

WHA YU INDUSTRIAL CO., LTD. (HEAD OFFICE)
 TAI HWA ELECTRONIC CO., LTD.(CHINA)
 SHANGHAI HUA YU ELECTRONIC CO., LTD.(CHINA)
 AEON TECH CO., LTD. (CHINA)

SPECIFICATION FOR APPROVAL

CUSTOMER: *Fire tide*

PART NAME: *RF Antenna Assembly*

PART NO.:

REVISION:

W. Y. P/NO.: *C812-510010-A*

REV.: *X1*

	MANUFACTURER SIGNATURE	CUSTOMER SIGNATURE
APPROVED BY :		
DATE :		

WHA YU GROUP

WHA YU INDUSTRIAL CO., LTD.(HEAD OFFICE)

譚裕實業股份有限公司

Address: No.326, Sec 2, Kung Tao 5 Road, Hsin Chu City, Taiwan, R.O.C.

Tel:+886-3-5714225(REP.)

Fax:+ 886-3-5713853 · + 886-3-5723600

TAI HWA ELECTRONIC CO., LTD. (CHINA)

台樺電業製品廠

Address: Pak Ho District, Hiu Street Town, Dong Guan City, Guangdong, China

Tel: + 86-769-5599375 · + 86-769-5912375

Fax: + 86-769-5599376

HUA HONG INTERNATIONAL LTD.

華弘國際有限公司

Rm.1103A,President Commercial Centre,608 Nathan Road,Mong Kok,Kowloon,Hong Kong

Tel: + 86-852-27712210

Fax: + 86-852-23843747

SHANGHAI HUA YU ELECTRONIC CO., LTD. (CHINA)

上海譚裕電子有限公司

Address:3586,Wai Qing Song Road, Qing Pu County, Shanghai China

Tel: + 86-21-59741348 · + 86-21-59744101~4

Fax: + 86-21-59741347

SU ZHOU AEON TECH CO., LTD. (CHINA)

蘇州華廣電通有限公司

Address:Limin North Road, LiLi Town,LiLi Industrial Park,LinHu Economic Zone

Wujiang City,Jiangsu Province,China

Tel: + 86-512-63627980

Fax: + 86-512-63627981

Contents

<i>Item</i>	<i>Description</i>	<i>Page</i>
1.	天線規格表 1
2.	成品圖 2
3.	測試報告 3~5
4.	Cable 規格 6~9
5.	天線桿套材質特性 10~16
6.	天線固定座材質特性 17~20
7.	Connector 材質特性 21~25
8.	SGS 測試 26~46

RF Antenna Cable Assembly

Specification

1. Electrical Properties :

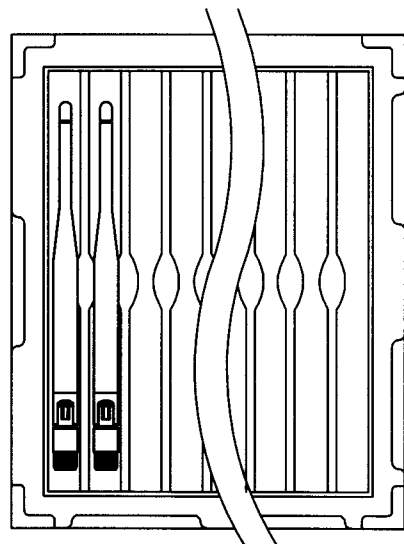
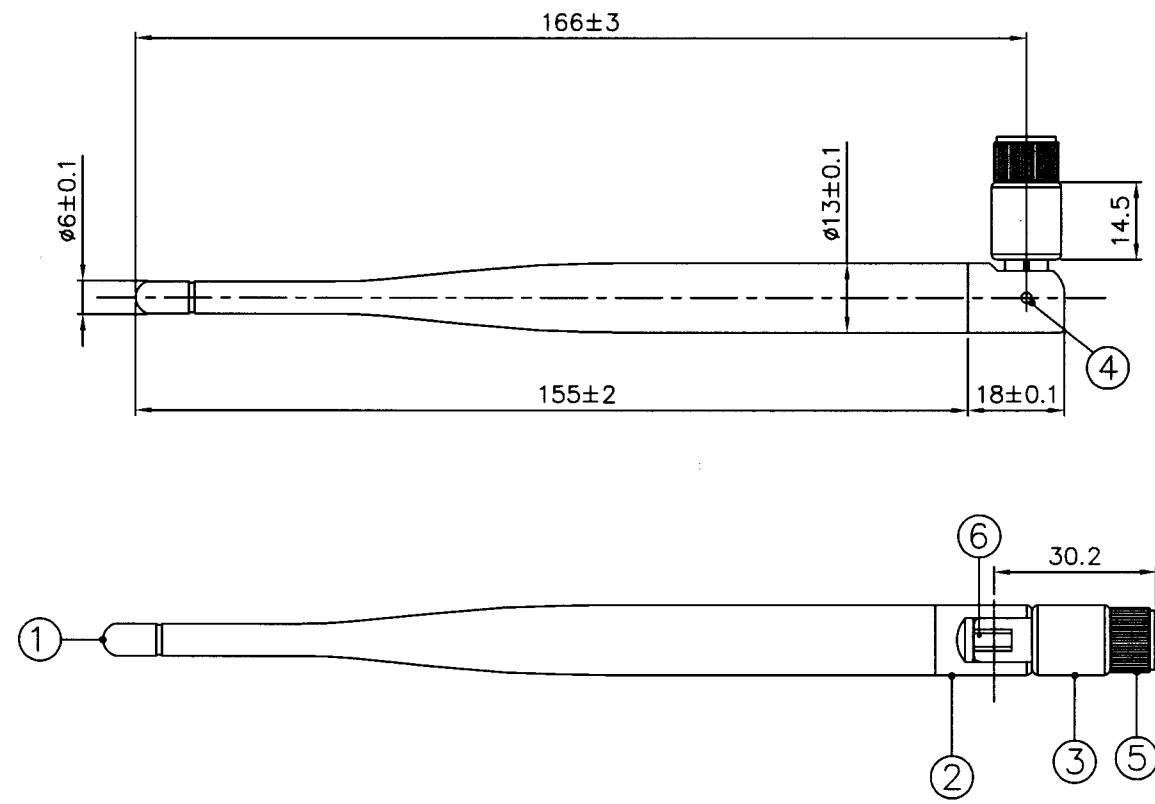
- 1.1 Frequency Range..... 2.4GHz ~ 2.5GHz
- 1.2 Impedance 50Ω Nominal
- 1.3 VSWR 1.92 Max.
- 1.4 Return Loss..... -10 dB Maximum
- 1.5 Electrical Wave..... $1/2\lambda$ Dipole
- 1.6 Gain(peak)..... 5dBi
- 1.7 Admitted Power..... 1W

2. Physical Properties :

- 2.1 Cable..... RG-178 Coaxial Cable
- 2.2 Antenna Cover..... TPE
- 2.3 Antenna Base..... PC
- 2.4 Antenna Base..... PBT
- 2.5 Operating Temp. -20 ~ +65
- 2.6 Storage Temp. -30 ~ +75
- 2.7 Color Black
- 2.8 Connector..... SMA Plug Reverse

CG-


REV	DATE	DESCRIPTION
X1	6/24-2005	New Issue



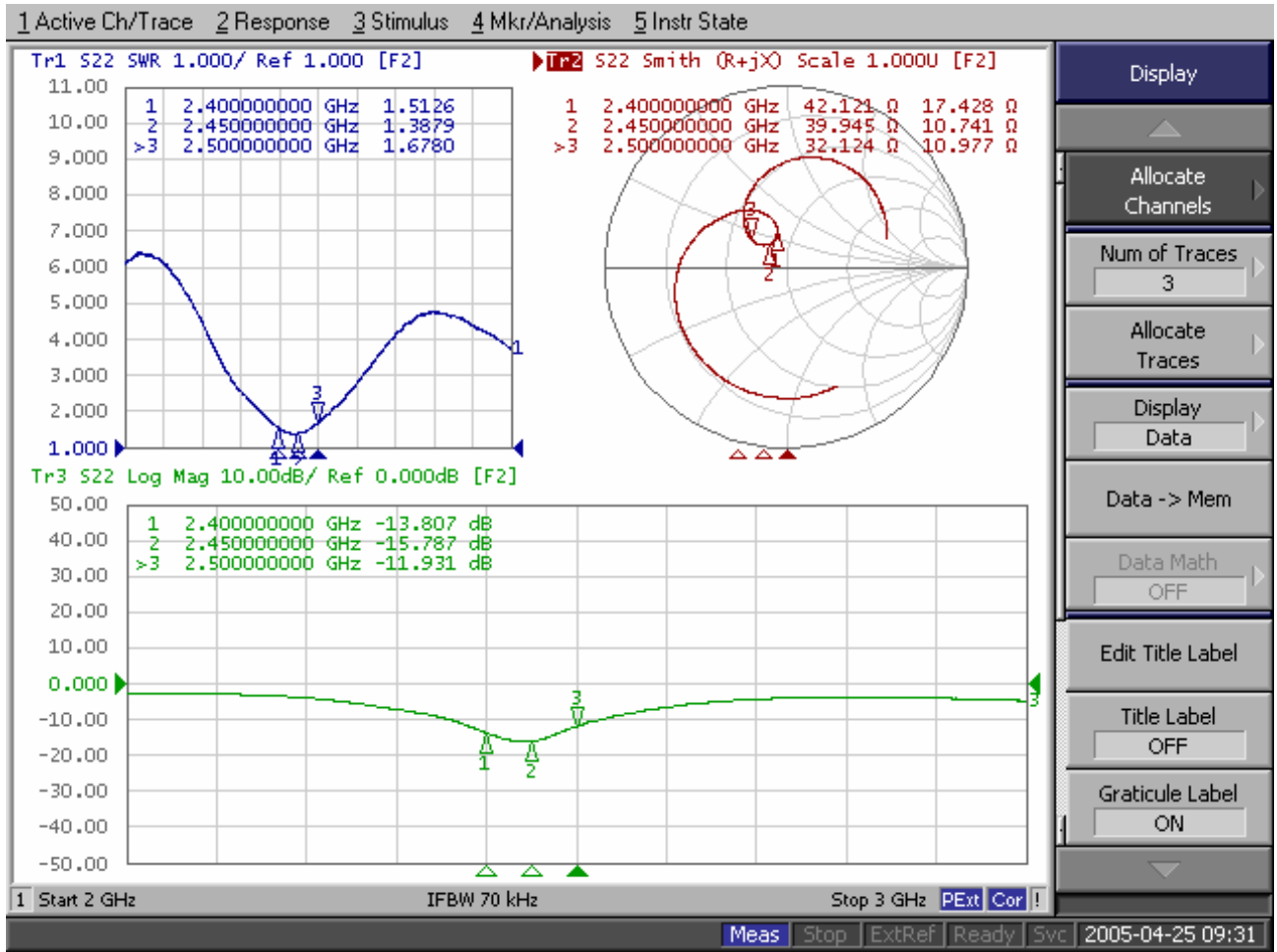
Packing : 20 pcs/ Tray

6	Cable	RG-178 ; 50 Ω	1	
5	Connector	Big SMA Straight Plug Reverse	1	
4	Rivet	POM ; Color : Black	2	
3	Antenna Base	PBT Color : Black	1	
2	Antenna Base	PC Color : Black	1	
1	Antenna Body	TPE Color : Black	1	
NO	DESCRIPTION		QTY	REMARK

CUSTOMER'S SIGNATURE	XX	±5	APPROVED	CUSTOMER: Fire tide PART NO : PARTNAME: RF Antenna Assembly W.Y P/NO : C812-510010-A REV UNIT FILE : X1 m/m SHEET : 1/1
	X	±1.0	林吉奇 程淑娟	
	X	±0.1		
	XX	±0.01		
	XXX	±0.005		
			DRAWING	


Wha Yu INDUSTRIAL CO.,LTD.
 譚裕實業股份有限公司
THIS DRAWING, AND ITS INHERANT DESIGN CONCEPTS, ARE THE PROPERTY OF WHA YU AND AS SUCH MAY NOT BE COPIED, REPRODUCED, OR GIVEN TO THIRD PARTIES WITHOUT THE WRITTEN CONSENT OF WHA YU.

