

## Test Report

No: 10502885(1) A1 R1

Date: 30-Nov-2020

Page 1 of 7

GLOBALFOUNDRIES Singapore Pte Ltd  
60 Woodlands Industrial Park D Street 2 Singapore 738406

### THIS REPORT IS TO SUPERSEDE TEST REPORT NO.: 10502885(1) A1 DATED 16-Oct-2020

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

Sample Name : One (1) 200mm die-patterned wafer  
Technode : 0.5um/0.6um  
Fab : 2

Sample Receiving Date : 12-Oct-2020  
Testing Period : 12-Oct-2020 to 16-Oct-2020

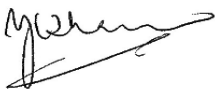
Test Requested : In accordance with the RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

Conclusion : Based on the performed tests on submitted sample(s), the results **comply with** the RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of  
SGS Testing & Control Services Singapore Pte Ltd



Y.C. Tham  
Technical Manager, Multi-Lab



Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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# Test Report

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## Test Result(s):

Sample Description : Wafer

Test Item(s):	Unit	Method	Results	MDL	RoHS Limit
Cadmium(Cd)	mg/kg	With reference to IEC62321-5 :2013. Analysis was performed by ICP/AES	n.d.	2	100
Lead (Pb)	mg/kg	With reference to IEC62321-5 :2013. Analysis was performed by ICP/AES	n.d.	2	1000
Mercury (Hg)	mg/kg	With reference to IEC62321-4 :2013+A1:2017. Analysis was performed by ICP/AES	n.d.	2	1000
Hexavalent Chromium (Cr(VI))	mg/kg	With reference to IEC62321-7-2 :2017. Analysis was performed by UV/Vis Spectrometry	n.d.	8	1000
<b>Sum of PBBs</b>	mg/kg	With reference to IEC62321-6 :2015. Analysis was performed by GC/MS	<b>n.d.</b>	-	1000
Monobromobiphenyl	mg/kg		n.d.	5	-
Dibromobiphenyl	mg/kg		n.d.	5	-
Tribromobiphenyl	mg/kg		n.d.	5	-
Tetrabromobiphenyl	mg/kg		n.d.	5	-
Hexabromobiphenyl	mg/kg		n.d.	5	-
Pentabromobiphenyl	mg/kg		n.d.	5	-
Heptabromobiphenyl	mg/kg		n.d.	5	-
Octabromobiphenyl	mg/kg		n.d.	5	-
Nonabromobiphenyl	mg/kg		n.d.	5	-
Decabromobiphenyl	mg/kg		n.d.	5	-
<b>Sum of PBDEs</b>	mg/kg		<b>n.d.</b>	-	1000
Monobromodiphenyl ether	mg/kg		n.d.	5	-
Dibromodiphenyl ether	mg/kg		n.d.	5	-
Tribromodiphenyl ether	mg/kg		n.d.	5	-
Tetrabromodiphenyl ether	mg/kg		n.d.	5	-
Pentabromodiphenyl ether	mg/kg		n.d.	5	-
Hexabromodiphenyl ether	mg/kg		n.d.	5	-
Heptabromodiphenyl ether	mg/kg		n.d.	5	-
Octabromodiphenyl ether	mg/kg		n.d.	5	-
Nonabromodiphenyl ether	mg/kg	n.d.	5	-	
Decabromodiphenyl ether	mg/kg	n.d.	5	-	

Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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**Test Result(s):**

Sample Description : Wafer

Test Item(s):	Unit	Method	Results	MDL	Limit
BBP (Benzyl butyl phthalate)	mg/kg	With reference to IEC 62321-8: 2017. Analysis was performed by GC/MS	n.d.	50	1000
DBP (Di-butyl phthalate)	mg/kg	With reference to IEC 62321-8: 2017. Analysis was performed by GC/MS	n.d.	50	1000
DEHP (Di-(2-ethylhexyl) phthalate)	mg/kg	With reference to IEC 62321-8: 2017. Analysis was performed by GC/MS	n.d.	50	1000
DIBP (Di-isobutyl Phthalate)	mg/kg	With reference to IEC 62321-8: 2017. Analysis was performed by GC/MS	n.d.	50	1000

Note: (1) mg/kg = ppm ; 0.1wt% = 1000ppm  
 (2) n.d.= Not Detected  
 (3) MDL = Method Detection Limit  
 (4) "-" = Not regulated  
 (5) \* : Exceeds limit  
 (6) Reference information: The limits of Benzyl butyl phthalate (BBP), Di-butyl phthalate (DBP), Di-(2-ethylhexyl) phthalate (DEHP ), Di-isobutyl phthalate (DIBP) as set by G/TBT/N/EU/256 of WTO/TBT .

