JIANGYIN XINSHUN MICROELECTRONIC CO., LTD
NO.78 CHANGSHAN RD.,JIANGYIN CITY,JIANGSU PRO.,CHINA

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

SGS Job No. :	SHIN1810072178PC - SH
Date of Sample Received :	11 Oct 2018
Testing Period :	11 Oct 2018 - 23 Oct 2018
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 selected part of submitted sample(s), the results of Cadmium, Lead, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs) , Polybrominated diphenyl ethers (PBDEs)do not exceed the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

Serena Wang
Approved Signatory

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA18-227777.001	Colour solid piece

Remarks :

(1) 1 mg/kg = 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 : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013, IEC62321-7-2:2017 and IEC 62321-6:2015, analyzed by ICP-OES, AAS,UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	*001*
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	8	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
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND

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Test Item(s)	Limit	Unit	MDL	*001*
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 RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(2)On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the Rohs Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.

(3)The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

(4)The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.

(5)The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

Halogen

Test Method : With reference to EN 14582: 2016 , analysis was performed by IC.

Test Item(s)	Unit	MDL	*001*
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND

Element(s)

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

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Test Item(s)	Unit	MDL	*001*
Beryllium (Be)	mg/kg	5	ND
Arsenic (As)	mg/kg	10	1018
Nickel (Ni)	mg/kg	5	5903
Antimony (Sb)	mg/kg	10	ND

Radioactive element

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

Test Item(s)	Unit	MDL	*001*
Cesium (Cs)	mg/kg	1	ND
Strontium (Sr)	mg/kg	1	ND
Uranium (U)	mg/kg	1	ND
Thorium (Th)	mg/kg	1	ND

Notes :

No radioactivity is detected by geiger counter

Halogen

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

Test Item(s)	Unit	MDL	*001*
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Polychlorinated Naphthalenes (PCNs)

Test Method : With reference to US EPA 8081B: 2007, analysis was performed by GC-MS

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Test Item(s)	Unit	MDL	001
2-Chlorinated Naphthalene	mg/kg	5	ND
1,4-Dichlorinated Naphthalene	mg/kg	5	ND
1,5-Dichlorinated Naphthalene	mg/kg	5	ND
1,2-Dichlorinated Naphthalene	mg/kg	5	ND
1,8-Dichlorinated Naphthalene	mg/kg	5	ND
1,2,3-Trichlorinated Naphthalene	mg/kg	5	ND
1,2,3,4-Tetrachlorinated Naphthalene	mg/kg	5	ND
1,2,3,4,6-Pentachlorinated Naphthalene	mg/kg	5	ND
Octa-chlorinaed Naphthalene	mg/kg	5	ND
1-Chlorinated Naphthalene	mg/kg	5	ND

Organic-tin compounds

Test Method : With reference to ISO 17353: 2004 with carbamate, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	001
Tributyl tin (TBT)	mg/kg	0.02	ND
Bis(tributyltin) oxide (TBTO) ◆	mg/kg	0.02	ND
Tripropyltin (TPT)	mg/kg	0.02	ND

Notes :

(1) ◆ Calculated concentration of TBTO is based on the identified TBT.

ODS

Test Method : With reference to US EPA 5021A-2014, analysis was performed by HS-GC-MS.

Test Item(s)	CAS NO.	Unit	MDL	001
CFC				
Sulphur Hexafluoride - SF_6	2551-62-4	µg/g	0.1	ND
CFC-11	75-69-4	µg/g	0.1	ND
CFC-12	75-71-8	µg/g	0.1	ND
CFC-113	76-13-1	µg/g	0.1	ND
CFC-114	76-14-2	µg/g	0.1	ND
CFC-13	75-72-9	µg/g	0.1	ND
CFC-111	354-56-3	µg/g	0.1	ND
CFC-112	76-11-9	µg/g	0.1	ND

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Test Item(s)	CAS NO.	Unit	MDL	*001*
CFC-112	76-12-0	µg/g	0.1	ND
CFC-113	354-58-5	µg/g	0.1	ND
CFC-114	374-07-2	µg/g	0.1	ND
CFC-115	76-15-3	µg/g	0.1	ND
CFC-211	422-78-6	µg/g	0.1	ND
CFC-212	661-96-1	µg/g	0.1	ND
CFC-213	1652-89-7	µg/g	0.1	ND
CFC-214	677-68-9	µg/g	0.1	ND
CFC-215	1599-41-3	µg/g	0.1	ND
CFC-215	76-17-5	µg/g	0.1	ND
CFC-216	661-97-2	µg/g	0.1	ND
CFC-216	1652-80-8	µg/g	0.1	ND
CFC-217	422-86-6	µg/g	0.1	ND
HCFC				
HCFC-21	75-43-4	µg/g	0.1	ND
HCFC-22	75-45-6	µg/g	0.1	ND
HCFC-123	306-83-2	µg/g	0.1	ND
HCFC-124	2837-89-0	µg/g	0.1	ND
HCFC-141b	1717-00-6	µg/g	0.1	ND
HCFC-142b	75-68-3	µg/g	0.1	ND
HCFC-31	593-70-4	µg/g	0.1	ND
HCFC-121	354-14-3	µg/g	0.1	ND
HCFC-122	354-21-2	µg/g	0.1	ND
HCFC-123a	354-23-4	µg/g	0.1	ND
HCFC-124a	354-25-6	µg/g	0.1	ND
HCFC-131	359-28-4	µg/g	0.1	ND
HCFC-131a	811-95-0	µg/g	0.1	ND
HCFC-132a	471-43-2	µg/g	0.1	ND
HCFC-132b	1649-08-7	µg/g	0.1	ND
HCFC-133a	75-88-7	µg/g	0.1	ND
HCFC-221	422-26-4	µg/g	0.1	ND
HCFC-222	422-30-0	µg/g	0.1	ND
HCFC-223	422-52-6	µg/g	0.1	ND
HCFC-225ca	422-56-0	µg/g	0.1	ND
HCFC-225cb	507-55-1	µg/g	0.1	ND
HCFC-226	431-87-8	µg/g	0.1	ND
HCFC-231	421-94-3	µg/g	0.1	ND
HCFC-232	460-89-9	µg/g	0.1	ND
HCFC-233	7125-84-0	µg/g	0.1	ND
HCFC-234	425-94-5	µg/g	0.1	ND

