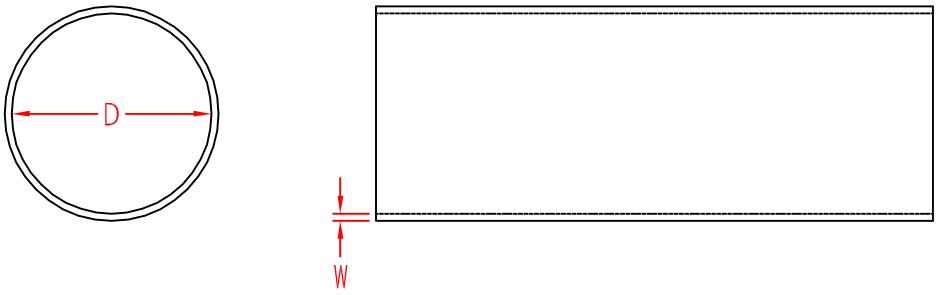
凱士士企業股份有限公司

KAI SUH SUH ENTERPRISE CO., LTD.

E48762

33298

F32 TYPE



ITEM NO.	AS SUPPLIED		AFTER SHRINKAGE	
	D	W	d	w
F32-1	1.4±0.2	0.2	0.5	0.33
F32-1.5	2.0±02	0.2	0.75	0.36
F32-2	2.5±0.2	0.2	1.0	0.44
F32-2.5	3.0±0.2	0.25	1.25	0.44
F32-3	3.5±0.3	0.25	1.5	0.44
F32-3.5	4.0±0.3	0.25	1.75	0.44
F32-4	4.5±0.3	0.25	2.0	0.44
F32-5	5.4±0.3	0.25	2.5	0.56
F32-6	6.4±0.4	0.25	3.0	0.56
F32-7	7.4±0.4	0.25	3.5	0.56
F32-8	8.4±0.4	0.25	4.0	0.56
F32-9	9.4±0.4	0.25	4.5	0.56
F32-10	10.4±0.4	0.25	5.0	0.56
F32-11	11.4±0.4	0.25	5.5	0.56
F32-12	12.4±0.4	0.25	6.0	0.56
F32-13	13.5±0.4	0.3	6.5	0.69
✓ F32-14	14.5±0.4	0.3	7.0	0.69
F32-15	15.5±0.5	0.3	7.5	0.69
F32-16	16.8±0.5	0.3	8.0	0.69
F32-18	18.7±0.5	0.35	9.0	0.77
F32-20	21.2±0.6	0.35	10.0	0.77
F32-22	23.2±0.6	0.4	11.0	0.77
F32-25	26.1±0.8	0.4	12.5	0.87
F32-28	29.0±1.0	0.45	14.0	0.87
F32-30	32.0±1.0	0.5	15.0	0.87

承認 KSS 97.11.18 邱平裕

審查

製圖 KSS 97.11.18 謝文通

設計

使用機種

設計驗證 工程課 2023.10.20

3N160000200(N0002)

中文名	MATERIAL	ITEM NO.
熱收縮套管		F32 TYPE
SCALE	FINISH	NAME
		HEAT-SHRINKABLE TUBINGS
△ (• •) TOLERANCE AS FIGURE	△ (• •) 11-18-2008 DATE	REVISIONS K001 R.NO.