Remarks: Sample received was totally dissolved by preconditioning method.  
 Lab Analyst(s): AQ, Pheng and SJ

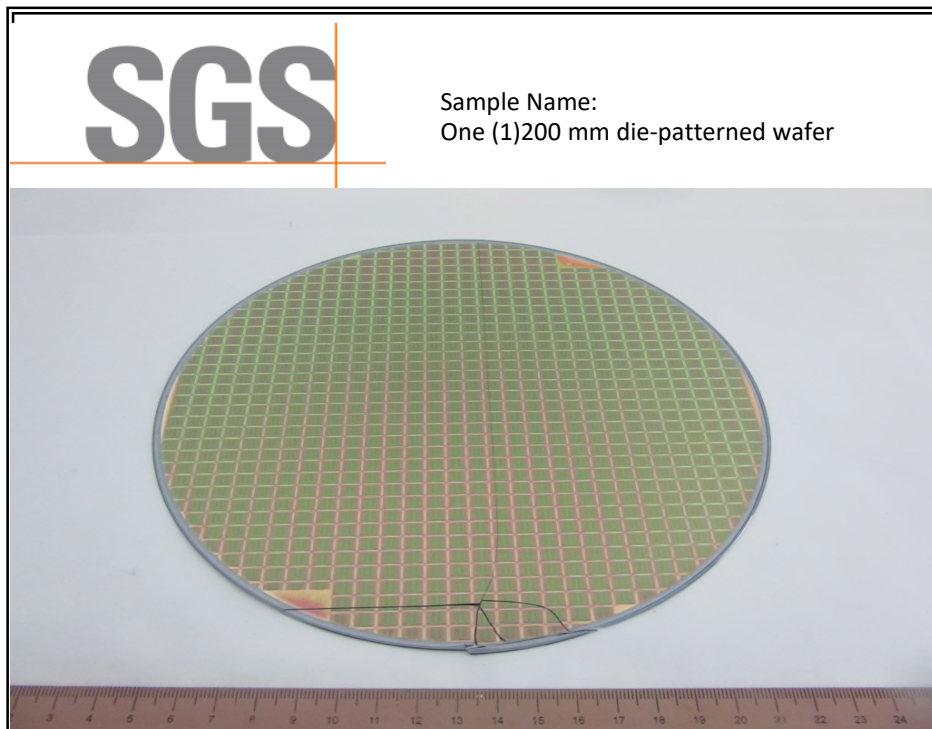
Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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**Sample photo:**