RF Antenna Assembly
P/NO :C812-510010-A SPEC : 2.4GHz



Display

Allocate Channels

Num of Traces 3

Allocate Traces

Display Data

Data -> Mem

Data Math OFF

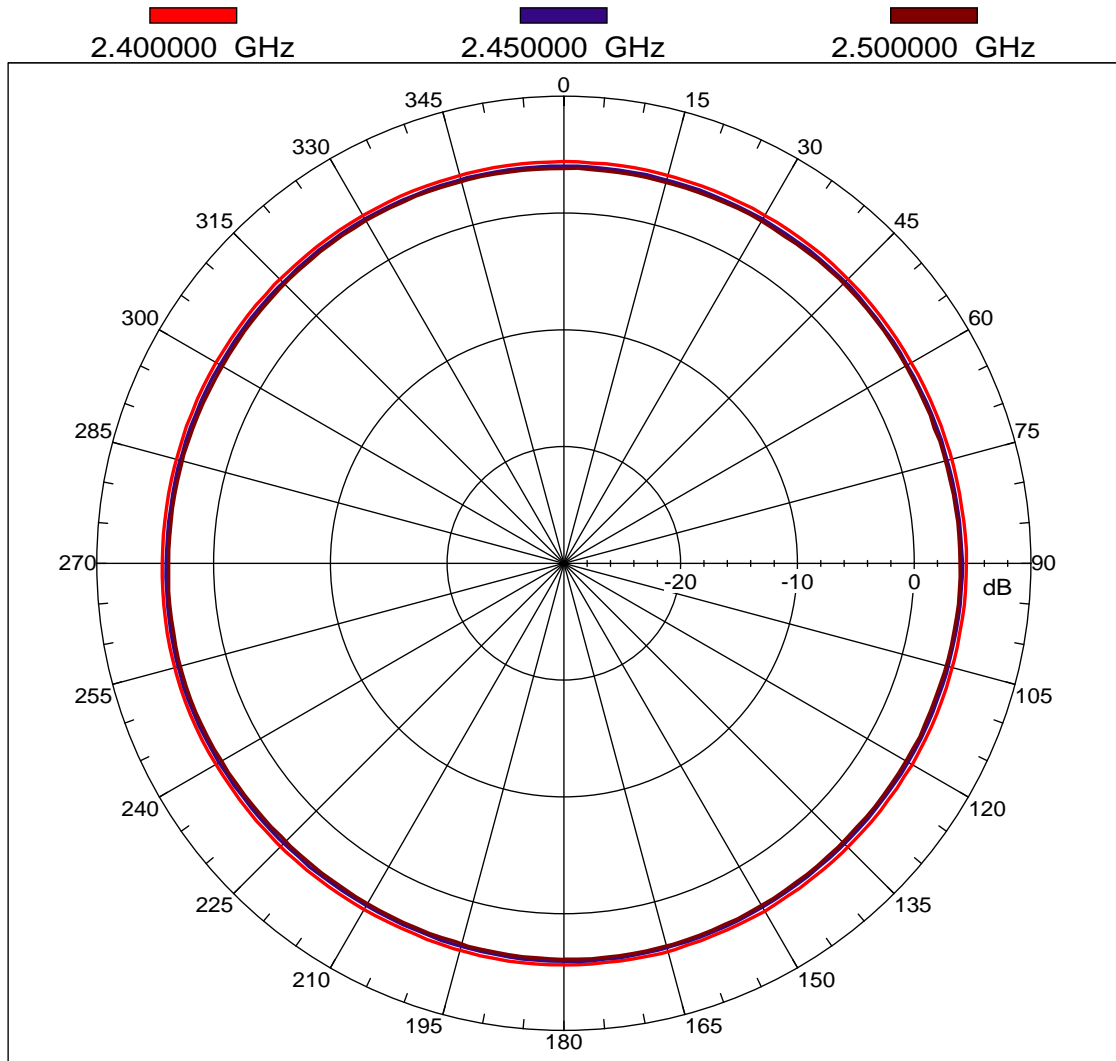
Edit Title Label

Title Label OFF

Graticule Label ON

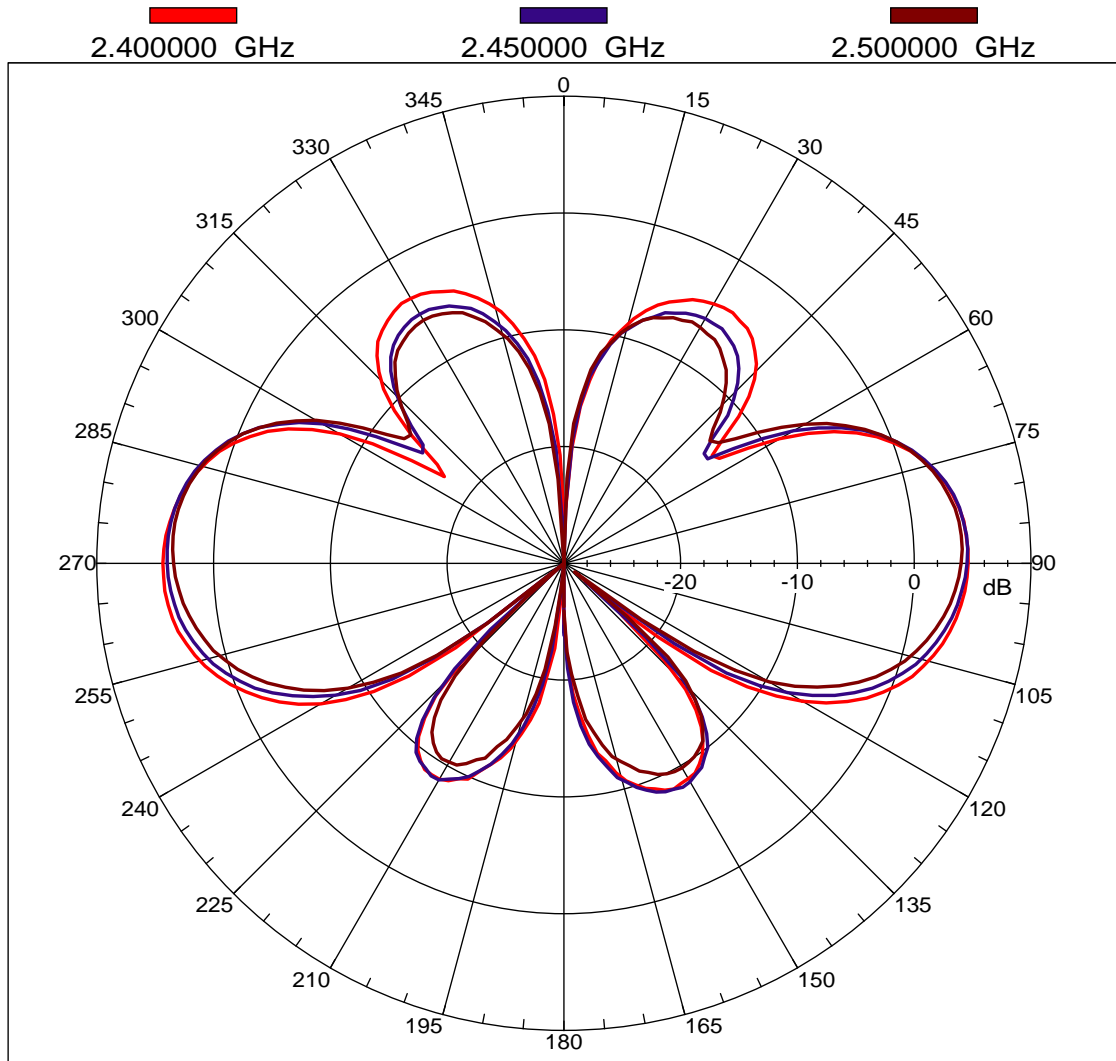
6/24/2005

Far-field amplitude of C812-510010-A.nsi



6/24/2005

Far-field amplitude of C812-510010-A.nsi



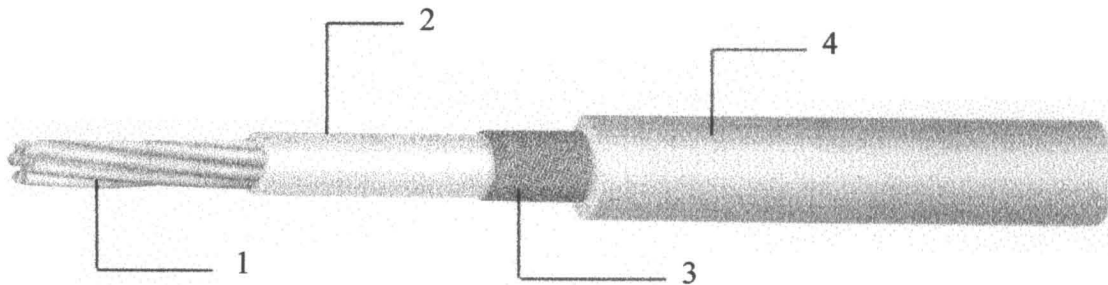
6/24/2005

RG 178 B/U	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE	PAGE	1 / 2
PRODUCT STANDARD		ISSUED	21. Oct. 2003
		REVISED	

I - Scope

This specification presents a FEP insulated high-frequency coaxial cable AWG 30, 1.8 mm O.D. for internal wiring of electronic equipment, such as Computer / Notebook with wireless communication systems.