發行 宏緯科技開發股份有限公司

凱士士企業股份有限公司

▶ 請勿實測圖面 ◀

YDPU2.E48762 - Tubing, Extruded Insulating - Component

Tubing, Extruded Insulating - Component

SUMITOMO ELECTRIC FINE POLYMER INC
1-950 ASASHIRO NISHI
KUMATORI-CHO
SENNAN-GUN, OSAKA 590-0458 Japan

E48762

Cat. No.	Voltage Rating	Temperature Rating, °C	Color	Oil-resistance Class	VW-1 Flame
Flexible heat shrinkable Irradiated cross-linked Polyolefin (PO) tubing					
717 or SUMITUBE NHR2	600	125	Pink, Yellow, Blue, Green, Red, Gray, Black	None	Yes
826 or SUMITUBE B2 or SUMITUBE B2 (a) or SUMITUBE B2C (a) or SUMIMARK SM3-36	600	125	All except clear	None	Yes
939 or SUMITUBE F(Z)	600	105	All except clear	None	Yes
940 or SUMITUBE F2(Z) or SUMITUBE T82	600	125	All except clear	None	Yes
958 or SUMIMARK SM12 or 963 or SUMIMARK SM23 or SUMIMARK SM3-12 or SUMIMARK SM3-23 or SUMITAG HPC or SUMITAG HPS or SUMITAG HPD	600	125	All except clear	None	Yes
978 or SUMITUBE B20 or SUMITUBE B20(3X)	600	125	All except clear	None	No
982 or SUMITUBE B2(Z) or SUMITUBE B2(Z)(Y/G) or SUMITUBE B2(3XZ) or SUMITUBE B2(Z)4X	600	125	All except clear	None	Yes
SUMITUBE F32	600	125	All except clear	None	Yes
SUMITUBE F32(Z)	600	125	All except clear	None	Yes
Flexible heat shrinkable Polyolefin (PO) tubing					
SUMITUBE HF2	600	125	BK	None	Yes
Flexible not heat shrinkable Polyolefin (PO) tubing					
719 or IRRAXTUBE NHR4	300	125	Pink, Yellow, Blue, Green, Red, Gray, Black	None	Yes
Heat shrinkable irradiated Polyvinyl Chloride (PVC) tubing					

808	300	105	All except clear	None	Yes
809	600	105	All except clear	None	Yes
822	300	105	All except clear	None	Yes
Heat shrinkable Polyvinyl Chloride (PVC) tubing					
818 or 836	300	105	CL	None	Yes
819 or 835	600	105	CL	None	Yes
823	300	105	CL	None	Yes
Not heat shrinkable irradiated cross-linked Polyvinyl Chloride (PVC) tubing					
806	300	105	All except clear	None	Yes
807	600	105	All except clear	None	Yes
Not heat shrinkable Polyvinyl Chloride (PVC) tubing					
816 or 837	300	105	CL	None	Yes
817 or 834	600	105	CL	None	Yes
Semi-rigid heat shrinkable irradiated cross-linked Polyolefin (PO) tubing					
846 or SUMITUBE B8	600	125	All except clear	None	Yes
967 or SUMITUBE FC3	600	125	All except clear	None	Yes

(a) - May be followed by suffix 3X, Y/G, FLT or (3X)FLT.

Marking: Company name or tradename "E48762", catalog designation, temperature rating in degrees Celsius (if authorized above), voltage rating (if authorized above), date of manufacture (or traceable code), flammability rating (if VW-1), oil resistance rating (if 01, 02., 03), inside diameter (before and after recovery for heat-shrinkable tubing), and date of manufacture (or traceable code) printed on tags attached to both ends of the tubing, or printed on the shipping spool label or smallest unit container in which the product is packaged..

Last Updated on 2021-11-18

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Test Report

No.: ETR23101823 Date: 12-Jan-2023

SUMI-PAC CORPORATION
NO. 15, KON YE 5 RD., FON SAN TSUEN, FU KOW SHAN, HSIN-CHU HSIEN, TAIWAN, R. O. C.

The following sample(s) was/were submitted and identified by the applicant as:

Sample Submitted By	:	SUMI-PAC CORPORATION
Sample Name	:	PLASTIC TUBE
Style/Item No.	:	SUMITUBE F32 (=SUMITUBE F34 , IRRAXTUBE F32A , SUMITUBE F(Z) , SUMITUBE F2(Z) , K32 , KF32)

==========

Sample Receiving Date	:	06-Jan-2023
Testing Period	:	06-Jan-2023 to 12-Jan-2023

Test Requested : As specified by client, to test Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).

Test Results : Please refer to following pages.

Troy Chang / Department Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

CHECK REPORT
PIN CODE: 3D5671BF

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SUMI-PAC CORPORATION
NO. 15, KON YE 5 RD., FON SAN TSUEN, FU KOW SHAN, HSIN-CHU HSIEN, TAIWAN, R. O. C.