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Test Item(s)	CAS NO.	Unit	MDL	001
HCFC-235	460-92-4	µg/g	0.1	ND
HCFC-241	666-27-3	µg/g	0.1	ND
HCFC-242	460-63-9	µg/g	0.1	ND
HCFC-243	338-75-0	µg/g	0.1	ND
HCFC-244	679-85-6	µg/g	0.1	ND
HCFC-251	421-41-0	µg/g	0.1	ND
HCFC-252	819-00-1	µg/g	0.1	ND
HCFC-253	460-35-5	µg/g	0.1	ND
HCFC-261	7799-56-6	µg/g	0.1	ND
HCFC-261	420-97-3	µg/g	0.1	ND
HCFC-271	430-55-7	µg/g	0.1	ND
HCFC-262	102738-79-4	µg/g	0.1	ND
HCFC-262	420-99-5	µg/g	0.1	ND
Halon				
Halon 1211	353-59-3	µg/g	0.1	ND
Halon 1301	75-63-8	µg/g	0.1	ND
Halon 2402	124-73-2	µg/g	0.1	ND
HBFC				
CHF_2Br	1511-62-2	µg/g	0.1	ND
CH_2FBr	373-52-4	µg/g	0.1	ND
C_2HFBr_4		µg/g	0.1	ND
$C_2HF_2Br_3$		µg/g	0.1	ND
$C_2HF_3Br_2$	354-04-1	µg/g	0.1	ND
C_2HF_4Br		µg/g	0.1	ND
$C_2H_2FBr_3$		µg/g	0.1	ND
$C_2H_2F_2Br_2$	75-82-1	µg/g	0.1	ND
$C_2H_2F_3Br$	421-06-7	µg/g	0.1	ND
$C_2H_3FBr_2$		µg/g	0.1	ND
$C_2H_3F_2Br$	359-07-9	µg/g	0.1	ND
C_2H_4FBr	762-49-2	µg/g	0.1	ND
C_3HFBr_6		µg/g	0.1	ND
$C_3HF_2Br_5$		µg/g	0.1	ND
$C_3HF_3Br_4$		µg/g	0.1	ND
$C_3HF_4Br_3$		µg/g	0.1	ND
$C_3HF_5Br_2$		µg/g	0.1	ND
C_3HF_6Br		µg/g	0.1	ND
$C_3H_2FBr_5$		µg/g	0.1	ND
$C_3H_2F_2Br_4$		µg/g	0.1	ND
$C_3H_2F_3Br_3$		µg/g	0.1	ND
$C_3H_2F_4Br_2$		µg/g	0.1	ND

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Test Item(s)	CAS NO.	Unit	MDL	001
$C_3H_2F_5Br$		µg/g	0.1	ND
$C_3H_3FBr_4$		µg/g	0.1	ND
$C_3H_3F_2Br_3$		µg/g	0.1	ND
$C_3H_3F_3Br_2$		µg/g	0.1	ND
$C_3H_3F_4Br$		µg/g	0.1	ND
$C_3H_4FBr_3$		µg/g	0.1	ND
$C_3H_4F_2Br_2$		µg/g	0.1	ND
$C_3H_4F_3Br$		µg/g	0.1	ND
$C_3H_5FBr_2$		µg/g	0.1	ND
$C_3H_5F_2Br$		µg/g	0.1	ND
C_3H_6FBr		µg/g	0.1	ND
Others				
Dibromofluoromethane	1868-53-7	µg/g	0.1	ND
Methyl bromide	74-83-9	µg/g	0.1	ND
Bromochloromethane	74-97-5	µg/g	0.1	ND
HFC				
HFC-23	75-46-7	µg/g	0.1	ND
HFC-32	75-10-5	µg/g	0.1	ND
HFC-41	593-53-3	µg/g	0.1	ND
HFC-43-10mee		µg/g	0.1	ND
HFC-125	354-33-6	µg/g	0.1	ND
HFC-134	359-35-3	µg/g	0.1	ND
HFC-134a	811-97-2	µg/g	0.1	ND
HFC-152a	75-37-6	µg/g	0.1	ND
HFC-143	420-46-2	µg/g	0.1	ND
HFC-143a	430-66-0	µg/g	0.1	ND
HFC-227ea		µg/g	0.1	ND
HFC-236cb		µg/g	0.1	ND
HFC-236ea	431-63-0	µg/g	0.1	ND
HFC-236fa	690-39-1	µg/g	0.1	ND
HFC-245ca	679-86-7	µg/g	0.1	ND
HFC-245fa		µg/g	0.1	ND
HFC-365mfc		µg/g	0.1	ND
PFC				
Perfluoromethane	75-73-0	µg/g	0.1	ND
Perfluoroethane	76-16-4	µg/g	0.1	ND
Perfluoropropane	76-19-7	µg/g	0.1	ND
Perfluorobutane	355-25-9	µg/g	0.1	ND
Perfluoropentane	678-26-2	µg/g	0.1	ND
Perfluorohexane	355-42-0	µg/g	0.1	ND

