

FHS-A9015S00

Application:

Picture:

Intel Nehalem LGA1156 (45nm) & Intel Sandy Bridge LGA1155 (32nm)

Thermal & Mechanical Spec

Thermal performance for 45 W CPU HSK Assembly Weight: 120 g (ref.)

Clipping Force: 16 Kgf (ref.)



Component Specification:

1. Heat Sink

Type: Thermal Shrink

Material: Aluminum A6063 Dimension: 90*90*30 mm 2. Thermal interface material

Material: Dow Corning TC-5630 or Equivalent.

3. Fan



(90x90x17 mm with Thermistor & PWM Control)

Rated Voltage: 12 V

Life Time:

Superflo bearing 50000 hrs

Connector:

a. Lead wire: UL 10368 -F- AWG#28

pin 1: black wire----(-)

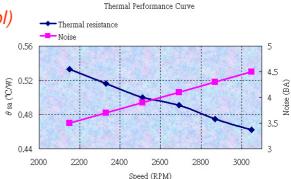
pin 2: yellow wire----(+)

pin 3: green wire----(F00)

pin 4: blue wire----(PWM)

b. Housing: Molex 47054-1000 or equivalent

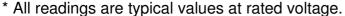
c. Terminal: Molex 2759T 08-50-0113 or equivalent











* Specifications are subject to change without notice

DELTA ELECTRONICS, INC. 252, Shang Ying Road, Kuei San TAOYUAN SHIEN 333, TAIWAN,R.O.C. TEL: 886-3-3591968 EXT 2073

FAX: 886-3-3591991

DELTA PRODUCTS CORPORATION 4405 CUSHING PARKWAY FREMONT, CA 94538, U.S.A. TEL: 1-510-668-5100 FAX: 1-510-668-0680

DELTA ELECTRONICS(JAPAN), INC. DELTA SHIBADAIMON BLDG 2-1-14 SHIBADAIMON, MINATO-KU, TOKYO, 105-0012, JAPAN TEL: 81-3-5733-1111 FAX: 81-3-5733-1211

DELTA ELECTRONICS EUROPE LTD. WEGALAAN 16.

2132 JC HOOFDDORP THE NETHERLANDS TEL: 31-23-566-8989 FAX: 31-23-5668910

Date: July-2009

APPROVAL SHEET

Customer Name:	
Model Name:	COOLER
Model Name:	FHS-A9015S00
Customer Part No:	
Spec Issue Date:	2015/12/14
Spec Revision:	<u>02</u>
	T THIS SPECIFICATION BACK AFTER YOU R PRODUCTION PRE-ARRANGMENT.
Approved By:	
Date:	

Approval	Check	Designer
Charles. Chen	Charles. Chen	Skyler.Huang

Form No.: tMP-D029 Form Rev.: 00



REV.	Description	Drawn	Checked	Approved	Issue Date
00	ISSUE SPEC	REEK.LI2011/11/25	Charles. Chen 2011/11/25	Alex-Hsia 2011/11/25	2011/11/25
01	ADD ROHS	Skyler	Charles, Chen	Alex-Hsia	2013/03/08
02	 Change the grease from TC-1996 to TC-5630 Update RoHS 	Skyler	Charles, Chen	Charles, Chen	2015/12/14
Descriptio	l n: SAMPLE REVIS	I SION CODE LI	ST		
Part No.					REV
DELTA MO	DEL: FHS-A9015S00		TOTAL _	78 PAGE	02

Form Rev.: 00 Form No.: tMP—D029

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Form Rev.: 00 Form No.: tMP-D029



1. SPECIFICATION

Characters

Item	Description
Scope	THIS SPECIFICATION DEFINES THE ELECTRICAL AND
	MECHANICAL CHARACTERISTICS OF THE HEATSINK
Application	INTEL CPU COOLER
Specification	
a: thermal Resistance	0.52 (°C/W) (REF.)
b: total weight	120 g (REF.)
c: clip force	16 kgf (REF.)

BOM

Item	Part Name	Material	Part NO.	Q'TY	Remark
1	Heatsink	A6063-T5	3346771500	1 pce	
2	FASTENER CAP	PC	3470415400	4 pce	
3	FASTENER BASE	PC	3470415500	4 pce	
4	LABEL	PE	3267128700	1 pce	
5	FAN	PBT	3622920411	1 pce	
6	TIM	DOW TC-5630	4021107300	0.12g	Rev 02

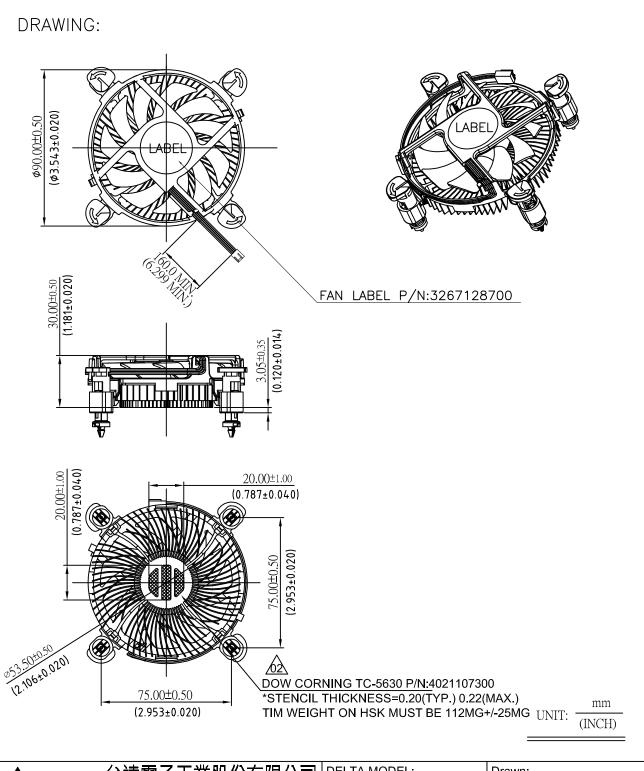
Form No.: tMP—D029 Form Rev.: 00



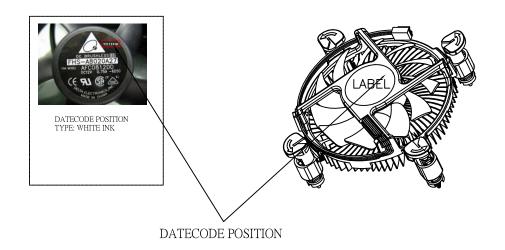
2. PRINT

Assembly Drawing

Form Rev.: 00 Form No.: tMP-D029



台達電子工業股份有限公司 DELTA ELECTRONICS, INC.	여미	DELTA MODEL: Drawn: Skyler 12/14'15
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE		CUSTOMER NAME: STD
BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION	l.	CUSTOMER P/N:
DIMENSIONAL TOLERANCES HOLES: ±0.05 ANGLES: ±0.85 () () () () <30	1,5	Description: PRODUCTION SPEC. (PHYSICAL DIMENSION)
>30-100 ±0.35 X ±0.3 100-150 ±0.25 300-350 ±0.45 600-900 ±: >100-300 ±0.5 XX ±0.2 150-200 ±0.3 350-400 ±0.5 900-OVER ±: ABOVE 300 ±0.6 X.XX ±0.1 200-250 ±0.35	2.4	A4 Part No. FHS-A9015S00-PD REV.
SCALE UNIT mm USED ON COOLER		SIZE SHEET 1 OF 2 ISSUE DATE: 02



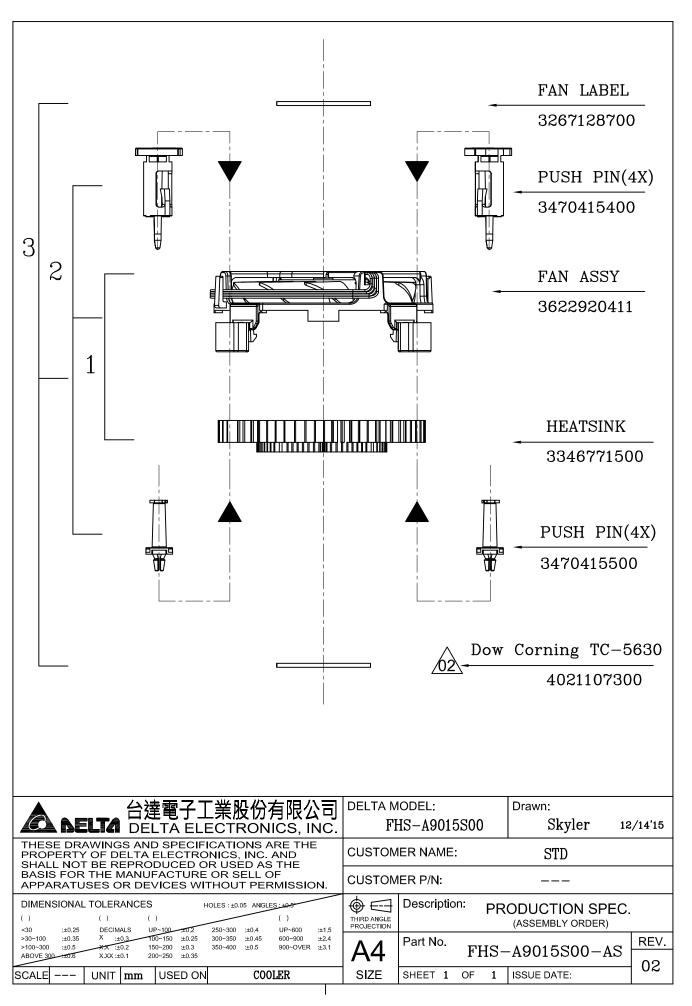
NOTE:

- 1. DATECODE ON FAN LABEL.
- 2. PLEASE REFER TO CP10S-00345 WHILE PRINTING DATECODE.

UNIT: $\frac{mm}{(INCH)}$

台達電子工業股份有限公司 DELTA ELECTRONICS, INC.	DELTA MODEL: Drawn: Skyler 12/14'15
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BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.	CUSTOMER P/N:
DIMENSIONAL TOLERANCES HOLES: ±0.05 ANGLES: ±0.05 () () () () () () () () () (Description: PRODUCTION SPEC. (PHYSICAL DIMENSION)
>30-100 ±0.35 X ±0.3 100-150 ±0.25 300-350 ±0.45 600-900 ±2.4 >100-300 ±0.5 XX ±0.2 150-200 ±0.3 350-400 ±0.5 900-OVER ±3.1 ABOVE 300 ±0.6 X.XX ±0.1 200-250 ±0.35	A4 Part No. FHS-A9015S00-PD REV. 02
SCALE UNIT mm USED ON COOLER	SIZE SHEET 2 OF 2 ISSUE DATE:

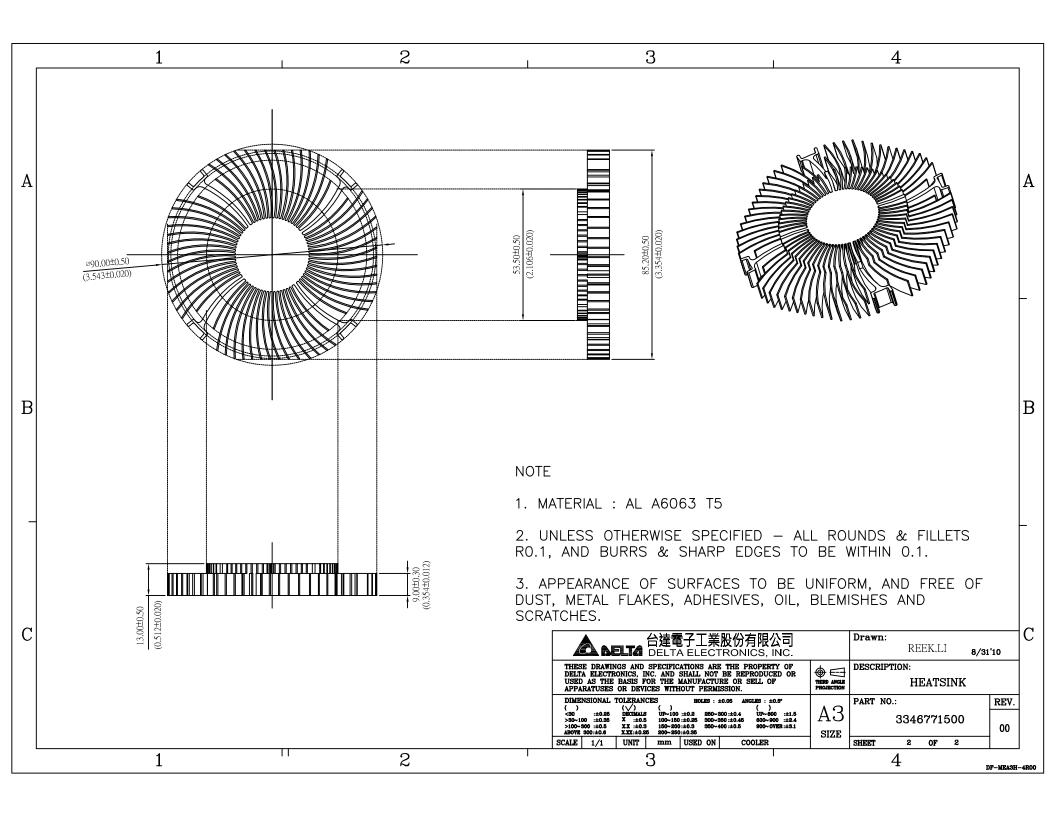
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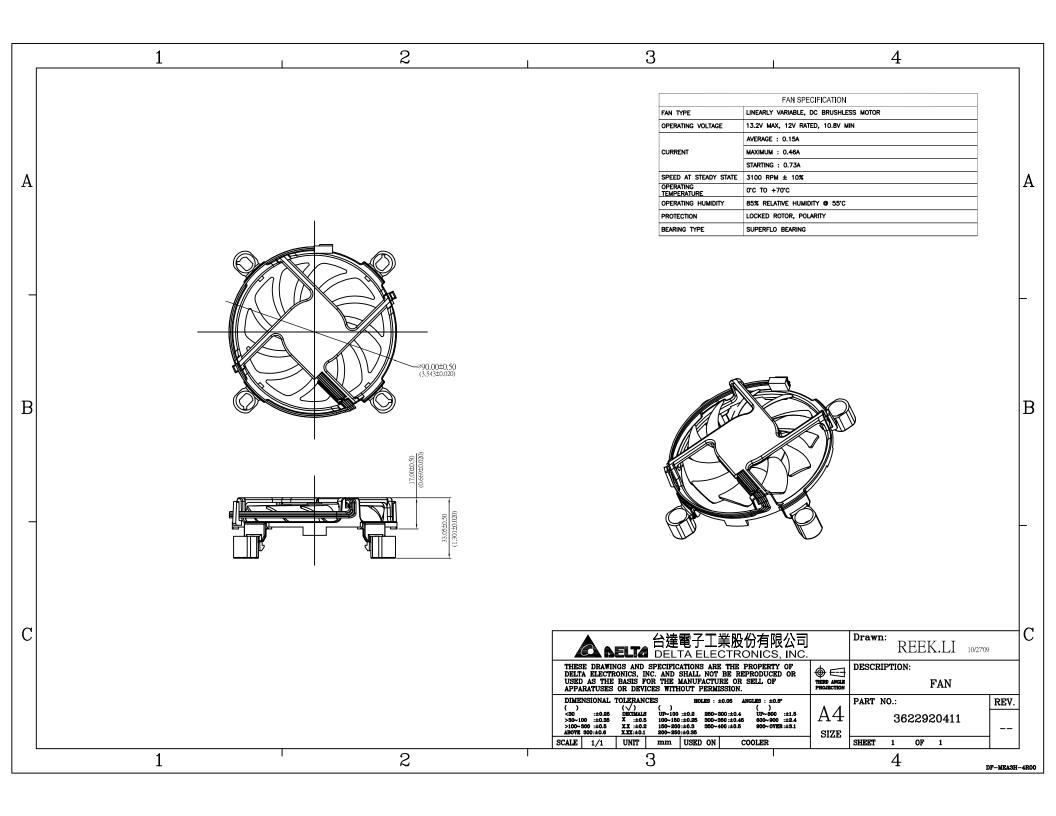


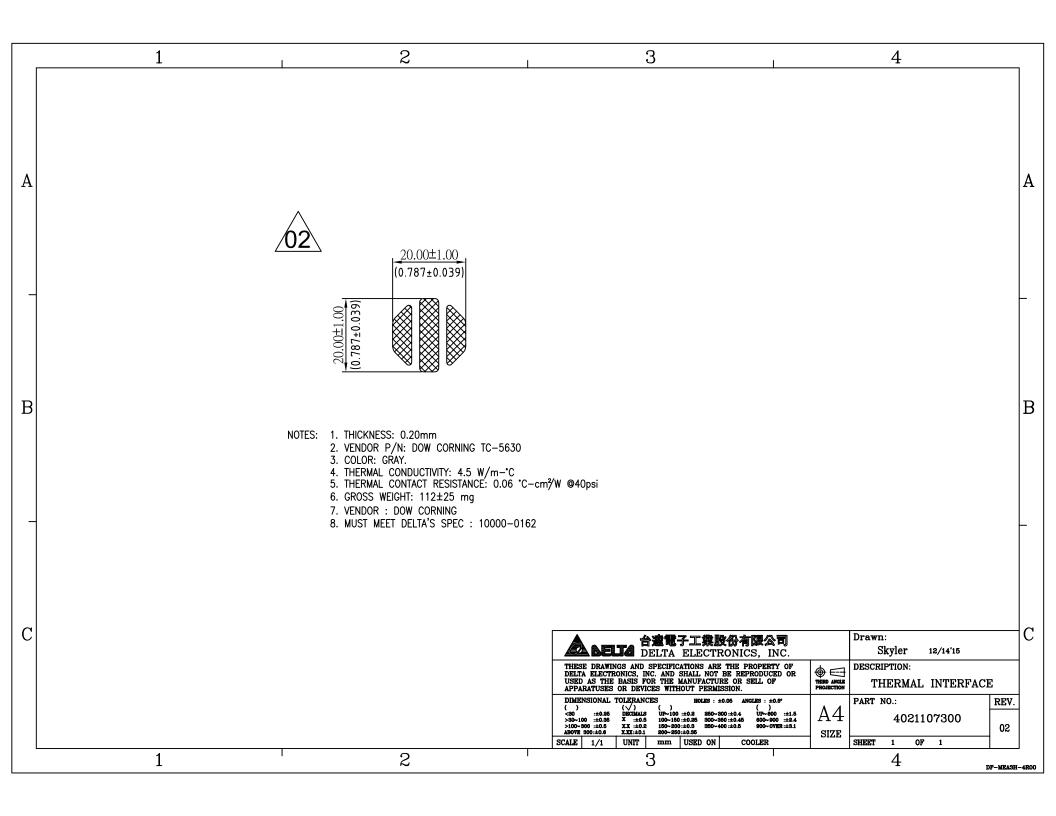


Parts Drawing

Form No.: tMP—D029 Form Rev.: 00





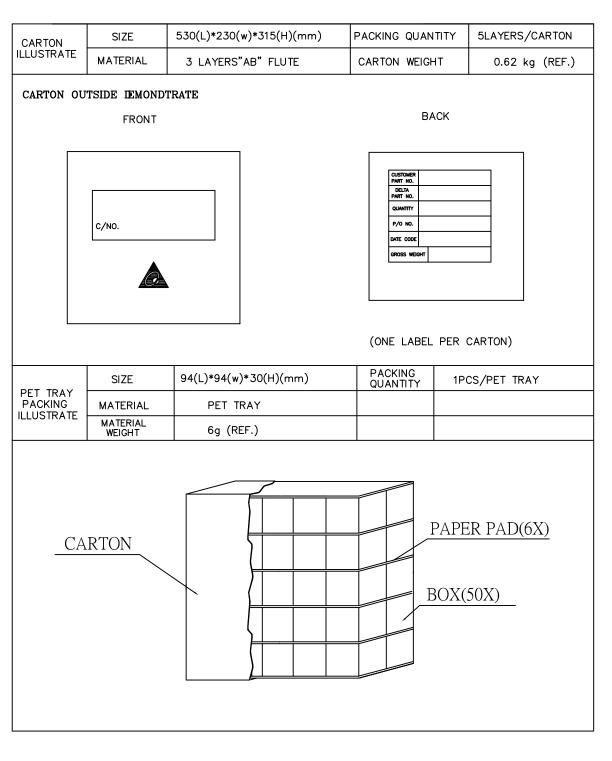




3. PACKING PLAN

Packing Specification

Form No.: tMP—D029 Form Rev.: 00



台達電子工業股份有限公司 DELTA ELECTRONICS, INC.	DELTA MODEL: FHS-A9015S00 Drawn: REEK.LI 11/2511
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE	CUSTOMER NAME: STD
BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.	CUSTOMER P/N:
DIMENSIONAL TOLERANCES HOLES: ±0.05 ANGLES: ±0.5* () () () () <80 ::±0.25 DECIMALS UP-100 ::±0.2 250~300:±0.4 UP-600 ::±1.5	Description: PRODUCTION SPEC. (PACKING ASSMEBLY)
>30~100 :±0.35 X :±0.3 100~150 :±0.25 300~350 :±0.45 600~900 :±2.4 >100~300 :±0.5	A4 Part No. FHS-A9015S00-PA REV
SCALE UNIT mm USED ON COOLER	SIZE SHEET 1 OF 2 ISSUE DATE:

PAI	RT NO.		FHS	6-A90	1550	D							
			QU,	ANTITY	//CAF	RTON	5	50PCS (5 LAYERS/CARTON, 10PCS/LAYER)					
l	BASIC DATA		PRODUCTION NET WEIGHT			7	7.8kg (REF.)						
L	JATA		PRODU	ICTION	GRO	DSS WEIGHT	Г).8kg	(REF.)				
20(f	t)CONTAINE	R	SIZE		5.	.889(L)*2.3	52(w)*	*2.38	6(H)m	PACKING QUANTITY	101	PALLETS/CO	NTAINER
	LUSTRATE		CONTAI	NER		STEEL					·		
CC	NTAINER F			NER L	OADII	NG MATHOD)						
	PALLET	P	ALLET	PALI	LET	PALLET	PALL	ET.					
	PALLET	P	ALLET	PALI	LET	PALLET	PALL	PALLET		PA	LLET	PALLET	
				TOP	VIEW				I		FRON	IT VIEW	
			SIZ	Ε	1	17(L)*107(v	v)*13(H	H)cm		PACKING QUANTITY	50	CARTONS/	PALLET
	LET LOADII JSTRATE	NG	PA	LLET		WOO	DD			4,0111111	ı		
P	ALLET ILLU	JSTI	RATE		Р	ALLET LOA	DING N	MATH	OD				
										CARTON(<u>(50X</u>	<u>)</u>	

台達電子工業股份有限公司 DELTA ELECTRONICS, INC.	DELTA MODEL: Drawn: REEK.LI 11/25/11	
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BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.	CUSTOMER P/N:	
DIMENSIONAL TOLERANCES HOLES: ±0.05 ANGLES: ±0.5° () () () () () () <30 ::±0.25 DECIMALS UP~100 ::±0.2 250~300:±0.4 UP~800 ::±1.5°	Description: PRODUCTION SPEC. (PACKING ASSMEBLY)	
>30~100 :±0.35 X :±0.3 100~150 :±0.25 300~350 :±0.45 600~900 :±2.4 >100~300 :±0.5	A4 Part No. FHS-A9015S00-PA	EV.
SCALE UNIT mm USED ON COOLER	SIZE SHEET 2 OF 2 ISSUE DATE:	



Delta Electronics Corp. 4. FAN

Form Rev.: 00 Form No.: tMP-D029



SPECIFICATION FOR APPROVAL

CustomerTMPBU
Description DC FAN
Part NoR E V.
Delta Model No. AUC0912D-AF1F REV. 00
Sample Issue No.
Sample Issue Date SEP.15.2010
'
PLEASE SEND ONE COPY OF THIS SPECIFICAITON BACK AFTER YOU SIGNED APPROVAL FOR PRODUCTION PRE-ARRANGMENT.
APPROVED BY:
DATE :

DELTA ELECTRONICS, INC.
TAOYUAN PLANT
252, SHANG YING ROAD, KUEI SAN INDUSTRIAL ZONE
TAOYUAN SHIEN, TAIWAN, R.O.C.

