

To:ASE KOREA, Inc.

Analysis Report

We provide the information of analytical results for Shin-Etsu Product X-71-8136A
Please see to the attachment.

Your kind consideration and arrangements will be greatly appreciated.


Satoshi Onishi
General Manager
Special Functional Products Dept.
Shin-Etsu Chemical Co., Ltd.

Test Report

No: 10571324(1)

Date: 14-Nov-2023

Page 1 of 7

Shin-Etsu Chemical Co., Ltd.
2-13-1 Isobe Annaka Gunma 379-0195 Japan

Sample Name : X-71-8136A, 305051, Perfluoropolyetherpolymer

The above sample(s) and information were provided by the client.

Sample Receiving Date : 03-Nov-2023
Testing Period : 03-Nov-2023 to 14-Nov-2023

Test Requested : Selected test(s) as requested by client.

Test Method : Please refer to next page(s)

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

Conclusion : Based on the performed tests on submitted sample(s), the results of Cadmium, Lead, Mercury, Hexavalent chromium, 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 Testing & Control Services Singapore Pte Ltd



Y.C. Tham
Technical Manager, Multi-Lab

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Test Result(s):

Sample Description : Colorless liquid

Test Item(s):	Unit	Method	Results	MDL	RoHS Limit
Cadmium(Cd)	mg/kg	With reference to IEC62321-5 :2013. Analysis was performed by ICP/OES	n.d.	2	100
Lead (Pb)	mg/kg	With reference to IEC62321-5 :2013. Analysis was performed by ICP/OES	n.d.	2	1000
Mercury (Hg)	mg/kg	With reference to IEC62321-4 :2013+A1:2017. Analysis was performed by ICP/OES	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
Sum of PBBs	mg/kg	With reference to IEC62321-6 :2015. Analysis was performed by GC/MS	n.d.	-	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	-
Sum of PBDEs	mg/kg		n.d.	-	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	-	

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Test Result(s):

Sample Description : Colorless liquid

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) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (7) IEC 62321 series is equivalent to EN 62321 series.

https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

Remarks: Sample received was totally dissolved by preconditioning method.

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule ($w=0$) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.

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Sample photo:

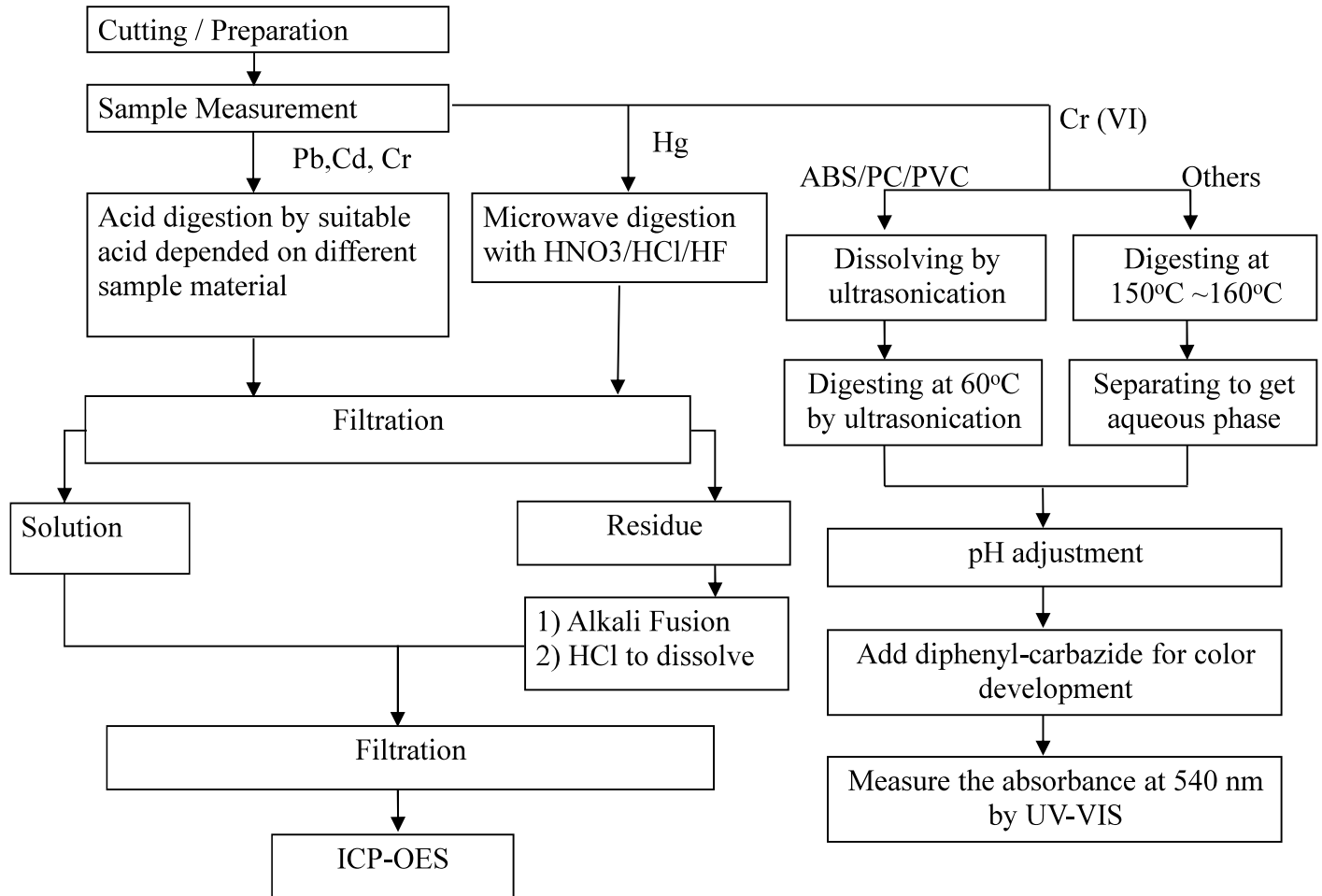
Sample Description : Colorless liquid

SGS authenticate the photo on original report only



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

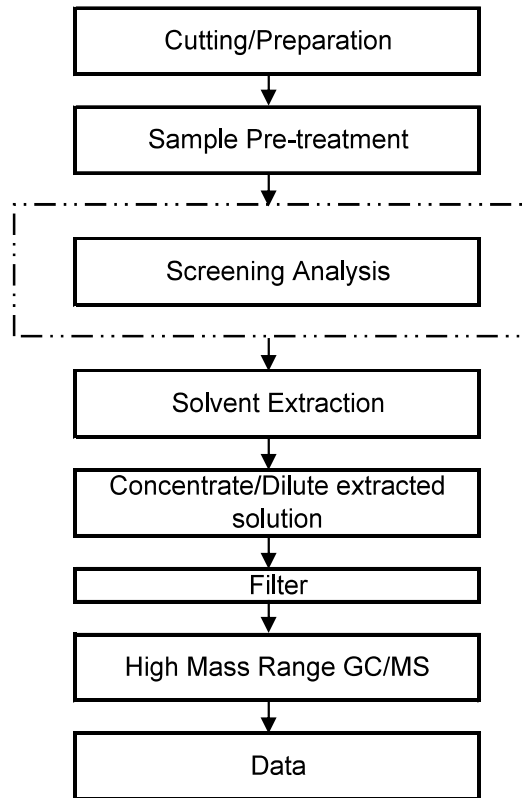


Remarks: Sample received was totally dissolved by preconditioning method. (CrVI method excluded)

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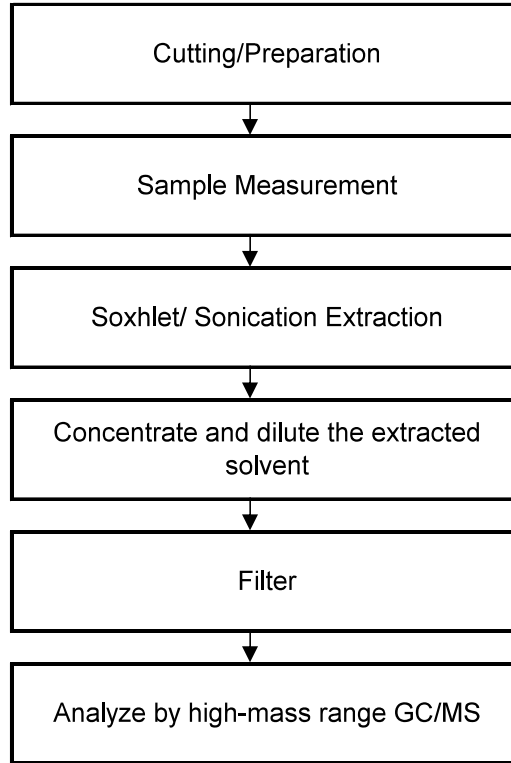
Process Flow of PBBs and PBDEs by GC/MS (IEC 62321)

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



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Process Flow of Phthalate by GC/MS (IEC 62321)



End of Report

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Test Report

No: 10571324(1a)

Date: 14-Nov-2023

Page 1 of 8

Shin-Etsu Chemical Co., Ltd.
2-13-1 Isobe Annaka Gunma 379-0195 Japan

Sample Name : X-71-8136A, 305051, Perfluoropolyetherpolymer

The above sample(s) and information were provided by the client.