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Test Item(s)	CAS NO.	Unit	MDL	001
Perfluorocyclobutane	115-25-3	µg/g	0.1	ND
CHC				
1,3-dichloropropane	142-28-9	µg/g	0.1	ND
2,2-dichloropropane	594-20-7	µg/g	0.1	ND
Carbon tetrachloride	56-23-5	µg/g	0.1	ND
chloroethane	75-00-3	µg/g	0.1	ND
Chloroform	67-66-3	µg/g	0.1	ND
chloromethane	74-87-3	µg/g	0.1	ND
Cis-1,2-dichloroethene	156-59-2	µg/g	0.1	ND
Cis-1,3-dichloropropene	10061-01-5	µg/g	0.1	ND
Hexachlorobutadiene	87-68-3	µg/g	0.1	ND
Methylene chloride	75-09-2	µg/g	0.1	ND
Tetrachloroethene	127-18-4	µg/g	0.1	ND
Trans-1,2-dichloroethene	156-60-5	µg/g	0.1	ND
Trans-1,3-dichloropropene	10061-02-6	µg/g	0.1	ND
Trichloroethylene	79-01-6	µg/g	0.1	ND
1,1,1,2-tetrachloroethane	630-20-6	µg/g	0.1	ND
1,1,1-trichloroethane	71-55-6	µg/g	0.1	ND
1,1,2,2-tetrachloroethane	79-34-5	µg/g	0.1	ND
1,1,2-trichloroethane	79-00-5	µg/g	0.1	ND
1,1-dichloroethane	75-34-3	µg/g	0.1	ND
1,1-dichloroethene	75-35-4	µg/g	0.1	ND
1,1-dichloropropene	563-58-6	µg/g	0.1	ND
1,2,3-trichloropropane	96-18-4	µg/g	0.1	ND
1,2-dichloroethane	107-06-2	µg/g	0.1	ND
1,2-dichloropropane	78-87-5	µg/g	0.1	ND

Mirex

Test Method : With reference to US EPA 8081B: 2007, analysis was performed by GC-MS.

Test Item(s)	CAS NO.	Unit	MDL	001
Mirex	2385-85-5	mg/kg	5	ND

Solvent Residue

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Test Method : With reference to US EPA Method 8260D: 2017 & US EPA Method 5000: 1996, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*001*
Pentachloroethane	mg/kg	5	ND

Asbestos

Test Method : With reference to NIOSH 9000:2015 and ISO 22262-1:2012. analysis was performed by X-ray diffractometer (XRD) and Polarized light microscope (PLM).

Test Item(s)	CAS NO.	Unit	MDL	*001*
Actinolite	77536-66-4	%	0.1	Negative
Amosite	12172-73-5	%	0.1	Negative
Anthophyllite	77536-67-5	%	0.1	Negative
Chrysotile	12001-29-5 132207-32-0	%	0.1	Negative
Crocidolite	12001-28-4	%	0.1	Negative
Tremolite	77536-68-6	%	0.1	Negative

Notes :

(1) Negative = the absence of asbestos, Positive = the presence of asbestos.

Red Phosphorus

Test Method : SGS in house method(SHTC- CHEM- SOP -342-T), Analysis was performed by ICP-OES and Pyrolysis-GC/MS

Test Item(s)	Unit	MDL	*001*
Red Phosphorus	mg/kg	500	ND

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Notes :

For Positive result, the testing result is based on the worst-case scenario, and confirmed by Pyrolysis-GC-MS.

Hexabromocyclododecane (HBCDD/HBCD)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-MS.

Test Item(s)	CAS NO.	Unit	MDL	*001*
Hexabromocyclododecane (HBCDD/HBCD)	25637-99-4, 3194- 55-6	mg/kg	10	ND

Tris(2,3-dibromopropyl) phosphate(TDBPP/TRIS), Bis (2,3-dibromopropyl) phosphate

Test Method : SGS in-house method (SHTC-CHEM-SOP-102-T), analysis was performed by LC-MS.