II - Construction



Item		Unit	Details
1. Inner Conductor	Material	—	CP-AG
	Composition	No./mm	AWG 30 or 7 × 0.1
	Dia. (approx.)	mm	0.305
2. Dielectric	Material	—	Extruded FEP
	Nom. O.D.	mm	0.84 ± 0.05
	Color	—	Natural
3. Outer Conductor	Material	—	Silver coated copper
	Composition	—	Braided (16 / 3 / 0.1)
	Dia. (approx)	mm	1.29 ± 0.07
4. Jacket	Material	—	Extruded FEP
	Dia.	mm	1.80 ± 0.08
	Color	—	Standard color is Light Orange

Note :



MADE BY

APPROVALS

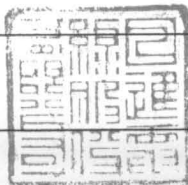
Shen Bin Chao
Shen Bin Chao

RG 178 B/U	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE	PAGE	2 / 2
PRODUCT STANDARD		ISSUED	21. Oct. 2003
		REVISED	

III – Characteristics

Item	Unit	Specified Value	Note
Temperature Rating	°C	-55 ~ +200	
Voltage Lasting	V	1000	
Dielectric strength	—	Dielectric core: No breakdown at AC 3 kv for 0.2 sec.	Spark test
		Jacket: No breakdown at AC 3 kv for 0.2 sec.	Spark test
Characteristic Impedance	Ω	50 ± 2	TDR method
Capacitance	pF / ft	29.4	
Attenuation. (Max.)	dB/100ft	16.0	100.0 MHz
		33.0	400.0 MHz
		52.0	1.0 GHz
		94.0	3.0 GHz
Approx. Weight	g / m	7.68	

Note :



MADE BY

Chuebe Lin

APPROVALS

Shen Bin Chao

Mil-C-17 Coaxial Cable QPL Approved

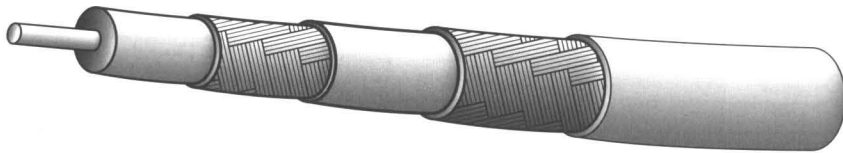
Single braid



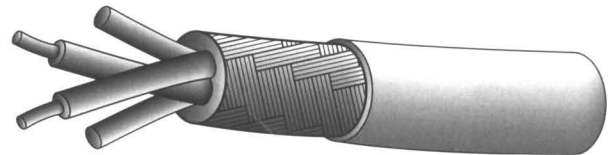
Double braid



Triax



Twinax



Harbour supplies a complete line of high temperature, high performance QPL approved MIL-C-17 coax cables for the military, commercial and industrial applications. The specific M17 constructions referenced are manufactured in accordance with the most recent revision of the MIL-C-17 specification. The MIL-C-17 specification defines complete physical and electrical characteristics for each M17 part number, including dimensional parameters, dielectric materials, shield construction, maximum attenuation, and VSWR levels.

VSWR Sweep Testing

When selecting a 50 ohm coaxial cable, constructions with VSWR requirements are recommended. Manufacturing and sweep testing cables with concern for VSWR ensures a quality cable free of spikes over the referenced frequency range. (Note the test frequencies specified in the electrical characteristics section.)

Precision PTFE Dielectrics

All of the high temperature, high performance coax cables listed have PTFE dielectrics with high dielectric strength and low capacitance in proportion to the dielectric constant. All PTFE dielectrics are manufactured with tolerances tighter than the MIL-C-17 specification to ensure uniformity of electrical characteristics, especially impedance, attenuation and VSWR.

Tape wrapped PTFE Constructions

Harbour also manufactures PTFE tape wrapped cables to a previous revision of the MIL-C-17 specification. These constructions can withstand operating temperatures up to 250° C. versus 200° C. for FEP jacketed cables. Also, PTFE tape wrapped cables are generally more flexible than their FEP jacketed counterparts.

UL Approvals

All of Harbour's M17 part numbers manufactured to the MIL-C-17 specification may be ordered with UL and FT4 approvals.

Mil-C-17 Coaxial Cables

Physical Characteristics:

M17 Number	Center Conductor	PTFE Dielectric Diameter	Shield	Jacket	Overall Diameter	Minimum Recommended Bend Radius	Operating Temp. (%C)	Weight (lbs./MFT)	Comments
M17/60-RG142	.037" SCCS	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	43.0	
M17/93-RG178	.0120"(7/.004")SCCS	.033"	SPC	FEP	.071"	0.4"	-55 +200	6.3	
M17/93-00001	.0120"(7/.004")SCCS	.033"	SPC	PFA	.071"	0.4"	-55 +230	6.3	M17/93-RG178 w/extended temp. range
M17/94-RG179	.0120"(7/.004")SCCS	.063"	SPC	FEP	.100"	0.4"	-55 +200	10.8	
M17/95-RG180	.0120"(7/.004")SCCS	.102"	SPC	FEP	.141"	0.7"	-55 +200	19.8	
M17/110-RG302	.0253"SCCS	.146"	SPC	FEP	.202"	1.0"	-55 +200	40.0	
M17/111-RG303	.037"SCCS	.116"	SPC	FEP	.170"	0.9"	-55 +200	31.0	
M17/112-RG304	.059" SCCS	.185"	SPC(2)	FEP	.280"	1.4"	-55 +200	94.0	
M17/113-RG316	.0201"(7/.0067")SCCS	.060"	SPC	FEP	.098"	0.5"	-55 +200	12.2	
M17/127-RG393	.094"(7/.0312")SC	.285"	SPC(2)	FEP	.390"	2.0"	-55 +200	165.0	
M17/128-RG400	.0384"(19/.008")SC	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	50.0	
M17/131-RG403	.0120"(7/.004")SCCS	.033"	SPC(2)	FEP(2)	.116"	0.6"	-55 +200	15.0	Triaxial M17/93-RG178
M17/152-00001	.0201"(7/.0067")SCCS	.060"	SPC(2)	FEP	.114"	0.6"	-55 +200	18.5	Double shielded M17/113-RG316
M17/158-00001	.037"SCCS	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	56.0	Unswep M17/60-RG142
M17/169-00001	.0120"(7/.004")SCCS	.033"	SPC	FEP	.071"	0.4"	-55 +200	6.3	Unswep M17/93-RG178
M17/170-00001	.037"(SCCS	.116"	SPC	FEP	.170"	0.9"	-55 +200	39.0	Unswep M17/111-RG303
M17/172-00001	.0201"(7/.0067")SCCS	.060"	SPC	FEP	.098"	0.5"	-55 +200	11.5	Unswep M17/113-RG316
M17/174-00001	.094"(7/.0312")SCCS	.285"	SPC(2)	FEP	.390"	2.0"	-55 +200	175.0	Unswep M17/127-RG393
M17/175-00001	.0384"(19/.008")SC	.116"	SPC(2)	FEP	.390"	1.0"	-55 +200	50.0	Unswep M17/128-RG400
M17/176-00002	.0235"(19/.005")SPA(2)	.042"	SPA	PFA	.129"	0.6"	-55 +230	18.0	Controlled impedance twinax
PTFE Tape Wrap Jacketed RG Cables									
RG 187 A/U	.0120"(7/.004)SCCS	.063	SPC	PTFE	.100"	0.5"	-55 +250	10.0	Flexible, 250° C. rated
RG 188 A/U	.0201"(7/.0067)SCCS	.060	SPC	PTFE	.100"	0.5"	-55 +250	11.0	Flexible, 250° C. rated
RG 195 A/U	.0120"(7/.004)SCCS	.102	SPC	PTFE	.141"	0.7"	-55 +250	18.0	Flexible, 250° C. rated
RG 196 A/U	.0120"(7/.004)SCCS	.034	SPC	PTFE	.067"	0.4"	-55 +250	6.0	Flexible, 250° C. rated

Electrical Characteristics:

M17 Number	Impedance (ohms)	Capacitance (pF/ft)	Max. Operating Voltage (RMS)	Maximum attenuation (dB/100ft) @						Max Frequency (GHz)
				100 MHz	400 MHz	1 GHz	3 GHz	5 GHz	10 GHz	
M17/60-RG142	50 +/- 2	29.4	1900	5.5	11.7	19.0	35.0	48.0	-	17.4
M17/93-RG178	50 +/- 2	29.4	1000	16.0	33.0	52.0	94.0	-	-	3.0
M17/93-00001	50 +/- 2	29.4	1000	16.0	33.0	52.0	94.0	-	-	3.0
M17/94-RG179	75 +/- 3	19.4	1200	-	21.0	-	-	-	-	-
M17/95-RG180	95 +/- 5	16.4	1500	-	17.0	-	-	-	-	-
M17/110-RG302	75 +/- 3	19.4	2300	-	8.0	-	26.0	-	-	-
M17/111-RG303	50 +/- 2	29.4	1900	3.9	8.0	15.0	28.0	-	-	-
M17/112-RG304	50 +/- 3	29.4	3000	2.7	6.4	11.1	22.0	30.0	-	8.0
M17/113-RG316	50 +/- 2	29.4	1200	11.0	21.0	38.0	58.0	-	-	3.0
M17/127-RG393	50 +/- 2	29.4	2500	2.4	5.0	8.8	18.0	24.6	37.0	11.0
M17/128-RG400	50 +/- 2	29.4	1900	4.5	10.5	17.0	38.0	50.0	78.0	12.4
M17/131-RG403	50 +/- 2	29.4	1000	-	37.0	-	-	-	-	10.0
M17/152-00001	50 +/- 2	29.4	1200	11.5	24.0	40.0	75.0	110.0	170.0	12.4
M17/158-00001	50 +/- 2	29.4	1900	-	9.5	-	-	-	-	-
M17/169-00001	50 +/- 2	29.4	1000	-	29.0	-	-	-	-	-
M17/170-00001	50 +/- 2	29.4	1900	-	8.6	-	-	-	-	-
M17/172-00001	50 +/- 2	29.4	1200	-	21.0	-	-	-	-	-
M17/174-00001	50 +/- 2	29.4	2500	-	5.0	-	-	-	-	-
M17/175-00001	50 +/- 2	29.4	1900	-	10.5	-	-	-	-	-
M17/176-00001	77 +/- 7	19.0	1000	-	-	-	-	-	-	-
PTFE Tape Wrap Jacketed RG Cables										
RG 187 A/U	75 +/- 3	19.4	1200	-	21.0	-	-	-	-	3
RG 188 A/U	50 +/- 2	29.4	1200	11.0	21.0	38.0	58.0	-	-	3
RG 195 A/U	95 +/- 5	15.4	1500	-	17.0	-	-	-	-	3
RG 196 A/U	50 +/- 2	29.4	1000	-	29.0	-	-	-	-	-

"Maximum frequencies" are those as referenced on individual slant sheets of the MIL-C-17 specification. No values are given for unswept constructions as the specification recommends these cables should not be used above 400 MHz. (All figures referenced above are nominal unless otherwise specified.)