Sample Description : Wafer

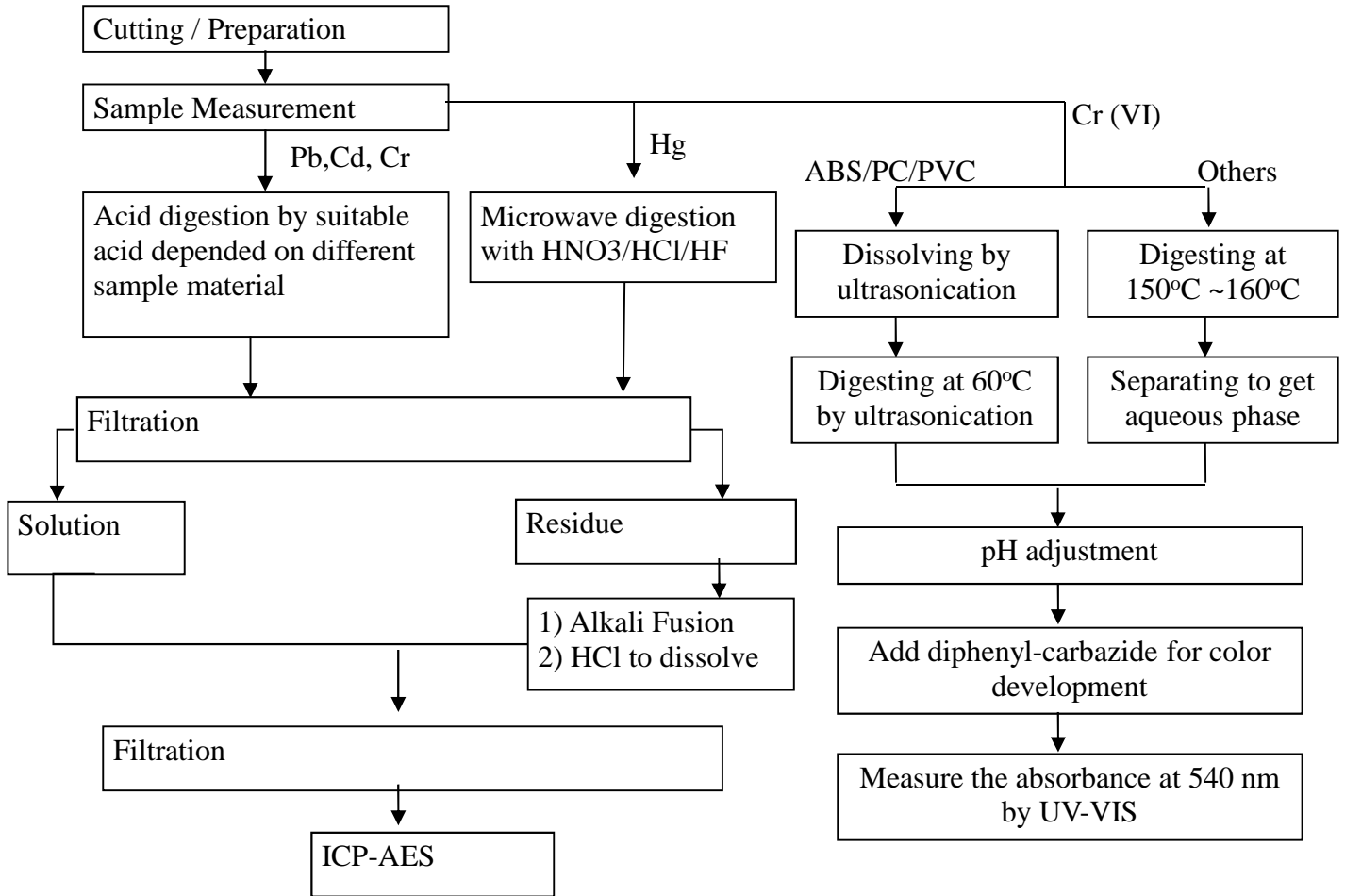
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**Process Flow of IEC 62321 (Pb, Cd, Hg, Cr & Cr(VI))**



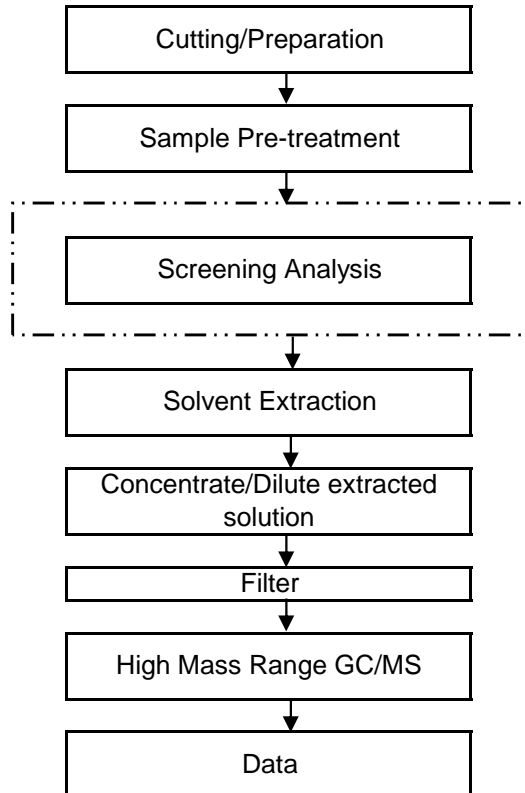
Remarks: Sample received was totally dissolved by preconditioning method. (CrVI method excluded)

Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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### Process Flow of PBBs and PBDEs by GC/MS (IEC 62321)

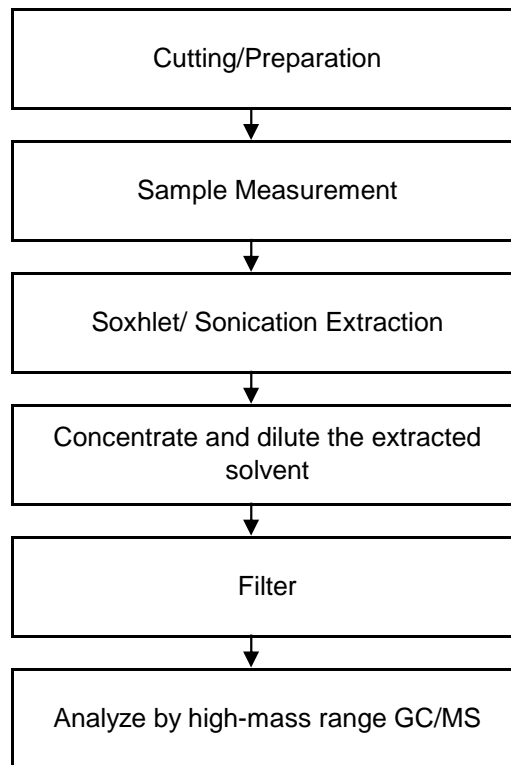
First Testing Process → Optional screen process ..... Confirmation process ...→



Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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### Process Flow of Phthalate Analysis (IEC62321)



\*\*\*End of Report\*\*\*

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## Test Report

No: 10502885(1a) A1 R1

Date: 30-Nov-2020

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GLOBALFOUNDRIES Singapore Pte Ltd  
60 Woodlands Industrial Park D Street 2 Singapore 738406

### THIS REPORT IS TO SUPERSEDE TEST REPORT NO.: 10502885(1a) A1 DATED 16-Oct-2020

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

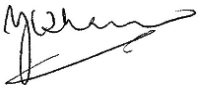
Sample Name : One (1) 200mm die-patterned wafer  
Technode : 0.5um/0.6um  
Fab : 2

Sample Receiving Date : 12-Oct-2020  
Testing Period : 12-Oct-2020 to 16-Oct-2020

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

Signed for and on behalf of  
SGS Testing & Control Services Singapore Pte Ltd



Y.C. Tham  
Technical Manager, Multi-Lab



Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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# Test Report

No: 10502885(1a) A1 R1

Date: 30-Nov-2020

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## Test Result(s):

Sample Description : Wafer

Test Item(s):	Unit	Method	Results	MDL
<b>Halogen</b>				
Halogen - Bromine (Br)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50
Halogen - Chlorine (Cl)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50
Halogen - Fluorine (F)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50
Halogen - Iodine (I)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50

Note: (1) mg/kg = ppm ; 0.1wt% = 1000ppm  
 (2) n.d.= Not Detected  
 (3) MDL = Method Detection Limit

Lab Analyst(s): Jenny

Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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**Sample photo:**

