

## Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 1 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



**The following sample(s) was/were submitted and identified by/on behalf of the client as:**

Sample Description : TSMC WLCSP FINISHED WAFER  
Sample Receiving Date : 2010/12/30  
Testing Period : 2010/12/30 TO 2011/01/06

=====  
**Test Result(s)** : Please refer to next page(s).

**Conclusion** : Based upon the performed tests by submitted samples, the test results of Cadmium, Lead, Mercury, Hexavalent Chromium Cr(VI), PBBs and PBDEs comply with the limits of RoHS Directive 2002/95/EC and its subsequent amendments.

  
  
**Chenyu Kung / Operation Manager**  
**Signed for and on behalf of**  
**SGS TAIWAN LTD.**  
**Chemical Laboratory – Taipei**

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 2 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



## Test Result(s)

PART NAME No.1 : WAFER

Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.	1000
Hexavalent Chromium Cr(VI) by alkaline extraction	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.	1000
Arsenic (As)	mg/kg	With reference to US EPA Method 3052 for Arsenic Content. Analysis was performed by ICP-AES.	2	n.d.	-
Antimony (Sb)	mg/kg	With reference to US EPA Method 3050B for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.	-
Polychlorinated Biphenyls (PCBs) (CAS No.: 001336-36-3)	mg/kg	With reference to US EPA 3540C method. Analysis was performed by GC/MS.	0.5	n.d.	-
Polychlorinated Naphthalene (PCNs)	mg/kg	With reference to US EPA 3540C method. Analysis was performed by GC/MS.	5	n.d.	-
Polychlorinated Terphenyls (PCTs)	mg/kg	With reference to US EPA 3540C method. Analysis was performed by GC/MS.	0.5	n.d.	-
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins) (CAS No.: 085535-84-8)	%	With reference to US EPA 3540C method. Analysis was performed by GC/MS.	0.01	n.d.	-
Perfluorooctane sulfonates (PFOS) PFOS – Acid PFOS – Metal Salt PFOS – Amide	mg/kg	With reference to US EPA 3540C: 1996 method for PFOS Content. Analysis was performed by LC/MS.	10	n.d.	-
PFOA (CAS No.: 000335-67-1)	mg/kg	With reference to US EPA 3540C: 1996 method for PFOA Content. Analysis was performed by LC/MS.	10	n.d.	-

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 3 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit		
				No.1			
<b>Sum of PBBs</b>	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	-	n.d.	1000		
Monobromobiphenyl			5	n.d.	-		
Dibromobiphenyl			5	n.d.	-		
Tribromobiphenyl			5	n.d.	-		
Tetrabromobiphenyl			5	n.d.	-		
Pentabromobiphenyl			5	n.d.	-		
Hexabromobiphenyl			5	n.d.	-		
Heptabromobiphenyl			5	n.d.	-		
Octabromobiphenyl			5	n.d.	-		
Nonabromobiphenyl			5	n.d.	-		
Decabromobiphenyl			5	n.d.	-		
<b>Sum of PBDEs</b>			-	n.d.	1000		
Monobromodiphenyl ether			5	n.d.	-		
Dibromodiphenyl ether			5	n.d.	-		
Tribromodiphenyl ether			5	n.d.	-		
Tetrabromodiphenyl ether			5	n.d.	-		
Pentabromodiphenyl ether			5	n.d.	-		
Hexabromodiphenyl ether			5	n.d.	-		
Heptabromodiphenyl ether			5	n.d.	-		
Octabromodiphenyl ether			5	n.d.	-		
Nonabromodiphenyl ether			5	n.d.	-		
Decabromodiphenyl ether			5	n.d.	-		
<b>Asbestos</b>							
Actinolite (CAS No.: 077536-66-4)			%	With reference to NIOSH 9000 method. Analysis was performed by XRD.	1	Negative	-
Amosite (CAS No.: 012172-73-5)	%	With reference to NIOSH 9000 method. Analysis was performed by XRD.	1	Negative	-		
Anthophyllite (CAS No.: 077536-67-5)	%	With reference to NIOSH 9000 method. Analysis was performed by XRD.	1	Negative	-		
Chrysotile (CAS No.: 012001-29-5)	%	With reference to NIOSH 9000 method. Analysis was performed by XRD.	1	Negative	-		
Crocidolite (CAS No.: 012001-28-4)	%	With reference to NIOSH 9000 method. Analysis was performed by XRD.	1	Negative	-		
Tremolite (CAS No.: 077536-68-6)	%	With reference to NIOSH 9000 method. Analysis was performed by XRD.	1	Negative	-		