Arnitel

polyether esters
polyetherester
esters de polyether

天線桿套材質特性表



Units Einheiten Unites	EM400	EM460	EL550	EL630	EL740	PL380
	1.12	1.16	1.20	1.23	1.27	1.18
	195	185	202	212	221	197
μ m/m.k	220	160	180	140	110	150
	\	\	110	115	120	\
	130	150	180	200	200	145
	\	50	85	115	150	\
%	0.30	0.30	0.20	0.20	0.15	0.40
%	0.75	0.70	0.55	0.60	0.90	7.0
*	HB	HB	HB	HB	HB	HB
Mpa	55	110	220	375	900	60
Mpa	4.0	7.1	13.2	20.2	26.9	3.5
Mpa	5.4	9.0	15.7	23	22.6	5.2
Mpa	8.4	11.4	16.6	22.0	26.3	8.5
Mpa	17	21	32	40	45	16
%	700	800	600	600	360	450
kj/m ²	NB	NB	NB	NB	NB	NB
kj/m ²	NB	NB	NB	NB	200	NB
kj/m ²	NB	NB	NB	NB	9	NB
kj/m ²	NB	NB	20	4	4	NB
	38	45	55	63	74	38
MV/m	\	\	\	\	\	\
.cm	5*10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹²	10 ¹²
	>10 ¹³	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁰	>10 ¹³
\	4.1	\	\	3.8	\	4.7
\	4.0	4.4	4.0	3.4	3.3	4.4
x10 ¹⁴	10	\	\	3.8	\	310
x10 ¹⁴	170	350	400	350	300	350
\	800	800	600	600	600	800
\	600	600	600	800	800	600

Arnitel

2.2 Product coding

The structure of the Arnitel productcodes is illustrated with the following example:

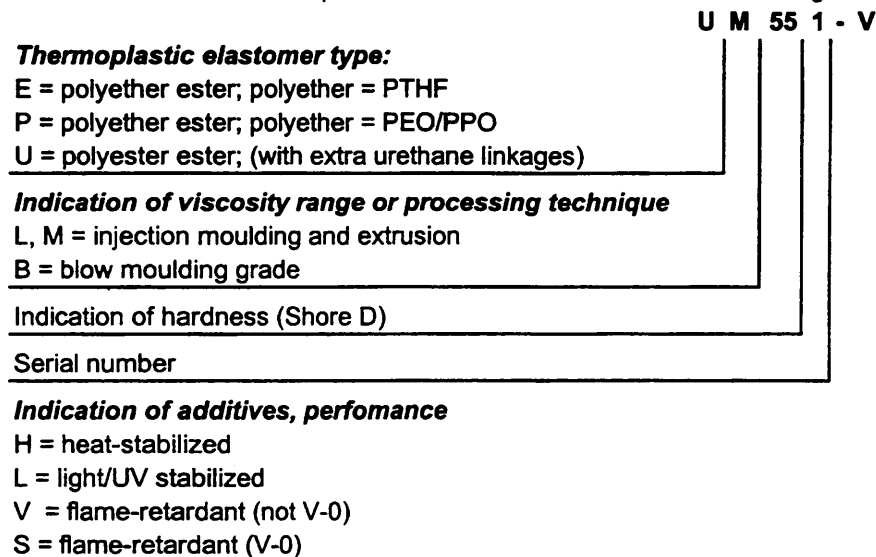


Figure 2.2: Arnitel product coding

2.3 Product portfolio

The Arnitel productrange is available with a hardness from 38 to 74 Shore D. The general Arnitel grades are shown in table 2.2. In order to enhance the flexibility of the portfolio a set of masterbatches (a.o. for heat, UV, etc) are on offer (refer to § 2.4).

Because of the development of these masterbatches heat stabilised Arnitel P is suggested for application areas where thermo-oxidative stability is an issue. For applications where colour and UV stability is required, the Arnitel E range is advised.

	Shore D					
	38	40	46	55	63	74
Arnitel E		EM400	EM460	EL550 EM550	EL630 EM630	EL740 EM740
Arnitel P	PL380		PL460	PL580 PM581		
Arnitel U				UM551 UM551-V UM552 UM552-V	UM622	

Table 2.2: Arnitel productrange for general purpose

Besides these multi-purpose grades, specialty grades can be offered for specific purposes and/or application areas. These grades are not intended for regular sales and are therefore restricted. Permission from marketing is needed before sampling is initiated.

	Arnitel E	Arnitel P	Arnitel U
Automotive			
• CVJ boots	EB460 EB463 EB464		
• Boyplugs		PL380-M0	
Extrusion			
• Roofing foil	EM402-L		

Table 2.3: Examples of specialty grades

Arnitel® EL630/EM630

2.8.31 General:

Arnitel is the brand name of a series polyester based thermoplastic elastomers. These polymers combine excellent processability with good elastomeric properties between -40 and 200°C. Arnitel EL630 and EM630 are excellent materials for injection moulding and extrusion applications respectively. The chemical structure of Arnitel EL630/EM630 is shown below.

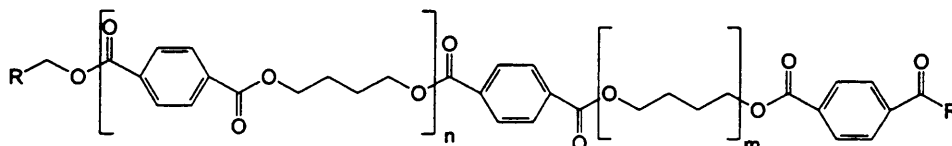


Figure 2.9: Chemical structure of Arnitel EL630/EM630.

Another way of writing the structure of Arnitels is shown below in Figure 2.



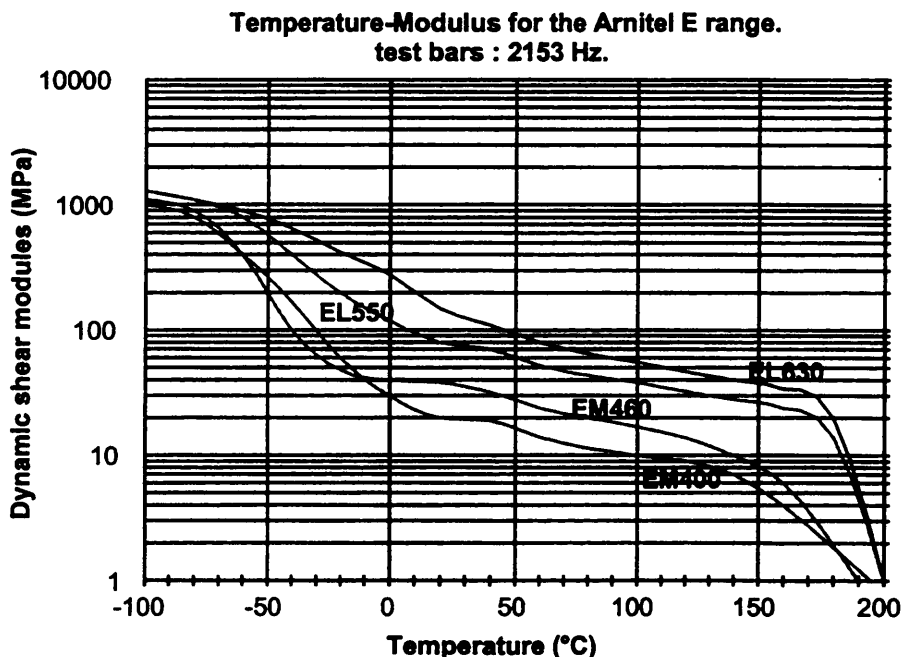
Figure 2.10: Simplified structure of Arnitel EL630/EM630.

Arnitel EL630/EM630 is TOSCA registered (including DSL-Canada) under CAS 37282-12-5

2.8.32 Thermal properties:

• **Modulus-temperature behaviour:**

The materials have a glass transition at circa -40°C and a typical melting point at 213°C. The modulus-temperature behaviour is shown in graph 2.76, for comparison, accompanied by other Arnitel E types.



Graph 2.76: Modulus-temperature behaviour of Arnitel EL630/EM630.

Arnitel® EL630/EM630

Although information on performance at higher temperatures may be extracted from the above shown graph, a Vicat or HDT are shown in table 2.29.

analysis	SI unit	typical data	test method
Vicat A	(°C)	200	ISO 306/A
Vicat B	(°C)	125	ISO 306/B
HDT-B	(°C)	115	ISO 75-1

Table 2.29: Vicat and HDT data on Arnitel® EL630 and EM630

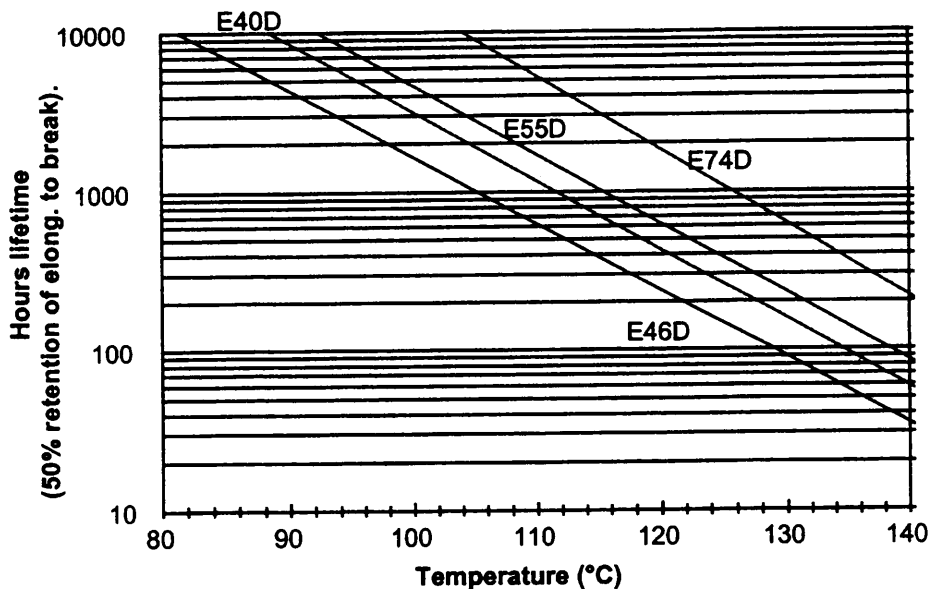
Arnitel EL630 and EM630 have a melting point of 213°C as found in the second heating curve of a DSC. The polymer will crystallize at 155°C using a 20°C/min cooling rate. The thermal expansion coefficient of Arnitel EL630/EM630 and is $140 \cdot 10^{-4} \mu\text{m/m.K}$.

• **Heat aging:**

Arnitel EL630/EM630 shows an optimum between heat resistance and colour stability. Heat aging for EL630/EM630 is under test at this moment, however the data will be between EL550 and EL740. Arrhenius curves of thermo-oxidative heat aging are shown in graph 2.77. Criterium chosen is retention of 50% original elongation at break.

Heat aging of Arnitel E40D, 46D, 55D and 74D.

Natural products, Arrhenius plot.



Graph 2.77: Heat stability for Arnitel E-range.

Heat ageing can be improve using a stabilisation masterbatch, however for heat stabilisation the P-range is preferred for it's excellence in performance. These data can be found in the Arnitel properties summary or an Arnitel P datasheet.