Test Part Description

No.1 : BLACK PLASTIC TUBE WITH WHITE PRINTED

Test Result(s)

Test Item(s)	Method	Unit	MDL	Result
				No.1
Cadmium (Cd) (CAS No.: 7440-43-9)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Lead (Pb) (CAS No.: 7439-92-1)		mg/kg	2	19.1
Mercury (Hg) (CAS No.: 7439-97-6)	With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Hexavalent Chromium Cr(VI) (CAS No.: 18540-29-9)	With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.	mg/kg	8	n.d.
Monobromobiphenyl	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	mg/kg	5	n.d.
Dibromobiphenyl		mg/kg	5	n.d.
Tribromobiphenyl		mg/kg	5	n.d.
Tetrabromobiphenyl		mg/kg	5	n.d.
Pentabromobiphenyl		mg/kg	5	n.d.
Hexabromobiphenyl		mg/kg	5	n.d.
Heptabromobiphenyl		mg/kg	5	n.d.
Octabromobiphenyl		mg/kg	5	n.d.
Nonabromobiphenyl		mg/kg	5	n.d.
Decabromobiphenyl		mg/kg	5	n.d.
Sum of PBBs		mg/kg	-	n.d.
Monobromodiphenyl ether	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	mg/kg	5	n.d.
Dibromodiphenyl ether		mg/kg	5	n.d.
Tribromodiphenyl ether		mg/kg	5	n.d.
Tetrabromodiphenyl ether		mg/kg	5	n.d.
Pentabromodiphenyl ether		mg/kg	5	n.d.
Hexabromodiphenyl ether		mg/kg	5	n.d.
Heptabromodiphenyl ether		mg/kg	5	n.d.
Octabromodiphenyl ether		mg/kg	5	n.d.
Nonabromodiphenyl ether		mg/kg	5	n.d.
Decabromodiphenyl ether		mg/kg	5	n.d.
Sum of PBDEs		mg/kg	-	n.d.

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SUMI-PAC CORPORATION
NO. 15, KON YE 5 RD., FON SAN TSUEN, FU KOW SHAN, HSIN-CHU HSIEN, TAIWAN, R. O. C.

Test Item(s)	Method	Unit	MDL	Result
				No.1
Butyl benzyl phthalate (BBP) (CAS No.: 85-68-7)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Dibutyl phthalate (DBP) (CAS No.: 84-74-2)		mg/kg	50	n.d.
Diisobutyl phthalate (DIBP) (CAS No.: 84-69-5)		mg/kg	50	n.d.
Di-(2-ethylhexyl) phthalate (DEHP) (CAS No.: 117-81-7)		mg/kg	50	n.d.

Note：

1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected (Less than MDL)
4. "-" = Not Regulated
5. The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value.

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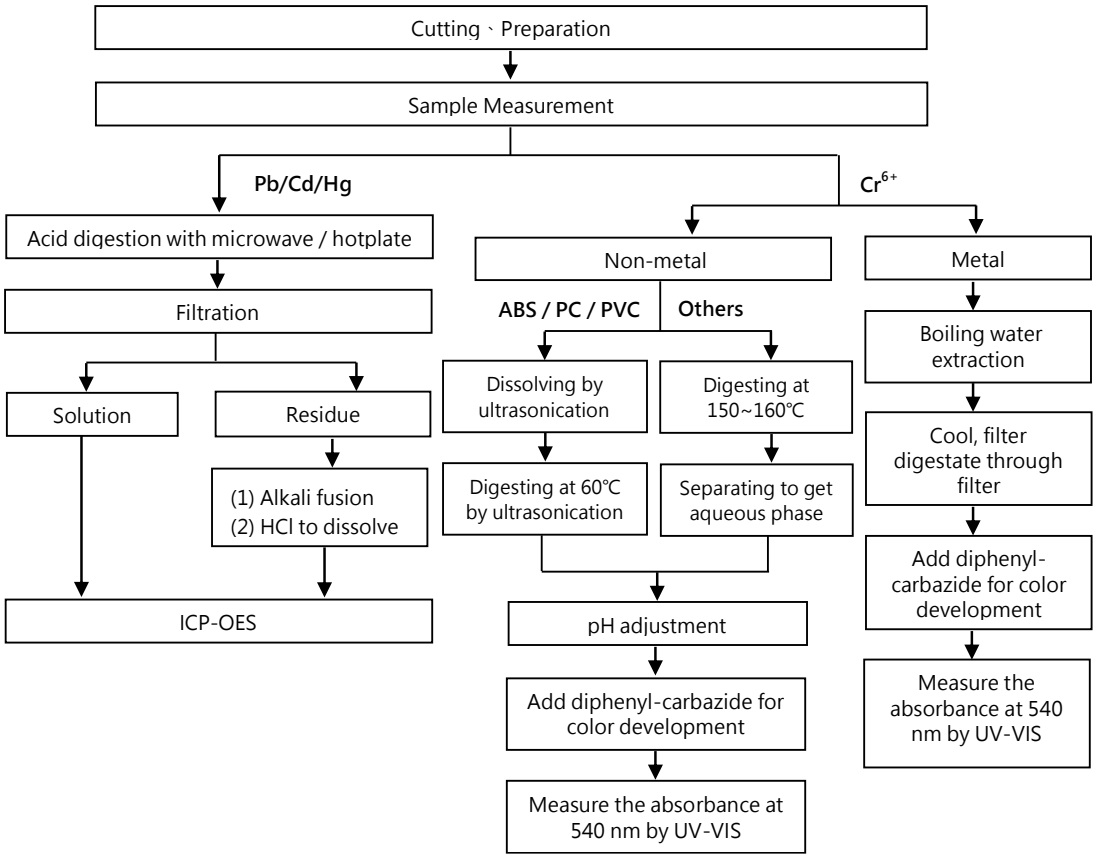
SUMI-PAC CORPORATION
NO. 15, KON YE 5 RD., FON SAN TSUEN, FU KOW SHAN, HSIN-CHU HSIEN, TAIWAN, R. O. C.