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 4 of 20

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NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
<b>Halogen</b>					
Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	-
Halogen-Chlorine (Cl) (CAS No.: 022537-15-1)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	-
Halogen-Bromine (Br) (CAS No.: 010097-32-2)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	-
Halogen-Iodine (I) (CAS No.: 014362-44-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.	-
<b>Organic-tin compounds</b>					
Tributyl Tin (TBT) (CAS No.: 000688-73-3)	mg/kg	With reference to DIN 38407-13. Analysis was performed by GC/FPD.	0.03	n.d.	-
Triphenyl Tin (TphT) (CAS No.: 000668-34-8)	mg/kg	With reference to DIN 38407-13. Analysis was performed by GC/FPD.	0.03	n.d.	-
<b>AZO</b>					
1): 4-AMINODIPHENYL (CAS No.: 000092-67-1)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
2): BENZIDINE (CAS No.: 00092-87-5)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
3): 4-CHLORO-O-TOLUIDINE (CAS No.: 000095-69-2)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
4): 2-NAPHTHYLAMINE (CAS No.: 000091-59-8)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
5): O-AMINOAZOTOLUENE (CAS No.: 000097-56-3)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
6): 2-AMINO-4-NITROTOLUENE (CAS No.: 000099-55-8)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
7): P-CHLOROANILINE (CAS No.: 000106-47-8)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
8): 2,4-DIAMINOANISOLE (CAS No.: 000615-05-4)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
9): 4,4'-DIAMINODIPHENYLMETHANE (CAS No.: 000101-77-9)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 5 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
10): 3,3'-DICHLOROBENZIDINE (CAS No.: 000091-94-1)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
11): 3,3'-DIMETHOXYBENZIDINE (CAS No.: 000119-90-4)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
12): 3,3'-DIMETHYLBENZIDINE (CAS No.: 000119-93-7)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
13): 3,3'-DIMETHYL-4,4'-DIAMINODIPHENYLMETHANE (CAS No.: 000838-88-0)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
14): P-CRESIDINE (2-METHOXY-5-METHYLANILINE) (CAS No.: 000120-71-8)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
15): 4,4'-METHYLENE-BIS-(2-CHLOROANILINE) (CAS No.: 000101-14-4)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
16): 4,4'-OXYDIANILINE (CAS No.: 000101-80-4)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
17): 4,4'-THIODIANILINE (CAS No.: 000139-65-1)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
18): O-TOLUIDINE (CAS No.: 000095-53-4)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
19): 2,4-TOLUYLENEDIAMINE (CAS No.: 000095-80-7)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
20): 2,4,5-TRIMETHYLANILINE (CAS No.: 000137-17-7)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
21): O-ANISIDINE (CAS No.: 000090-04-0)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
22): P-AMINOAZOBENZENE (CAS No.: 000060-09-3)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
23): 2,4-XYLIDINE (CAS No.: 000095-68-1)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-
24): 2,6-XYLIDINE (CAS No.: 000087-62-7)	mg/kg	With reference to LFGB 82.02-2. Analysis was performed by GC/MS.	3	n.d.	-