Sample Description : Wafer

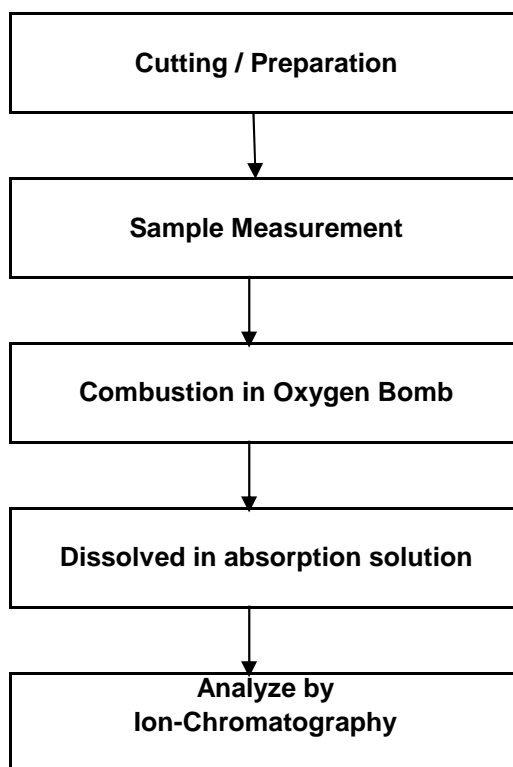
SGS authenticate the photo on original report only



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### Process Flow of BS EN 14582 (Halogen Analysis)



\*\*\*End of Report\*\*\*

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## Test Report

No: 10502885(1c) R1

Date: 30-Nov-2020

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GLOBALFOUNDRIES Singapore Pte Ltd  
60 Woodlands Industrial Park D Street 2 Singapore 738406

### THIS REPORT IS TO SUPERSEDE TEST REPORT NO.: 10502885(1c) DATED 16-Oct-2020

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

Sample Name : One (1) 200mm die-patterned wafer  
Technode : 0.5um/0.6um  
Fab : 2

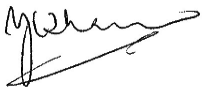
Sample Receiving Date : 12-Oct-2020  
Testing Period : 12-Oct-2020 to 16-Oct-2020

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

Signed for and on behalf of  
SGS Testing & Control Services Singapore Pte Ltd



Y.C. Tham  
Technical Manager, Multi-Lab



Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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**Test Report**

No: 10502885(1c) R1

Date: 30-Nov-2020

Page 2 of 4

**Test Result(s):**

Sample Description : Wafer

Test Item(s):	Unit	Method	Results	MDL
Beryllium (Be)	mg/kg	With reference to US EPA 3052. Analysis was performed by ICP/AES	n.d.	2

Note: (1) mg/kg = ppm ; 0.1wt% = 1000ppm  
 (2) n.d.= Not Detected  
 (3) MDL = Method Detection Limit

Remarks: Sample received was totally dissolved by pre-conditioning method.  
 Lab Analyst(s): Pheng

Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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**Sample photo:**

Sample Description : Wafer

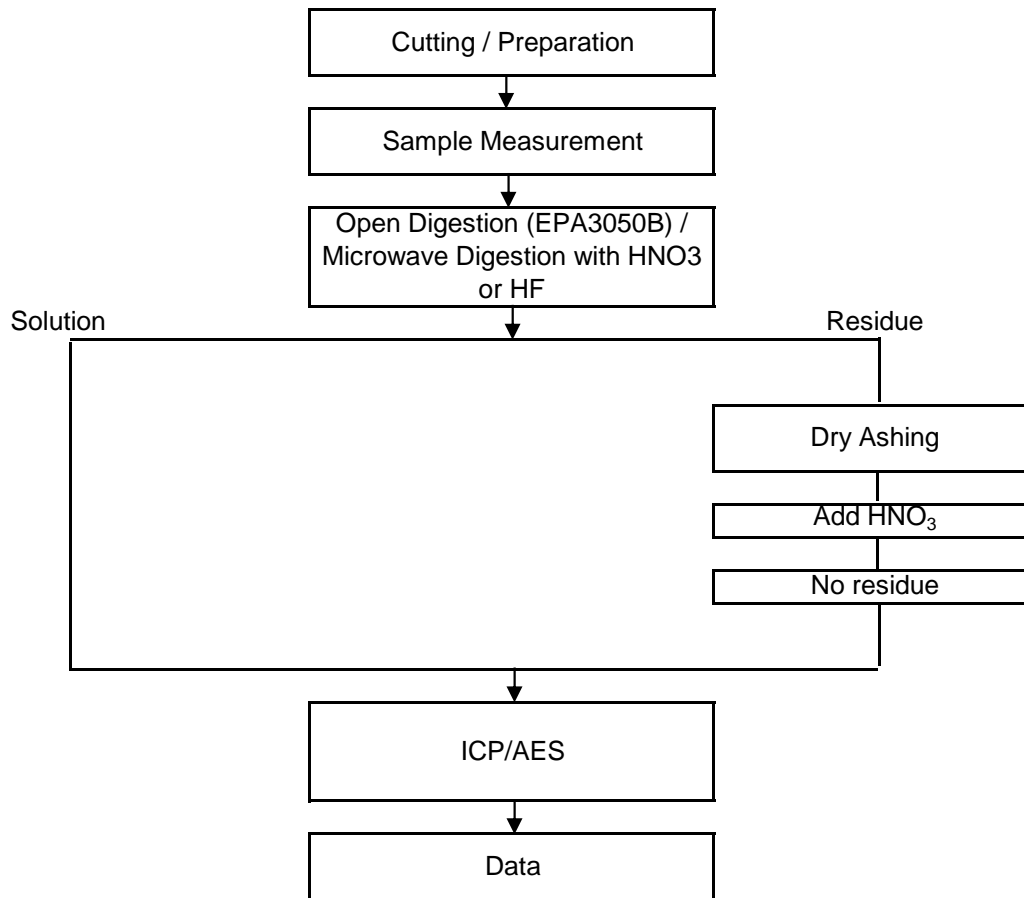
SGS authenticate the photo on original report only



