Restriction of Hazardous Substances (ROHS)

Summary Report

Test of:	150mm Processed Wafers
Model No.:	412101
Unique Identifier:	129095 Wafer 09
Applicant:	SemeFab Ltd.
Test Type:	XRF Scan
Test Specification:	EN 62321-1:2013 EN 62321-2:2014 EN 62321-3-1:2014
SGS Serial Number:	EMC253345/1B
Date of Receipt:	27th April 2018
Date of Test(s):	30th April 2018
Date of Issue:	8th May 2018
Issue Number:	1
Conclusion:	Based on the tests performed on submitted sample(s), the results show no conflict with the ROHS Directive 2011/65/EU and its subsequent amendments. See test results section of the report for details.

Signature

Test Engineer

Chris Levy

Signature

Authorised Signatory

Zee Ellahi

SGS United Kingdom Ltd 12a & 12b Bowburn South Industrial Estate Bowburn Durham DH6 5AD **t** +44 (0)191 377 2000 **f** +44 (0)191 377 2020 www.sgs.com

Member of the SGS Group (SGS SA)

Registered in England No. 1193985 Registered Office: Rossmore Business Park, Ellesmere Port, Cheshire CH65 3EN

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1. Client Information

Company Name:
SemeFab Ltd.

Main Address:
Newark Road South,
Eastfield Industrial Estate,
Glenrothes, Fife.
KY7 4NS
United Kingdom

Contact Person:
Stuart Small
Email:
Stuart.small@semefab.com
Phone:
+44 1592 630630

2. Test Location

All testing performed as part of this assessment was undertaken at the following location;

SGS United Kingdom Ltd
Units 12a and 12b Bowburn South Industrial Estate
Bowburn
Durham
DH6 5AD
United Kingdom

3. Test Specification(s) and Purpose

3.1 Test Specification(s)

Standard	Title
EN 62321-1:2013 EN 62321-2:2014 EN 62321-3-1:2014	Electro technical products. Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)

3.2 Purpose Of Test

The widespread use of electro technical products has drawn increased attention to their impact on the environment. The purpose of this test is to determine the levels of regulated substances Pb, Hg, Cd, Cr (VI) and their compounds, as well as PBB and PBDE in electro technical products on a consistent global basis.

4. Notes on Findings

When inconclusive levels are obtained this denotes that the element cannot be accurately measured due to the close proximity of a non-restricted element with similar fluorescence characteristics.

I/M denotes that insufficient material has been supplied to gain a useable measurement.

XRF scanning indicates total Bromine presence, and cannot determine the presence of PBB or PBDEs. Only wet chemical analysis can confirm the level and presence of PBB or PBDEs.

XRF scanning indicates total Chromium presence, and cannot isolate the presence of Chromium 6. Only wet chemical analysis can confirm the level and presence of Chromium 6.

The maximum permitted limits are quoted from ROHS directive 2011/65/EU

ROHS Restricted substances in Homogenous materials	Maximum permissible Limit (mg/kg)
Cadmium Cd	100
Lead Pb	1000
Mercury Hg	1000
Hexavalent Chromium (Cr VI)	1000
Polybrominated biphenyls (PBBs)	1000
Polybrominated diphenyl ethers (PBDE's)	1000

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5. Test Results

Sample No.	Sample Description	Results				
		Cd	Hg	Pb	Cr	Br
2	412101 129095 Wafer 09	BL	BL	BL	BL	BL

Note: BL = Below Limit
OL = Over Limit
X = Further investigation needed

All readings were below the limits. No further investigation needed.