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 6 of 20

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NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
<b>CFC's (Chlorofluorocarbons)</b>					
Group I					
Chlorofluorocarbon-11 (CAS No.: 000075-69-4)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-12 (CAS No.: 000075-71-8)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-113 (CAS No.: 000076-13-1)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-114 (CAS No.: 000076-14-2)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-115 (CAS No.: 000076-15-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Group III					
Chlorofluorocarbon-13 (CAS No.: 000075-72-9)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-111 (CAS No.: 000354-56-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-112 (CAS No.: 000076-12-0)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-211 (CAS No.: 000422-78-6)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-212 (CAS No.: 003182-26-1)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-213 (CAS No.: 002354-06-5)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 7 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
Chlorofluorocarbon-214 (CAS No.: 029255-31-0)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-215 (CAS No.: 004259-43-2)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-216 (CAS No.: 000661-97-2)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-217 (CAS No.: 000422-86-6)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
<b>HCFCs (Hydrochlorofluorocarbons)</b>					
HCFC-21 (CAS No.: 000075-43-4)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-22 (CAS No.: 000075-45-6)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-31 (CAS No.: 000593-70-4)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-121 (CAS No.: 000354-14-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-122 (CAS No.: 000354-21-2)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-123 (CAS No.: 000306-83-2)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-124 (CAS No.: 002837-89-0)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-131 (CAS No.: 000359-28-4)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 8 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
HCFC-132b (CAS No.: 001649-08-7)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-133a (CAS No.: 000075-88-7)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-141b (CAS No.: 001717-00-6)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-142b (CAS No.: 000075-68-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-221 (CAS No.: 000422-26-4)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-222 (CAS No.: 000422-49-1)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-223 (CAS No.: 000422-52-6)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-224 (CAS No.: 000422-54-8)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-225ca (CAS No.: 000422-56-0)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-225cb (CAS No.: 000507-55-1)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-226 (CAS No.: 000431-87-8)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-231 (CAS No.: 000421-94-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 9 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
HCFC-232 (CAS No.: 000460-89-9)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-233 (CAS No.: 007125-84-0)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-234 (CAS No.: 000425-94-5)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-235 (CAS No.: 000460-92-4)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-241(CAS No.: 000666-27-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-242 (CAS No.: 000460-63-9)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-243 (CAS No.: 000460-69-5)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-244	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-251 (CAS No.: 000421-41-0)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-252 (CAS No.: 000819-00-1)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-253 (CAS No.: 000460-35-5)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-261 (CAS No.: 000420-97-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-

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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 10 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



Test Item (s):	Unit	Method	MDL	Result	Limit
				No.1	
HCFC-262 (CAS No.: 000421-02-03)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
HCFC-271 (CAS No.: 000430-55-7)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
<b>Halons</b>					
Halon-1211 (CAS No.: 000353-59-3)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Halon-1301 (CAS No.: 000075-63-8)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-
Halon-2402 (CAS No.: 000124-73-2)	mg/kg	With reference to US EPA 5021 method. Analysis was performed by GC/MS.	1	n.d.	-

## Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated
5. Asbestos : Negative = "< 1.0 %", Positive = "> 1.0 %"

## PFOS Reference Information : Directive 2006/122/EC

(1) May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005 % by mass.

(2) May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1 % by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than 1µg/m<sup>2</sup> of the coated material.