2.8.33 Processing and Handling:

Arnitel EL630/EM630 is a polyester with a density of 1.12 g/cm³ according ISO 1183. Due to the polyester nature of these materials it is of major importance to store the material dry prior to processing. Materials packaged in sealed packaging should have a moisture content lower then 500 ppm. The polymer will contain 0.12% moisture in 50% RH and 0.58% water after saturation in water. Both numbers are in equilibrium. If samples have become wet during storage a drying step of 24 hours 120°C (or 6 hours 140°C) prior to use will prevent degradation of the material during processing combined with an eventual loss of properties. The air or nitrogen will have to have a dew point of at least -30°C.

Arnitel® EL630/EM630

• **Processing:**

Arnitel EL630/EM630 shows a single melting point at 195°C in DSC. Processing conditions are shown in the table below.

polymer	zone 1	zone 2	zone 3	additional	melt	mold
EL630	225	230	235	235	225-235	20-50
EM630	225	230	235	235	235	50

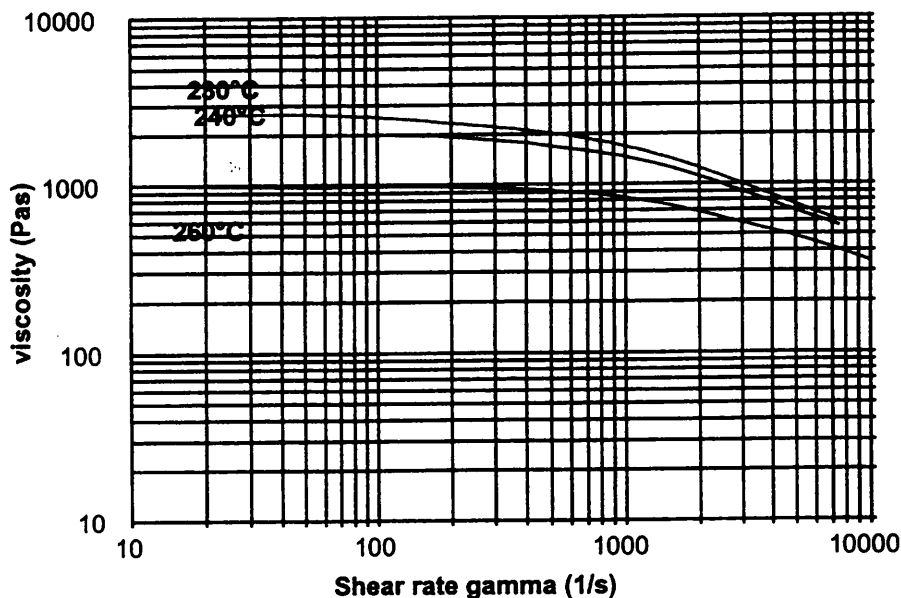
All temperatures are in °C.

Table 2.30: Processing conditions for Arnitel EL630 and Arnitel EM630.

• **Rheology:**

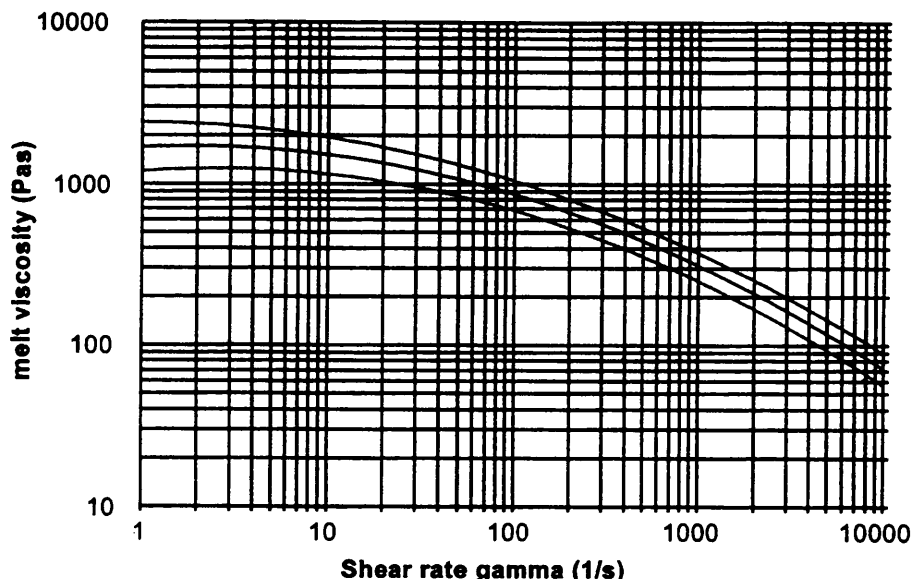
The temperature depending melt viscosity of Arnitel EL630/EM630 and are shown below in graph 2.80 and 2.81 respectively.

**Shear rate dependent of the melt viscosity of Arnitel EL630.
Effect of melt temperature.**



Arnitel® EL630/EM630

**Capillar melt viscosity of Arnitel EM630.
240, 250 and 260°C.**



Graph 2.80 and 2.81: Temperature dependency of the melt viscosity for Arnitel EL630 and EM630 .

The MFI values are shown in table 2.31.

		EL630	EM630	
MFI 230°C	g/10 min		7	ISO 1133
MFI 240°C	g/10 min	30		ISO 1133

Table 2.31: MFI for Arnitel EL630/EM630.

• **Use of regrind:**

Arnitel can readily be recycled. If the MFI of the regrind is up or down to four points higher, 20% can be recycled. A difference of 2 MFI points allows up to 50% of regrind. Obviously the regrind should be dried properly before use.

2.8.34 Mechanical properties:

If Arnitel EL630 or Arnitel EM630 are processed properly the materials will have mechanical properties as shown in table 2.32.

Mechanical property	SI Unit	typica data*		test method .
		EL630	EM630	
Hardness	Shore D	63	63	ISO 868
Tensile modulus (1 mm/min)	MPa	330	330	ISO 527
Tensile strength (50 mm/min)	MPa	30	30	ISO 527
Strain at break	%	350	350	ISO 527
Tensile stress at 5% strain	Mpa	11.5	11.5	
Tensile stress at 10% strain	Mpa	15.9	15.9	
Tensile stress at 50% strain	Mpa	17.3	17.3	
Tear strength Graves	KN/m	145	145	DIN53515
Izod notched 23°C (73°F)	KJ/m ²	NB	NB	ISO 180/1A
Izod notched -30°C (-22°F)	KJ/m ²	4	4	ISO 180/1A
Charpy notched 23°C (73°F)	KJ/m ²	NB	NB	ISO 179/1eA
Charpy notched -30°C (-22°F)	KJ/m ²	12	12	ISO 179/1eA

Data for dry natural materials.

*1 NB: No Break

Table 2.32: mechanical properties of Arnitel® EL630.

Arnitel® EL630/EM630

- **Abrasion:**

Arnitels show good abrasion resistance in both Taber and DIN 53516 abrasion tests. Data are shown in the Arnitel general property overview (also included in the EPIC)

2.8.35 Flame retardancy:

Arnitel EL630 and EM630 show in an ISO1210/A flammability test a burning rate leading to a classification FH-1. Flame retardancy can be improved using a halogenated or halogen free FR masterbatch.

2.8.36 Electrical properties:

Arnitel EL630/EM630 can be used for cable jacketing applications. If the material is in permanent contact with copper a copper stabilisation package should be added. If the copper wires are coated with a tin layer, no stabilisation is necessary. The electrical properties are shown in table 33.

Electrical property	SI Unit	typical data*		test method
		EL630	EM630	
Dielectric strength	KV/mm	22	22	IEC 243-1
Relative permittivity (ϵ_r) at 1 kHz	-	4.4	4.4	IEC 250
Dissipation factor ($\tan \delta$) at 1kHz	-	0.019	0.019	IEC 250
Comparative tracking index	-	600	600	IEC 112
Volume resistivity	$10^{14} \Omega \cdot \text{cm}$	1	1	IEC 93
Surface resistivity	$10^{14} \Omega$	1	1	IEC 93

Table 2.33: Typical electrical properties of Arnitel® EL630 and EM630.

2.8.37 Chemical resistance:

Arnitel EL630 and EM630 are sensitive to strong bases and strong acids, especially at elevated temperatures. In some halogenated hydrocarbons (like tetrachloroethane), the materials (partially) dissolve. For a full review on chemical resistance of Arnitel EL630 and EM630 request the chemical resistance brochure.

- **Hydrolysis**

Like all polyesters Arnitel are sensitive to moisture, however Arnitels are more stable to water than e.g. PET and PBT. graph 2.84 shows the hydrolytic stability of Arnitel EL630 at 100°C and in steam (120°C). For improved hydrolysis stability, using a polycarbodiimid containing masterbatch like Stabaxol® in an option. To maintain all other properties use a masterbatch based on polyester. Data on the Stabaxol stabilised grade are shown in graph 2.85.



WONDERLITE® PC-110 代表物性：

June 9, 2004, V2.0

特性	試驗法	單位	試驗條件	PC-110
流動係數 Melt Flow Index	ASTM D1238	g/10min	300 , 1.2 kg	10
比重 Specific Gravity	ASTM D792	-	23/23	1.20
吸水率 Water Absorption (immersion)	ASTM D570	%	24hr at 23	0.20
全光穿透率 Light Transmission	ASTM D1003	%	3 mm thick	89
濁度 Haze	ASTM D1003	%	3.2 mm thick	< 0.8
折射率 Refractive Index	ASTM D542	-	-	1.585
引張強度，降伏點 Tensile Strength at Yield	ASTM D638	Kg/cm ²	23	630
延伸率 Tensile Elongation	ASTM D638	%	降伏點 Yield 23	6
			破斷點 Break 23	110
彎曲強度 Flexural Strength	ASTM D790	Kg/cm ²	23	920
彎曲模數 Flexural Modulus	ASTM D790	Kg/cm ²	23	24000
Izod 缺口衝擊強度 Izod Impact Strength (Notched)	ASTM D256	Kg . cm/cm	1/4"	14.3
			1/8"	87
洛式硬度 Rockwell Hardness	ASTM D785	M Scale	-	M-77
壓縮強度 Compressive Strength	ASTM D695	Kg/cm ²	-	780
熱變形溫度，未退火 Heat Distortion Temperature (unannealed)	ASTM D648		4.6 Kg/cm ² , 120 /hr	136
			18.6 Kg/cm ² , 120 /hr	125
軟化點 Vicat Softening Temperature	ASTM D1525		1 Kg, 50 /hr	153
線膨脹係數 Coefficient of Linear Expansion	ASTM D696	x10 ⁻⁵ cm/cm/	40~100	6~8
熱傳導率 Thermal Conductivity	ASTM C177	W/m	-	0.2
成型收縮率 Mold Shrinkage	ASTM D955	%	流動方向 parallel	0.5-0.7
			垂直方向 across	0.5-0.7
燃燒率 Flammability	UL 94	1/16"	-	V-2
體積電阻率 Volume Resistivity	ASTM D257	x10 ¹⁶ Ω·cm	-	3
介電常數 Dielectric Constant	ASTM D150	-	60 Hz	2.95
			10 ⁶ Hz	2.9
介電損失 Dielectric Dissipation Factor (tan δ)	ASTM D150	-	60 Hz	0.0004
			10 ⁶ Hz	0.009
絕緣破壞強度 Dielectric Breakdown Strength	ASTM D149	kV/mm	1.6mm	30
耐電弧性 Arc Resistance (Tungsten electrode)	ASTM D495	sec	-	110
產品特性 / 主要應用 Characteristics/Principal Applications				中黏度 Medium Viscosity

請注意：上表數據僅供參考用。

VALOX® 310SE0

Americas: COMMERCIAL

Unreinforced. UL94V-0/5VA rated. For electrical industry; bobbins, keyboard switches and switch components, and appliance housings.