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr^{6+} test method excluded)



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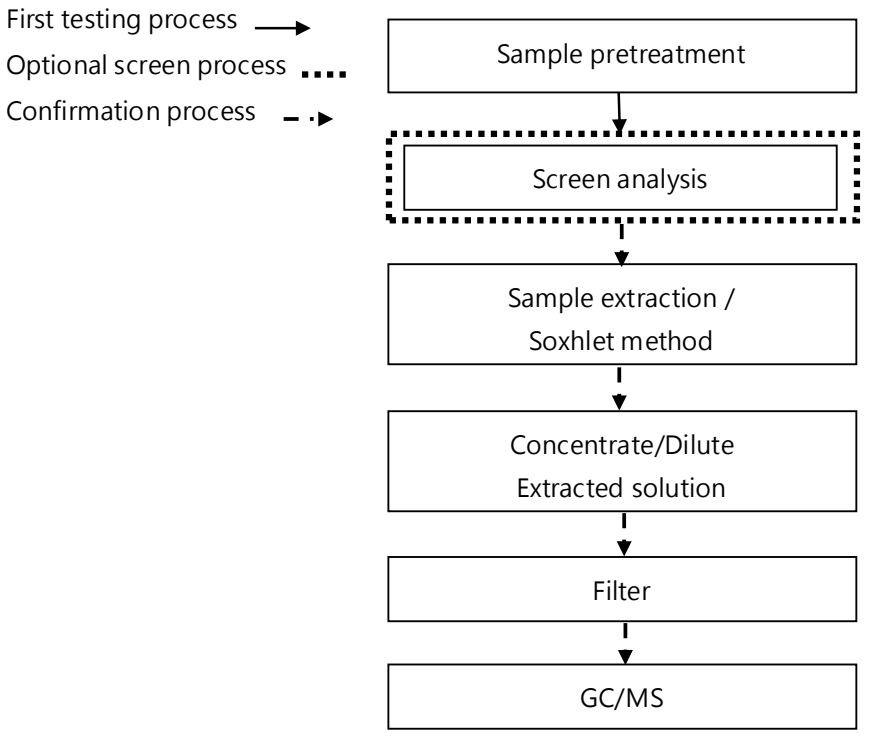
SUMI-PAC CORPORATION
NO. 15, KON YE 5 RD., FON SAN TSUEN, FU KOW SHAN, HSIN-CHU HSIEN, TAIWAN, R. O. C.