TEL:886-(0)3-3591968 FAX:886-(0)3-3591991 DELTA ELECTRONICS, INC.

252, SHANG YING ROAD, KUEI SAN TAOYUAN HSIEN 333, TAIWAN, R. O. C. TEL: 886-(0)3-3591968FAX : 886 - (0)3 - 3591991

SPECIFICATION FOR APPROVAL

Sample Issue Da	te: SEP.15.2010	Quantity:
Sample Rev:	00	Issue NO:
Delta Model NO.:	AUC0912D-AF1F	Delta Safety Model NO.: N/A
Customer P/N:		REV:
Description:	DC FAN	
Customer:	TMPBU	

1. SCOPE:

THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL CHARACTERISTICS OF THE DC BRUSHLESS AXIAL FLOW FAN. THE FAN MOTOR IS WITH SINGLE PHASE AND FOUR POLES.

2. CHARACTERS:

ITEM	DESCRIPTION
RATED VOLTAGE	12.0 VDC
OPERATION VOLTAGE	10.8 - 13.2 VDC
INPUT CURRENT	0.15 (MAX. 0.22) A
INPUL CURRENT 	(SAFETY CURRENT 0.46 A)
INPUT POWER	1.80 (MAX. 2.64) W
SPEED (FAN ONLY)	3100±10% R.P.M.
SPEED (FAN ON SINK)	3100±10% R.P.M.
MAX. AIR FLOW (FAN ONLY) (AT ZERO STATIC PRESSURE)	0.643 (MIN. 0.578) M ³ /MIN. 22.68 (MIN. 20.41) CFM
MAX. AIR PRESSURE (FAN ONLY) (AT ZERO AIRFLOW)	1.66 (MIN. 1.34) mmH_20 0.065 (MIN. 0.053) $inchH_20$
ACOUSTICAL NOISE(ON SINK AVG.)	32.6 (MAX. 36.6) dB-A
INSULATION TYPE	UL: CLASS A
1	

(continued)

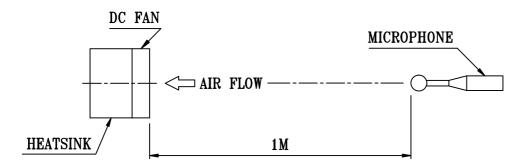
A00 page: 1

PART NO:	
DELTA MODEL:	AUCO912D-AF1F

	
INSULATION STRENGTH	10 MEG OHM MIN. AT 500 VDC (BETWEEN FRAME AND (+) TERMINAL)
DIELECTRIC STRENGTH	5 mA MAX. AT 500 VAC 50/60 Hz ONE MINUTE, (BETWEEN FRAME AND (+) TERMINAL)
EXTERNAL COVER	OPEN TYPE
LIFE EXPECTANCE	80,000 HOURS CONTINUOUS OPERATION AT 45 °C WITH 15 ~ 65 %RH.
ROTATION	CLOCKWISE VIEW FROM NAME PLATE SIDE
OVER CURRENT SHUT DOWN	THE CURRENT WILL SHUT DOWN WHEN LOCKING ROTOR.
LEAD WIRE	UL 10368 -F- AWG #28 BLACK WIRE NEGATIVE(-) YELLOW WIRE POSITIVE(+) GREEN WIRE FREQUENCY(-F00) BLUE WIRE SPEED CONTROL(PWM)

NOTES: 1. ALL READINGS ARE MEASURED AFTER STABLY WARMING UP THROUGH 10 MINUTES.

- 2. THE VALUES WRITTEN IN PARENS, (), ARE LIMITED SPEC.
- 3. ACOUSTICAL NOISE MEASURING CONDITION:



NOISE IS MEASURED AT RATED VOLTAGE IN FREE AIR IN ANECHOIC CHAMBER WITH B & K SOUND LEVEL METER WITH MICROPHONE AT A DISTANCE OF ONE METER FROM THE FAN INTAKE.

A00

PA	RT N	0:											
DE	LTA 1	MODEL:	<i>E</i>	AUC0912D-	AF1F								
 3.	MECI	HANICAL:											
	3-1.	DIMENSIO	NS					SE	E DIN	MENSIC)NS	DRAWI	NG
	3-2.	FRAME -]	PLASTI	C UI	: 94V	7 –0
	(TH	IE CONTAC	T OF	HALOGEN	LESS	THAN	1500	PPM	FOR	USING	EDY	KE	rc)
	3-3.	IMPELLER]	PLASTI	C UI	J: 94V	7-0
	(TH	IE CONTAC	T OF	HALOGEN	LESS	THAN	1500	PPM	FOR	USING	EDY	(E	rc)
	3-4.	BEARING	SYST	EM					9	SUPER	FLO	BEARI	NG
	3-5.	WEIGHT -									- 58	5 GRA	MS
4.	ENVI	RONMENTA	\L:										
	4-1.	OPERATIN	G TE	MPERATUR	E				- 0	TO +	-70]	DEGRI	EE C
	4-2.	STORAGE	TEMP	PERATURE					-30	TO +	-85 1	DEGRE	EE C
	4-3.	OPERATIN	G HU	MIDITY -	85	% REL	ATIVE	HUM	IDITY	WITH	55]	DEGRI	EE C
	4-4.	STORAGE	HUMI	DITY						5	то 9	95 %	RH

5. PROTECTION:

- 5-1. LOCKED ROTOR PROTECTION

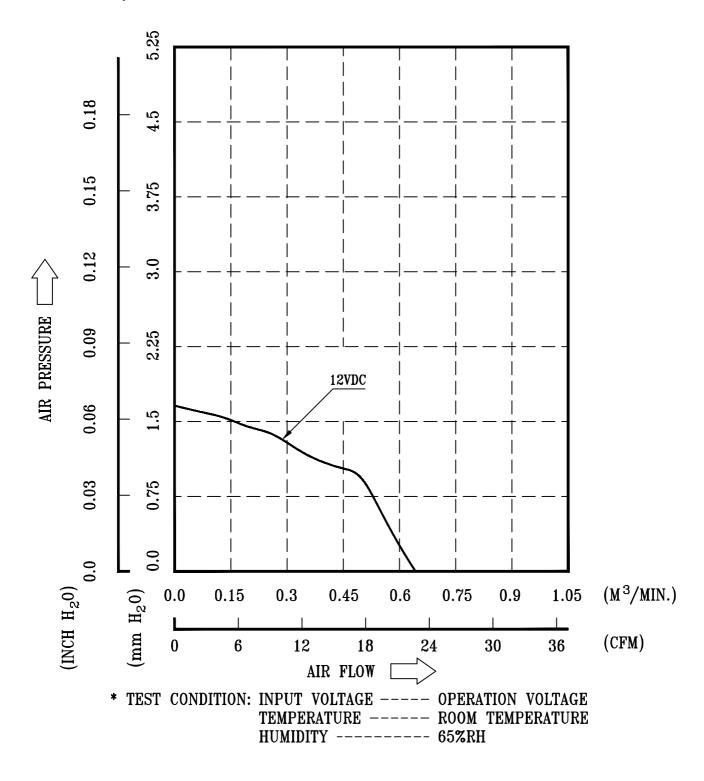
 IMPEDANCE OF MOTOR WINDING PROTECTS MOTOR FROM FIRE IN 96
- 5-2. POLARITY PROTECTION

 HOURS OF LOCKED ROTOR CONDITION AT THE RATED VOLTAGE.

 BE CAPABLE OF WITHSTANDING IF REVERSE CONNECTION FOR POSITIVE AND NEGATIVE LEADS.
- 6. RE OZONE DEPLETING SUBSTANCES:
 - 6-1. NO CONTAINING PBBs, PBBos, CFCs, PBBEs, PBDPEs AND HCFCs.
- 7. PRODUCTION LOCATION
 - 7-1. PRODUCTS WILL BE PRODUCED IN CHINA OR THAILAND OR TAIWAN.

PART NO:			
	AUCO912D-AF1F	 	

8. P & Q CURVE:



page: 4 A00

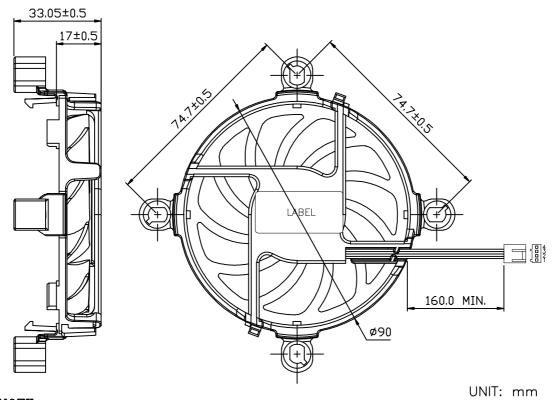
PART NO:

DELTA MODEL: AUC0912D-AF1F

9. DIMENSION DRAWING:

LABEL:

DELTA AUCO912D -AF1F yymmdd CHINA



NOTE:

1. LEAD WIRE: UL 10368 -F- AWG #28

PIN 1 : BLACK WIRE: NEGATIVE(-)

PIN 2 : YELLOW WIRE: POSITIVE(+)

PIN 3 : GREEN WIRE: TACHOMETER OUTPUT (F00)

PIN 4 : BLUE WIRE: SPEED CONTROL (PWM)

- 2. HOUSING: MOLEX 47054-1000 OR EQUIVALENT
- 3. TERMINAL: MOLEX 2759T 08-50-0113 OR EQUIVALENT
- 4. THIS PRODUCT IS ROHS COMPLIANT
- 5. DELTA'S RESTRICTIONS ON HALOGEN APPLY ONLY TO BROMINATED AND CHLORINATED COMPOUNDS. NO OTHER HALOGEN IS RESTRICTED. SUBSTANCES RESTRICTIONS FOR HALOGEN-FREE (INCLUDE FAN PLASTIC PARTS, PWB BOARD, IC, ELECTRICAL MATERIALS & CABLE ASSY),
 - a. BROMINE(Br) < 900 PPM,
 - b. CHLORINE(C1) < 900 PPM
 - c. (Br) + (Cl) < 1500 PPM.