Test Item(s)	CAS NO.	Unit	MDL	*001*
Bis (2,3-dibromopropyl) phosphate	5412-25-9	mg/kg	5	ND
Tris(2,3-dibromopropyl) phosphate(TDBPP/TRIS)	126-72-7	mg/kg	5	ND

Short-chain Chlorinated Paraffin (SCCP)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-ECD / GC-NCI-MS

Test Item(s)	Unit	MDL	*001*
Short-chain Chlorinated Paraffin (SCCP) (C_{10}-C_{13})	mg/kg	50	ND

Formaldehyde

Test Method : With reference to ISO 17226-1: 2008, analysis was performed by HPLC-DAD.

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Test Item(s)	Unit	MDL	*001*
Formaldehyde	mg/kg	16	ND

Bisphenol-A

Test Method : Extraction by organic solvent, analysis by HPLC-DAD-MS.

Test Item(s)	Unit	MDL	*001*
Bisphenol-A	mg/kg	1	ND

Cationic Surfactants

Test Method : With reference to US EPA Method 3550C:2007, analysis was performed by LC-MS.

Test Item(s)	Unit	MDL	*001*
DTDMAC、DODMAC/DSDMAC、DHTDMAC	mg/kg	40	ND
DTDMAC	mg/kg	20	ND
DODMAC/DSDMAC	mg/kg	10	ND
DHTDMAC	mg/kg	10	ND

Triclosan

Test Method : With reference to EPA 3550C: 2007, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*001*
Triclosan	mg/kg	10	ND

Decabromodiphenyl ethane (DeBDethane)

Test Method : With reference to US EPA 8270D: 2014/3550C: 2007, analysis was performed by GC-MS.

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Test Item(s)	CAS NO.	Unit	MDL	*001*
Decabromodiphenyl ethane	84852-53-9	mg/kg	25	ND

PVC (Polyvinyl chloride)

Test Method : SGS in-house method (SHTC-CHEM-SOP-115-T), analysis was performed by FTIR/HATR.

Test Item(s)	CAS NO.	Unit	MDL	*001*
PVC	9002-86-2	-	-	Negative

Notes :

(1) Negative=Undetectable,Positive=Detectable

Tetrabromobisphenol A (TBBP-A)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*001*
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

Polychlorinated Terphenyls (PCTs)

Test Method : With reference to US EPA 8082A: 2007, analysis was performed by GC-MS

Test Item(s)	Unit	MDL	*001*
Aroclor 5432	mg/kg	5	ND
Aroclor 5442	mg/kg	5	ND

Muskxylene and Muskketone

Test Method : With reference to US EPA 3550C:2007, analysis was performed by GC-MS

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Test Item(s)	Unit	MDL	*001*
Musk Xylene	mg/kg	10	ND
Musk Ketone	mg/kg	10	ND

Sensorial Examination - Odour Grade Test

Test Method : With reference to PV3900-2000 method.

Sample 001:

Test specimen variant: A

Storage Condition Variant	Condition 1	Condition 2	Condition 3
1	Grade 2.0	Grade 2.5	Grade 3.0
2	Grade 2.0	Grade 2.5	Grade 3.0
3	Grade 2.0	Grade 2.5	Grade 3.5
4	Grade 2.0	Grade 2.0	Grade 3.5
5	Grade 2.0	Grade 2.0	Grade 3.5
Average	Grade 2.0	Grade 2.5	Grade 3.5

1) Nomenclature for Evaluation Scale:

Evaluation Scale	Description
Grade 1	Not perceptible
Grade 2	Perceptible, not offensive
Grade 3	Clearly perceptible, but not yet offensive
Grade 4	Offensive
Grade 5	Strongly offensive
Grade 6	Unbearable

2) Nomenclature for Test Specimen Variant:

Variant	Application
A	Clips, plugs, grommets and other small parts
B	Armrests, ashtrays, grab handles, gearshift lever bellows and other medium-sized components
C	Insulation materials, films, leather, covering materials, foams, carpets and other large surface area materials

3) Nomenclature for Storage Condition Variant:

Variant	Temperature	Aging Duration
1	(23 ± 2)℃	(24 ± 1) h
2	(40 ± 2)℃	(24 ± 1) h
3	(80 ± 2)℃	2h± 10 min.

Polychlorinated Biphenyls (PCBs)

Test Method : With reference to US EPA 8082A: 2007, analysis was performed by GC-MS

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Test Item(s)	CAS NO.	Unit	MDL	001
2,4,4'-Trichlorobiphenyl (PCB 28)	7012-37-5	mg/kg	0.5	ND
2,2',5,5'-Tetrachloro-biphenyl (PCB 52)	35693-99-3	mg/kg	0.5	ND
2,2',4,5,5'-Pentachloro-biphenyl (PCB 101)	37680-73-2	mg/kg	0.5	ND
2,3',4,4',5-Pentachlorobiphenyl (PCB 118)	31508-00-6	mg/kg	0.5	ND
2,2',3,4,4',5'-Hexachloro-biphenyl (PCB 138)	35065-28-2	mg/kg	0.5	ND
2,2',4,4',5,5'-Hexachloro-biphenyl (PCB 153)	35065-27-1	mg/kg	0.5	ND
2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)	35065-29-3	mg/kg	0.5	ND

Azo Dyes

Test Method : According to Ref. EN 14362-1:2012- Analysis was conducted with GC-MS/HPLC-DAD.