Analytical flow chart – PBBs / PBDEs



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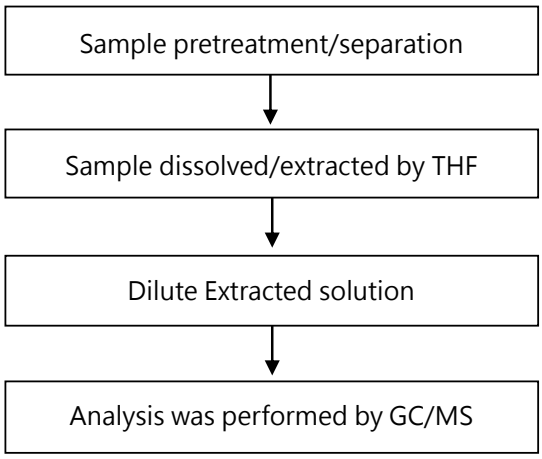
SUMI-PAC CORPORATION
NO. 15, KON YE 5 RD., FON SAN TSUEN, FU KOW SHAN, HSIN-CHU HSIEN, TAIWAN, R. O. C.

Analytical flow chart - Phthalate

【Test method: IEC 62321-8】



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*** The tested sample / part is marked by an arrow if it's shown on the photo. ***

ETR23101823



** End of Report **

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DATE : Jan, 10, 2008

NO. : S/P9008-F32

TO WHOM IT MAY CONCERN:

SPECIFICATION FOR SUMITUBE F32

PREPARED BY Karen Hsu

KAREN HSU
CHEMICAL ENGINEER
SUMIPAC CORPORATION

SUMIPAC

1. SCOPE

THIS SPECIFICATION COVERS NEW **SUMITUBE F32** .

2. FEATURE

NEW **SUMITUBE F32** IS AN IRRADIATED CROSSLINKED , THERMALLY-STABILIZED , FLAME-RETARDANT FLEXIBLE POLYOLEFIN HEAT SHRINKABLE TUBING .
UNLIKE OTHER TYPICAL FLAME-RETARDANT TUBING , NEW **SUMITUBE F32** IS FREE OF POLYBROMINATED BIPHENYL OXIDES (PBBOs) , POLYBROMINATED BIPHENYL ETHERS (PBBEs) , POLYBROMINATED BIPHENYLS (PBBs) AS FLAME-RETARDED CHEMICALS .

3. RECOGNITION

NEW **SUMITUBE F32** IS UL-RECOGNIZED AND CSA-CERTIFIED AT 125 DEG. C , 600 V WITH UL VW-1 AND CSA OFT FLAME-RETARDANCY RATING .

	UL 224	**CSA**
VALTAGE RATING	600V	600V
TEMPERATURE RATING	125 DEG. C	125 DEG. C
CATALO NO.	**SUMITUBE F32**	**SUMITUBE F32**
FILE NO.	E48762	LR84766

4. COLOR

STANDARDS COLORS ; BLACK , WHITE , BROWN , RED , ORANGE , BLUE , GREEN , YELLOW , VIOLET , GRAY .

5. MARKING

FOLLOWING LETTERS SHOULD BE PRINTED ON THE SURFACE OF THE PRODUCTS .
SUMI-PAC SUMITUBE F32 CSA 125°C VW-1 -F- (Size **)**

6. STANDARD SIZES

STANDARD SIZES SHALL BE SPECIFIED IN TABLE 1& 2.

7. PROPERTIES.

PROPERTIES SHALL BE AS SPECIFIED WITH TABLE 3 .

8. METOD OF MEASURING SIZES AND TESTING PROPERTIES

1.) INSIDE DIAMETER
INSIDE DIAMETER SHALL BE MEASURED BY A METAL GAGE ROD OR A METAL TAPE GAGE WHICH HAS INTERVAL OR GRADUATION .

IN CASE OF USING A GAGE ROD : READ THE VALUE OF THE MAXIMUM GAGE ROD WHICH SHALL PASS FREELY INTO THE TUBING WITHOUT EXPANDING THE TUBING .

IN CASE OF USING A TAPER GAGE : READ THE VALUE ON THE GAGE WHEN THE TUBING ISN'T EXPANDED BY INSERTION AND THERE IS NO VISIBLE SPACE BETWEEN THE TUBING AND THE TAPER GAGE .

2.) WALL THICKNESS

WALL THICKNESS SHALL BE MEASURED BY A PIN-DIAL GAGE OR A MICROMETER AT SEVERAL POINTS .

3.) SHRINKABLE CONDITION AND LONGITUDINAL CHANGE

SHRINKABLE CONDITION : UNRESTRICTED SHRINKAGE SHALL BE PLACED AT 150 DEG. C IN A CICULATING AIR OVEN FOR 5 MINUTES .