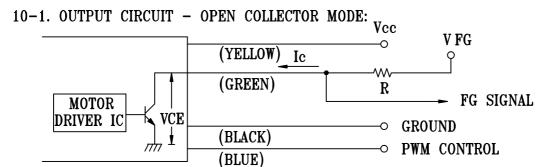
page: 5

A00

PART NO:

DELTA MODEL: AUCO912D-AF1F

10. FREQUENCY GENERATOR (FG) SIGNAL:



CAUTION: THE FG SIGNAL LEAD WIRE MUST BE KEPT AWAY FROM "+" LEAD WIRE & "-" LEAD WIRE.

10-2. SPECIFICATION:

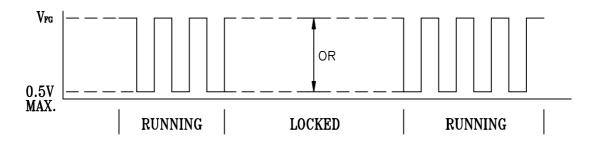
 V_{CE} (sat)=0.5V MAX.

 $V_{FG} = 5.0V$ TYP. (Vcc MAX.)

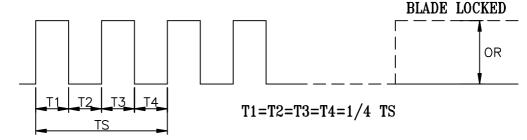
 $I_c = 5mA MAX.$

 $R \ge V_{FG} / I_c$

10-3. FREQUENCY GENERATOR WAVEFORM:



FAN RUNNING FOR 4 POLES



N=R.P.M

TS=60/N(SEC)

*VOLTAGE LEVEL AFTER BLADE LOCKED

*4 POLES

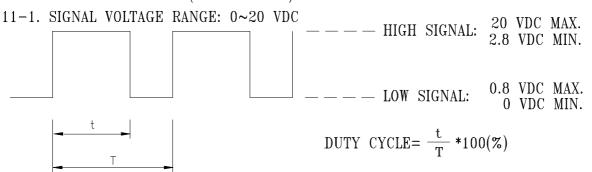
page: 6

A00

PART NO:

DELTA MODEL: AUCO912D-AF1F

11. PWM CONTROL SIGNAL:(FAN ON SINK)



- THE PREFERRED OPERATING POINT FOR THE FAN IS 25KHZ.
- AT 100% DUTY CYCLE, THE ROTOR WILL SPIN AT MAXIMUM SPEED.
- WITH CONTROL SIGNAL LEAD DISCONNECTED, THE FAN WILL SPIN AT MAXIMUM SPEED.
- 11-2. SPEED VS PWM CONTROL SIGNAL:

(AT 25°C, RATED VOLTAGE & PWM SIGNAL AS FOLLOW)

DUTY CYCLE (%)	SPEED R.P.M.	CURRENT (A) TYP.	* PWM SIGNAL PWM FREQUENCY = 25KHz
100	3100±10%	0.15	-5 VDC
0~20	1000±200	0.03	
			0 VDC

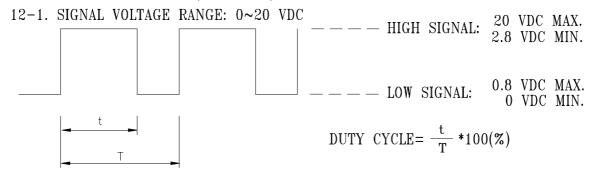
page: 7 A00

DADT NO.

PART NO:

DELTA MODEL: AUCO912D-AF1F

12. PWM CONTROL SIGNAL: (FAN ONLY)

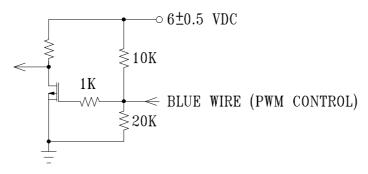


- THE PREFERRED OPERATING POINT FOR THE FAN IS 25KHZ.
- AT 100% DUTY CYCLE, THE ROTOR WILL SPIN AT MAXIMUM SPEED.
- WITH CONTROL SIGNAL LEAD DISCONNECTED, THE FAN WILL SPIN AT MAXIMUM SPEED.
- 12-2. SPEED VS PWM CONTROL SIGNAL:

(AT 25°C, RATED VOLTAGE & PWM SIGNAL AS FOLLOW)

DUTY CYCLE (%)	SPEED R.P.M.	CURRENT (A) TYP.	*	 SIGNAL FREQUENCY = 25KHz
100	3100±10%	0.15		5 VDC
0~20	1000±200	0.03		
				O VDC

12-3. PWM CONTROL LEAD WIRE INPUT IMPEDANCE:



A00



Application Notice

- 1. Delta will not guarantee the performance of the products if the application condition falls outside the parameters set forth in the specification.
- 2. A written request should be submitted to Delta prior to approval if deviation from this specification is required.
- 3. Please exercise caution when handling fans. Damage may be caused when pressure is applied to the impeller, if the fans are handled by the lead wires, or if the fan was hard-dropped to the production floor.
- 4. Except as pertains to some special designs, there is no guarantee that the products will be free from any such safety problems or failures as caused by the introduction of powder, droplets of water or encroachment of insect into the hub.
- 5. The above-mentioned conditions are representative of some unique examples and viewed as the first point of reference prior to all other information.
- 6. It is very important to establish the correct polarity before connecting the fan to the power source. Positive (+) and Negative (-). Damage may be caused to the fans if connection is with reverse polarity, if there is no foolproof method to protect against such error specifically mentioned in this spec.
- 7. Delta fans without special protection are not suitable where any corrosive fluids are introduced to their environment.
- 8. Please ensure all fans are stored according to the storage temperature limits specified. Do not store fans in a high humidity environment. We highly recommend performance testing is conducted before shipping, if the fans have been stored over 6 months.
- 9. Not all fans are provided with the Lock Rotor Protection feature. If you impair the rotation of the impeller for the fans that do not have this function, the performance of those fans will lead to failure.
- 10. Please be cautious when mounting the fan. Incorrect mounting of fans may cause excess resonance, vibration and subsequent noise.
- 11. It is important to consider safety when testing the fans. A suitable fan guard should be fitted to the fan to guard against any potential for personal injury.
- 12. Except where specifically stated, all tests are carried out at room (ambient) temperature and relative humidity conditions of 25°C, 65% RH. The test value is only for fan performance itself.
- 13. Be certain to connect an " $4.7\mu F$ or greater" capacitor to the fan externally when the application calls for using multiple fans in parallel, to avoid any unstable power.

Doc. No: FMBG-ES Form 001 Rev. 0001 Date: June 24, 2009



5. ROHS

- 5.1. PBT
- 5.2. AL6063-T5
- 5.3. PC
- 5.4. PET · INK · COATING
- 5.5. DOW TC-5630

Form Rev.: 00 Form No.: tMP—D029



Test Report No. CANEC1503047702 Date: 13 Mar 2015 Page 1 of 13

KINGFA SCI. & TECH. CO., LTD.

NO.33 KEFENG ROAD, SCIENCE CITY, GUANGZHOU HI-TECHINDUSTRIAL DEVELOPMENT ZONE, GUANGZHOU CITY
CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as: PBT-NPG30

SGS Job No.: CP15-009615 - GZ

Date of Sample Received: 09 Mar 2015

Testing Period: 09 Mar 2015 - 13 Mar 2015

Test Requested : Selected test(s) as requested by client.

Test Method : Please refer to next page(s).

Test Results: Please refer to next page(s).

Conclusion: Based on the performed tests on submitted sample(s), the results of Lead,

Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) comply with the limits as set by RoHS

Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

Alkene Liang

Approved Signatory



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Test Report No. CANEC1503047702

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Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description

SN1 CAN15-030477.002 Black plastic grains

Remarks:

(1) 1 mg/kg = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method: (1)With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.

(2)With reference to IEC 62321-5:2013, determination of Lead by ICP-OES. (3)With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.

(4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by Colorimetric

Method using UV-Vis.

(5) With reference to IEC 62321:2008, determination of PBBs and PBDEs by GC-MS.

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	5
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	1,000	mg/kg	2	ND
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND

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No. CANEC1503047702		Date: 1	3 Mar 2015	Page 3 of 13
<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>002</u>	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
-	mg/kg	5	ND	
	<u>Limit</u>	Limit Unit - mg/kg	Limit Unit MDL - mg/kg 5 - mg/kg 5	Limit Unit MDL 002 - mg/kg 5 ND - mg/kg 5 ND

Notes:

(1) The maximum permissible limit is quoted from the directive 2011/65/EU, Annex II

<u>Halogen</u>

Test Method: With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Chlorine (CI)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND

Elementary Analysis

Test Method: With reference to US EPA Method 3052:1996, analysis was performed by ICP-OES.

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Sb ₂ O₃	mg/kg	12	ND

Notes:

(1) ◆ Calculated concentration of Sb₂O₃ is based on the identified Sb

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Polynuclear Aromatic Hydrocarbons (PAHs)

Test Method: With reference to ZEK 01.4-08 of German ZLS and its amendments, analysis was performed by GC-MS.



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Test Item(s) Naphthalene(NAP)	<u>CAS NO.</u> 91-20-3	<u>Unit</u> mg/kg	MDL 0.1	<u><i>002</i></u> ND	
Acenaphthylene(ANY)	208-96-8	mg/kg	0.1	ND	
Acenaphthene(ANA)	83-32-9	mg/kg	0.1	ND	
Fluorene(FLU)	86-73-7	mg/kg	0.1	ND	
Phenanthrene(PHE)	85-01-8	mg/kg	0.1	ND	
Anthracene(ANT)	120-12-7	mg/kg	0.1	ND	
Fluoranthene(FLT)	206-44-0	mg/kg	0.1	ND	
Pyrene(PYR)	129-00-0	mg/kg	0.1	ND	
Benzo(a)anthracene(BaA)	56-55-3	mg/kg	0.1	ND	
Chrysene(CHR)	218-01-9	mg/kg	0.1	ND	
Benzo(b)fluoranthene(BbF) +	205-99-2/205-82-3	mg/kg	0.1	ND	
Benzo(j)fluoranthene(BjF) Benzo(k)fluoranthene(BkF)	207-08-9	mg/kg	0.1	ND	
Benzo(e)pyrene(BeP)	192-97-2	mg/kg	0.1	ND	
Benzo(a)pyrene(BaP)	50-32-8	mg/kg	0.1	ND	
Indeno(1,2,3-c,d)pyrene(IPY)	193-39-5	mg/kg	0.1	ND	
Dibenzo(a,h)anthracene(DBA)	53-70-3	mg/kg	0.1	ND	
Benzo(g,h,i)perylene(BPE)	191-24-2	mg/kg	0.1	ND	
Sum of 18 PAHs		mg/kg	-	ND	



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Note 1: ZEK 01.4-08: Restraining maximum values for products

Parameter	Category 1	Category 2	Category 3	
	Material indented to be put in the mouth or material for toys with normal skin contact for children aged < 36 months	Materials those are not included in Category 1, with predictable contact with the skin longer than 30 s. (long-term skin contact)	Materials those are not included in Category 1 or 2, with predictable skin contact up to 30 s (short-term skin contact).	
Benzo[a]pyrene (mg/kg) Not detectable (<0.2)***		1	20	
Sum of 18 PAH (mg/kg)**	Not detectable (<0.2)***	10	200	

^{** =} Only PAH substances > 0.1 mg/kg are taken into account while calculating the sum of PAHs

Phthalate

Test Method: With reference to EN14372: 2004. Analysis was performed by GC-MS.