Property

TYPICAL PROPERTIES ⁽¹⁾			
MECHANICAL	Value	Unit	Method
Tensile Stress, yld, Type I, 50 mm/min	59	MPa	ASTM D 638
Tensile Stress, brk, Type I, 50 mm/min	59	MPa	ASTM D 638
Tensile Strain, brk, Type I, 50 mm/min	80	%	ASTM D 638
Flexural Stress, yld, 1.3 mm/min, 50 mm span	101	MPa	ASTM D 790
Flexural Stress, brk, 1.3 mm/min, 50 mm span	101	MPa	ASTM D 790
Flexural Modulus, 1.3 mm/min, 50 mm span	2620	MPa	ASTM D 790
Hardness, Rockwell R	120	-	ASTM D 785
IMPACT	Value	Unit	Method
Izod Impact, unnotched, 23 °C	1602	J/m	ASTM D 4812
Izod Impact, notched, 23 °C	37	J/m	ASTM D 256
Gardner, 23 °C	34	J	ASTM D 3029
Modified Gardner, 23 °C	34	J	ASTM D 3029
THERMAL	Value	Unit	Method
HDT, 0.45 MPa, 6.4 mm, unannealed	163	°C	ASTM D 648
HDT, 1.82 MPa, 6.4 mm, unannealed	71	°C	ASTM D 648
CTE, -40 °C to 40 °C, flow	7.92E-05	1/°C	ASTM E 831
CTE, 60 °C to 138 °C, flow	1.31E-04	1/°C	ASTM E 831
Relative Temp Index, Elec	120	°C	UL 746B
Relative Temp Index, Mech w/impact	120	°C	UL 746B
Relative Temp Index, Mech w/o impact	140	°C	UL 746B
PHYSICAL	Value	Unit	Method
Specific Gravity	1.39	-	ASTM D 792
Specific Volume	0.72	cm ³ /g	ASTM D 792
Water Absorption, 24 hours	0.08	%	ASTM D 570
Mold Shrinkage, flow, 0.75-2.3 mm	0.9 - 1.6	%	GE Method
Mold Shrinkage, flow, 2.3-4.6 mm	1.5 - 2.3	%	GE Method
Mold Shrinkage, xflow, 0.75-2.3 mm	1 - 1.7	%	GE Method
Mold Shrinkage, xflow, 2.3-4.6 mm	1.6 - 2.4	%	GE Method
ELECTRICAL	Value	Unit	Method
Volume Resistivity	>1.6E+16	Ohm-cm	ASTM D 257
Dielectric Strength, in air, 3.2 mm	18.4	kV/mm	ASTM D 149

Dielectric Strength, in oil, 1.6 mm	22	kV/mm	ASTM D 149
Relative Permittivity, 100 Hz	3.1	-	ASTM D 150
Relative Permittivity, 1 MHz	3.1	-	ASTM D 150
Dissipation Factor, 100 Hz	0.002	-	ASTM D 150
Dissipation Factor, 1 MHz	0.02	-	ASTM D 150
Arc Resistance, Tungsten {PLC}	6	PLC Code	ASTM D 495
Hot Wire Ignition {PLC}	2	PLC Code	UL 746A
High Voltage Arc Track Rate {PLC}	4	PLC Code	UL 746A
High Ampere Arc Ign, surface {PLC}	0	PLC Code	UL 746A
Comparative Tracking Index (UL) {PLC}	3	PLC Code	UL 746A
FLAME CHARACTERISTICS	Value	Unit	Method
UL Recognized, 94V-0 Flame Class Rating (3)	0.7	mm	UL 94
UL Recognized, 94-5VA Rating (3)	3	mm	UL 94
CSA (See File for complete listing)	LS88480	File No.	CSA LISTED

Source GMD, last updated:04/14/2003

Processing

Parameter		
	Value	Unit
Injection Molding		
Drying Temperature	120	°C
Drying Time	3 - 4	hrs
Drying Time (Cumulative)	12	hrs
Maximum Moisture Content	0.02	%
Melt Temperature	245 - 260	°C
Nozzle Temperature	240 - 255	°C
Front - Zone 3 Temperature	245 - 260	°C
Middle - Zone 2 Temperature	240 - 255	°C
Rear - Zone 1 Temperature	230 - 250	°C
Mold Temperature	50 - 75	°C
Back Pressure	0.3 - 0.7	MPa
Screw Speed	50 - 100	rpm
Shot to Cylinder Size	40 - 80	%
Vent Depth	0.013 - 0.025	mm

Source GMD, last updated:04/14/2003

THESE PROPERTY VALUES ARE NOT INTENDED FOR SPECIFICATION PURPOSES.

PLEASE CHECK WITH YOUR [\(LOCAL SALES OFFICE\)](#) FOR AVAILABILITY IN YOUR REGION

(1) Typical values only. Variations within normal tolerances are possible for various colors. All values are measured after at least 48 hours storage at 23 °C/50% relative humidity. All properties, except the melt volume and melt flow rates, are measured on injection molded samples. All samples tested under ISO test standards are prepared according to ISO 294.

(2) Only typical data for selection purposes. Not to be used for part or tool design.

(3) This rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

(4) Internal measurements according to UL standards.

Disclaimer : THE MATERIALS AND PRODUCTS OF THE BUSINESSES MAKING UP THE GE PLASTICS UNIT OF GENERAL ELECTRIC COMPANY, ITS SUBSIDIARIES AND AFFILIATES ("GEP"), ARE SOLD SUBJECT TO GEP' S STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, GEP MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (I) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (II) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING GEP MATERIALS, PRODUCTS, RECOMMENDATIONS OR ADVICE. EXCEPT AS PROVIDED IN GEP' S STANDARD CONDITIONS OF SALE, GEP AND ITS REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS OR PRODUCTS DESCRIBED HEREIN. Each user bears full responsibility for making its own determination as to the suitability of GEP' s materials, products, recommendations, or advice for its own particular use. Each user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating GEP materials or products will be safe and suitable for use under end-use conditions. Nothing in this or any other document, nor any oral recommendation or advice, shall be deemed to alter, vary, supersede, or waive any provision of GEP' s Standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by GEP. No statement contained herein concerning a possible or suggested use of any material, product or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of General Electric Company or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product or design in the infringement of any patent or other intellectual property right

® VALOX is a registered trademark of the General Electric Company

© 1997-2003 General Electric Company. All rights reserved

宮前五金股份有限公司

檢驗報告表

編號 :911048

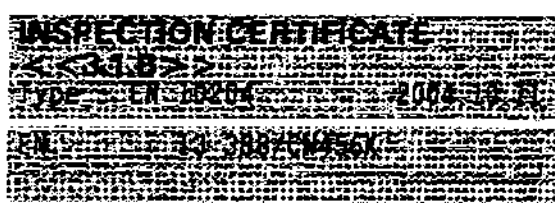
91年10月31日

客 戶	立杰實業社		
品 名	FREE CUTTING BRASS ROD	六角 8.0 m/m	
規 格	JIS H3250 C3604 BD		
數 據	標 準 值	實 測 值	備 註
項 目			
化 學 成 份 %	Cu	57.0-61.0	58.19
	pb	1.8 - 3.7	3.08
	Fe	<0.5	—
	Sn+Fe	<1.2	0.76
	Zn	REMAINDER	REMAINDER
其 它			



桃園縣龜山鄉頂湖一街 24 號 TEL: (03) 3283068-70

Joelle Haeni
Direct call : +32/4820335



WELLIDEA TRADING CO., LTD.
4F, NO. 21, ALLEY 10
LANE 245, WU LING RD
30090 HSINCHU CITY
TAIWAN

Y/order
W42145

Date
04.05.17

O/delivery note
83688.0

Product
ROUND BRONZE RODS
3.000 mm L: 2500 mm

O/product
13062

Y/product

Alloy
B24 CuSn4Pb4Zn4

Quantity
913.6 Kg

		Standards	Guaranteed values	Sample
Cu	%	Balance	Balance	Balance
Pb	%	3.5 - 4.5	3.5 - 4.0	3.71
Fe	%	max. 0.1	max. 0.1	0.01
Sn	%	3.5 - 4.5	3.5 - 4.5	3.89
Ni	%	max. 0.2	max. 0.2	0.03
Al	%		max. 0.02	-----
P	%	0.01 - 0.4	0.01 - 0.4	0.10
Te	%	max. 0.2	max. 0.2	-----
Tot.Others	%	max. 0.2	max. 0.2	-----
Zn	%	3.5 - 4.5	3.5 - 4.5	3.92
Rm	N/mm2	760 - 830	760 - 830	783

We certify that the above described materials comply with the terms of the specifications of our order confirmation. All copyright reserved.

BVQI certificates
ISO 9001/14001
SCES 003/031

SWISSMETAL
UMS Swiss Metalworks Ltd
PLANT BOILLAT

宮前五金股份有限公司

檢驗報告表

編號：900118

客 戶	宏基企業社		
品 名	FREE CUTTING BRASS ROD	丸 9.5 mm	
規 格	JIS H3250 C3604 BD		
數 據	標 準 值	實 測 值	備 註
項 目			
化 學 成 份 %	Cu	57.0 - 61.0	58.88
	Pb	1.8 - 3.7	3.40
	Fe	<0.5	-----
	Sn+Fe	<1.2	0.73
	Zn	REMAINDER	REMAINDER
其 它			



桃園縣龜山鄉頂湖一街 24 號 TEL: (03) 3283068-70

APPENDIX (附錄)

LEO ME PTFE rod is manufactured with virgin PTFE powder by ram extrusion or compression molding and is conformed to meet the requirement of ASTM


TABLE 1 Detail Specification for PTFE Rod.

