

Test Report No. Date: 18-Mar-2020 Page 1 of 18 4544143

Client: Henkel (Thailand) Ltd.

The Offices at Centralworld, 35th Floor, 999/9 Rama 1 Rd.

Pathumwan Bangkok 10330 Thailand

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

Sample Name : 8200T Sample Description : Adhesive

Manufacturer/Vendor : Henkel Corporate

Country of Origin : KOREA

The following sample(s) was/were identified by SGS as:

: 4710920 SGS Sample No.

: As per attached photograph. Sample Condition

Quantity Submitted : 2 pcs

Sample Receiving Date: 11-Mar-2020

Testing Period : 12-Mar-2020 to 18-Mar-2020

: In accordance with the RoHS Directive 2011/65/EU (Annex II) [amended by Directive Test Requested

(EU) 2015/863] .Selected test (s) as requested by client.

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Test Method

- : (1) IEC 62321-5 edition 1.0 : 2013 for Lead content, Analyzed by ICP-OES. Microwave digestion method
 - (2) IEC 62321-5 edition 1.0 : 2013 for Cadmium content, Analyzed by ICP-OES. Microwave digestion method
 - (3) IEC 62321-4 ,edition 1.1 : 2017 for Mercury Content, Analyzed by ICP-OES. Microwave digestion method
 - (4) IEC 62321-7-2 edition 1.0 : 2017, determination of Hexavalent Chromium For Insoluble polymer by Colorimetric Method using UV-Vis. and/or with reference to IEC 62321-5:2013, determination of Chromium by ICP-OES.
 - (5) IEC 62321-6 edition 1.0: 2015 for PBBs/PBDEs content, Analyzed by GC/MS.
 - (6) IEC 62321-8,Edition 1.0,2017 for Phthalates content, Analyzed was performed by GC/MS.
 - (7) Hexabromocyclododecane (HBCDD) With reference to IEC62321
 - (8) Perfluorooctane Sulfonates (PFOS) With reference to CEN/TS 15968 : 2010 Analyzed by LC/MS. Follow Global SOP : RSTS-CHEM-219-1
 - (9) Perfluorooctanoic acid (PFOA) With reference to CEN/TS 15968 : 2010 Analyzed by LC/MS. Follow Global SOP : RSTS-CHEM-219-1
 - (10) With reference to US EPA 3052 with ICP-OES
 - (11) With reference to US EPA 3052 with ICP-OES
 - (12) With reference to US EPA 3052 with ICP-OES

Test Results

: Please refer to next page.

CONCLUSION

Based on the performed tests on submitted sample(s), the results of Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent chromium (Cr-VI), Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) comply with 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 (Thailand) Limited



Patcharee Treeporncharoen Laboratory manager - Chemical

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Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Lead (Pb)	(1)	n.d.	2	1000
Cadmium (Cd)	(2)	n.d.	2	100
Mercury (Hg)	(3)	n.d.	2	1000
Hexavalent Chromium (Cr(VI))	(4)	n.d.	8	1000

Test Part Description Result (1) gray adhesive

Note:

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

(b) n.d. = Not Detected (<MDL)

(c) MDL = Method Detection Limit

(d) Test done on client submitted sample

(e) The result of Hexavalent Chromium (Cr(VI)) is "ND" as the result of Chromium (Cr) is "ND", and confirmation test of Hexavalent Chromium (Cr(VI)) is not required.

(f) If the Chromium (Cr) content is greater than the MDL of Hexavalent Chromium (Cr(VI)), confirmation test of Hexavalent Chromium (Cr(VI)) is required.

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Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Sum of PBBs	(5)	n.d.	-	1000
Monobromobiphenyl		n.d.	5	-
Dibromobiphenyl		n.d.	5	-
Tribromobiphenyl		n.d.	5	-
Tetrabromobiphenyl		n.d.	5	-
Pentabromobiphenyl		n.d.	5	-
Hexabromobiphenyl		n.d.	5	-
Heptabromobiphenyl		n.d.	5	-
Octabromobiphenyl		n.d.	5	-
Nonabromobiphenyl		n.d.	5	-
Decabromobiphenyl		n.d.	5	-

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Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Sum of PBDEs	(5)	n.d.	-	1000
Monobromodiphenyl ether		n.d.	5	-
Dibromodiphenyl ether		n.d.	5	-
Tribromodiphenyl ether		n.d.	5	-
Tetrabromodiphenyl ether		n.d.	5	-
Pentabromodiphenyl ether		n.d.	5	-
Hexabromodiphenyl ether		n.d.	5	-
Heptabromodiphenyl ether		n.d.	5	-
Octabromodiphenyl ether		n.d.	5	-
Nonabromodiphenyl ether		n.d.	5	-
Decabromodiphenyl ether		n.d.	5	

Test Part Description Result (1) gray adhesive

- (a) mg/kg = ppm; 0.1 wt% = 1000 ppm
- (b) n.d. = Not Detected
- (c) MDL = Method Detection Limit
- (d) "-" = Not regulated
- (e) Test done on client submitted sample

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As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine DBP, BBP, DEHP, DIBP contents in the submitted sample. Analysis was performed by GC/MS.