Test Item(s)	CAS NO.	<u>Unit</u>	<u>MDL</u>	<u>002</u>
Dibutyl Phthalate (DBP)	84-74-2	%(w/w)	0.003	ND
Benzylbutyl Phthalate (BBP)	85-68-7	%(w/w)	0.003	ND
Bis(2-ethylhexyl) Phthalate (DEHP)	117-81-7	%(w/w)	0.003	ND
Diisononyl Phthalate (DINP)	28553-12-0 / 68515-48-0	%(w/w)	0.010	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	%(w/w)	0.003	ND

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^{*** =} In case that the maximum values exceed the limits of category 1, but are within the limits of category 2, one may confirm the suitability of the tested material which is indented to be put in the mouth by additional specific migration tests of PAH components based on DIN EN 1186ff and §64 LFGB 80.3 The conclusion of the migration test results must be made based on food law criteria.



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<u>Test Item(s)</u> Diisodecyl Phthalate (DIDP)	<u>CAS NO.</u> 26761-40-0 / 68515-49-1	<u>Unit</u> %(w/w)	<u>MDL</u> 0.010	<u>002</u> ND	
Dimethyl Phthalate (DMP)	131-11-3	%(w/w)	0.003	ND	
Diethyl Phthalate (DEP)	84-66-2	%(w/w)	0.003	ND	
Diisobutyl Phthalate (DIBP)	84-69-5	%(w/w)	0.003	ND	
Dinonyl Phthalate (DNP)	84-76-4	%(w/w)	0.003	ND	
Diisooctyl Phthalate (DIOP)	27554-26-3	%(w/w)	0.010	ND	
Dipropyl Phthalate (DPrP)	131-16-8	%(w/w)	0.003	ND	
Dicyclohexyl Phthalate (DCHP)	84-61-7	%(w/w)	0.003	ND	
Di-n-pentyl Phthalate (DnPP)	131-18-0	%(w/w)	0.003	ND	
Dibenzyl Phthalate (DBzP)	523-31-9	%(w/w)	0.003	ND	
Diphenyl Phthalate (DPhP)	84-62-8	%(w/w)	0.003	ND	
Di-n-hexyl Phthalate (DnHP)	84-75-3	%(w/w)	0.003	ND	

Notes:

(1)DBP,BBP,DEHP Reference information: Entry 51 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC): i) Shall not be used as substances or in mixtures, in concentrations greater than 0.1 % by weight of the plasticised material, in toys and childcare articles.



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ii) Toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by weight of the plasticised material shall not be placed on the market.

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Please refer to Regulation (EC) No 552/2009 to get more detail information

- (2)DINP, DNOP, DIDP Reference information: Entry 52 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC).
- i) Shall not be used as substances or in mixtures, in concentrations greater than 0.1 % by weight of the plasticised material, in toys and childcare articles which can be placed in the mouth by children.
- ii) Such toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by weight of the plasticised material shall not be placed on the market.

Please refer to Regulation (EC) No 552/2009 to get more detail information



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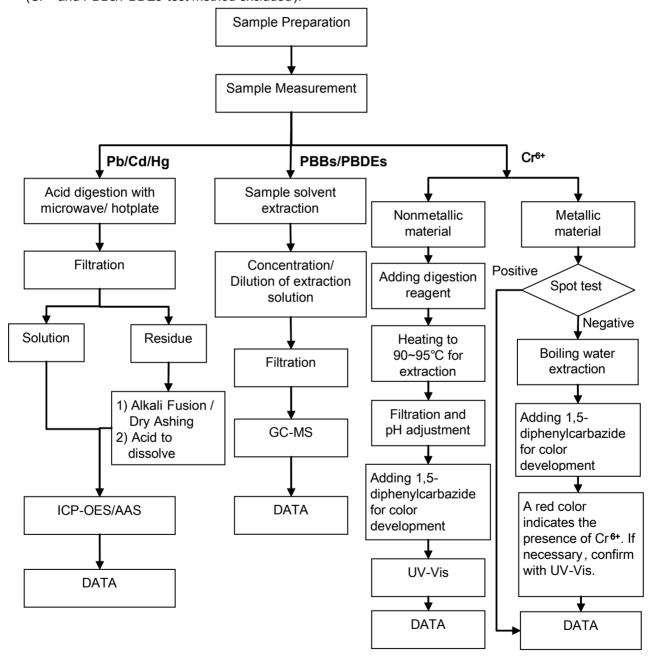
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RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bruce Xiao / Sunny Hu
- 2) Name of the person in charge of testing: Bella Wang / Cutey Yu
- 3) These samples were dissolved totally by pre -conditioning method according to below flow chart (Cr⁶⁺ and PBBs/PBDEs test method excluded).





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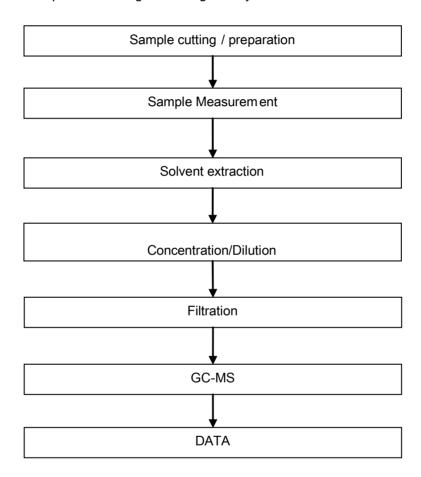
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Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Sunny Hu
- 2) Name of the person in charge of testing: Cutey Yu





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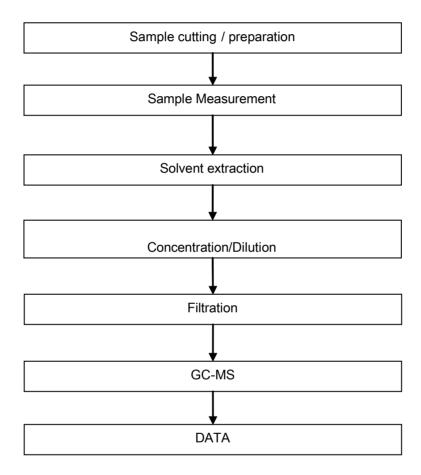
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PAHs Testing Flow Chart

- 1) Name of the person who made testing: Sunny Hu
- 2) Name of the person in charge of testing: Cutey Yu





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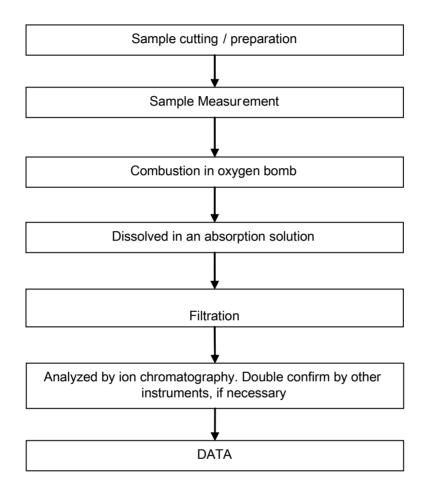
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Halogen Testing Flow Chart

1) Name of the person who made testing: Hanming Xiao

2) Name of the person in charge of testing: Bella Wang





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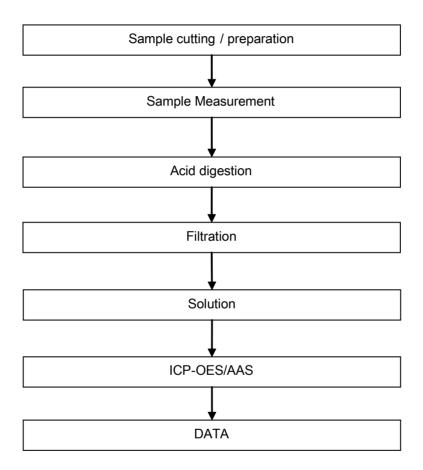


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ATTACHMENTS

Elementary Testing Flow Chart

Name of the person who made testing: Bruce Xiao
 Name of the person in charge of testing: Bella Wang





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Test Report No. CANML1500460601 Date: 14 Jan 2015 Page 1 of 4

GUANGDONG XINGFA ALUMINIUM CO., LTD

RENGHE ROAD 23#,NANZHUANG TOWN,CHANGCHENG DISTRICT,FOSHAN CITY,GUANGDONG PROVINCE,CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as: 6063-T5 Aluminium alloy profiles

SGS Job No.: GZIN1501001229PC - GZ

Internal Reference No.: GZIN1501001119ML

Date of Sample Received: 09 Jan 2015

Testing Period: 09 Jan 2015 - 14 Jan 2015

Test Requested: Selected test(s) as requested by client.

Test Method : Please refer to next page(s).

Test Results : Please refer to next page(s).

Conclusion: Based on the performed tests on submitted sample(s), the results of Lead,

Mercury, Cadmium, Hexavalent chromium comply with the limits as set by RoHS

Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of SGS-CSTC Ltd.

tcho

Echo Yeung

Approved Signatory



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Test Report No. CANML1500460601 Date: 14 Jan 2015 Page 2 of 4

Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description
SN1 CAN15-004606.001 Silvery metal

Remarks:

(1) 1 mg/kg = 1 ppm = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method: (1)With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.

(2)With reference to IEC 62321-5:2013, determination of Lead by ICP-OES. (3)With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.

(4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by spot test /

Colorimetric Method using UV-Vis.

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	_	-	\Diamond	Negative

Notes:

- (1) The maximum permissible limit is quoted from the directive 2011/65/EU, Annex II
- (2) Spot-test:

Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;

(The tested sample should be further verified by boiling-water-extraction method if the spot test result is Negative or cannot be confirmed.)

♦Boiling-water-extraction:

Negative = Absence of CrVI coating

Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.



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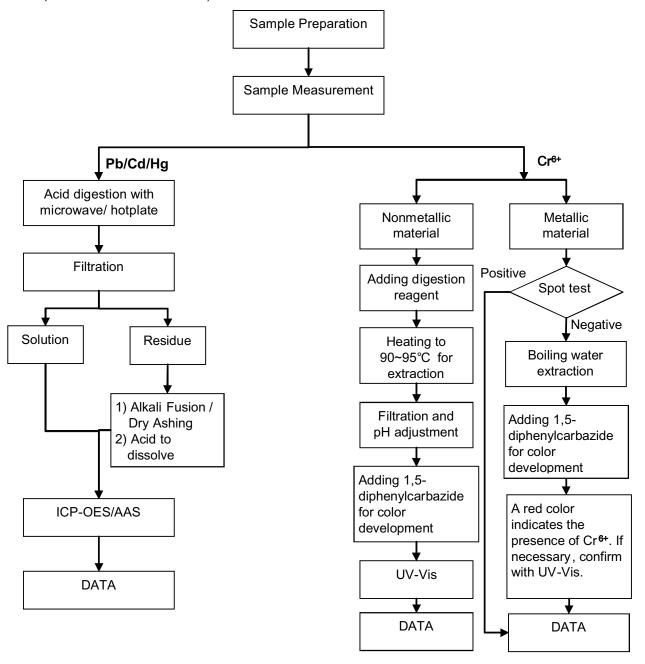
Page 3 of 4

Date: 14 Jan 2015

ATTACHMENTS

RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bruce Xiao
- 2) Name of the person in charge of testing: Bella Wang
- 3) These samples were dissolved totally by pre -conditioning method according to below flow chart (Cr6+ test method excluded).





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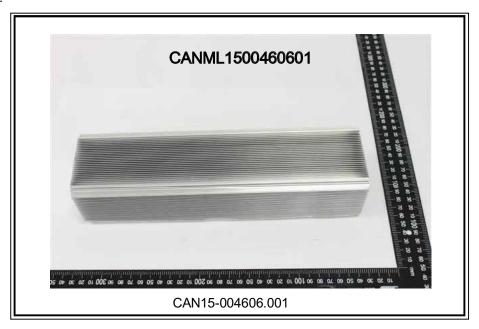


No. CANML1500460601

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Date: 14 Jan 2015

Sample photo:



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SABIC Innovative Plastics™



01-March-2010

Dear Valued Customer,

<u>Subject: Status of our products with respect to RoHS Directive</u> 2002/95/EC (and its amendments)

Thank you for using SABIC INNOVATIVE PLASTICS' products.