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### Process Flow of US EPA 3050B/3051A/3052



\*\*\*End of Report\*\*\*

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## Test Report

No: 10502885(1d) R1

Date: 30-Nov-2020

Page 1 of 4

GLOBALFOUNDRIES Singapore Pte Ltd  
60 Woodlands Industrial Park D Street 2 Singapore 738406

### THIS REPORT IS TO SUPERSEDE TEST REPORT NO.: 10502885(1d) DATED 16-Oct-2020

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

Sample Name : One (1) 200mm die-patterned wafer  
Technode : 0.5um/0.6um  
Fab : 2

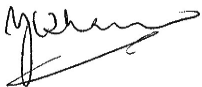
Sample Receiving Date : 12-Oct-2020  
Testing Period : 12-Oct-2020 to 16-Oct-2020

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

Signed for and on behalf of  
SGS Testing & Control Services Singapore Pte Ltd



Y.C. Tham  
Technical Manager, Multi-Lab



Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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**Test Report**

No: 10502885(1d) R1

Date: 30-Nov-2020

Page 2 of 4

**Test Result(s):**

Sample Description : Wafer

Test Item(s):	Unit	Method	Results	MDL
Antimony (Sb)	mg/kg	With reference to US EPA 3052. Analysis was performed by ICP/AES	n.d.	2

Note: (1) mg/kg = ppm ; 0.1wt% = 1000ppm  
 (2) n.d.= Not Detected  
 (3) MDL = Method Detection Limit

Remarks: Sample received was totally dissolved by pre-conditioning method.  
 Lab Analyst(s): Pheng

Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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**Sample photo:**