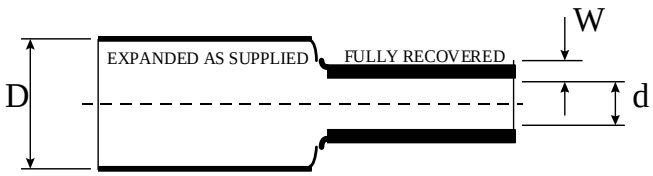
LONGITUDINAL CHANGE : THE TUBING SHALL BE CUT IN ABOUT 100 MM AND MEASURED THE LENGTH ， AFTER UNRESTRICTED SHRINKAGE (AFTER RECOVERED) THE LENGTH IS TO BE RE-MEASURED , AND THE LONGITUDINAL CHANGE SHALL BE CALCULATED FROM THE FOLLOWING FORMULA.

$$\text{LONGITUDINAL CHANGE} = \frac{\text{LENGTH AFTER RECOVERED - LENGTH AS SUPPLIED}}{\text{LENGTH AS SUPPLIED}} * 100\ \%$$

$$\text{ECCENTRICITY (\%)} = \frac{\text{MIN. THICKNESS}}{\text{MAX. THICKNESS}} * 100\ \%$$

4.) PROPERTIES SHALL BE TESTED IN ACCORDANCE WITH UL224 & CSA 22.2 NO. 198.1 TEST METHOD .

TABLE 1. STANDARD SIZE



TRADE SIZE (METRIC)	AS SUPPLIED (MM)		AFTER RECOVERED (MM)		STANDARDS LENGTH
	INSIDE DIAMETER D	NOM. WALL THICKNESS	INSIDE DIAMETER d (MAX)	WALL THICKNESS W (MIN)	SPOOL(M)
1*0.20	1.40±0.20	0.20	0.50	0.33	200
1.5*0.20	2.00±0.20	0.20	0.75	0.36	200
2*0.20	2.50±0.20	0.20	1.00	0.44	200
2.5*0.25	3.00±0.20	0.25	1.25	0.44	200
3*0.25	3.50±0.30	0.25	1.50	0.44	200
3.5*0.25	4.00±0.30	0.25	1.75	0.44	200
4*0.25	4.50±0.30	0.25	2.00	0.44	200
5*0.25	5.40±0.30	0.25	2.50	0.56	100
6*0.25	6.40±0.40	0.25	3.00	0.56	100
7*0.25	7.40±0.40	0.25	3.50	0.56	50
8*0.25	8.40±0.40	0.25	4.00	0.56	50
9*0.25	9.40±0.40	0.25	4.50	0.56	50
10*0.25	10.4±0.40	0.25	5.00	0.56	50
11*0.25	11.4±0.40	0.25	5.50	0.56	50
12*0.25	12.4±0.40	0.25	6.00	0.56	50
13*0.30	13.5±0.40	0.30	6.50	0.69	50
14*0.30	14.5±0.40	0.30	7.00	0.69	50
15*0.30	15.5±0.50	0.30	7.50	0.69	50
16*0.30	16.8±0.50	0.30	8.00	0.69	50
18*0.35	18.7±0.50	0.35	9.00	0.77	50
20*0.35	21.2±0.60	0.35	10.00	0.77	50
22*0.40	23.2±0.60	0.40	11.00	0.77	50
25*0.40	26.1±0.80	0.40	12.50	0.87	50
28*0.50	29.0±1.00	0.50	14.00	0.87	50
30*0.50	32.0±1.00	0.50	15.00	0.87	50

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TABLE 2. STANDARD SIZE

TRADE SIZE (INCH)	AS SUPPLIED (MM)		AFTER RECOVERED (MM)		STANDARDS LENGTH
	INSIDE DIAMETER D	NOM. WALL THICKNESS	INSIDE DIAMETER d (MAX)	WALL THICKNESS W (MIN)	SPOOL(M)
3/64"	1.60±0.20	0.20	0.60	0.33	200
1/16"	2.10±0.20	0.20	0.80	0.36	200
3/32"	2.70±0.20	0.25	1.20	0.44	200
1/8"	3.60±0.20	0.25	1.60	0.44	100
3/16"	5.20±0.30	0.25	2.40	0.44	100
1/4"	6.80±0.40	0.30	3.20	0.56	50
3/8"	10.00±0.40	0.30	4.80	0.56	50
1/2"	13.20±0.50	0.30	6.40	0.56	50
3/4"	20.00±0.60	0.35	9.50	0.69	50
1"	26.60±0.80	0.40	12.70	0.77	50