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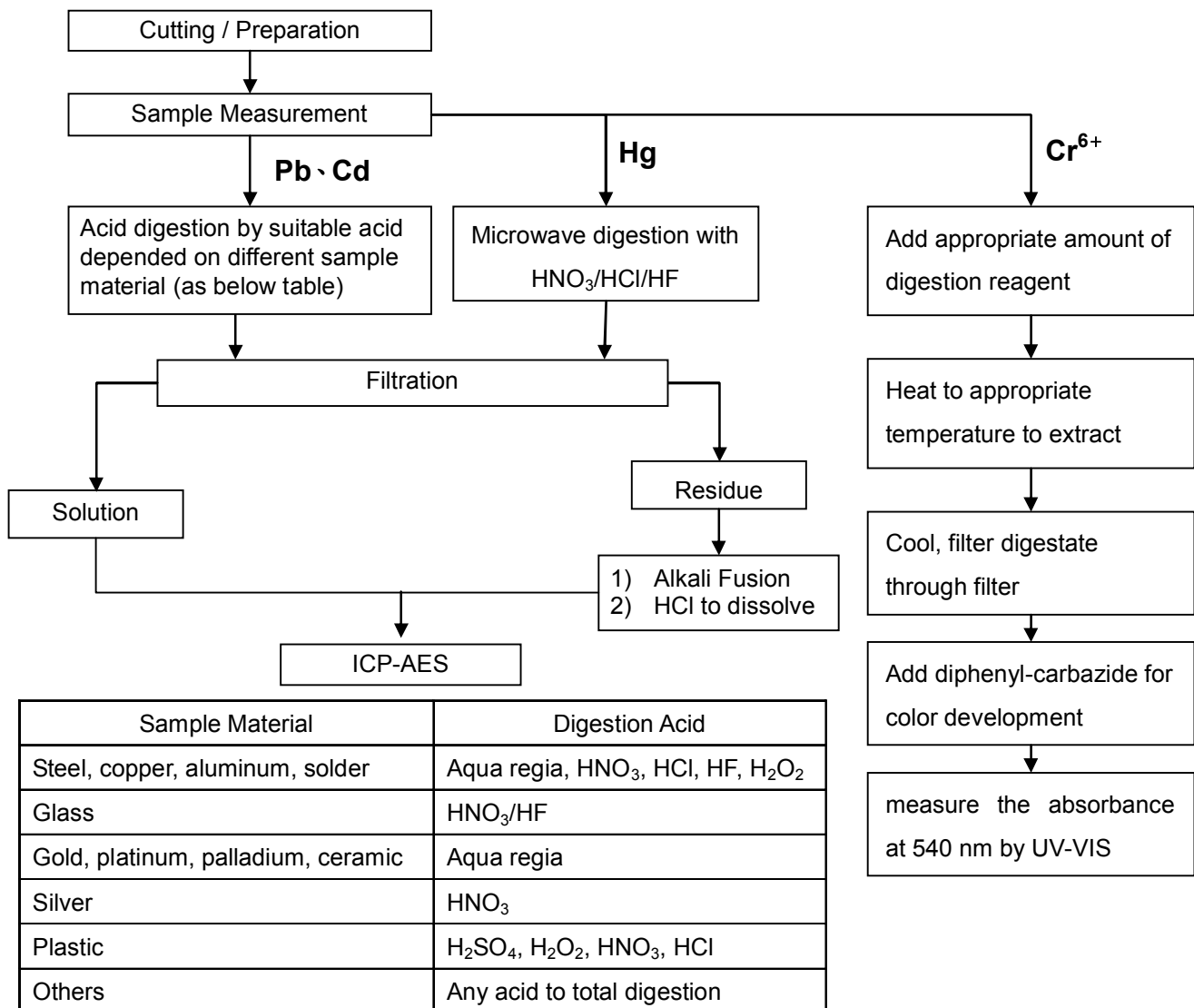
No. : CE/2010/C5692 Date : 2011/01/06 Page : 11 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang



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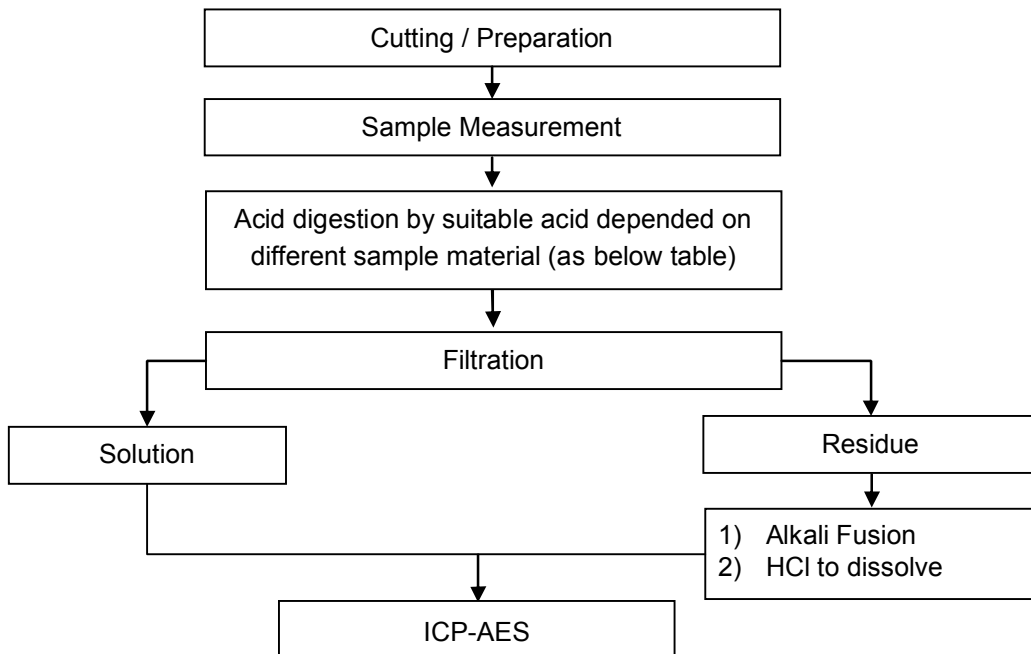
No. : CE/2010/C5692 Date : 2011/01/06 Page : 12 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
- 2) Name of the person who made measurement: Climbgreat Yang
- 3) Name of the person in charge of measurement: Troy Chang