ITEM	PROPERTY	ASTM TEST METHOD	VALUE
1	Specific gravity	D792	2.15-2.2
2	Tensile strength	D638	280-350 kg/cm ²
3	Elongation	D638	200-400%
4	Dielectric strength	D149	30KV/mm
5	Deformation under load. 6.9Mpa, 50C, %	D621	3.5 - 6
6	Dissipation factor 1 KHz	D150	Less than 0.0005
7	Dielectric constant 1 KHz	D150	2.0 - 2.1
8	Volume resistivity	D257	> 10 ¹⁶
9	Surface resistivity	D257	10 ¹⁷
10	Flexural modulus	D790	430-500Mpa
11	Compressibility	D1147	16-20%
12	Hardness, durometer	D2240	D53 - D60
13	Impact strength	D256	16kg-cm/cm
14	Coefficient of linear thermal expansion, per C. 30C to 80C, 10 ⁻⁵ C	D696	12.3 to 11.6

宮前五金股份有限公司

檢驗報告表

93年2月20日

客 戶				
品 名		FREE CUTTING BRASS ROD	丸 2.0, 5.5 m/in	
規 格		JIS H3250 C3604 BD		
項 目	數 據	標 準 值	實 測 值	備 註
	化 學 成 份 %			
	Cu	57.0 - 61.0	58.01	
	Pb	1.8 - 3.7	3.21	
	Fe	<0.5	—	
	Sn+Fe	<1.2	0.72	
	Zn	REMAINDER	REMAINDER	
其 它				

桃園縣龜山鄉頂湖一街 24 號 TEL: (03) 3283068-70

萬興業

SGS Test Report

Product : RF Antenna

Contents

No	Description		Report No.	Page
1	Cable	RG-178 Cable	CE/2004/C1640	P.27~29
2	Antenna Body	TPE EL-550	CE/2004/C2040	P.30~32
3	Antenna Base	PC -110	GZSCR050529SS2/LP GZSCR040833297/LP	P.33~34
4	Antenna Base	PBT	CE/2005/30689A	P.35~37
5	Rivet	POM ; Black	CE/2005/50700	P.38~41
6	Connector	Big SMA Plug/Reverse	CE/2004/73632	P.42~46

Result for RoHS : PASS




Test Report

Report No. : CE/2004/C1640
Date : 2004/12/16
Page : 1 of 3

The following merchandise was (were) submitted and identified by the client as :

Type of Product : RG-178 B/U SERIES
Sample Received : 2004/12/09
Testing Date : 2004/12/09 TO 2004/12/16

=====
Test Result : - Please see the next page -


Daniel Yeh, M.R. / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company

Test Report

Report No. : CE/2004/C1640

Date : 2004/12/16

Page : 2 of 3

Test Result

PART NAME NO.1 : TRANSPARENT FEP JACKET(PLEASE REFER TO THE PHOTO ATTACHED)

Test Item (s):	Unit	Method	MDL	Result			
				No.1			
PBBs(Polybrominated biphenyls)(CAS NO:059536-65-1)	%	With reference to USEPA3540 or USEPA3550. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.			
PBBEs(PBDEs)(Polybrominated biphenyl ethers)	%	With reference to USEPA3540 or USEPA3550. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.			

Test Item (s):	Unit	Method	MDL	Result			
				No.1			
Chromium VI (Cr+6)	ppm	As per US EPA 7196A and US EPA 3060A.	2	N.D.			
Cadmium (Cd)	ppm	ICP-AES after as per EN 1122, method B:2001 or other acid digestion.	2	N.D.			
Mercury (Hg)	ppm	ICP-AES after as per US EPA 3052 or other acid digestion.	2	N.D.			
Lead (Pb)	ppm	ICP-AES after as per US EPA 3050B or other acid digestion.	2	N.D.			

- NOTE • (1) N.D. = Not detected (<MDL)
 (2) ppm = mg/kg
 (3) MDL = Method Detection Limit

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.

Report No. : CE/2004/C1640

Date : 2004/12/16

Page : 3 of 3



The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company.



Test Report

DSM ENGINEERING PLASTICS.

Report No. : CE/2004/C2040

Date : 2004/12/17

Page : 1 of 3

The following merchandise was (were) submitted and identified by the client as :

Type of Product : EL550
Sample Received : 2004/12/10
Testing Date : 2004/12/10 TO 2004/12/17

=====
Test Result : - Please see the next page -


Daniel Yeh, M.R. / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.



Test Report

DSM ENGINEERING PLASTICS.

Report No. : CE/2004/C2040

Date : 2004/12/17

Page : 2 of 3

Test Result

PART NAME NO.1 : WHITE PLASTIC PELLETS(PLEASE REFER TO THE PHOTO ATTACHED)

Test Item (s):	Unit	Method	MDL	Result			
				No.1			
PBBs(Polybrominated biphenyls)(CAS NO:059536-65-1)	%	With reference to USEPA3540 or USEPA3550. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.			
PBBEs(PBDEs)(Polybrominated biphenyl ethers)	%	With reference to USEPA3540 or USEPA3550. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.			

Test Item (s):	Unit	Method	MDL	Result			
				No.1			
Chromium VI (Cr+6)	ppm	As per US EPA 7196A and US EPA 3060A.	2	N.D.			
Cadmium (Cd)	ppm	ICP-AES after as per EN 1122, method B:2001 or other acid digestion.	2	N.D.			
Mercury (Hg)	ppm	ICP-AES after as per US EPA 3052 or other acid digestion.	2	N.D.			
Lead (Pb)	ppm	ICP-AES after as per US EPA 3050B or other acid digestion.	2	N.D.			

- NOTE : (1) N.D. = Not detected (<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit

Test Report

DSM ENGINEERING PLASTICS.

Report No. : CE/2004/C2040

Date : 2004/12/17

Page : 3 of 3





Test Report

No.: QZSCR050529552/LP

Date: MAY 18, 2005

Page 1 of 1

PIN SHINE ELECTRONIC & PLASTIC PRODUCTS (DONGGUAN) CO., LTD.
WEST PART OF LIU WU INDUSTRIAL AREA, SAN HENG ROAD,
NEW DISTRICT OF SHI JIE TOWN, DONG GUAN CITY,
GUANG DONG PROVINCE

Report on the submitted sample said to be PC110

SGS Ref No. : GZML05051729③
Sample Receiving Date : MAY 17, 2005
Testing Period : MAY 17, 2005 TO MAY 18, 2005

Test Requested : As specified by client, to determine the Cadmium Content in the submitted sample.

Test Method : With reference to BS EN1122 : 2001 method B,
Analysis was performed by Atomic Absorption Spectrometer.

RESULTS

	Black plastic grains
Cadmium content (Cd)	N.D.

Note : - N.D. = Not Detected (< 2 ppm)
- ppm = mg/kg

*** End of Report ***

Signed for and on behalf of
SGS-CSTC Ltd.


He Xiaoyan, Jane
Tech. Manager



Test Report

No.: GZSCR040833297/LP

Date: SEP 20, 2004

Page 2 of 2

Results :

(1)

White plastic part

Lead Content (Pb)	N.D.
Cadmium Content (Cd)	N.D.
Mercury Content (Hg)	N.D.
Hexavalent Chromium Content [Cr(VI)]	N.D.

Note : - N.D. = Not Detected (< 2 ppm)
 - ppm = mg/kg

(2)

Flame Retardants	White plastic part	Detection Limit (ppm)
Monobromobiphenyl	N.D.	5
Dibromobiphenyl	N.D.	5
Tribromobiphenyl	N.D.	5
Tetrabromobiphenyl	N.D.	5
Pentabromobiphenyl	N.D.	5
Hexabromobiphenyl	N.D.	5
Heptabromobiphenyl	N.D.	5
Octabromobiphenyl	N.D.	5
Nonabromodiphenyl	N.D.	5
Decabromodiphenyl	N.D.	5
Monobromodiphenyl ether	N.D.	5
Dibromodiphenyl ether	N.D.	5
Tribromodiphenyl ether	N.D.	5
Tetrabromodiphenyl ether	N.D.	5
Pentabromodiphenyl ether	N.D.	5
Hexabromodiphenyl ether	N.D.	5
Heptabromodiphenyl ether	N.D.	5
Octabromodiphenyl ether	N.D.	5
Nonabromodiphenyl ether	N.D.	5
Decabromodiphenyl ether	N.D.	5

Note : - N.D. = Not Detected (< 5 ppm)
 - ppm = mg/kg

*** End of Report ***

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf or attached. Said Conditions are also available upon request or are accessible at www.sgs.com. Attention is drawn to the limitations of liability, indemnification and jurisdictional policies defined therein. The results shown in this Test Report refer only to the sample(s) tested unless otherwise stated and such sample(s) are retained for 30 days only. This Test Report shall not be reproduced except in full, without written approval of the Company.

GZCM 152835



Test Report

HUEI SUN PLASTIC CO., LTD.
NO. 17, LANE 679, PIN-TUNG ROAD, PIN-CHENG CITY,
TAOYUAN HSIEN, TAIWAN

Report No. : CE/2005/30689A
Date : 2005/03/10
Page : 1 of 3

The following merchandise was (were) submitted and identified by the client as :

Type of Product : 塑膠射出零件
Sample Received : 2005/03/03
Testing Date : 2005/03/03 TO 2005/03/10

=====
Test Result : - Please see the next page -


Daniel Yeh, M.R. / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company



Test Report

HUEI SUN PLASTIC CO., LTD.
 NO. 17, LANE 679, PIN-TUNG ROAD, PIN-CHENG CITY,
 TAOYUAN HSIEN, TAIWAN

Report No. : CE/2005/30689A
 Date : 2005/03/10
 Page : 2 of 3

Test Result

PART NAME NO.1 : DEEP GRAY PLASTIC (PLEASE REFER TO THE PHOTO ATTACHED)

Test Item (s):	Unit	Method	MDL	Result
				No.1
PBBs(Polybrominated biphenyls)(CAS NO:059536-65-1)	%	With reference to USEPA3540C or USEPA3550C. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.
PBBEs(PBDEs)(Polybrominated biphenyl ethers)	%	With reference to USEPA3540C or USEPA3550C. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.

Test Item (s):	Unit	Method	MDL	Result
				No.1
Chromium VI (Cr+6)	ppm	As per US EPA 7196A and US EPA 3060A.	2	N.D.
Cadmium (Cd)	ppm	ICP-AES after as per EN 1122, method B:2001 or other acid digestion.	2	N.D.
Mercury (Hg)	ppm	ICP-AES after as per US EPA 3052 or other acid digestion.	2	N.D.
Lead (Pb)	ppm	ICP-AES after as per US EPA 3050B or other acid digestion.	2	20.9

NOTE : (1) N.D. = Not detected (<MDL)
 (2) ppm = mg/kg
 (3) MDL = Method Detection Limit

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company

Test Report

HUEI SUN PLASTIC CO., LTD.
NO. 17, LANE 679, PIN-TUNG ROAD, PIN-CHENG CITY,
TAOYUAN HSIEN, TAIWAN

Report No. : CE/2005/30689A
Date : 2005/03/10
Page : 3 of 3





Test Report

REN-YUH ENTERPEISE CO., LTD.
NO. 3, LANE 36, DONG-SHUN ST., SHE-LIN, TAIPEI,
TAIWAN, R. O. C.

Report No. : CE/2005/50700
Date : 2005/05/12
Page : 1 of 4

The following merchandise was (were) submitted and identified by the client as :

Type of Product : BLACK POM
Sample Received : 2005/5/5
Testing Date : 2005/5/5 TO 2005/05/12

=====
Test Result : - Please see the next page -


Daniel Yeh, M.R. / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.