With reference to your request for the information regarding status of our Products with respect to the RoHS Directive 2002/95/EC (and its amendments), SABIC INNOVATIVE PLASTICS can provide following information:

The CYCOLAC*, CYCOLOY*, EXTEM*, GELOY*, LEXAN*, NORYL*, NORYL GTX*, NORYL PPX*, ULTEM*, VALOX*, XENOY*, XYLEX* resins and, COLORCOMP*, FARADEX*, KONDUIT*, LUBRICOMP*, LUBRILOY*, STARAMIDE* STARFLAM*, STAT-KON*, STAT-LOY*, THERMOCOMP*, THERMOTUF*, VERTON* compounds [all existing grade-colors, except those which are designed to consume Post Consumer Recycle (PCR)] do not contain any chemicals listed below as intentionally added components or as expected process impurities [above threshold limits of 0.1% for Lead, Mercury, Hexavalent Chromium, PBB and PBDE, and 0.01% for Cadmium]

- Cadmium and its compounds
- Lead and its compounds
- Mercury and its compounds
- Hexavalent Chromium compounds
- Polybrominated biphenyls (PBBs)
- Polybrominated diphenyl ethers (PBDEs including Deca-BDE)

Please note that analysis of the raw materials and/or finished goods for presence of the above mentioned substances on a routine basis is neither a part of our quality control plan, nor is a part of the SABIC-IP product specifications, and hence it should not be construed as any warranty, expressed or implied.

Please be informed that, certain SABIC-IP products are designed to consume PCR for environmental waste reduction. The details about use of the PCR, if any, are stated in the respective MSDS. Please contact our Customer Service or Product Stewardship team to request information regarding the chemical compliance attributes of these products, which may differ from those contained in this letter.

If you have any further questions, or you require any additional information, please contact: gopal.majmudar@SABIC-IP.com (Phone: +91 265 3068501) or chris.wu@sabic-ip.com (Phone: +86 20 38488383 3003)

Sincerely,

Gregory Porta, Ph.D. for SABIC Innovative Plastics

Encl: Nil

Gregory Porta, Ph.D.

Director-Product Stewardship & Toxicology

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This version for the letter supersedes all previous versions of it on the same subject.



Test Report No. CANEC1517788106 Date: 22 Oct 2015 Page 1 of 8

FOUR PILLARS INDUSTRIAL(SHENZHEN)CO.,LTD.

FOUR PILLARS TECHNOLOGIES & APPLIED MATERIALS(SHENZHEN)CO.,LTD. FIRST AND SECOND BUILDING,THIRD INDUSTRIAL ZONE,FENGHUANG COUNTRY,FUYONG TOWN,BAOAN DISTRICT,SHENZHEN,CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as: Label

SGS Job No. : CP15-058194 - SZ

Lot No. : 40371004 Model No. : PO32AZ

Client Ref. Info.: PO32AZ, PO3BZ, PO3MAZ, PO3MZ, PO6BZ, PO6GZ,

PO6LZ, PO6MZ, PO6NZ, PO6TZ, PO6WZ, PO72AZ, PO72BZ, PO72TZ, PO72Z, PO7MCZ, PO7YZ, PO7NZ, PO92Z, PO94AZ, PO9BHZ, PO9LZ, PO9MGZ, PO9MHZ, PO9MZ, PO9WZ, POBDZ, POBGZ, POBHZ, POBKZ, POBGZ, POBKZ, POBGZ, POBKZ, POBGZ, POBKZ, POBGZ, POBKZ, POBGZ, POBGZ, POBKZ, POGGZ, POBGZ, POGGZ, P

PO3BWZ, PO5MZ, PO9BZ, PO4MHZ, PO7YBZ

Manufacturer: FOUR PILLARS INDUSTRIAL(SHENZHEN)CO.,LTD.

FOUR PILLARS TECHNOLOGIES & APPLIED

MATERIALS(SHENZHEN)CO.,LTD.

Manufacturer Address: FIRST AND SECOND BUILDING, THIRD INDUSTRIAL ZONE, FENGHUANG

COUNTRY, FUYONG TOWN, BAOAN DISTRICT, SHENZHEN, CHINA

Date of Sample Received: 19 Oct 2015

Testing Period: 19 Oct 2015 - 22 Oct 2015

Test Requested: Selected test(s) as requested by client.

Test Method: Please refer to next page(s).

Test Results: Please refer to next page(s).

rest results.

Based on the performed tests on selected part of submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP), and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.



Conclusion:

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Test Report No. CANEC1517788106 Date: 22 Oct 2015 Page 2 of 8

Signed for and on behalf of SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

Violet,Shi

Approved Signatory

violet



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Test Report No. CANEC1517788106 Date: 22 Oct 2015 Page 3 of 8

Test Part Description:

Specimen No. SGS Sample ID Description

SN1 CAN15-177881.006 Silver-grey adhesive sheet

Remarks:

(1) 1 mg/kg = 1 ppm = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Method: (1)With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.

(2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.

(3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.

(4)With reference to IEC 62321:2008, determination of Hexavalent Chromium by Colorimetric

Method using UV-Vis.

(5)With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.

(6) With reference to EN 14372:2004, determination of phthalates by GC-MS.

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>006</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	1,000	mg/kg	2	ND
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND



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Test Report	No. CANEC15177881	06	Date: 2	2 Oct 2015	Page 4 of 8
Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>006</u>	
Dibromodiphenyl ether	-	mg/kg	5	ND	
Tribromodiphenyl ether	-	mg/kg	5	ND	
Tetrabromodiphenyl ether	-	mg/kg	5	ND	
Pentabromodiphenyl ether	-	mg/kg	5	ND	
Hexabromodiphenyl ether	-	mg/kg	5	ND	
Heptabromodiphenyl ether	-	mg/kg	5	ND	
Octabromodiphenyl ether	-	mg/kg	5	ND	
Nonabromodiphenyl ether	-	mg/kg	5	ND	
Decabromodiphenyl ether	-	mg/kg	5	ND	
Dibutyl phthalate (DBP)	1,000	mg/kg	30	ND	
Butyl benzyl phthalate (BBP)	1,000	mg/kg	30	ND	
Bis (2-ethylhexyl) phthalate (DEHP)	1,000	mg/kg	30	ND	
Diisobutyl Phthalates (DIBP)	1,000	mg/kg	30	ND	

Notes:

(1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.

<u>Halogen</u>

Test Method: With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	<u>Unit</u>	<u>MDL</u>	<u>006</u>
Fluorine (F)	mg/kg	50	ND
Chlorine (CI)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
lodine (I)	mg/kg	50	ND

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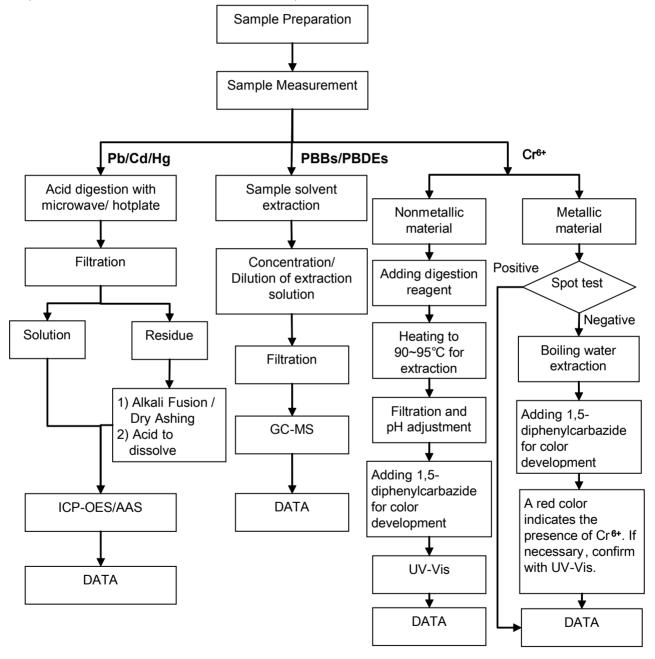
Page 5 of 8

Date: 22 Oct 2015

ATTACHMENTS

RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bruce Xiao / Sunny Hu
- 2) Name of the person in charge of testing: Bella Wang / Cutey Yu
- 3) These samples were dissolved totally by pre -conditioning method according to below flow chart (Cr⁶⁺ and PBBs/PBDEs test method excluded).





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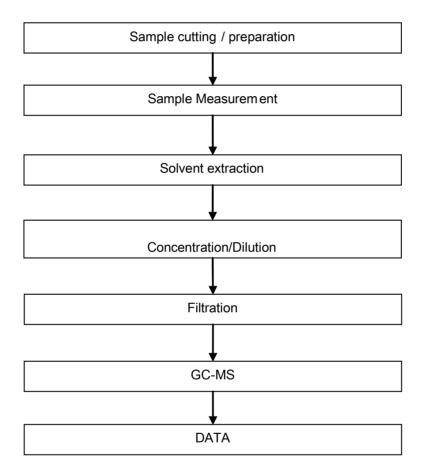
Page 6 of 8

Date: 22 Oct 2015

ATTACHMENTS

Phthalates Testing Flow Chart

- 1) Name of the person who made testing: Sunny Hu
- 2) Name of the person in charge of testing: Cutey Yu



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邮编: 510663 t (86-20) 82155555 f (86-20) 82075113 e sgs.china@sgs.com



No. CANEC1517788106

Page 7 of 8

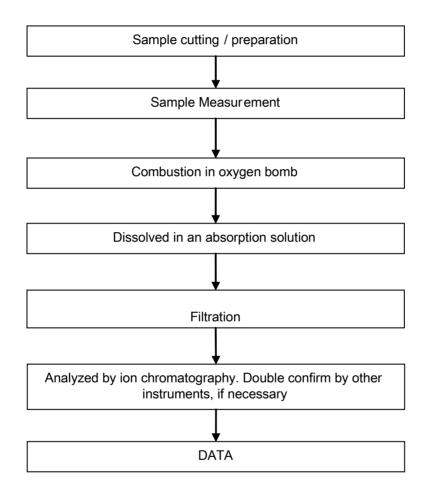
Date: 22 Oct 2015

ATTACHMENTS

Halogen Testing Flow Chart

1) Name of the person who made testing: Hanming Xiao

2) Name of the person in charge of testing: Bella Wang





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No. CANEC1517788106

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Date: 22 Oct 2015

Sample photo:



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Test Report No. SHAEC1515770519 Date: 13 Aug 2015 Page 1 of 5

NANTONG DIC COLOR CO.,LTD

NO 11 ZHONGYANG ROAD NANTONG ECONOMIC&TECHNOLOGICAL DEVELOPMENT AREA JIANGSU PROVINCE

The following sample(s) was/were submitted and identified on behalf of the clients as: DRAGON-FC BLACK

SGS Job No. : SP15-026570 - SH

Date of Sample Received: 06 Aug 2015

Testing Period: 06 Aug 2015 - 13 Aug 2015

Test Requested: Selected test(s) as requested by client.

Test Method: Please refer to next page(s).

Test Results: Please refer to next page(s).

Conclusion: Based on the performed tests on submitted sample(s), the results of Lead,

Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) comply with the limits as set by RoHS

Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Terry Wang

Approved Signatory



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Test Report No. SHAEC1515770519 Date: 13 Aug 2015 Page 2 of 5

Test Results:

Test Part Description:

Specimen No. SGS Sample ID Description
SN1 SHA15-157705.015 Black mud

Remarks:

- (1) 1 mg/kg = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected (< MDL)
- (4) "-" = Not Regulated

RoHS Directive 2011/65/EU

Test Method: (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.