### Flow Chart of digestion for the elements analysis performed by ICP-AES



Steel, copper, aluminum, solder	Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
Glass	HNO <sub>3</sub> /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO <sub>3</sub>
Plastic	H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl
Others	Any acid to total digestion

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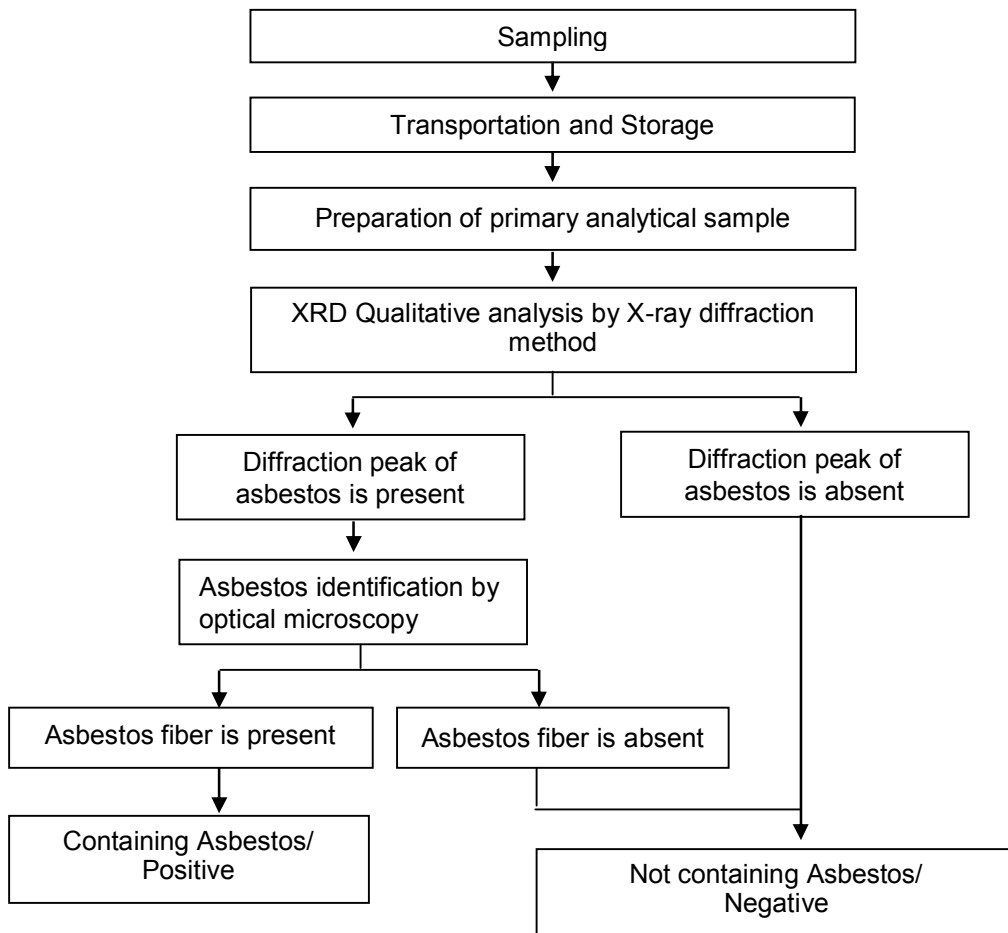
No. : CE/2010/C5692 Date : 2011/01/06 Page : 13 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