Sample Receiving Date : 03-Nov-2023
Testing Period : 03-Nov-2023 to 14-Nov-2023
Test Requested : (1) As specified by client, to test Halogen- Chlorine, Bromine and Iodine
(2) As specified by client, to test Antimony (Sb)
(3) As specified by client, to test Beryllium (Be)
(3) As specified by client, to test PFOA, PFOS
Test Method : Please refer to next page(s)
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

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Test Result(s):

Sample Description : Colorless liquid

Test Item(s):	Unit	Method	Results	MDL
Halogen				
Halogen - Chlorine (Cl)	mg/kg	With reference to BS EN 14582. Analysis was performed by IC	n.d.	50
Halogen - Bromine (Br)	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
Antimony (Sb)				
Antimony (Sb)	mg/kg	With reference to US EPA 3052. Analysis was performed by ICP/OES	n.d.	2
Beryllium (Be)				
Beryllium (Be)	mg/kg	With reference to US EPA 3052. Analysis was performed by ICP/OES	n.d.	2
PFOS and its salts* (CAS No.: 1763-23-1 and its salts)				
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/MS	n.d.	10
PFOA and its salts* (CAS No.: 335-67-1 and its salts)				
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/MS	n.d.	10

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

*** Tested by SGS Lab (Ref: ETR23B00901)**

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PFAS Remark :

The quantitative technology of PFAS is to analyze the specific structure of PFAS substances. However, PFAS acid and its salts with the same carbon number group have the same specific structure that can be identified. The tested results of the analyzed specific structure cannot be distinguished to identify the contribution from PFAS acid or its salts. Therefore, the tested results display the sum of concentrations of PFAS acids and its salts with the same carbon number group. The concentration of PFAS substances in the below table have been included in the tested results, please refer to the table for relevant information: (The listed PFAS substances are examples only, it does not include all PFAS salts with the same carbon number group.)

Classification of Substance Concentration	Substance Name	CAS No.
Perfluorooctane sulfonates and its salts (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	Potassium perfluorooctanesulfonate (PFOS-K)	2795-39-3
	Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	29457-72-5
	Perfluorooctanesulfonic acid, ammonium salt (PFOS- NH ₄)	29081-56-9
	Perfluorooctane sulfonate diethanolamine salt (PFOS-NH(OH) ₂)	70225-14-8
	Perfluorooctanesulfonic acid, tetraethylammonium salt (PFOS-N(C ₂ H ₅) ₄)	56773-42-3
	N-decyl-N,N-dimethyldecyl-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptafluorooctane-1-sulfonate (PFOS-DDA)	251099-16-8
	Perfluorooctane sulfonyl fluoride (POSF)	307-35-7
	Perfluorooctanesulfonic acid, magnesium salt (PFOS- Mg)	91036-71-4
	Perfluorooctanesulfonic acid, sodium salt (PFOS-Na)	4021-47-0
Perfluorooctanoic acid and its salts (PFOA and its salts) (CAS No.: 335-67-1 and its salts)	Sodium perfluorooctanoate (PFOA-Na)	335-95-5
	Potassium perfluorooctanoate (PFOA-K)	2395-00-8
	Silver perfluorooctanoate (PFOA-Ag)	335-93-3
	Perfluorooctanoyl fluoride (PFOA-F)	335-66-0
	Ammonium pentafluorooctanoate (APFO)	3825-26-1
	Lithium perfluorooctanoate (PFOA-Li)	17125-58-5

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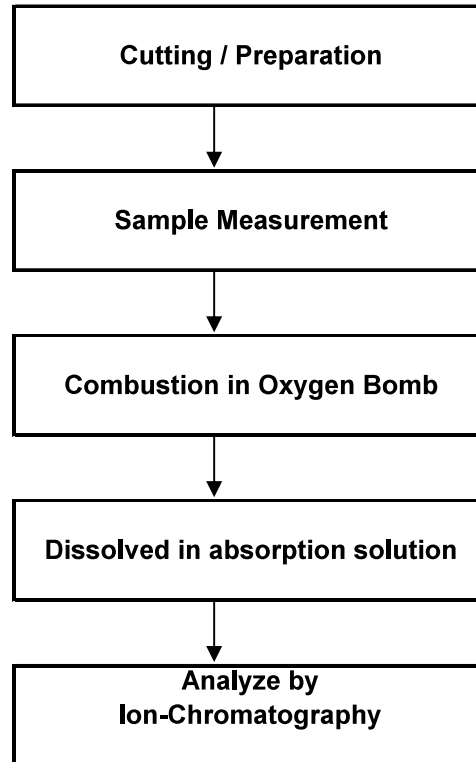
Sample Description : Colorless liquid