Test Report

REN-YUH ENTERPEISE CO., LTD.
NO. 3, LANE 36, DONG-SHUN ST., SHE-LIN, TAIPEI,
TAIWAN, R. O. C.

Report No. : CE/2005/50700
Date : 2005/05/12
Page : 2 of 4

Test Result

PART NAME NO.1 : BLACK PLASTIC PELLETS (PLEASE REFER TO THE PHOTO ATTACHED)

Test Item (s):	Unit	Method	MDL	Result
				No.1
Monobromobiphenyl	%	With reference to USEPA3540C or USEPA3550C. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.
Dibromobiphenyl	%		0.0005	N.D.
Tribromobiphenyl	%		0.0005	N.D.
Tetrabromobiphenyl	%		0.0005	N.D.
Pentabromobiphenyl	%		0.0005	N.D.
Hexabromobiphenyl	%		0.0005	N.D.
Heptabromobiphenyl	%		0.0005	N.D.
Octabromobiphenyl	%		0.0005	N.D.
Nonabromobiphenyl	%		0.0005	N.D.
Decabromobiphenyl	%		0.0005	N.D.
Total PBBs (Polybrominated biphenyls)/Sum of above	%	-	N.D.	
Monobromobiphenyl ether	%	With reference to USEPA3540C or USEPA3550C. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC)	0.0005	N.D.
Dibromobiphenyl ether	%		0.0005	N.D.
Tribromobiphenyl ether	%		0.0005	N.D.
Tetrabromobiphenyl ether	%		0.0005	N.D.
Pentabromobiphenyl ether	%		0.0005	N.D.
Hexabromobiphenyl ether	%		0.0005	N.D.
Heptabromobiphenyl ether	%		0.0005	N.D.
Octabromobiphenyl ether	%		0.0005	N.D.
Nonabromobiphenyl ether	%		0.0005	N.D.
Decabromobiphenyl ether	%		0.0005	N.D.
Total PBBEs (PBDEs)(Polybrominated biphenyl ethers)/Sum of above	%	-	N.D.	

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company



Test Report

REN-YUH ENTERPEISE CO., LTD.
NO. 3, LANE 36, DONG-SHUN ST., SHE-LIN, TAIPEI,
TAIWAN, R. O. C.

Report No. : CE/2005/50700
Date : 2005/05/12
Page : 3 of 4

Test Item (s):	Unit	Method	MDL	Result
				No.1
Chromium VI (Cr+6)	ppm	UV-VIS after reference to US EPA 3060A.	2	N.D.
Cadmium (Cd)	ppm	ICP-AES after reference to EN 1122, method B:2001 or other acid digestion.	2	N.D.
Mercury (Hg)	ppm	ICP-AES after reference to US EPA 3052 or other acid digestion.	2	N.D.
Lead (Pb)	ppm	ICP-AES after reference to US EPA 3050B or other acid digestion.	2	N.D.

NOTE : (1) N.D. = Not detected (<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit
(4) " - " = No Regulation

Test Report

REN-YUH ENTERPEISE CO., LTD.
NO. 3, LANE 36, DONG-SHUN ST., SHE-LIN, TAIPEI,
TAIWAN, R. O. C.

Report No. : CE/2005/50700
Date : 2005/05/12
Page : 4 of 4





Test Report

萬晉興業有限公司
*710 台南縣永康市正南一街57巷31號

報告號碼 : CE/2004/73632
日期 : 2004/08/09
頁數 : 1 of 5

以下測試樣品乃供應廠商所提供及確認：

樣品名稱 : 100-200-1008A1
買主 / 訂單號碼 : 譚裕實業股份有限公司
收件日期 : 2004/08/02.
測試日期 : 2004/08/02 TO 2004/08/09

=====
測試結果 : - 請見下一頁 -


Daniel Yeh, M.R. / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company



Test Report

萬晉興業有限公司
*710 台南縣永康市正南一街57巷31號

報告號碼 : CE/2004/73632
日期 : 2004/08/09
頁數 : 2 of 5

測試結果

測試部位 NO.1 : 黑色金屬

測試項目:	單位	測試方法	偵測極限值	結果				
				NO.1				
石棉		石棉定性分析, 參考Health Canada, Product safety Bureau Reference-Manual方法						
斜方角閃石	**	參考 NIOSH 9000 / X光繞射定性分析法(XRD)	-	Negative				
青石棉	**	參考 NIOSH 9000 / X光繞射定性分析法(XRD)	-	Negative				
棕石棉	**	參考 NIOSH 9000 / X光繞射定性分析法(XRD)	-	Negative				
透閃石	**	參考 NIOSH 9000 / X光繞射定性分析法(XRD)	-	Negative				
白石棉	**	參考 NIOSH 9000 / X光繞射定性分析法(XRD)	-	Negative				
陽起石	**	參考 NIOSH 9000 / X光繞射定性分析法(XRD)	-	Negative				

測試項目:	單位	測試方法	偵測極限值	結果				
				NO.1				
偶氮(AZO)		參考德國1998年1月FOODSTUFFS AND COMMODITY ARTICLES ACT B82.02-2方法						
4-氨基二苯(CAS NO. 000092-67-1)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
聯苯胺(CAS NO. 00092-87-5)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
4-氯鄰甲苯胺(CAS NO. 000097-56-3)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
2-萘胺(CAS NO. 000091-59-8)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
鄰氨基二甲基偶氮(CAS NO. 000097-56-3)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company



Test Report

萬晉興業有限公司

*710 台南縣永康市正南一街57巷31號

報告號碼：CE/2004/73632

日期：2004/08/09

頁數：3 of 5

測試項目：	單位	測試方法	偵測極限值	結果				
				NO.1				
對硝基鄰甲苯胺(CAS NO. 000099-55-8)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
對氯苯胺(CAS NO. 000106-47-8)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
4-甲氧基-間苯二胺(CAS NO. 000615-05-4)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
4,4-二氨基二苯甲烷(CAS NO. 000101-77-9)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
3,3 二甲聯苯胺(CAS NO. 000091-94-1)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
3,3 二甲氧基聯苯胺(CAS NO. 000119-90-4)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
3,3 二基聯苯胺(CAS NO. 000119-93-7)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
4,4-二胺基-3,3-二甲氧基聯苯(CAS NO. 000838-88-0)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
2-甲氧基-5-甲氧基聯苯(CAS NO. 000120-71-8)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
4,4-亞甲基雙(氯苯胺)(CAS NO. 000101-14-4)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
4-4-氧化雙苯胺(CAS NO. 000101-80-4)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
4,4-硫代雙苯胺(CAS NO. 000139-65-1)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
鄰甲苯胺(CAS NO. 000095-53-4)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
2,4-二胺基甲苯(CAS NO. 000095-80-7)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
2,4,5-三甲基苯胺(CAS NO. 000137-17-7)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
鄰氨基苯甲醚(CAS NO. 000090-04-0)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				
對氨基偶氮苯(CAS NO. 000060-09-3)	ppm	以氣相層析質譜儀和薄層色層等相關技術檢測分析	3	N.D.				

測試項目：	單位	測試方法	偵測極限值	結果				
				NO.1				
氯化石蠟(C10-C13)	%	以氣相層析質譜儀(GC/MS)檢測	0.01	N.D.				

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company



Test Report

萬晉興業有限公司
*710 台南縣永康市正南一街57巷31號

報告號碼 : CE/2004/73632
日期 : 2004/08/09
頁數 : 4 of 5

測試項目:	單位	測試方法	偵測極限值	結果				
				NO.1				
滅蟻靈(Mirex)	ppm	以氣相層析質譜儀(GC/MS)檢測	4	N.D.				

測試項目:	單位	測試方法	偵測極限值	結果				
				NO.1				
有機錫								
三苯基錫	ppm	參考DIN38407 / 89/677/EEC方法,以氣相層析儀/火焰光度偵器(GC/FPD)檢測有機錫定量分析	0.03	N.D.				
三丁基錫	ppm	參考DIN38407 / 89/677/EEC方法,以氣相層析儀/火焰光度偵器(GC/FPD)檢測有機錫定量分析	0.03	N.D.				

測試項目:	單位	測試方法	偵測極限值	結果				
				NO.1				
多溴聯苯(PBBs)	%	參考83/264/EEC方法,以氣相層析儀/電子捕捉偵測器/質譜儀(GC/ECD/MS)或高效液相層析儀/二極體陣列偵測器/質譜儀(HPLC/DAD/MS)檢測	0.0005	N.D.				
多溴聯苯醚(PBBes/PBDEs)	%	參考83/264/EEC方法,以氣相層析儀/電子捕捉偵測器/質譜儀(GC/ECD/MS)或高效液相層析儀/二極體陣列偵測器/質譜儀(HPLC/DAD/MS)檢測	0.0005	N.D.				

測試項目:	單位	測試方法	偵測極限值	結果				
				NO.1				
多氯聯苯(PCBs)	ppm	參考 USEPA 8082A方法,以氣相層析質譜儀/電子捕捉偵測器/質譜儀(GC/ECD/MS)檢測	0.5	N.D.				

測試項目:	單位	測試方法	偵測極限值	結果				
				NO.1				
多氯奈(PCNs)	ppm	以氣相層析質譜儀(GC/MS)檢測	5	N.D.				

The content of this PDF file is in accordance with the original issued reports for reference only. This Test Report cannot be reproduced, except in full, without prior written permission of the Company



Test Report

萬晉興業有限公司
*710 台南縣永康市正南一街57巷31號

報告號碼 : CE/2004/73632
日期 : 2004/08/09
頁數 : 5 of 5

測試項目:	單位	測試方法	偵測極限值	結果					
				NO.1					
聚氯乙烯(PVC)	**	聚氯乙烯定性分析,以紅外線光譜分析法搭配垂直式全反射配件(FTIR/ATR)或熱裂解氣相層析質譜儀(Pyrolyzer/GC/MS)檢測	-	Negative					

測試項目:	單位	測試方法	偵測極限值	結果					
				NO.1					
六價鉻	ppm	依照US EPA 7196A及3060A方法	2	N.D.					
鎘	ppm	依照 EN1122 方法B:2001或其他酸消化方法,用感應耦合電漿原子發射光譜儀(ICP-AES)做分析	2	N.D.					
汞	ppm	依照 US EPA 3052 方法或其他酸消化方法,用感應耦合電漿原子發射光譜儀(ICP-AES)做分析	2	N.D.					
鉛	ppm	依照 US EPA 3050B 方法或其他酸消化方法,用感應耦合電漿原子發射光譜儀(ICP-AES)做分析	2	40.0					

- 備註 : (1) N.D. = Not detected.(<MDL) / 未檢出(低於偵測極限值)
(2) ppm = mg/kg / 百萬分之一
(3) MDL= Method Detection Limit(偵測極限值)
(4) " ---" = Not Applicable / 未測項目
(5) " -" = Not Regulation / 無規格值
(6) **定性分析(無單位)
(7) Negative / 陰性(未偵測到), Positive / 陽性(已偵測到)
(8) * = 表示依法規規定調整之數據