### Analysis flow chart for determination of Asbestos

- 1) Name of the person who made measurement: Victor Kao
- 2) Name of the person in charge of measurement: Wendy Wei



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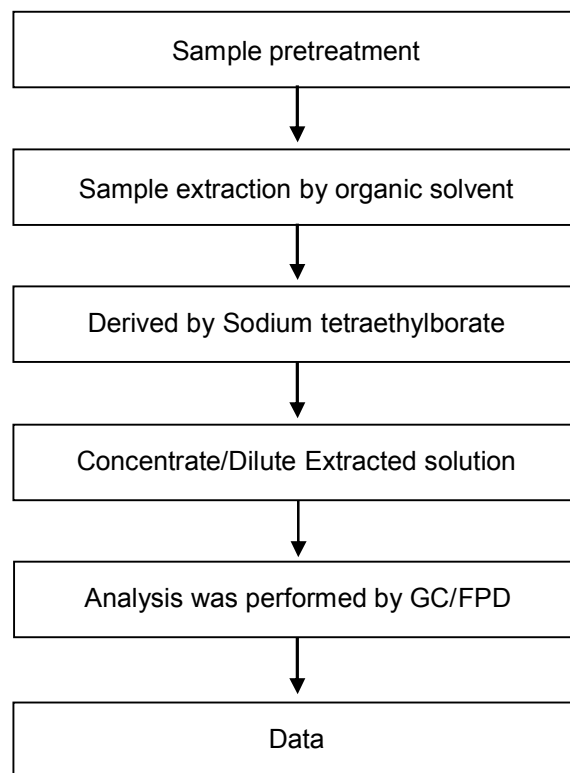
No. : CE/2010/C5692 Date : 2011/01/06 Page : 14 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



## Analytical flow chart of Organic-Tin content

- 1) Name of the person who made measurement: Ginny Chen
- 2) Name of the person in charge of measurement: Troy Chang



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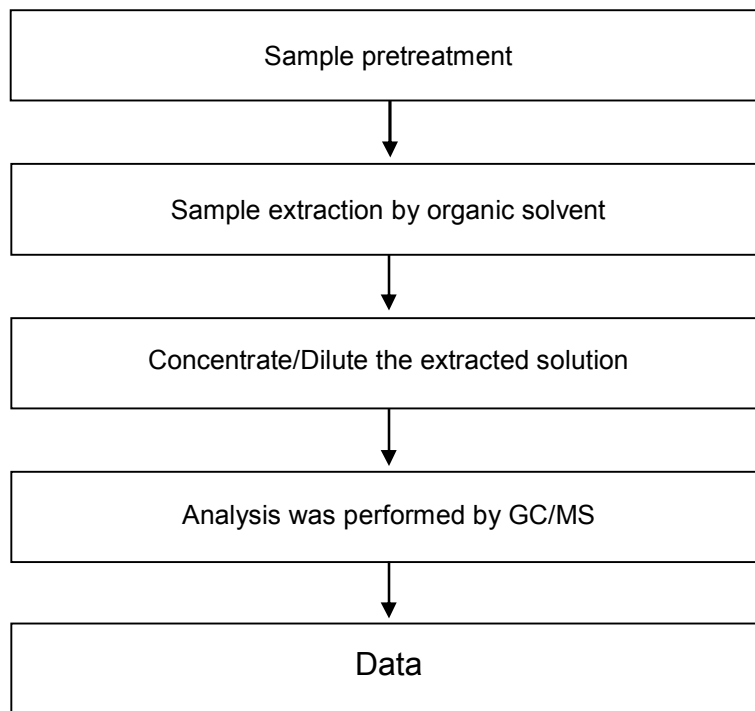
No. : CE/2010/C5692 Date : 2011/01/06 Page : 15 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



### Chlorinated Flame retardant analytical flow chart

- 1) Name of the person who made measurement: Barry Tseng
  - 2) Name of the person in charge of measurement: Troy Chang
- Reference method: US EPA 8270D, US EPA 3540
  - Test Items: PCBs, PCNs, PCTs, Mirex, CP, MCCP



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# Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 16 of 20