SGS authenticate the photo on original report only



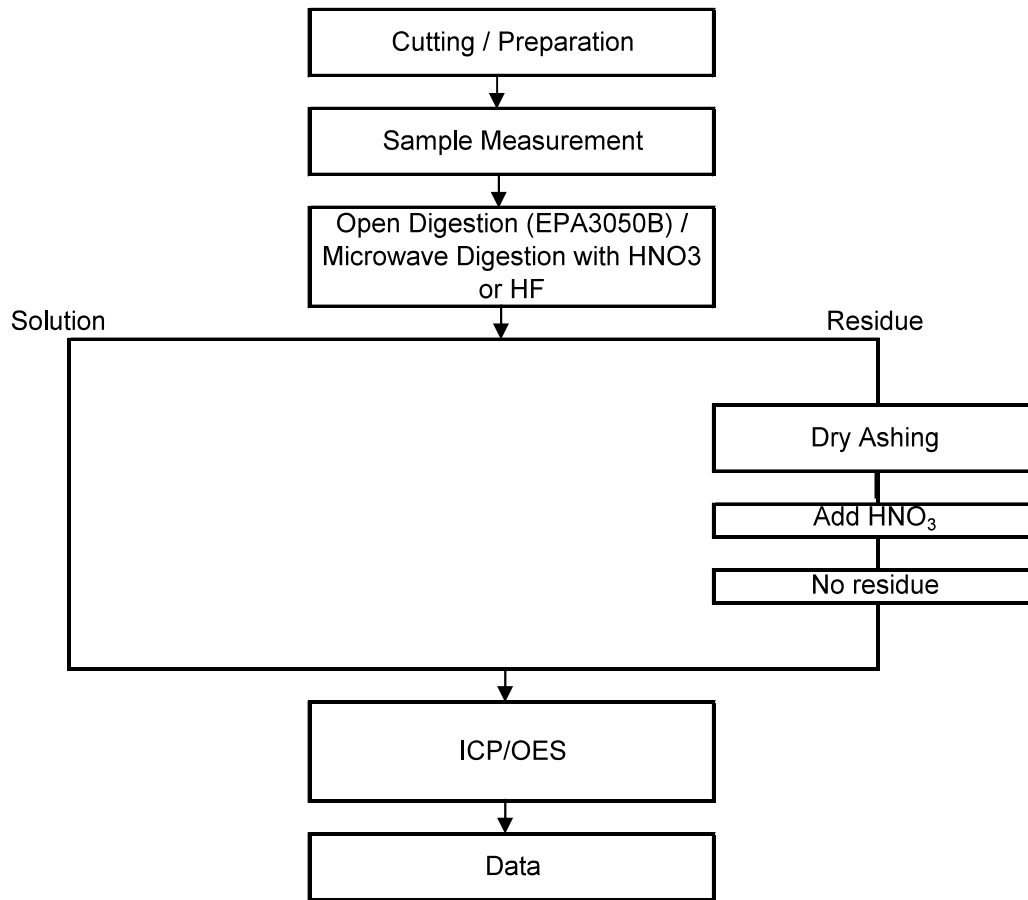
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Process Flow of BS EN 14582 (Halogen Analysis)



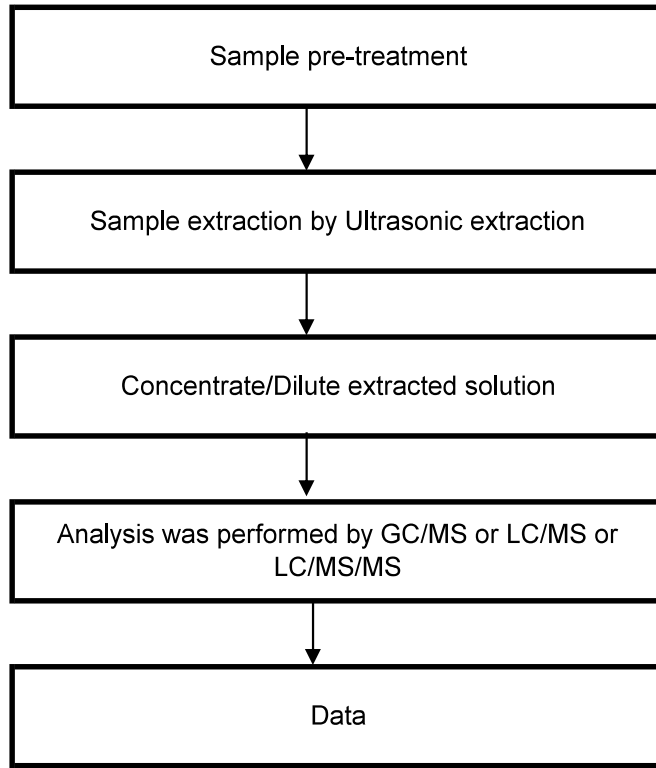
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Process Flow of US EPA 3050B/3051A/3052



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Process Flow of PFAS (including PFOS/PFOA/its related compounds, etc.)



End of Report

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