Sample Description : Wafer

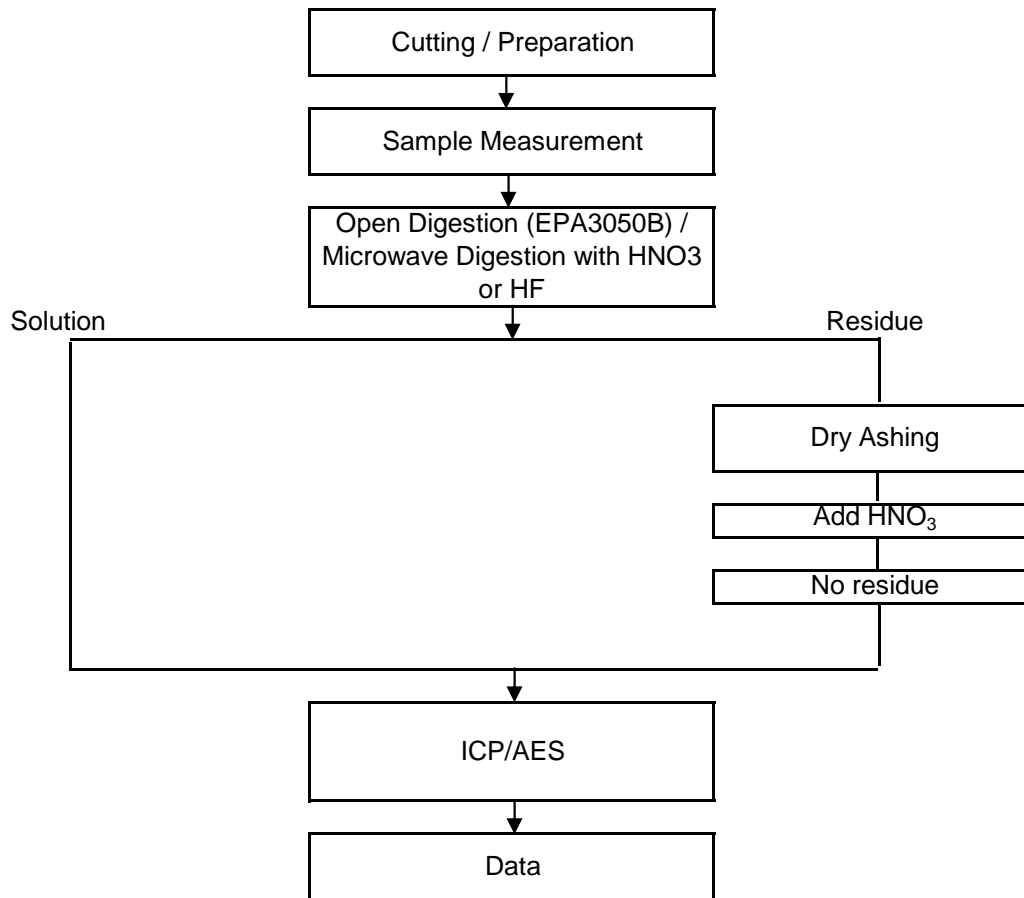
SGS authenticate the photo on original report only



Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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### Process Flow of US EPA 3050B/3051A/3052



\*\*\*End of Report\*\*\*

Test Location: 3 Toh Tuck Link, #01-02, Singapore 596228

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## Test Report

No: 10499111(1f)

Date: 19-Aug-2020

Page 1 of 4

GLOBALFOUNDRIES Singapore Pte Ltd  
60 Woodlands Industrial Park D Street 2 Singapore 738406

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

Sample Name : One (1) 200mm die-patterned wafer  
Fab : 2

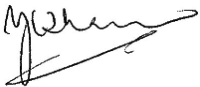
Sample Receiving Date : 07-Aug-2020  
Testing Period : 07-Aug-2020 to 19-Aug-2020

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

Signed for and on behalf of  
SGS Testing & Control Services Singapore Pte Ltd



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Y.C. Tham  
Laboratory Manager

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**Test Result(s):**

Sample Description : Wafer

*Test Item(s):	Unit	Method	Results	MDL
PFOA and its salts (CAS No.: 335-67-1 and its salts)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	n.d.	10

- Note:
- (1) mg/kg = ppm ; 0.1wt% = 1000ppm
  - (2) n.d.= Not Detected
  - (3) MDL = Method Detection Limit
  - (4) PFOA and its salts including CAS No.: 3825-26-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0.