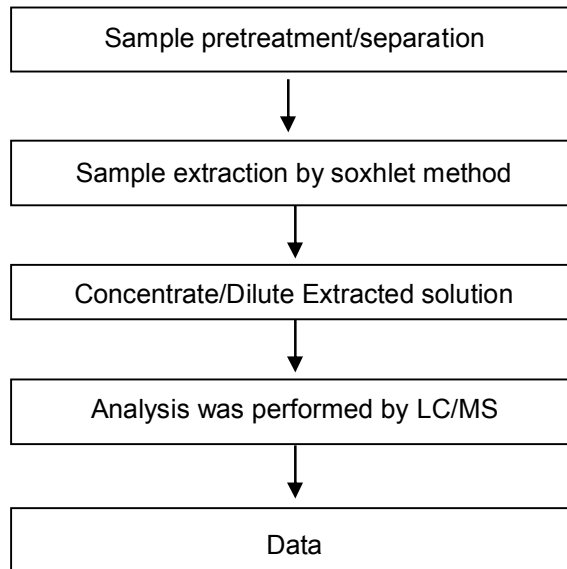
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## Analytical flow chart of Soxhlet extraction (LC/MS) procedure

- 1) Name of the person who made measurement: Lydia Fu
- 2) Name of the person in charge of measurement: Shinjyh Chen

■ Test Items: PFOS/PFOA、Benzotriazole



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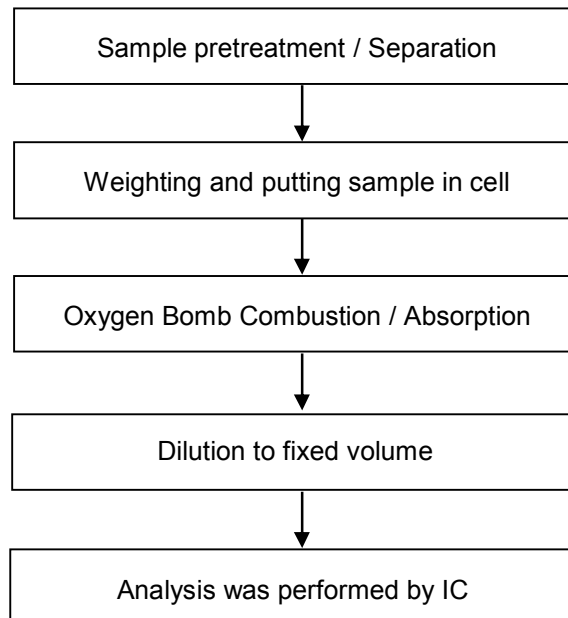
No. : CE/2010/C5692 Date : 2011/01/06 Page : 17 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.



### Analytical flow chart of halogen content

- 1) Name of the person who made measurement: Rita Chen
- 2) Name of the person in charge of measurement: Troy Chang



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## Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 18 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 6, CREATION RD. 2, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

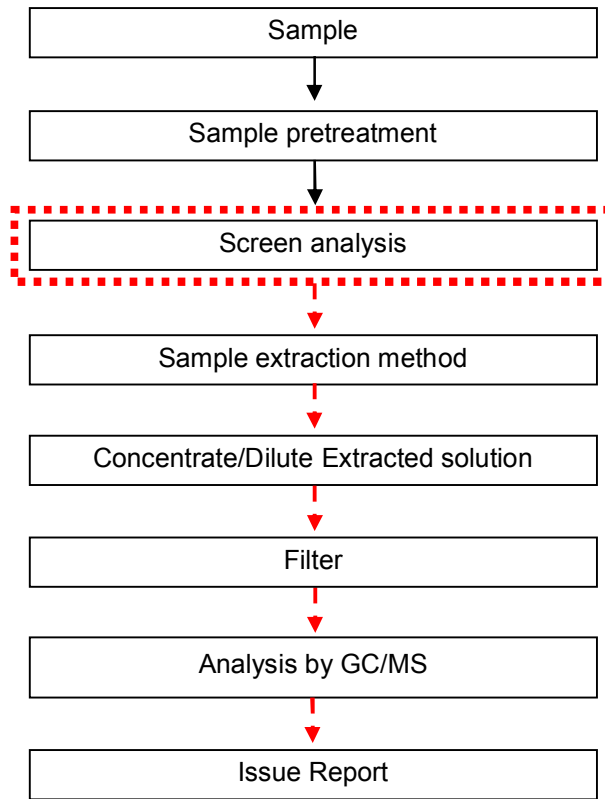


### Analytical flow chart

- 1) Name of the person who made measurement: Roman Wong
- 2) Name of the person in charge of measurement: Troy Chang