(2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.

(3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.

(4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.

(5) With reference to IEC 62321:2008, determination of PBBs and PBDEs by GC-MS.

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>015</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	2	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND



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i est Report	No. SHAEC1515770519	Date: 13 Aug 2015	Page 3 of 5

Test Item(s)	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>015</u>
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

Notes:

- (1) The maximum permissible limit is quoted from the directive 2011/65/EU, Annex II
- (2) Result shown is of the total weight of wet sample.









No. SHAEC1515770519

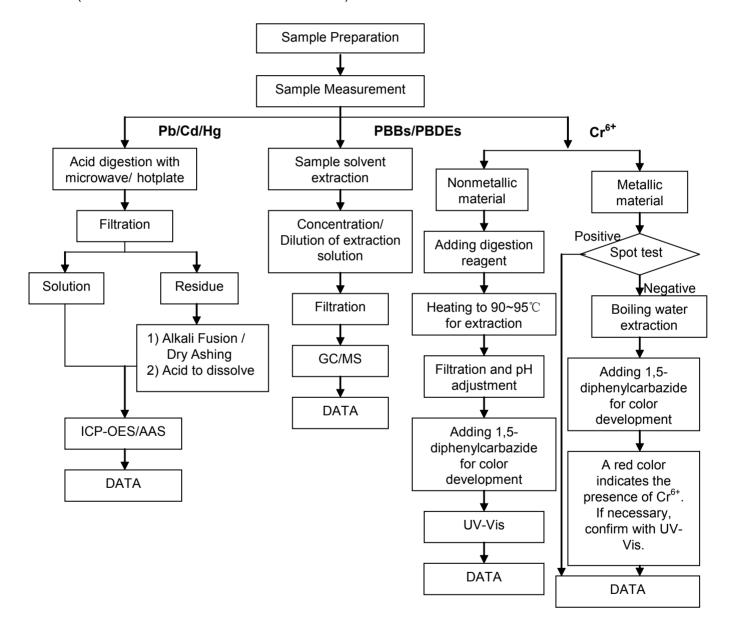
Date: 13 Aug 2015

Page 4 of 5

ATTACHMENTS

RoHS Testing Flow Chart

- 1) Name of the person who made testing: Bob Zhang/Gary Xu/Zengzhen Zhu/Sunny Qin
- 2) Name of the person in charge of testing: Jan Shi/Summer Jin/Jessy Huang/Stone Chen
- 3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ and PBBs/PBDEs test method excluded)





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No. SHAEC1515770519 Date: 13 Aug 2015 Page 5 of 5

Sample photo:



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Report No. SCL01H013155001 Page 1 of 7

Applicant DONGGUAN SUNWAY PRINTING INDUSTRY CO.,LTD

Address YINLING INDUSTRIAL, XIAQIAO GUANLONG ROAD, DONGCHENG ZONE,

DONGGUAN CITY, GUANGDONG PROVINCE, CHINA

The following sample(s) and sample information was/were submitted and identified by/on the

behalf of the client

Sample Name 上光PP膜
Part No. OPAT
Color 透明
Manufacturer FUZHOU
Sample Received Date Mar. 2, 2015

Testing Period Mar. 2, 2015 to Mar. 4, 2015

Test Requested As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg),

Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyl(PBBs), Polybrominated Diphenyl Ethers(PBDEs), Fluorine(F), Chlorine(Cl), Bromine(Br), Iodine(I), Hexabromocyclododecane (HBCDD), Phthalates in

the submitted sample(s).

Test Method Please refer to the following page(s).

Test Result(s) Please refer to the following page(s).

Tested

bv

Neuto

Reviewed by

Cathy

Date

Mar. 4, 2015

Danny Liu Technical Manager

No. R148192600

ernational (Shenzhen) Co., Ltd. Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China



Report No. SCL01H013155001

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Test Method

Test Item(s)	Test Method	Measured Equipment(s)
Lead (Pb)	IEC 62321-5:2013 Ed.1.0	ICP-OES
Cadmium (Cd)	IEC 62321-5:2013 Ed.1.0	ICP-OES
Mercury (Hg)	IEC 62321-4:2013 Ed.1.0	ICP-OES
Hexavalent Chromium(Cr(VI))	IEC 62321:2008 Ed.1 Annex C	UV-Vis
Polybrominated Biphenyl(PBBs)	IEC 62321:2008 Ed.1 Annex A	GC-MS
Polybrominated Diphenyl Ethers(PBDEs)	IEC 62321:2008 Ed.1 Annex A	GC-MS
Fluorine(F)	Refer to BS EN 14582:2007	IC
Chlorine(Cl)	Refer to BS EN 14582:2007	IC
Bromine(Br)	Refer to BS EN 14582:2007	IC
Iodine(I)	Refer to BS EN 14582:2007	IC
Hexabromocyclododecane (HBCDD)	Refer to US EPA 3540C:1996 & US EPA 8270D:2007	GC-MS
Phthalates	Refer to EN 14372:2004(E)	GC-MS

Test Result(s)

Tested Item(s)	Result	MDL
Lead (Pb)	N.D.	2 mg/kg
Cadmium (Cd)	N.D.	2 mg/kg
Mercury (Hg)	N.D.	2 mg/kg
Hexavalent Chromium (Cr(VI))	N.D.	2 mg/kg
Tested Item(s)	Result	MDL
Polybrominated Biphenyl(PBBs)		
Monobromobiphenyl	N.D.	5 mg/kg
Dibromobiphenyl	N.D.	5 mg/kg
Tribromobiphenyl	N.D.	5 mg/kg
Tetrabromobiphenyl	N.D.	5 mg/kg
Pentabromobiphenyl	N.D.	5 mg/kg
Hexabromobiphenyl	N.D.	5 mg/kg
Heptabromobiphenyl	N.D.	5 mg/kg
Octabromobiphenyl	N.D.	5 mg/kg
Nonabromobiphenyl	N.D.	5 mg/kg
Decabromobiphenyl	N.D.	5 mg/kg





Report No.	SCL01H013155001
report 110.	DCE0111013133001

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Tested Item(s)	Result	MDL
Polybrominated Diphenyl Ethers(PBDEs)		
Monobromodiphenyl ether	N.D.	5 mg/kg
Dibromodiphenyl ether	N.D.	5 mg/kg
Tribromodiphenyl ether	N.D.	5 mg/kg
Tetrabromodiphenyl ether	N.D.	5 mg/kg
Pentabromodiphenyl ether	N.D.	5 mg/kg
Hexabromodiphenyl ether	N.D.	5 mg/kg
Heptabromodiphenyl ether	N.D.	5 mg/kg
Octabromodiphenyl ether	N.D.	5 mg/kg
Nonabromodiphenyl ether	N.D.	5 mg/kg
Decabromodiphenyl ether	N.D.	5 mg/kg
Tested Item(s)	Result	MDL
Halogen(s)		
Fluorine(F)	N.D.	10 mg/kg
Chlorine(Cl)	N.D.	10 mg/kg
Bromine(Br)	N.D.	10 mg/kg
Iodine(I)	N.D.	10 mg/kg
Tested Item(s)	Result	MDL
Hexabromocyclododecane (HBCDD)	N.D.	5 mg/kg

















































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Tested Item(s)	Result	MDL
Phthalates		
Dimethyl phthalate(DMP) CAS#:131-11-3	N.D.	50 mg/kg
Diethyl phthalate(DEP) CAS#:84-66-2	N.D.	50 mg/kg
Diisobutyl phthalate(DIBP) CAS#:84-69-5	N.D.	50 mg/kg
Dibutyl phthalate(DBP) CAS#:84-74-2	N.D.	50 mg/kg
Butylbenzyl phthalate(BBP) CAS#:85-68-7	N.D.	50 mg/kg
Di-2-ethylhexyl phthalate(DEHP) CAS#:117-81-7	N.D.	50 mg/kg
Di-n-octyl phthalate(DNOP) CAS#:117-84-0	N.D.	50 mg/kg
Diisononyl phthalate(DINP) CAS#:28553-12-0,68515-48-0	N.D.	50 mg/kg
Diisodecyl phthalate(DIDP) CAS#:26761-40-0,68515-49-1	N.D.	50 mg/kg
Di-n-hexyl phthalate (DNHP) CAS#:84-75-3	N.D.	50 mg/kg

Tested Sample/Part Description

Transparent plastic film with adhesive paste

Remark: The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury.

-MDL = Method Detection Limit

-N.D. = Not Detected (< MDL)

-mg/kg = ppm = parts per million





















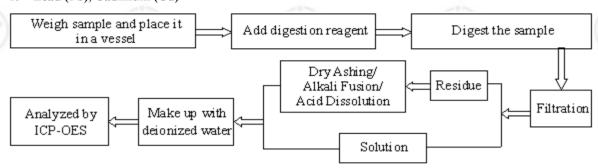


Report No. SCL01H013155001

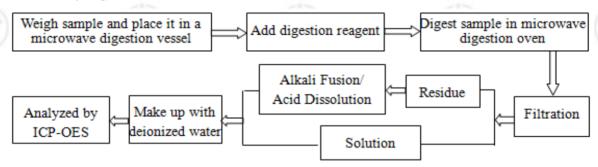
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Test Process

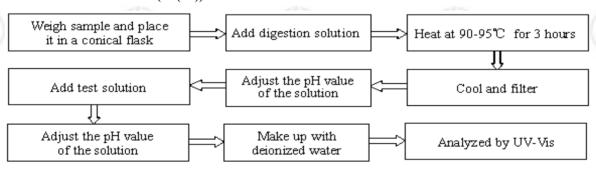
1. Lead (Pb), Cadmium (Cd)



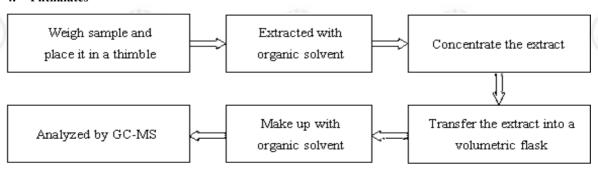
2. Mercury (Hg)



3. Hexavalent Chromium(Cr(VI))

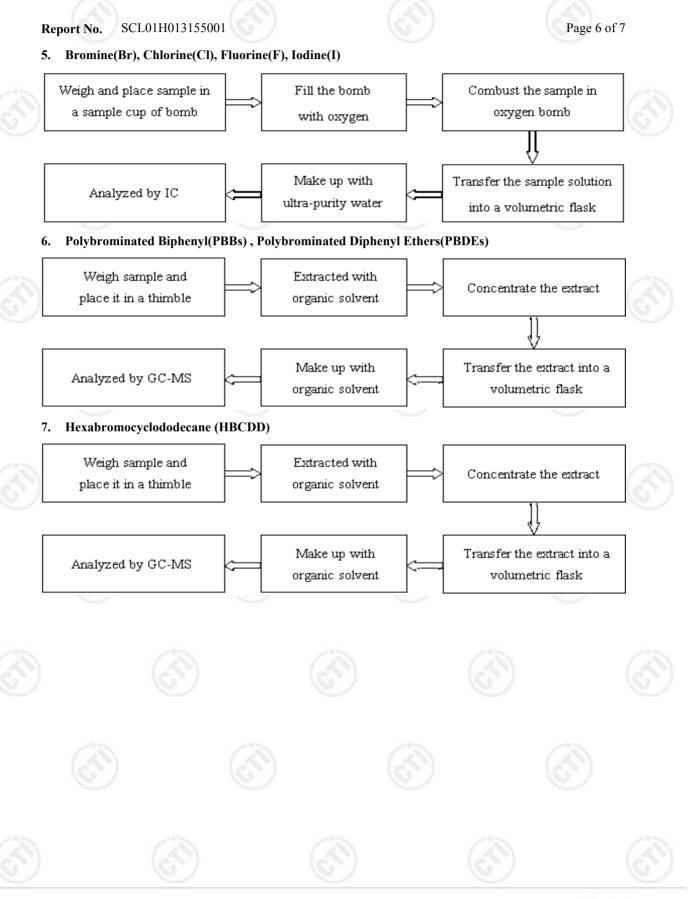


4. Phthalates







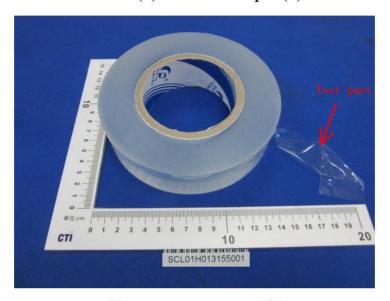




Report No. SCL01H013155001

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Photo(s) of the sample(s)



*** End of report ***

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Test Report

號碼(No.): CE/2015/53008 日期(Date): 2015/05/20 頁數(Page): 1 of 11

喬越實業有限公司

SIL-MORE INDUSTRIAL LTD.