REMARK:

***LONGITUDINAL CHANGE :-5±5%**

***ECCENTRICITY OF WALL THICKNESS : 60%(MIN.)**

***UNRESTRICTED SHRINKAGE SHALL BE FOR 5 MINUTES AT 150 DEG. C IN A CIRCULATING AIR-OVEN .**

TABLE 3. PROPERTIES

PROPERTIES		UL224 (5 EDITION)		CSA C22.2 No. 198.1-99	
		CONDITION	REQUIREMENT	CONDITION	REQUIREMENT
TENSILE STRENGTH	UNAGED	* 1	10.4MPA(MIN.) , (1.05KG/SQ. MM)	* 1	10.4MPA(MIN.) , (1.05KG/SQ. MM)
	AGED *2	*1	7.4MPA(MIN.)	*1	7.4MPA(MIN.)
ELONGATION	UNAGED	*1	200% (MIN.)	*1	200% (MIN.)
	AGED *2	*1	100%(MIN.)	*1	100%(MIN.)
HEAT SHOCK		250 ℃ * 4 HR	NO Crack, Flowing, or Dripping	250 ℃ * 4 HR	NO Crack, Flowing, or Dripping
COLD BEND		(-30 ℃*1 HR)	NO CRACK	(-30 ℃*1 HR)	NO CRACK
FLAMMABILITY		VW-1	PASS	VW-1	PASS
SECANT MODULAS		2%STRAIN	173 MPA (MAX.),(17.5KG/SQ. MM)	2%STRAIN	173 MPA (MAX.),(17.5KG/SQ. MM)
DIELECTRIC VOLT. WITHSTAND	UNAGED	A.C. , 2500 V * 1 MINUTE	NO BREAKDOWN	A.C. , 2500 V * 1 MINUTE	NO BREAKDOWN
	AGED	A.C. , 2500 V 60 SEC.	NO BREAKDOWN	A.C. , 2500 V 60 SEC.	NO BREAKDOWN
BREAKDOWN VOLTAGE	UNAGED		A.C. 2500V(MIN.)		AC. 2500V(MIN.)
	AGED	AC 2.5 KV MIN. AND MORE THAN THE 50% OF THE VALUE OBTAINED WITH UNAGED SAMPLES			
VOLUME RESISTIVITY		10^{14} Ω-CM MIN.		10^{14} Ω-CM MIN.	
CORROSION OF BARE COPPER		*3	NO CORROSION	*3	NO CORROSION
COPPOER STABILITY		*1 , 3	ELONGATION , 100%(MIN)	*1 , 3	ELONGATION , 100%(MIN)

*1. WHEN TESTED AT 500 MM/ MIN.

*2. 158 ℃ * 7 DAYS

*3. AFTER PLACED IN A HUMIDITY CHAMBER WITH RELATIIVE HUMIDITY OF 95 ± 5% AT 23 ℃ FOR 24 HOURS AGEDIN CONDITION OF 158℃ * 7 DAYS .

SUMIPAC CORPORATION

APPLIED POLYMER PRODUCTS DIV.

No.15 Fon San Tsuen, Fu Kow Shan, Hsin Chu Hsien. Taiwan.R.O.C.

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Feb. 24, 2014

TO : whom it may concern 1/1

Dear Sirs

Regarding you and your customer's requirement on the subject whether Sumitube F32 & F34 contain red Phosphorous or not, that Sumi-Pac hereby announce Sumitube F32 & F34 don't use red phosphorous in the heat shrinkable tube for its ingredient and fabricating process. As our limitation for red Phosphorous with Sumitube F32 & F34 is under 1000ppm.

Anyway, as we are convinced that our customers are also concerned for environment issue, Sumi-Pac Corporation would agree to do our best to fulfill environmental care in all its operation. Tks!

Best Regards,



Karen Hsu

Tech. & Environmental Dept. Engineer

Sumi-Pac Corporation