Test Report

No. CRSSA/08508/17 **Date : 12/07/2017**
CRS Ref. CRSSA/17/1742/CSC

CSC STEEL SDN BHD
180, KAWASAN INDUSTRI AYER KEROH, AYER KEROH
75450 MELAKA, MALAYSIA

The following merchandise was (were) submitted and identified by the client as:

Sample Description	:	realzinc™ Enhance
Sample Receiving Date	:	06/07/2017
Testing Period	:	06/07/2017 to 12/07/2017

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).
Analysts	:	Tan Mei Ann & Ling Yii Ming

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

Test results:

Test Part Description :

Sample Description : realzinc™ Enhance

RoHS Directive 2011/65/EU Annex II

Test Item(s):	Unit	Test Method	Results	MDL	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cd by ICP-OES)	N.D.	2	100
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Pb by ICP-OES)	N.D.	2	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Hg by ICP-OES)	N.D.	2	1000
Hexavalent Chromium (CrVI) #	$\mu g/cm^2$	With reference to IEC 62321-7-1:2015 (Determination of CrVI by UV-VIS)	N.D.	0.10	-
Sum of PBBs	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	-	1000
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)	N.D.	5	-

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

Sum of PBDEs	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	-	1000
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)	N.D.	5	-

Note :

(a) mg/kg = ppm ; 0.1wt% = 1000ppm

(b) N.D.= Not Detected

(c) MDL = Method Detection Limit

(d) # = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm^2. The sample coating is considered to contain CrVI
b. The sample is negative for CrVI if the CrVI concentration is less than 0.10 µg/cm^2. The coating is considered a non-CrVI based coating
c. The result between 0.10 µg/cm^2 and 0.13 µg/cm^2 is considered to be inconclusive - unavoidable coating variations may influence the determination
For corrosion protection coatings on metals: 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 represent status of the sample at the time of testing.

(e) - = not regulated

(f) The above test was conducted at SGS Shah Alam Seksyen 22

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

Test result:

Test Part Description :

Sample Description : realzinc™ Enhance

Optional: RoHS Directive 2011/65/EU, priority substances

Test Item(s):	Unit	Test Method	Results	MDL	Limit
Hexabromocyclododecane (HBCDD) (Cas#25637-99-4 & 3194-55-6)	mg/kg	Based on IEC 62321:2008 (Determination of HBCDD by GC-MS)	N.D.	10	-

Note:

(a) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromo-cyclododecane (HBCDD), Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

(b) - = not regulated

(c) N.D. = Not Detected

(d) The above test was conducted at SGS Shah Alam Seksyen 22

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

Test result:

Test Part Description :

Sample Description : realzinc™ Enhance

RoHS Directive 2011/65/EU Annex II (amended by Directive (EU) 2015/863)

Test Item(s):	Unit	Test Method	Results	MDL	Limit
Bis (2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7)	mg/kg	Based on EN 14372:2004 (Determination of DEHP by GC-MS)	N.D.	30	1000
Butyl benzyl phthalate (BBP) (CAS No. 85-68-7)	mg/kg	Based on EN 14372:2004 (Determination of BBP by GC-MS)	N.D.	30	1000
Dibutyl phthalate (DBP) (CAS No. 84-74-2)	mg/kg	Based on EN 14372:2004 (Determination of DBP by GC-MS)	N.D.	30	1000
Diisobutyl phthalate (DIBP) (CAS No. 84-69-5)	mg/kg	Based on EN 14372:2004 (Determination of DIBP by GC-MS)	N.D.	30	1000

Note : (a) mg/kg = ppm ; (0.1wt% = 1000ppm)
(b) N.D. = Not Detected
(c) MDL = Method Detection Limit
(d) - = Not regulated
(e) The above test was conducted at SGS Shah Alam Seksyen 22