Test Item(s)	CAS NO.	Unit	MDL	001
4-Aminobiphenyl	92-67-1	mg/kg	5	ND
Benzidine	92-87-5	mg/kg	5	ND
4-chloro-o-toluidine	95-69-2	mg/kg	5	ND
2-naphthylamine	91-59-8	mg/kg	5	ND
o-aminoazotoluene	97-56-3	mg/kg	5	ND
5-nitro-o-toluidine / 2-Amino-4-nitrotoluene	99-55-8	mg/kg	5	ND
4-chloroaniline	106-47-8	mg/kg	5	ND
4-methoxy-m-phenylenediamine / 2,4-Diaminoanisole	615-05-4	mg/kg	5	ND
4,4'-diaminodiphenylmethane	101-77-9	mg/kg	5	ND
3,3'-dichlorobenzidine	91-94-1	mg/kg	5	ND
3.3'-dimethoxybenzidine	119-90-4	mg/kg	5	ND
3,3'-dimethylbenzidine	119-93-7	mg/kg	5	ND
3,3'-Dimethyl-4,4'-diaminodiphenylmethane / 4,4'-methylenedi-o-toluidine	838-88-0	mg/kg	5	ND
p-cresidine	120-71-8	mg/kg	5	ND
4,4'-methylene-bis-(2-chloroaniline)	101-14-4	mg/kg	5	ND
4,4'-oxydianiline	101-80-4	mg/kg	5	ND
4,4'-thiodianiline	139-65-1	mg/kg	5	ND
o-toluidine	95-53-4	mg/kg	5	ND
4-methyl-m-phenylenediamine / 2,4-Toluylendiamine	95-80-7	mg/kg	5	ND
2,4,5-trimethylaniline	137-17-7	mg/kg	5	ND
4-aminoazobenzene	60-09-3	mg/kg	5	ND
O-Anisidine	90-04-0	mg/kg	5	ND
2,4-Xylidine	95-68-1	mg/kg	5	ND

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Test Item(s)	CAS NO.	Unit	MDL	001
2,6-Xylidine	87-62-7	mg/kg	5	ND
Conclusion				**##**

Notes :

(1) Test result for 4-aminoazobenzene (CAS no.: 60-09-3) is considered as “not detected” (i.e. <5mg/kg) since both aniline and/or 1,4-phenylenediamine is not found (i.e. <5mg/kg) by mentioned test method
(2) ##= For textiles no relevant amine exceeding 30 ppm (mg/kg) is required, the test method is only applicable for textile and the result is only for client’s information.
(3) Whenever 4-aminodiphenyl (CAS number 92-67-1), 2-naphylamine (CAS number 91-59-8) and 4-methoxy-m-phenylene-diamine (CAS number 615-05-4) is found, the use of banned azo colorants cannot be reliably ascertained without additional information, e.g. the chemical structure of the colorants used.
(4) In case polyurethane materials are used, e.g. PU foams and coatings and in prints, it cannot be ruled out that certain amines, e.g. 4,4’-methylene-dianiline (MDA, CAS number 101-77-9) and 2,4-toluylen-diamine (TDA, CAS number 95-80-7) are released from the PU component and not from a banned azo colorant.
(5) In case of pigment prints care has to be taken that 4,4’-methylene-dianiline (MDA, CAS number 101-77-9) is not released from a source of banned azo colorants but from e.g. a chemical fixing agent.
(6) These tests were subcontracted to SGS Ningbo Chemical Lab.

Phthalates Content

Test Method : With reference to EN 14372:2004, analysis was performed by GC-MS.

Test Item(s)	CAS NO.	Unit	MDL	001
Dibutyl Phthalate (DBP)	84-74-2	%	0.003	ND
Benzylbutyl Phthalate (BBP)	85-68-7	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	117-81-7	%	0.003	ND
Diisononyl Phthalate (DINP)	28553-12-0 /68515-48-0	%	0.01	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	%	0.003	ND
Diisodecyl Phthalate (DIDP)	26761-40-0 /68515-49-1	%	0.01	ND
Diisobutyl Phthalate (DIBP)	84-69-5	%	0.003	ND
Di-n-hexyl Phthalate (DnHP)	84-75-3	%	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.
Please refer to Regulation (EC) No 552/2009 to get more detail information
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

Benzotriazole UV Absorbant

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	001
2-(3,5-Di-tert-butyl-2-hydroxyphenyl) benzotriazole (UV-320) (CAS No: 3846-71-7)	mg/kg	5	ND
2-(3',5'-Di-tert-butyl-2'-hydroxyphenyl)-5-chloro benzotriazole (UV-327) (CAS No: 3864-99-1)	mg/kg	5	ND
2-(2'-hydroxy-3',5'-di-tert- amylphenyl) benzotriazole (UV-328) (CAS No: 25973-55-1)	mg/kg	5	ND
TinUVin 350 (UV-350) (CAS No: 36437-37-3)	mg/kg	5	ND

Pentachlorophenol (PCP)

Test Method : With reference to LFGB § 64 BVL B 82.02.08:2001, analysis was performed by GC-ECD or GC-MS.

Test Item(s)	Unit	MDL	001
Pentachlorophenol (PCP)	mg/kg	0.05	ND

Volatile Organic Compounds (VOCs)

Test Method : With reference to US EPA 5021A:2014, analysis was performed by HS-GC-MS.