**\* Tested by SGS lab (CE/2020/81849)**

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**Sample photo:**

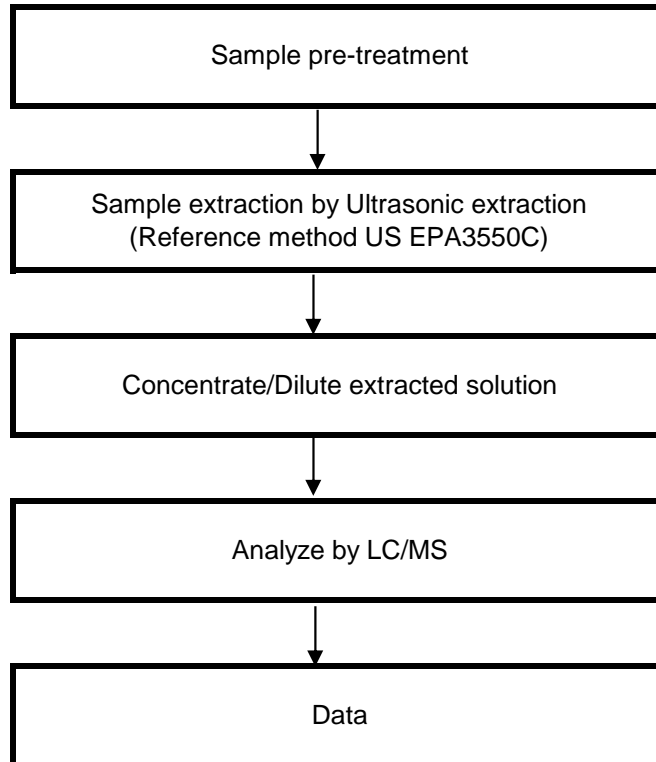
Sample Description : Wafer

SGS authenticate the photo on original report only



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### Process Flow of PFOA



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## Test Report

No: 10499111(1f)

Date: 19-Aug-2020

Page 1 of 4

GLOBALFOUNDRIES Singapore Pte Ltd  
60 Woodlands Industrial Park D Street 2 Singapore 738406

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

Sample Name : One (1) 200mm die-patterned wafer  
Fab : 2

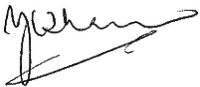
Sample Receiving Date : 07-Aug-2020  
Testing Period : 07-Aug-2020 to 19-Aug-2020

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

Signed for and on behalf of  
SGS Testing & Control Services Singapore Pte Ltd



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Y.C. Tham  
Laboratory Manager

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**Test Result(s):**

Sample Description : Wafer

*Test Item(s):	Unit	Method	Results	MDL
PFOS and its salts (CAS No.: 1763-23-1 and its salts)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	n.d.	10

- Note:
- (1) mg/kg = ppm ; 0.1wt% = 1000ppm
  - (2) n.d.= Not Detected
  - (3) MDL = Method Detection Limit
  - (4) PFOS and its salts including CAS No.: 29081-56-9, 2795-39-3, 29547-72-5, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7.

**\* Tested by SGS lab (CE/2020/81849)**

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**Sample photo:**

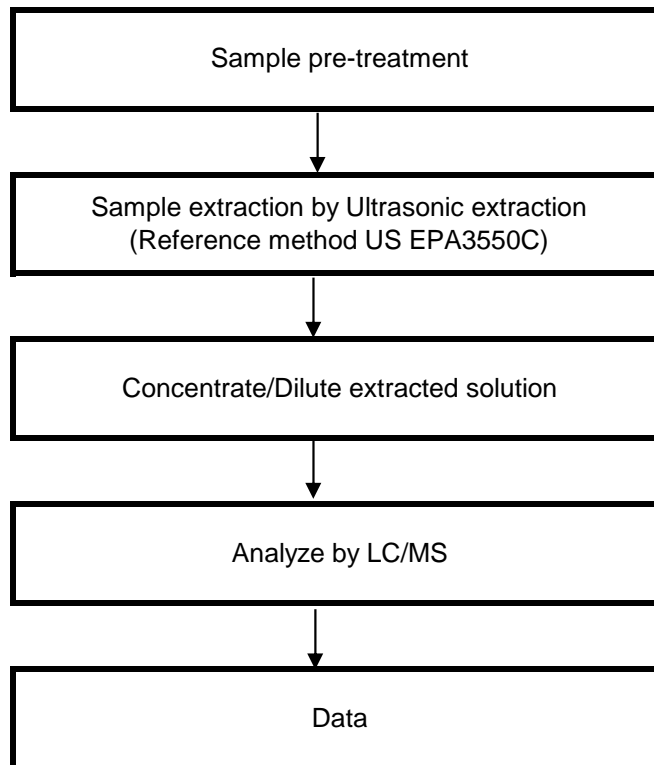
Sample Description : Wafer

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### Process Flow of PFOS



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