■ Test Items: PBB/PBDE, TBBP-A-bis

First testing process —> Optional screen process ..... Confirmation process ->



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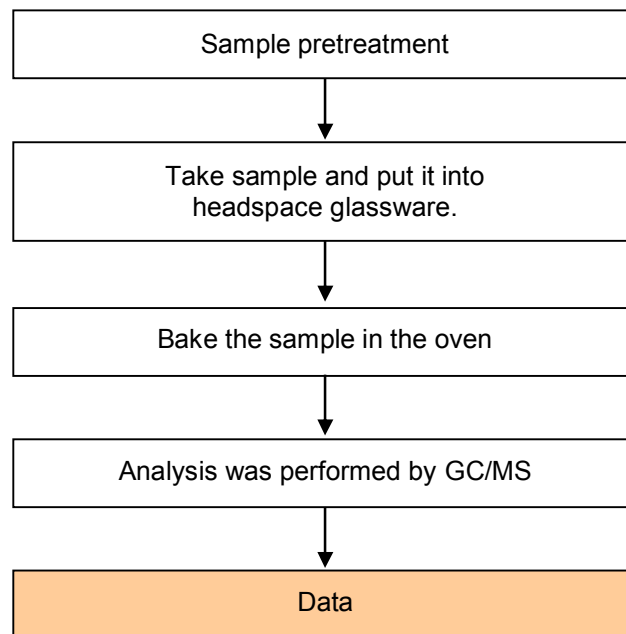
No. : CE/2010/C5692 Date : 2011/01/06 Page : 19 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
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### Analytical flow chart of volatile organic compounds (VOCs)

- 1) Reference method : US EPA 5021
- 2) Name of the person who made measurement : Dalki Yen
- 3) Name of the person in charge of measurement : Shinjyh Chen

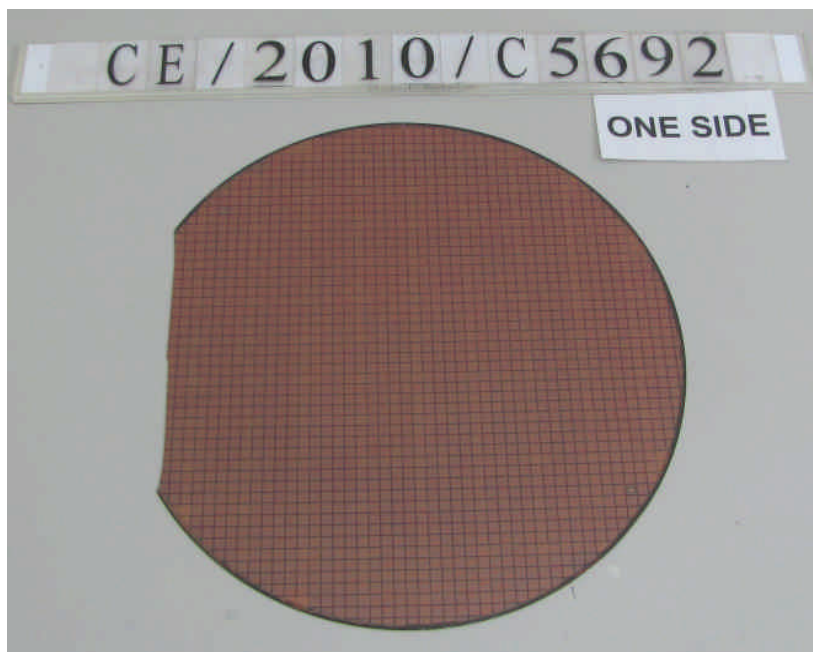


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## Test Report

No. : CE/2010/C5692 Date : 2011/01/06 Page : 20 of 20

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
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**\*\* End of Report \*\***

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