Test item (s) :	Method (Refer to 6)	Result (1) (mg/kg)	MDL (mg/kg)	RoHS Limit (mg/kg)
DBP (Di-butyl phthalate) (CAS No.: 84-74-2)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000
BBP (Benzyl butyl phthalate) (CAS No.: 85-68-7)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000
DEHP (Di-2-ethylhexyl phthalate) (CAS No.: 117-81-7)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	-
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	-
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	-

Note:

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) Result (1) gray adhesive

(e) Test done on client submitted sample

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TEST RESULTS

Test Item (s):	Method (Refer to)	Unit	MDL	Result (1)
Hexabromocyclododecane (HBCDD)	(7)	mg/kg	10	n.d.

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Note:

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) Result (1) gray adhesive

(e) Test done on client submitted sample

Test Item (s):	Method (Refer to 8)	Instrument	Unit	MDL	Result (1)
Perfluorooctane Sulfonates (^ PFOS)	With reference to CEN/TS 15968	LC-MS	mg/kg	10	n.d.

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) Result (1) gray adhesive

^ PFOS refer to Perfluoroctanesulfonic acid and its derivatives including Perfluoroctanesulfonic acid, Perfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamide, N-Ethylperfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamidoethanol and N-Ethylperfluoroctane sulfonamidoethanol

Test Item (s):	Method (Refer to 9)	Instrument	Unit	MDL	Result (1)
Perfluorooctanoic acid (PFOA)	With reference to CEN/TS 15968	LC-MS	mg/kg	10	n.d.

Note:

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) Result (1) gray adhesive

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Analysis	Method (Refer to 10)	Instrument	Unit	MDL	Result (1)
Antimony (Sb)	With reference to US EPA 3052	ICP- OES	ppm	2	n.d.

Note:

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) Result (1) gray adhesive

(e) Test done on client submitted sample

Analysis	Method (Refer to 11)	Instrument	Unit	MDL	Result(1
Beryllium (Be)	With reference to US EPA 3052	ICP-OES	ppm	2	n.d.

Note:

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) Result (1) gray adhesive

(e) Test done on client submitted sample

Analysis	Method (Refer to 12)	Instrument	Unit	MDL	Result(1)
Phosphorus content	With reference to US EPA 3052	ICP- OES	ppm	2	n.d.

Note:

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

(b) n.d. = Not Detected

(c) MDL = Method Detection Limit

(d) Result (1) gray adhesive

(e) Test done on client submitted sample

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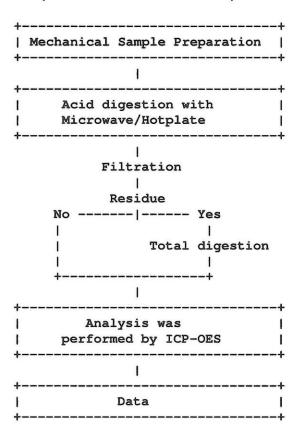
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Flow chart of Pb, Cd, Hg Testing

(Test method : IEC 62321)



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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

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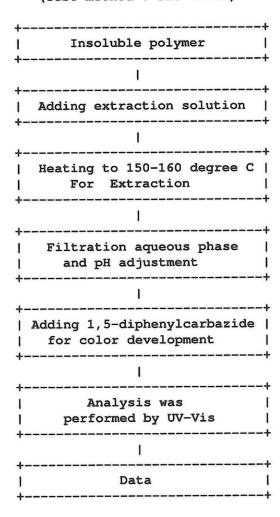
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Flow chart of Hexavalent Chromium Testing

(Test method : IEC 62321)



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Flow chart of PBBs, PBDEs Testing

(Test method: IEC 62321)

+	
1	Sample pretreatment/separation
T.	l
1	Sample solvent extraction by Toluene
+-	
	Concentrate/Dilution of extracted solution
Τ.	ı
 -	Filtration
Τ.	ı
 -	Analysis was performed by GC/MS
٠.	
	Data
T-	

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Flow chart of Phthalates Analysis