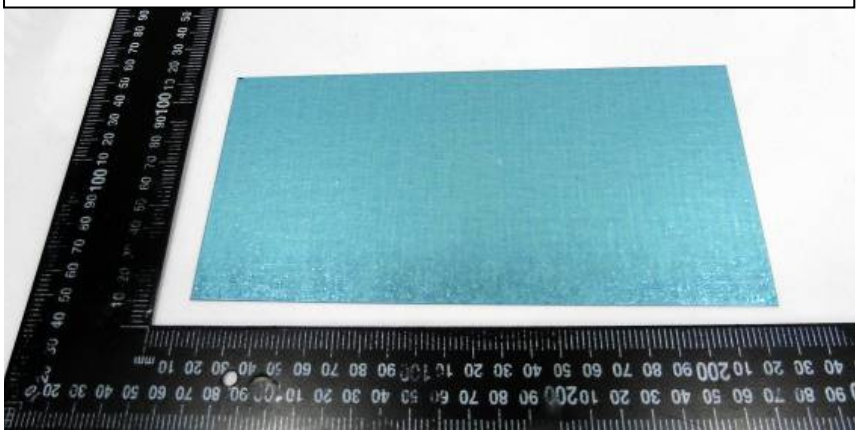
SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

Test Part Description :

Sample Description : realzinc™ Enhance

CSC STEEL SDN BHD
CRSSA/08508/17



SGS authenticate the photo on original report only

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321-5 2013

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

2. DETERMINATION OF LEAD CONTENT BY IEC 62321-5 2013

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

3. DETERMINATION OF MERCURY CONTENT BY IEC 62321-4 2013

Sample Receiving and Registration
↓
Cut sample in small pieces
↓
Weight sample (0.1-0.5g) into digestion vessel
↓
Acid digestion (Microwave)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

4. DETERMINATION OF HEXAVALENT CHROMIUM BY IEC 62321-7-1 2015

Sample Receiving and Registration
↓
Sample Preparation
↓
Boiling-water-extraction
↓
Analyses by UV- Spectrophotometer
↓
Test Report

5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321-6 2015

Cut sample in small pieces
↓
Weight sample (0.5-4.0g) into extraction thimble
↓
Soxhlet Extraction with Toluene
↓
Filter through 0.45 um membrane filter
↓
Analyses by GC-MS (with appropriate dilution)

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

DETERMINATION OF HBCDD CONTENT

Cut sample in small pieces

↓

Weight sample (0.5-4.0g) into extraction thimble

↓

Soxhlet Extraction with Toluene

↓

Filter through 0.45 um membrane filter

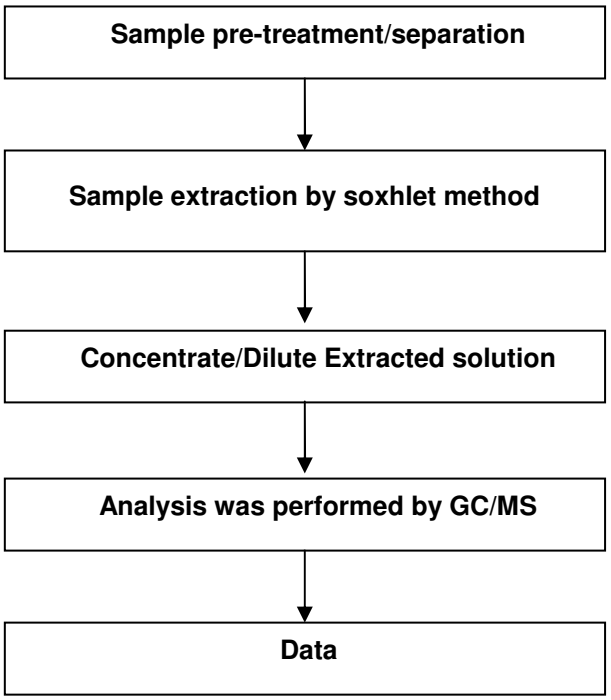
↓

Analyses by GC-MS (with appropriate dilution)

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER

Analytical flow chart of Phthalates Content



**** End of Report ****

SGS (MALAYSIA) SDN. BHD.

TAY SIAM PINE
B.Sc.(HONS) MMIC
TECHNICAL MANAGER