Test Item(s)	CAS NO.	Unit	MDL	001
1,1,2,2-Tetrachloroethane	79-34-5	µg/g	1	ND
1,1,1,2-Tetrachloroethane	630-20-6	µg/g	1	ND

Test Item(s)	CAS NO.	Unit	MDL	001
1,1-Dichloroethylene	75-35-4	µg/g	1	ND
Dichloromethane	75-09-2	µg/g	1	ND
1,1-Dichloroethane	75-34-3	µg/g	1	ND
Carbon tetrachloride	56-23-5	µg/g	1	ND
Chloroform	67-66-3	µg/g	1	ND
Trichloroethylene	79-01-6	µg/g	1	ND
Tetrachloroethylene	127-18-4	µg/g	1	ND

PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by HPLC-MS.

Test Item(s)	Limit	Unit	MDL	001
Perfluorooctanesulfonate (PFOS)^	1000	mg/kg	10	ND
Perfluorooctanoic Acid (PFOA)	-	mg/kg	10	ND

Notes :

(1) Max. limit specified by commission regulation (EU) No. 757/2010 amending regulation (EC) No 850/2004

(2)^ PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluoroctanesulfonic acid, Perfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamide, N-Ethylperfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamidoethanol and N-Ethylperfluoroctane sulfonamidoethanol.

Polycyclic aromatic hydrocarbons (PAHs)

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

Test Item(s)	Unit	MDL	001
Sum of 18 PAHs	mg/kg	-	ND
Naphthalene(NAP)	mg/kg	0.1	ND
Acenaphthylene(ANY)	mg/kg	0.1	ND
Acenaphthene(ANA)	mg/kg	0.1	ND
Fluorene(FLU)	mg/kg	0.1	ND
Phenanthrene(PHE)	mg/kg	0.1	ND
Anthracene(ANT)	mg/kg	0.1	ND
Fluoranthene(FLT)	mg/kg	0.1	ND
Pyrene(PYR)	mg/kg	0.1	ND
Benzo(a)anthracene(BaA)	mg/kg	0.1	ND

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Test Item(s)	Unit	MDL	001
Chrysene(CHR)	mg/kg	0.1	ND
Benzo(b)fluoranthene(BbF) and Benzo(j)fluoranthene(BjF)	mg/kg	0.1	ND
Benzo(k)fluoranthene(BkF)	mg/kg	0.1	ND
Benzo(a)pyrene(BaP)	mg/kg	0.1	ND
Benzo(e)pyrene(BeP)	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene(IPY)	mg/kg	0.1	ND
Dibenzo(a,h)anthracene(DBA)	mg/kg	0.1	ND
Benzo(g,h,i)perylene(BPE)	mg/kg	0.1	ND

Notes :

Above 8 PAHs(BaA,CHR,BbF,BjF.BkF,BeP,BaP,DBA) are listed in Commission Regulation (EU) No 1272/2013 amending Annex XVII to Regulation (EC) No 1907/2006.

(1) In order to protect the health of consumers from the risk arising from exposure to PAHs in articles, limits on the PAH content in the accessible plastic or rubber parts of articles should be set, and the placing on the market of articles containing any of the PAHs in concentrations greater than 1 mg/kg in those parts should be prohibited.

(2) Taking into account the vulnerability of children a lower limit value should be established. Therefore the placing on the market of toys and childcare articles, containing any of the PAHs in concentrations greater than 0,5 mg/kg in their accessible plastic or rubber parts, should be prohibited.

Remark:

The German committee on Product Safety (AfPS) adopted a new PAHs document on August 4, 2014, which was taken into account by the GS certification bodies for the certification process of the GS mark. The previously valid PAK-document (ZEK 01.4-08, English version) was repealed on June 30, 2015.

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)	<0.2**	1	20
Sum of 18 PAHs (mg/kg)*	<0.2**	10	200

Notes:

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

** = 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 80.30-1. The conclusion of the migration test results must be made based on food law criteria.