(Test method : IEC 62321-8)
++
Sample pretreatment/
separation
++
1
++
Sample dissolved/
extraction by Hexane
++
1
++
Dilution
extracted solution
++
1
++
Analysis was
performed by GC/MS
++
Ì
++
Data
++

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Flow chart of HBCDD Analysis

++
Sample pretreatment
++
Sample extraction by
Soxhlet extraction
I
++
Concentrate/Dilute
extract Solution
++
1
++
Filter
++
Į.
++
Analysis was
performed by GC/MS
++
I.
++
Data
++

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> Flow chart of PFOS Analysis Sample pretreatment | 1 | Sample extraction by | untrasonic method | concentrate/Dilution | extracted solution | 1 Analysis was | performed by LC/MS 1 ------Data

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> Flow chart of PFOA Analysis Sample pretreatment | Sample extraction by | | untrasonic method | concentrate/Dilution | extracted solution | 1 Analysis was performed by LC/MS | Data

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Flow chart of digestion for the element analysis performed by ICP-OES

```
Cutting/Preparation
                Sample Measurement
       Acid digestion/Microwave digestion
by suitable acid depended on different sample material
                 (as below table)
             +----Filtration----+
         Solution
                               Residue
                           1) Alkali Fusion
            1
                           2) HCl to dissove
```

ICP-OES

1	L
Steel, copper, aluminum, solder	Aqua regia, HNO3, HC1, HF, H2O2
Glass	HNO3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO3
Plastic	H2SO4, H2O2, HNO3, HC1
Others	Any acid to tatal digestion
T	гт

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SAMPLE/ATTACHMENT PICTURE



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Client: Henkel (Thailand) Ltd.

The Offices at Centralworld,35th Floor,999/9 Rama 1 Rd.

Pathumwan Bangkok 10330 Thailand

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

Sample Name : 8200T Sample Description : Adhesive

Manufacturer/Vendor : Henkel Corporate

Country of Origin : KOREA

The following sample(s) was/were identified by SGS as:

SGS Sample No. : 4718532

Sample Condition : As per attached photograph.

Quantity Submitted : 2 pcs

Sample Receiving Date : 18-Mar-2020

Testing Period : 18-Mar-2020 to 19-Mar-2020

Test Method & Results : Please refer to next page(s).

Signed for and on behalf of SGS (Thailand) Limited

Patcharee T.

Patcharee Treeporncharoen Laboratory manager - Chemical

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Analysis	Method	Instrument	Unit	MDL	Result (1)
Halogen	-	-	Ψ)	-	-
Halogen-Fluorine (F) (CAS No.14762-94-8)	In-house method LBCH-08482 based on BS EN 14582 : 2016	Analyzed was performed by Ion Chromatography	mg/kg	50	116
Halogen -Chlorine (CI) (CAS No.22537-15-1)	In-house method LBCH-08482 based on BS EN 14582 : 2016	Analyzed was performed by Ion Chromatography	mg/kg	50	n.d.
Halogen -Bromine (Br) (CAS No.10097-32-2)	In-house method LBCH-08482 based on BS EN 14582 : 2016	Analyzed was performed by Ion Chromatography	mg/kg	50	n.d.
Halogen-Iodine (I) (CAS No.14362-44-8)	In-house method LBCH-08482 based on BS EN 14582 : 2016	Analyzed was performed by Ion Chromatography	mg/kg	50	n.d.

Notes:

- (a) mg/kg = ppm
- (b) n.d. = not detected
- (c) MDL = Method detection limit
- (d) Test done on client submitted sample
- (e) Result (1) gray adhesive

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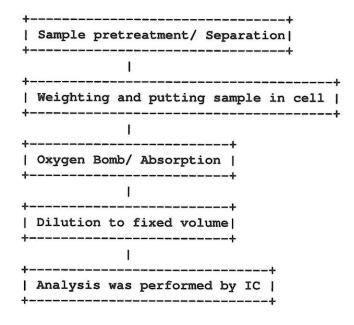
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Analytical flow chart of halogen content



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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

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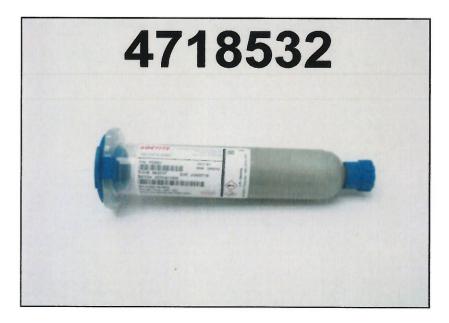


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