新北市三重區興德路100號16樓

16F, NO. 100, XINGDE RD., SANCHONG DISTRICT, NEW TAIPEI CITY 24158, TAIWAN

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

樣品名稱(Sample Description) : DOW CORNING TC-5630 THERMALLY CONDUCTIVE COMPOUND

收件日期(Sample Receiving Date) : 2015/05/14

測試期間(Testing Period) : 2015/05/14 TO 2015/05/20

測試需求(Test Requested):

- (1) 依據客户要求,參考RoHS 2011/65/EU Annex II 指令測試鎬、鉛、汞、六價鉻、多溴聯苯醚. (As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs contents in the submitted sample.)
- (2) 依據客户要求,參考 WTO/TBT 通報 G/TBT/N/EU/256,檢測 DBP, BBP, DEHP, DIBP. (As specified by client, with reference to G/TBT/N/EU/256 of WTO/TBT to test DBP, BBP, DEHP, DIBP.)
- (3) 其他測試項目請見下一頁 . / Please refer to next pages for the other item(s).

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).



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Test Report

號碼(No.): CE/2015/53008 日期(Date): 2015/05/20 頁數(Page): 2 of 11

喬越實業有限公司 SIL-MORE INDUSTRIAL LTD. 新北市三重區興德路100號16樓

16F, NO. 100, XINGDE RD., SANCHONG DISTRICT, NEW TAIPEI CITY 24158, TAIWAN

測試結果(Test Results)

測試部位(PART NAME)No.1 : 灰色膏狀 (GRAY PASTE)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result)	
				No.1	
鎬 / Cadmium (Cd)	mg/kg	參考IEC 62321-5: 2013方法,以感應 耦合電漿原子發射光譜儀檢測./With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	n.d.	
鉛 / Lead (Pb)	mg/kg	參考IEC 62321-5: 2013方法,以感應 耦合電漿原子發射光譜儀檢測./With reference to IEC 62321-5: 2013 and performed by ICP-AES.	2	n.d.	
汞 / Mercury (Hg)	mg/kg	參考IEC 62321-4: 2013方法,以感應 耦合電漿原子發射光譜儀檢測./With reference to IEC 62321-4: 2013 and performed by ICP-AES.	2	n.d.	
六價络 / Hexavalent Chromium Cr(VI)	mg/kg	参考IEC 62321: 2008方法,以UV-VIS 檢測. / With reference to IEC 62321: 2008 and performed by UV- VIS.	2	n.d.	
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	參考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之./ With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.	
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	參考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之./ With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.	



Test Report

號碼(No.): CE/2015/53008 日期(Date): 2015/05/20 頁數(P

頁數(Page): 3 of 11

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SIL-MORE INDUSTRIAL LTD.

新北市三重區興德路100號16樓

16F, NO. 100, XINGDE RD., SANCHONG DISTRICT, NEW TAIPEI CITY 24158, TAIWAN

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値	結果 (Result)
<u> </u>	, ,	, ,	(MDL)	No.1
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	参考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之. / With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	參考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之./ With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg	参考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之./ With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二異壬酯 / DINP (Di- isononyl phthalate) (CAS No.: 28553- 12-0; 68515-48-0)	mg/kg	参考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之./ With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二異癸酯 / DIDP (Di- isodecyl phthalate) (CAS No.: 26761- 40-0; 68515-49-1)	mg/kg	参考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之./ With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.
鄰苯二甲酸二戊酯 / Di-n-pentyl phthalate (CAS No.: 131-18-0)	mg/kg	参考IEC 62321-8 (111/321/CD),以氣相層析儀/質譜儀檢測之./ With reference to IEC 62321-8 (111/321/CD). Analysis was performed by GC/MS.	50	n.d.



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喬越實業有限公司 SIL-MORE INDUSTRIAL LTD. 新北市三重區興德路100號16樓

16F, NO. 100, XINGDE RD., SANCHONG DISTRICT, NEW TAIPEI CITY 24158, TAIWAN

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result) No.1
六溴環十二烷及所有主要被辨别出的異構物 / Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α - HBCDD, β - HBCDD, γ - HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	參考IEC 62321: 2008方法,以氣相層析/質譜儀檢測. / With reference to IEC 62321: 2008 method. Analysis was performed by GC/MS.	5	n.d.
多溴聯苯總和 / Sum of PBBs	mg/kg		-	n.d.
一溴聯苯 / Monobromobiphenyl	mg/kg	1	5	n.d.
二溴聯苯 / Dibromobiphenyl	mg/kg	1	5	n.d.
三溴聯苯 / Tribromobiphenyl	mg/kg	1	5	n.d.
四溴聯苯 / Tetrabromobiphenyl	mg/kg	1	5	n.d.
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n.d.
六溴聯苯 / Hexabromobiphenyl	mg/kg		5	n.d.
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n.d.
九溴聯苯 / Nonabromobiphenyl	mg/kg	参考IEC 62321: 2008方法,以氣相層	5	n.d.
十溴聯苯 / Decabromobiphenyl	mg/kg	析/質譜儀檢測. / With reference to IEC 62321: 2008 and performed by GC/MS.	5	n.d.
多溴聯苯醚總和 / Sum of PBDEs	mg/kg		-	n.d.
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n.d.
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg		5	n.d.
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n.d.
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg mg/kg mg/kg] Γ	5	n.d.
五溴聯苯醚 / Pentabromodiphenyl ether]	5	n.d.
六溴聯苯醚 / Hexabromodiphenyl ether] Γ	5	n.d.
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg] Γ	5	n.d.
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg] Γ	5	n.d.
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg	1 Γ	5	n.d.
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg	1	5	n.d.



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16F, NO. 100, XINGDE RD., SANCHONG DISTRICT, NEW TAIPEI CITY 24158, TAIWAN

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result)
				No.1
鹵素 / Halogen				
鹵素(氟)/ Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	参考BS EN 14582:2007, 以離子層析儀 分析. / With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
鹵素(氣)/ Halogen-Chlorine (C1) (CAS No.: 22537-15-1)	mg/kg		50	n.d.
鹵素(溴)/ Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.
鹵素(碘)/ Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.

備註(Note):

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. "-" = Not Regulated (無規格值)

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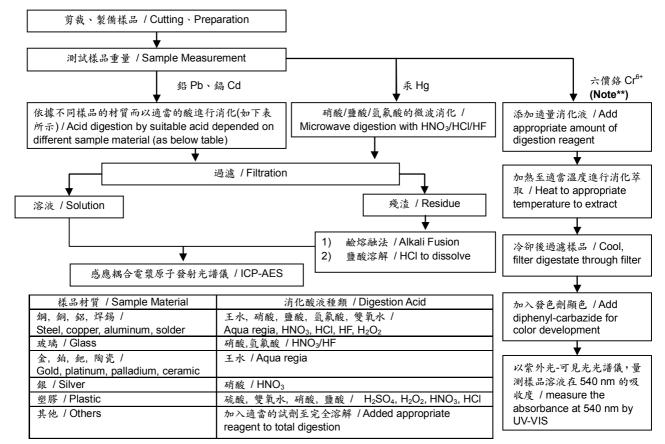
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- 1) 根據以下的流程圖之條件,樣品已完全溶解。(六價鉻測試方法除外) / These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)
- 2) 測試人員:楊登偉 / Name of the person who made measurement: Climbgreat Yang
- 3) 测試負責人:張啓興 / Name of the person in charge of measurement: Troy Chang



Note** (For IEC 62321)

- (1) 針對非金屬材料加入鹼性消化液,加熱至 90~95℃萃取. / For non-metallic material, add alkaline digestion reagent and heat to 90~95℃.
- (2) 針對金屬材料加入純水,加熱至沸騰萃取. / For metallic material, add pure water and heat to boiling.



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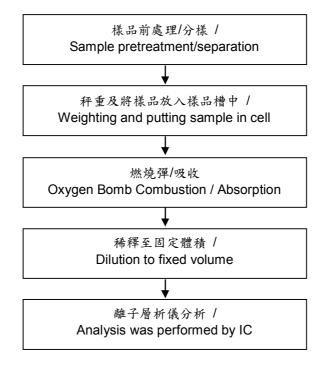
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鹵素分析流程圖 / Analytical flow chart of halogen content

- 測試人員:陳恩臻 / Name of the person who made measurement: Rita Chen
- 測試負責人:張啓興 / Name of the person in charge of measurement: Troy Chang





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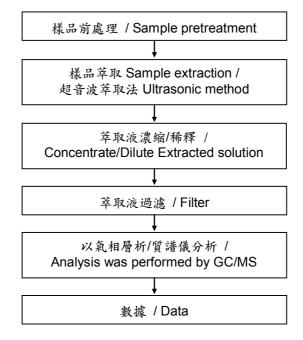
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六溴環十二烷分析流程圖 / HBCDD analytical flow chart

- 測試人員:翁賜彬 / Name of the person who made measurement: Roman Wong
- 測試負責人:張啓興 / Name of the person in charge of measurement: Troy Chang





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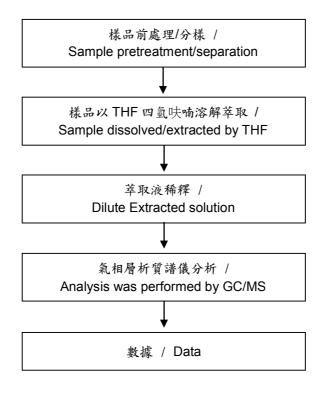
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可塑劑分析流程圖 / Analytical flow chart of phthalate content

- 測試人員:徐毓明 / Name of the person who made measurement: Andy Shu
- 測試負責人:張啓興 / Name of the person in charge of measurement: Troy Chang

【測試方法/Test method: IEC 62321-8】



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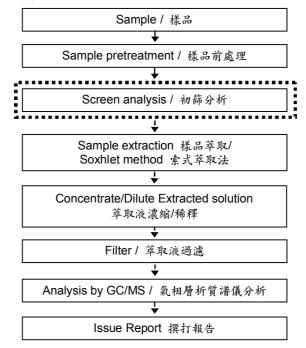
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多溴聯苯/多溴聯苯醚分析流程圖 / PBB/PBDE analytical FLOW CHART

- 測試人員:翁賜彬 / Name of the person who made measurement: Roman Wong

選擇性篩檢程序 / Optional screen process ••••••

確認程序 / Confirmation process - · - · ▶





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* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. * (The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2015/53008



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