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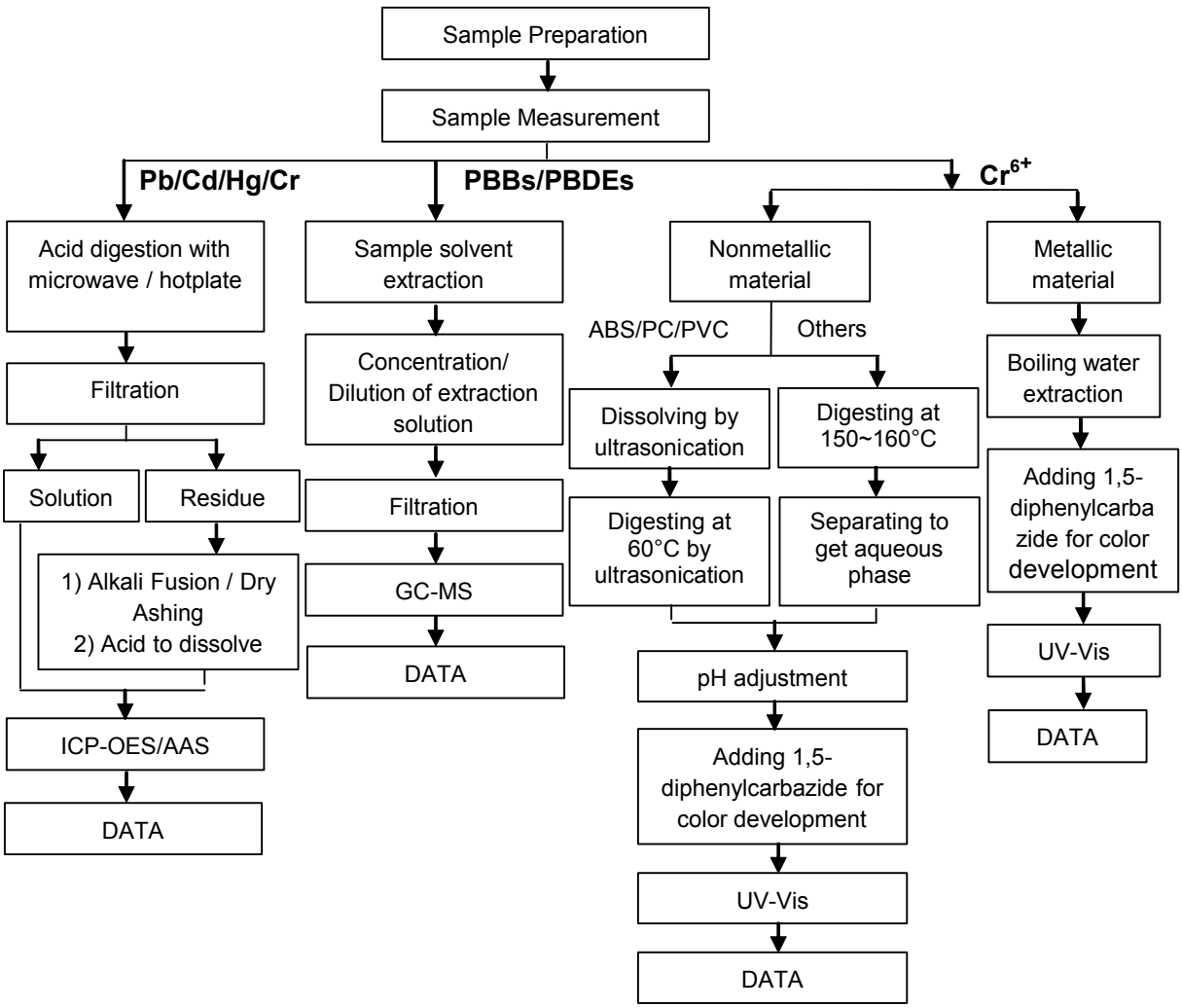
Pb/Cd/Hg/Cr^{6+}/PBBs/PBDEs Testing Flow Chart

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



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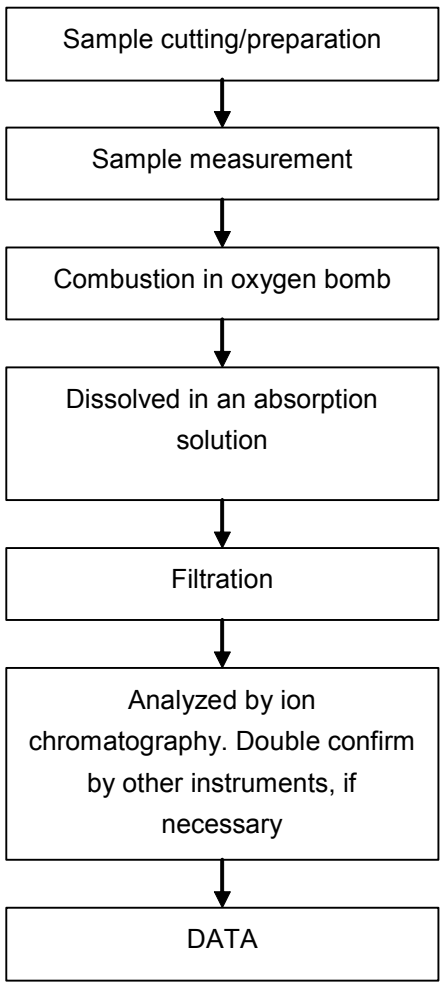
Halogen Testing (oxygen bomb) Flow Chart



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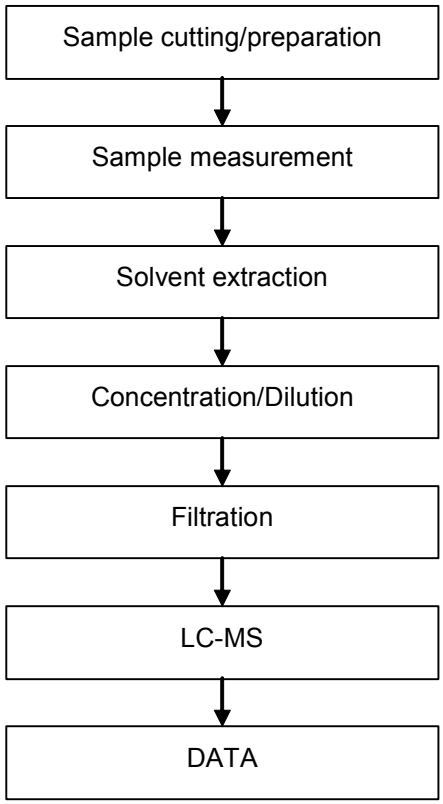
PFOS/PFOA Testing Flow Chart