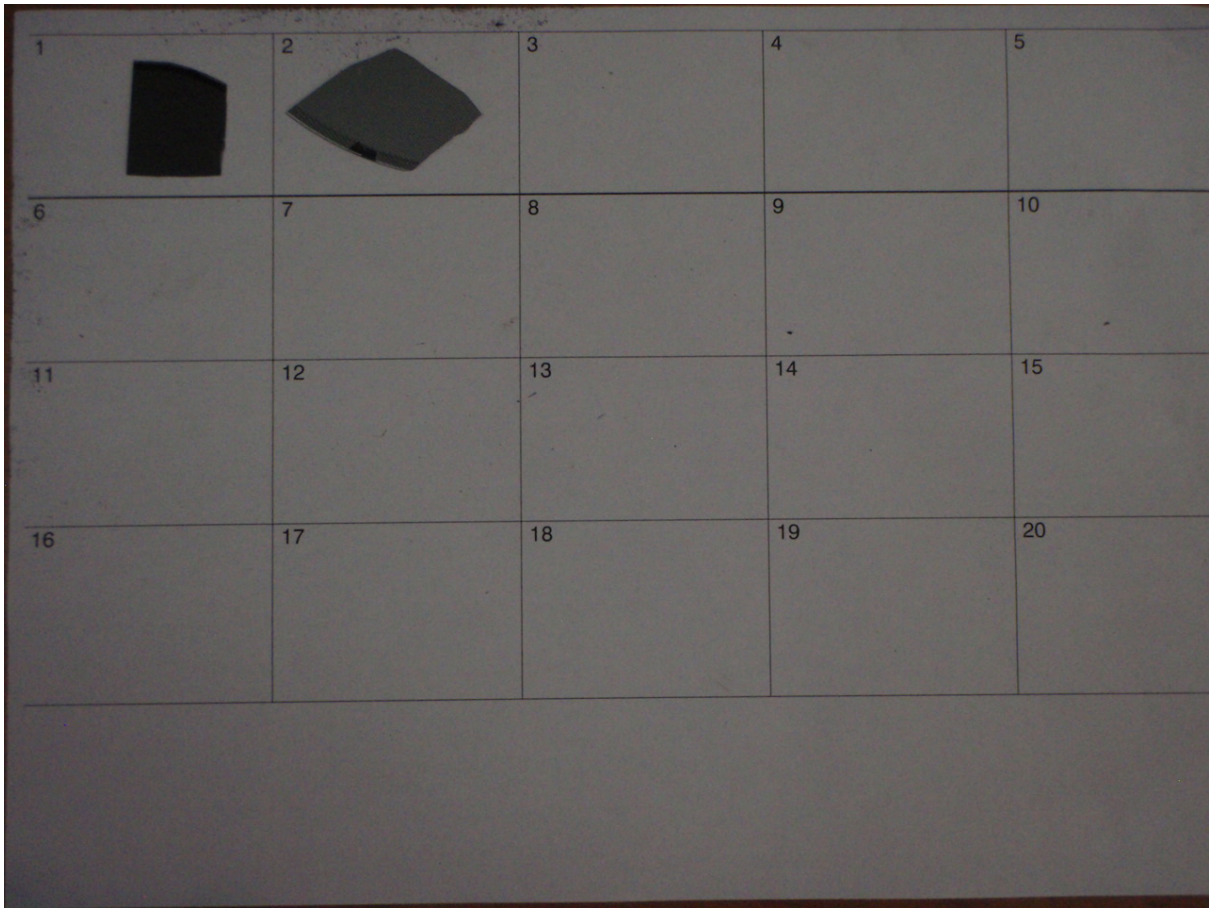
Screening limits in mg/kg for regulated elements

Element	Polymer Materials	Metallic Materials	Composite Material
Cd	BL ≤ (70-3σ) < X < (130+3σ) ≤ OL	BL ≤ (70-3σ) < X < (130+3σ) ≤ OL	LOD < X < (150+3σ) ≤ OL
Pb	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < X < (1500+3σ) ≤ OL
Hg	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < X < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < X < (1500+3σ) ≤ OL
Br	BL ≤ (300-3σ) < X	---	BL ≤ (250-3σ) < X
Cr	BL ≤ (700-3σ) < X	BL ≤ (700-3σ) < X	BL ≤ (500-3σ) < X

Notes:

BL/OL = A "BELOW LIMIT" (BL) or "OVER LIMIT" (OL) determination will be set at 30 % (50 % for composite materials) less than or greater than the limit, respectively.
X = the symbol "X" marks the region where further investigation is necessary.
LOD = Limit of Detection
σ = standard deviation

6 Photgraphs of Samples Tested



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End of Report