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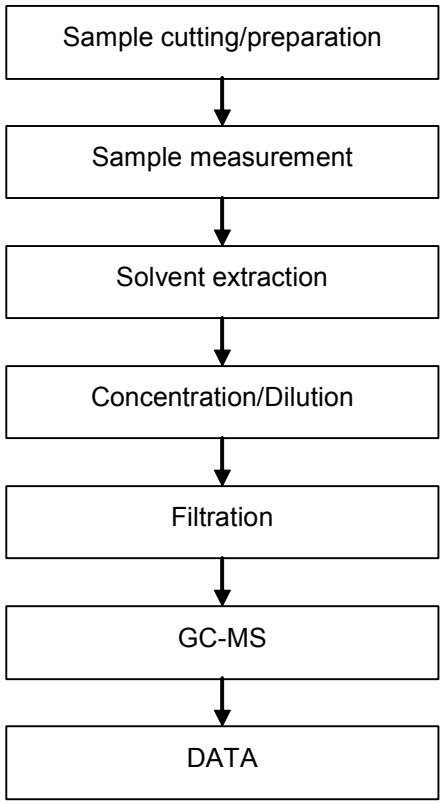
PAHs Testing Flow Chart



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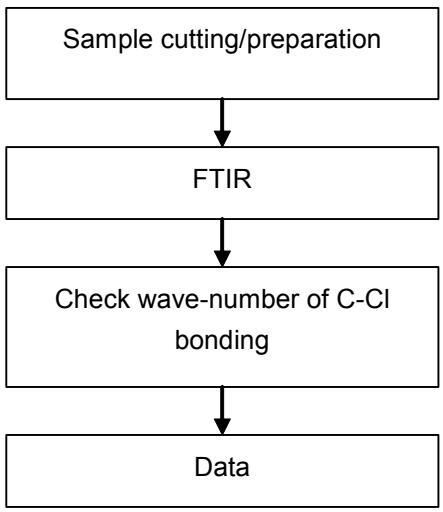
PVC Testing Flow Chart



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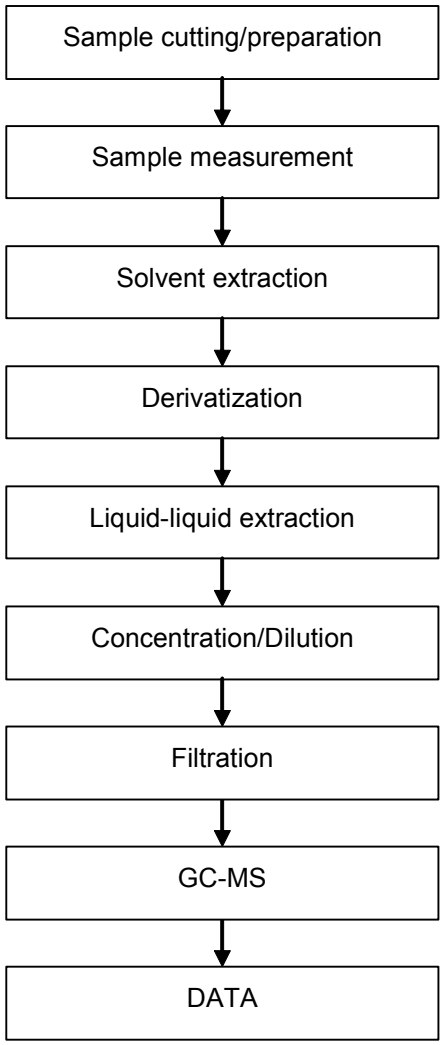
TBBP-A Testing Flow Chart



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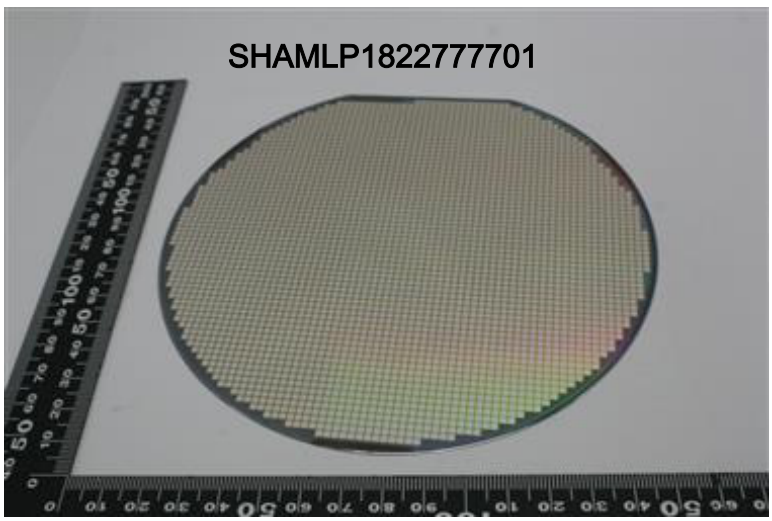
Sample photo:



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